ESTIMATIONS OF UNDISTURBED GROUND TEMPERATURES USING NUMERICAL AND ANALYTICAL MODELING

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ESTIMATIONS OF UNDISTURBED GROUND

TEMPERATURES USING NUMERICAL AND

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Abstract: The interaction of buildings and ground source heat pump systems with the surrounding ground is quite important for design and energy calculation procedures. Building design load calculations, building energy calculations, ground heat exchangers design and design and energy analyses of district heating and cooling systems often require as inputs the undisturbed ground temperatures.

Currently, the available undisturbed ground temperatures are rather limited. In the U.S., the ground temperatures are usually represented with a three-parameter one-harmonic model. The model parameters for the continental US or North America are presented in maps in the ASHRAE handbooks. The results presentation in small maps can be quite difficult to read for a specific location. Furthermore, the sources of some results are unknown, and where the source is known, the results were published more than half a century ago. ASHRAE district heating manual also published a world-wide data set presented in one-harmonic model with model parameters presented in tables. However, the data are computed based on a simplified approximation that the ground surface temperature is equal to the air temperature; this approximation can lead to significant error in the cold climates and arid climates.

Therefore, the main objective of this research is to provide a new set of ground temperature estimates for use by engineers. A numerical model and a simplified design model have been developed for the estimations of the typical year ground temperature and maximum/minimum ground temperatures of multiple years. Both models have been validated against the experimental results. The validated numerical model will be run with 1020 TMY3 weather files in the U.S., 80 CWEC weather files in Canada and 3012 IWEC-2 weather files around the world. The simplified design model relies on empirical parameters to estimate the ground temperatures. Therefore, the numerical model results will be used to generate parameters for the design model. Two sets of ground temperature estimates approximated for with two different earth surface conditions will be developed; these two earth surface conditions are short grass, tall grass. These ground temperatures are presented in a two-harmonic form using parameters estimated from the numerical model results.

TABLE OF CONTENTS

Chapter Page

LIST OF TABLES

Table Page

Table Page

Table Page

LIST OF FIGURES

Figure Page

Figure Page

Figure Page

CHAPTER I

INTRODUCTION

The interaction of buildings and ground source heat pump systems with the surrounding ground is quite important for design and energy calculation procedures. Building design load calculations, building energy calculations, ground heat exchangers design and design and energy analyses of district heating and cooling systems often require as inputs the undisturbed ground temperatures. These include:

- Design load calculations for both residential and non-residential cooling and heating load calculations. For design purposes, the basement wall and floor heat loss is estimated using an estimate of the minimum ground surface temperature, which could be determined from:
    - the annual average ground temperature
    - the ground temperature amplitude
- Building energy calculation procedures. The annual-mean slab foundation and basement heat loss/gain is currently estimated using an annual average ambient temperature and an annual amplitude.
- Design of vertical ground heat exchangers used in the ground source heat pump systems. Vertical ground heat exchangers are deep enough that annual transients in the undisturbed

ground temperature are relatively unimportant, so a single value - annual average undisturbed ground temperature may be used as a design condition. This value can be measured if a test borehole is drilled.

- Design of horizontal ground heat exchangers used in the ground source heat pump systems. Horizontal ground heat exchangers are relatively shallow so that annual transients in the undisturbed ground temperature are very important. A single temperature profile would not be adequate for this. A more accurate procedure - simple harmonic model for predicting undisturbed ground temperatures as a function of depth and time of year is usually used. This procedure mainly relies on three parameters: annual average ground temperature, annual amplitude of ground temperature at the surface and phase angle. More details about this procedure will be introduced in the following part and in Section 2.2.1.
- Design and energy analysis of district heating and cooling systems. Estimates of ground temperature are needed for calculation of heat loss and gain through the pipes which distribute thermal energy from a central source to buildings. The district heating pipes are usually buried at relatively shallow depths so that annual transients in the undisturbed ground temperature are very important. So a similar procedure as used for design of horizontal ground heat exchanger is commonly used.

The simple design and analysis procedures mentioned above rely on ground temperatures as inputs. Likewise, more sophisticated analyses like numerical simulations still rely on undisturbed ground temperatures for initial conditions and boundary conditions.

Lord Kelvin presented a higher order harmonic model (Thomson 1862) to estimate the ground temperatures, as shown in Equation 1-1:

$$T_s(z,t) = T_{s,avg} - \sum_{n=1}^{\infty} e^{-z\sqrt{\frac{n\pi}{\alpha_s t_p}}} T_{s,amplitude,n}\, cos\left[\frac{2\pi n}{t_p}(t - PL_n) - z\sqrt{\frac{n\pi}{\alpha_s t_p}}\right] \qquad (1-1)$$

Where:

$T_s(z,t)$ is the undisturbed soil temperature at the depth of z and time t of the year , in °C or °F;

z is the soil depth, in m or ft;

t is the time of year, starting from January 1st, in days;

t_p is the period of soil temperature cycle (365), in days;

α_s is the soil diffusivity, in m^2/day or ft^2/day;

$T_{s,avg}$ is the annual average soil temperature of different depth and time, in °C or °F;

$T_{s,amplitude,n}$ is the n^{th} order surface amplitude, which can be assume to be half of the difference between the maximum and minimum monthly average temperature

The results of the equation depends on three types of model parameters, which are annual average ground temperature $T_{s,avg}$, annual amplitude of ground temperature at the surface $T_{s,amplitude,n}$ and the phase angle PL_n. In Equation 1, when n = 1, it becomes a simple harmonic form which is commonly used in the U.S. for the estimations of ground temperatures for engineering applications. This one-harmonic model is at first proposed by Fourier (1822, as cited by Narasimhan 2010). The annual average undisturbed ground temperature $T_{s,avg}$and annual amplitude of surface temperature variation $T_{s,amplitude,1}$ can be read from very small maps for the continental US as Figure 17 of Chapter 34 of the ASHRAE Handbook - HVAC Applications (2011) or North America as Figure 13 of Chapter 18 of the ASHRAE Handbook - Fundamentals (2013a). These maps can be traced back to research in the 1920s (Collins 1925) and 1950s (Chang 1958). Collins (1925) developed a map for US. based on average annual air temperature, assuming the well water temperatures at the depths of 30-60 ft (annual average ground temperature) would be equivalent to average annual air temperatures. Chang (1958) presents the temperature ranges (twice the amplitude) worldwide at 10 cm (4") depth. This map is derived based on measured results at only 10 sites worldwide. The phase angle term set the number of days after the beginning of the year when the minimum soil temperature at the ground surface occurs. Kusuda and Achenbach (1965) fitted this parameter for 28 locations, based on air temperatures during 1931-1960 in the continental US, and came up with values between 0.55 and 0.65 radians. This is equivalent to a range between 32 and 38 days.

ASHRAE (2013b) published a district heating guide which suggests using the one-harmonic model and three constants annual average ground temperature $T_{s,avg}$, annual amplitude of ground temperature at the surface $T_{s,amplitude,1}$ and the phase angle PL'_1 to estimate the undisturbed ground temperatures, as shown in Equation 1-2:

$$T_s(z,t) = T_{s,avg} + e^{-z\sqrt{\frac{\pi}{\alpha_s t_p}}} T_{s,amplitude,1} sin\left[\frac{2\pi}{t_p}(t - PL'_1) - z\sqrt{\frac{\pi}{\alpha_s t_p}}\right] \qquad (1-2)$$

Equation 1-2 is slightly different from the commonly used one-harmonic model; it uses a sine function instead of a cosine function to represent the ground temperature variation. However, the two equations are equivalent if $PL_1 = PL'_1 - \frac{t_p}{4}$. In Equation 1-2, the three constant values are computed by performing a best fit to the average monthly air temperature using the least squares method. This is based on the assumption that the ground surface temperature equals to the air temperature. This is done for all 5564 weather stations (U.S. and international) listed in Chapter 14 of 2009 ASHRAE Handbook - Fundamentals. These constants are publicly available (ASHRAE, 2013c).

Despite the need for the ground temperatures, availability of ground temperature estimates for engineers is surprising limited. The ASHRAE handbooks only presents ground temperatures based on measured results more than half a century ago and only applied to the continental US or North America. The results presentation in small maps can be quite difficult to read for a specific location. The ASHRAE district heating manual (ASHRAE 2013b) developed ground temperature dataset based on an over simplified assumption that works well in warm temperate climates, but leads to significant errors in estimated results in cold climates and arid climates. In addition, the ground temperatures are represented as the three parameters of the Fourier (1822) model is still based on pure conduction and neglects the effects of solar radiation, snow cover, soil freezing/thawing and evapotranspiration. As discussed by Signorelli and Kohl (2004), the effects of these phenomena on undisturbed ground temperature may cause deviations on the order of 1-4 K or 2-7°F. Lord Kelvin presented the same model but with higher order harmonics (Thomson 1862), which could be used to improve these results (Thomson 1862; Jacovides, et al. 1996; Elias, et al. 2004; Droulia, et al. 2009). Therefore, the main objective of this research is to provide a new set of typical year ground temperature estimates for use by engineers using a two-harmonic model; this simplified design model has been validated against measured ground temperatures for nineteen geographically diverse measurement sites in United States.

A one-dimensional explicit finite volume numerical model used for generating the coefficients of the simplified design model was developed. Both the simplified design model and the numerical model have been validated against measured ground temperatures for nineteen geographically diverse measurement sites in United States. The validated numerical model will be run with typical meteorological year-type data for 4112 sites worldwide and automatically generates a set of undisturbed ground temperature simplified design model coefficients for these sites. The resulting coefficients cover greenfield sites with short grass or tall grass. The results in this thesis cover typical weather year cases that are appropriate for energy calculations. It is also desirable to be able to forecast temperatures for more extreme cases that represent worst-case design considerations. A procedure for developing design (extreme) year ground temperature is presented in this thesis.

A numerical ground heat transfer model has been developed for estimating the undisturbed ground temperature under short and tall grass covers; it is validated against experimental results measured at the grass-covered sites. This numerical model should be usable for other surface conditions such as bare soil, asphalt and concrete, but will require additional validation. The model utilizes a full surface heat balance coupled with weather files to calculate the soil temperatures. The model reads the incident short wave radiation on a radiation horizontal surface, air temperature, relative humidity and wind speed as inputs from the weather files. Vegetation density and snow depth for each site are estimated. Freezing and melting of moisture are considered in the model; snow cover is treated as a boundary condition. Moisture transport within the ground is not modeled and fixed moisture content is assumed. Soil properties are estimated from the measured ground temperatures using the procedure recommended by Kusuda and Achenbach (1965). They assumed the soil is homogenous and estimated the soil diffusivity using the least-square fitting for the measured results and the simple harmonic relationship. Although the numerical model can provide the ground temperature estimates with a good accuracy, a simpler form might be preferred for engineering applications. A two harmonic model is proposed in this thesis. This model mainly relies on five parameters: annual average soil temperature, two ground temperature amplitudes at the surface and phase lag to predict undisturbed ground temperatures. The numerical model is used for generating coefficients of the two-harmonic model. Both the numerical model and the two-harmonic model have been validated against one year measured soil temperature at 19 SCAN sites in the U.S. The detailed description of the two models is given in Chapter 3 of this thesis.

The finite volume model was run with the soil thermal diffusivity estimated from the measured ground temperatures at the site for the validation work. As my overall goal is to use the finite volume model in conjunction with typical meteorological year-type data for 4112 sites worldwide, it is not feasible to tune the soil thermal diffusivity for each site. Thus, a typical value of soil thermal diffusivity is used here. Furthermore, the vegetation density and snow depth which are required as inputs to the numerical model which varies for each site and cannot be read from the weather files. Thus, I found it necessary to develop automated heuristic procedures for predicting vegetation density and snow depth for each site. Besides the typical meteorological year type weather files, these procedures make use of a database of Köppen -Geiger climate classifications (Kottek et al. 2006). The validations described by in Chapter 3 make use of these procedures also. The discussion of development of the procedures is given in Chapter 4 of this thesis.

In US, the commonly used analytical approach is the one-harmonic model first proposed by Fourier (1822, as cited by Narasimhan 2010). The model relies on parameters which can be read from very small maps for the continental US (Figure 17 of Chapter 34 of the 2011 ASHRAE Handbook - HVAC Applications) or North America (Figure 13 of Chapter 18 of the 2013 ASHRAE Handbook - Fundamentals). ASHRAE published a district heating guide (ASHRAE 2013b) which also uses one-harmonic model to estimate the undisturbed ground temperatures. This is done for all 5564 weather stations world-wide listed in Chapter 14 of 2009 ASHRAE handbook - fundamentals. In Chapter 5 of this thesis, the estimated ground temperatures using the commonly used approach in US are compared to the measured results at the nineteen SCAN sites, the root mean square errors (RMSEs) are summarized and are compared to the RMSEs of the model results described in Chapter 4. Furthermore, for the ground heat exchanger design and energy analysis work, the estimations of the peak (maximum/minimum) ground temperatures of multiple years are also important. The commonly used approach in US is not designed for predicting the ground temperatures under severe weather conditions. Thus, a correction factor is introduced in the two-harmonic model described in Chapters 3 and 4; the improved simplified design model can both be used for estimations of the typical year ground temperatures and maximum/minimum ground temperatures of multiple years.

The simplified design model predicts ground temperatures with better accuracy compared to the commonly used approach in US. In order to demonstrate the importance of this improvement in the horizontal ground heat exchanger design, a small-scale study has been performed for one house type in 12 locations in the U.S. The horizontal ground heat exchanger (HGHX) simulation tool is developed based on the foundation heat exchanger (FHX) analytical model (Xing et al. 2012). The foundation heat exchanger is a relatively new type of ground heat exchanger that utilizes the excavation often made for basements and foundation in order to reduce the high cost of trench excavation. Horizontal ground heat exchangers are close in geometry, without the presence of a basement in close proximity to the heat exchanger tubing. The building heating and cooling loads are generated using EnergyPlus; the required lengths of the GHX pipes are calculated using inputs as measured soil temperature, soil temperature estimated from the simplified design model and soil temperature predicted from the existing approach. The four results are compared and discussed in Chapter 6 of this thesis.

Before proceeding to the material described above, Chapter 2 reviews the related literature. The conclusions and recommendations of my PhD thesis will be introduced in Chapter 7. Appendix A and B contain tables and maps which present the weather related constant values: annual average soil temperature, surface temperature amplitudes and phase delays required for use of simplified design model for estimations of typical year ground temperature and maximum/minimum ground temperature of multiple years. These constants have been computed for all 4112 locations world-wide where the weather files are available (1020 TMY3 type files, 80 CWEC type files, 3012 IWEC type files).

CHAPTER II

LITERATURE REVIEW

Prediction of ground temperature is an important part of building heating load calculations and design of ground heat exchangers used with ground source heat pump systems. Furthermore, as building envelopes become better insulated and tighter, heat transfer to/from the foundation becomes more important. This is particularly the case for houses. Although losses to the ground are currently neglected for cooling load calculations, it is possible that it may be advantageous to include them in the future. Beyond load calculations, undisturbed ground temperatures may also be used in design of vertical and horizontal ground heat exchangers and district heating and cooling systems. Furthermore, many physical, chemical, and biological processes that occur in soil are influenced by ground temperature as well.

Currently available results to support the above calculation procedures are very limited. In the US, numerous ground temperature data have been collected and summarized in the literature. Section 2.1 reviews history of the ground temperature measurements. Modeling can be a useful tool for calculating diurnal and annual variations of the soil temperature at different depths, two approaches are usually used: analytical models and numerical models. These models will be introduced in Section 2.2. Currently, there is a common procedure used for the estimations of the ground temperatures, which can be thought to use the three parameters of the simple harmonic (Fourier 1822, cited by Narasimhan 2010) model: average annual ground temperature, annual amplitude at the ground surface, and phase angle. This common procedure for estimating the ground temperature nowadays is presented in details in Section 2.3. Finally, there will be a summary of literature review covered in Section 2.4.

2.1. Experimental Measurements

This section reviews the history of the ground temperature measurements. Ground temperatures have been measured since the 18th century. Since then, ground temperature data have been collected by individuals, weather stations and agricultural field stations. The history of ground temperature measurements is reviewed and introduced in Section 2.1.1. Observations have been made from the measured ground temperature profiles; it is found that the weather conditions, earth surface conditions and soil thermal properties all affects the ground temperature. A more detailed description is given in Section 2.1.2.

2.1.1. Ground Temperature Data

The ground temperatures at the earth surface have a significant influence on the weather condition adjacent to the ground; the ground temperature at or near the plant root affects vegetation; the knowledge of temperature distribution and frost phenomena in the ground is essential in engineering design work. Thus, ground temperature distribution is an important topic to scientists in different fields, especially for meteorologists, climatologists, agronomists, soil scientists and engineers.

Starting in 1837, Professor Forbes of University of Edinburgh of made 5 years observations of ground temperature in three locations in Edinburgh, Scotland up to 2 meters deep (Thomson 1862), to study the pattern of the ground temperature distribution. Weather data was first systematically collected in North America by John Campanius Holm, a Lutheran minister, starting in 1644 (NOAA 2013). However, scientists hadn't paid much attention to the important relationship between air and ground surface temperature until 1900s. Since then some of the weather stations started to record ground surface temperatures. Agronomists and soil scientists have measured ground temperatures at the beginning of 1900s, in order to study the relationship between ground temperature and vegetation growth. They usually measured the ground temperature to or slightly deeper than the depth where plant roots are located. Engineers often took measurements up to a depth where frost occurs or where the pipes are buried.

These measured ground temperatures have been compiled into a nation-wide summary. Fitton and Brooks (1931) collected soil temperatures from 32 stations in the United States. Chang (1958) wrote a book which summarized monthly averaged ground temperature of 600 stations throughout the world. For the period from1967 to 1981, soil temperature data for United States can be found in the TD-9639 soil temperature data archive (Hu and Feng 2003); for the period from1982 to 1993, soil temperature data can be found in the TD-3200 daily data archive (Hu and Feng 2003). Since 1990s, daily soil temperatures measured across the U.S. are available on the website. The United States Department of Agriculture developed the Soil Climate Analytical Network, which provides ground temperature data for 191 sites located in 40 states in the U.S. (NRCS 2013a). The ground temperatures are measured at six standard depths: 5, 10, 20, 50, 100 and 200 cm (2, 4, 8, 20, 40 and 80") for several years. Since 2000, the National Climatic Data Center (NCDC) developed the U.S. Climate Reference Network (Bell, et al. 2013) dataset, which includes measured ground temperatures at 114 stations in the U.S. The ground temperatures are measured at five depths: 5, 10, 20, 50, 100 and 200 cm (2, 4, 8, 20, 40 and 80").

World-wide, the Bureau of Meteorology in Australia provides soil temperatures at 5, 10, 20, 50 and 100 cm (2, 4, 8, 20 and 40") depth for over 700 stations since 1990s (Australian Government Bureau of Meteorology 2013).The Russian National Snow & Ice Data Center provides a data set of monthly and annual average soil temperature measured at Russian weather stations up to a depth of 3.2 meters (10.5 ft) from the 1930s to the 1990s (Zhang, et al. 2005). The German

Weather Service measured soil temperature three times a day at 5, 10, 20 and 50 cm depth (2, 4, 8 and 20") for 70 stations from 1951 until now (Muerth 2008).

2.1.2. Factors Affecting Ground Temperatures

Johnson and Davies (1927) took ground surface temperature measurements in bare soil; soils covered by Tar-Macadam, grass, rubble, sand and bare clay. They found that the land cover and soil thermal properties can have significant effects on the soil temperatures. Doll, et al. (1985) also found that ground temperatures are greatly affected by the ground covers. Based on measured near-surface ground temperatures in Canada, Cook (1955) found that the weather conditions (freezing/thawing of moisture in the soil and snow fall) have relatively large effects on the ground temperature. Crawford (1951) gave a detailed discussion of the factors affecting the ground temperatures.

2.1.3. Summary

Measurements of ground temperature data can be quite useful for research purposes. However, ground temperature profiles vary with weather conditions (soil freezing/thawing, snow fall, etc), earth surface conditions and soil properties. Therefore, the measurement of ground temperature profile it is neither easy nor practical for most engineering design studies. Modeling can be a useful tool for calculating diurnal and seasonal variations of the soil temperature at different depths under various land covers.

2.2 Modeling of Ground Temperatures

There are two methods used for estimating ground temperatures: analytical solutions and numerical solutions. The analytical model method is discussed in Section 2.2.1.; the numerical model method is discussed in Section 2.2.2..

2.2.1. Analytical Models

The most commonly used analytical model is the simple harmonic model, which was developed in the early years of the 18th century by Joseph Fourier (1822, cited by Narasimhan 2010). Lord Kelvin presented the same model but with higher order harmonics (1862). This model was derived based on the one-dimensional heat conduction equation, using the ground surface temperature as boundary condition; this method is discussed in Section 2.2.1.1. A less commonly used analytical model - the solar-air temperature model is discussed in Section 2.2.1.2. Khatry, et al. (1978) developed this model based on one dimensional heat conduction equation, using the heat flux at the ground surface as boundary condition.

2.2.1.1. Simple Harmonic Model

Joseph Fourier invented the Fourier series, and used this mathematical expression to solve some heat transfer problems. Fourier addressed the terrestrial heat problem - heat transfer through the Earth's crust in his book (Fourier 1822, cited by Narasimhan 2010). Since the Earth's diameter is very large, he considered the Earth as an infinite one-dimensional vertical column extending down from the land surface ($z = 0$) when solving the heat problem. Therefore, the soil heat transfer is assumed to satisfy the pure heat conduction theory as shown in Equation 2-1:

$$\rho_s C_{ps} \frac{\partial T_s}{\partial t} = k_s \frac{\partial^2 T_s}{\partial z^2} \qquad (2-1)$$

Where:

T_s is the undisturbed soil temperature at the depth of z and time t of the year , in °C or °F;

z is the soil depth, in m or ft;

t is the time of year, starting from January

k_s is the soil thermal conductivity, in W/m·K or Btu/ft·°F·hr;

ρ_s is the density of the soil, in kg/m^3 or lb/ft^3;

C_{ps} is the specific heat of the soil, in J/kg-K or Btu/lb•°F;

In addition, two boundary conditions needs to be satisfied, as shown in Equations 2-2 and 2-3:

$$T(z = 0, t) = T_{s,avg} + T_{s,amplitude} sin(\omega t + PL) \quad (2-2)$$

$$lim_{z \to \infty} T(z, t) = T_{s,avg} \quad (2-3)$$

Where:

$T_{s,avg}$ is the annual average soil temperature, in °C or °F;

$T_{s,amplitude}$ is the amplitude of the ground temperature at the earth surface, in °C or °F;

ω is the radial frequency, in rad/s;

PL is the phase lag, in rad;

Equation 2-2 indicates that the ground surface temperature varies sinusoidally with time; Equation 2-3 assumes that the soil temperature at deep depths is constant all the year. The soil temperature actually increases with increasing depth in the soil domain. The geothermal gradient is the rate of increasing temperature with respect to increasing depth, which is about 25 - 30 °C/km of depth (1.4 - 1.6 °F/100 feet) (Fridleifsson, et al. 2008). Based on the pure heat conduction theory, Fourier summarized a simple harmonic equation for calculating the ground temperature. This equation is discussed former in Section 2.3 (Equation 2-10). The model relies on three parameters to estimate the ground temperatures: annual average ground temperature $T_{s,avg}$, annual amplitude of surface temperature variation $T_{s,amplitude}$ and phase lag PL. These three parameters can be tuned from measured ground surface temperatures.

Lord Kelvin presented the same model but with higher order harmonics, in 1860 (Thomson 1862). He suggested in the thesis that a simple harmonic formula would be sufficiently accurate for approximating the actual ground temperature variation; in some cases, the second term could have noticeable influence and needs to be considered. Later on, those works were discussed in several texts; particularly notable among them are Carslaw and Jaeger (1959) and Eckert and Drake (1959).

Several scientists (Krishnana and Kushwaha, 1971; Kusuda and Achenbach, 1965; Carson, 1963; Pearce and Gold 1959; Flucker, 1958; West, 1952) verified the simple harmonic theory against site observed soil temperature under different climates, surface covers and soil types. Those studies have been summarized in Table 2.1 shown below:

Table 2.1: Validation of the simple harmonic model

Year	Author	Years of Measured Data	Measured Depths, cm (inch)	Surface Cover	Climate Type	Soil Type
1971	Krishnan and Kushwaha	4	1.0 - 120.0 (0.4 - 47.2)		Arid	sand, loamy sand
1965	Kusuda and Achenbach	>=1	91.4 - 243.8 (36.0 - 96.0)	bare soil/ grass covered	humid continental, humid subtropical, Arid	all
1963	Carson	3	1.0 - 884.0 (0.4 - 348.0)	Pasture grass	hot, humid summer, cool/cold winter	sandy clay
1959	Pearce and Gold	1	5.0 - 90.0 (2.0 - 36.0)	grass covered	Really cold winter	
1958	Flucker	5	5.0 - 304.8 (2.0 - 120.0)	bare soil	dry summer, cool/cold winter	clay
1952	West	8	2.5 -243.8 (1.0 - 96.0)	vegetation covered	dry summer, mild winter	sandy loam

Flucker (1958) and West (1952) found out that using simple harmonic model three-parameter form to represent the undisturbed ground temperature could be quite satisfactory for places with dry summer and mild/cool/cold winter. Carson (1963) also reported that 93.0% - 99.8 % of the variance of ground temperature could be explained by the first harmonic for places with hot humid summer and cold winter. Kusuda and Achenbach (1965) applied the simple harmonic equation for estimating the undisturbed monthly average soil temperature for 63 stations in the continental U.S.

The simple harmonic model was developed based upon pure heat conduction theory and it neglected the effects of some weather conditions (precipitation, snow fall and soil freezing/thawing). As discussed by Signorelli and Kohl (2004), the effects of these phenomena on undisturbed ground temperature may cause deviations on the order of 1-4 °C (2-7°F). The simple harmonic model may not be satisfactory for some applications.

Pearce and Gold (1959) found that, for locations such as Canada where soil freezing and snow fall occurs the simple harmonic equation is not sufficient for depths less than 50 cm (20") (depending on the frost depth). They also found out that the theory is quite applicable at deeper depths. Krishnan and Kushwaha (1971) suggested that the simple harmonic equation only represents 80 to 85 % of the ground temperature variations at depth of 1.2 m (3.9 ft) in the observed sites, due to the frequent rainfall. A higher order harmonic model could be used to improve these results (Thomson 1862; Jacovides, et al. 1996; Elias, et al. 2004; Droulia, et al. 2009). Gao et al. (2003) and Gao et al. (2008) modified the simple harmonic model so it accounts for the moisture transport in the soil due to precipitation. Tyagi and Satyanarayana (2010) found that the Gao et al. model (2003;2008) works better than the simple harmonic model which doesn't include the moisture transport. However, this new model was much more complex in form and not convenient to be used.

The simple harmonic model considers the effects of weather conditions and soil properties. But it does not consider the effect of the land cover. As discussed by Herb et al. (2008), the variation of the land cover causes deviations on the order of 3.0 - 6.0 °C (5.4 - 10.8 °F) in the average surface temperature, 5.0- 12.0 °C (9.0 - 21.6 °F) in surface amplitude. Baggs (1983) derived an empirical formula which is similar to the simple harmonic model in the form but considers the effect of ground covers by including a vegetation coefficient k_v that depends on the "proportion of vegetation projective shade cover". Cui, et al. (2011) used Baggs' formula to predict ground temperature at depths of 0-100 m in the humid climate in China.

2.2.1.2. Solar-air Temperature Model

Khatry, et al. (1978) developed an analytical model based on one dimensional heat conduction equation as shown in Equation 2-1. The surface heat flux is used as the boundary condition as shown in Equation 2-4:

$$-k_s\left(\frac{\partial T_s}{\partial z}\right)_{z=0} = h_c\big(T_a - T_s(z=0)\big) + R_{ns} - R_{nl} \qquad (2-4)$$

Where:

R_{ns} is the solar radiation absorbed by the surface, in W/m^2 or Btu/ ft^2•hr;

R_{nl} is the net long wave radiation leaving the earth surface, in W/m^2 or Btu/ ft^2•hr;

k_s is the soil thermal conductivity, in W/m•K or Btu/ft•°F•hr;

$T_s(z=0)$ is the soil temperature at the earth surface, in °C or °F;

h_c is the convection coefficient, in W/m^2•K or Btu/ft^2•°F•hr;

T_a is the air temperature, in °C or °F;

Equation 2-4 can be transformed to Equations 2-5 and 2-6:

$$-k_s\left(\frac{\partial T_s}{\partial z}\right)_{z=0} = h_c\big(T_{solair} - T_s(z=0)\big) \qquad (2-5)$$

$$T_{solair} = T_a + \frac{(R_{ns} - R_{nl})}{h_c} \qquad (2-6)$$

Where:

T_{solair} is the solar air temperature, in °C or °F;

The solar-air or sol-air temperature shown in Equation 2-6 can be expressed as a Fourier series shown in Equation 2-7. The values of $T_{solair,avg}$, $T_{solair,amplitude}$ and PL_{solair} can be tuned from the measured weather data using Equations 2-6 and 2-7:

$$T_{solair} = T_{solair,avg} + \sum_{m=1}^{\infty} T_{solair,amplitude}\, exp\big(i(mwt - PL_{solair})\big) \qquad (2-7)$$

Where:

$T_{solair,avg}$ is the annual average solar air temperature, in °C or °F;

$T_{solair,amplitude}$ is the amplitude of the solar air temperature variation, in °C or °F;

PL_{solair} is the phase lag of the solar air temperature cycle, in rad;

The particular solution to Equation 2-4 is quite similar to solution given by simple harmonic theory. The solar air temperature model relies on three parameters to estimate ground temperatures; these are annual average solar air temperature, amplitude of the solar air temperature variation and phase lag. These parameters could be tuned from measured weather data.

This model also has been applied to estimate ground temperature in different climate types. Moustafa, et al. (1981) used the solar-air temperature to estimate the soil temperature in the hot and dry desert in Kuwait; they found that the computed soil temperature was within ±1.2 °C (± 2.2 °F) of the measured soil temperature during 1978. Krarti, et al. (1995) applied the model to predict soil temperature for four U.S. locations: Seattle, St. Paul, Lexington and Columbus; some of them are located in cold regions where soil freezing/thawing and snow fall occurs. They didn't quantify the differences of the computed and measured soil temperature. The solar-air temperature method is used (Mihalakakou, et al. 1997; Mihalakakou 2001) to predict soil temperature in maritime climate in Athens and Dublin under different ground cover (bare and short grass). They found that for the bares soil, the differences of the computed and measured mean monthly surface temperatures are less than 1.5 °C (2.7 °F). For the short-grass covered soil they are less than 2.5 °C (4.5 °F).

2.2.1.3. Summary

Both the simple harmonic model and solar-air temperature model were developed based upon the simple heat conduction theory. The simple harmonic model utilizes the measured ground surface temperature as boundary condition and relies on three parameters to estimate the ground temperature; these three parameters are annual average ground temperature, temperature amplitude at the ground surface and phase lag. The solar-air temperature model calculates the heat flux at the earth surface from the weather data and uses it as an upper boundary condition. It uses the measured weather data to tune three model parameters: annual average solar air temperature, amplitude of the solar air temperature variations and phase angle.

The simple harmonic model is commonly used; it is simpler in form and convenient for engineering application. However, it relies on model parameters to predict ground temperatures. These parameters are usually tuned from the measured ground surface temperature. Thus, the application of the simple harmonic model is limited by both the availability of the measured soil temperature profiles and simplified form of the model itself.

2.2.2. Numerical Models

The modeling of heat and mass transport in the soil using numerical methods has been discussed in a vast quantity of publications. The coupling of heat and mass transfer in porous media was first formulated by Philip and de Vries (1957) and de Vries (1958; 1987), as shown in Equation 2-8. This formula both the conduction heat transfer $k_s \frac{\partial^2 T_s}{\partial z^2}$ and evaporation/condensation heat transfer term $h_{fg}\nabla\left(k_{diff}\nabla\theta\right)$ due to moisture transport in the soil:

$$\rho_s C_{ps}\frac{\partial T_s}{\partial t} = k_s\frac{\partial^2 T_s}{\partial z^2} - h_{fg}\rho_s\nabla\left(k_{diff}\nabla\theta_s\right) \qquad (2-8)$$

Where:

h_{fg} is the latent heat of vaporization of water, in J/kg or Btu/lb;

k_{diff} is the diffusivity of the water vapor, in m^2/s or ft^2/s;

θ_s is the volumetric liquid water content of the soil, in cm^3/cm^3 or ft^3/ft^3;

The moisture transport in the soil is composed of two parts, vapor transfer and liquid transfer. According to the simple theory of vapor transfer (Penman 1940; Rollins, et al. 1954) and liquid transfer (Child and Collis-George 1950), the vapor flux is driven by two factors: temperature gradient and moisture gradient; the liquid flux is determined by temperature, moisture gradient and gravity. Janssen (2011) found that the moisture transport due to temperature gradient is negligibly small. Philip and de Vries (1957) derived a general differential equation describing the moisture transport in porous media, as shown in Equation 2-9:

$$\frac{\partial \theta_s}{\partial t} = \nabla\left(k_{diff,T} \nabla T_s\right) + \nabla\left(k_{diff,\theta} \nabla \theta_s\right) + \frac{\partial k_{hyd}}{\partial z} \qquad (2-9)$$

Where:

$k_{diff,T}$ is the thermal moisture diffusivity, which varies with temperature, in m^2/K-s or ft^2/°F-s;

$k_{diff,\theta}$ is the isothermal moisture diffusivity, which varies with water content, in m^2/s or ft^2/s;

k_{hyd} is the (unsaturated) hydraulic conductivity, in m/s or ft/s;

Equation 2-9 shows that the variation of moisture content per time $\frac{\partial \theta}{\partial t}$ equals the summation of three terms: moisture transfer due to temperature gradient $\nabla\left(k_{diff,T} \nabla T_s\right)$, moisture transfer due to moisture gradient $\nabla\left(k_{diff,\theta} \nabla \theta_s\right)$ and moisture transfer due to gravity $\frac{\partial k_{hyd}}{\partial z}$. A large number of numerical models had been developed based on the Philip and de Vries method. These models are one or two-dimensional finite difference or finite volume models, most of which consider both heat and mass transfer in the soil. Two types of boundary conditions are used at the surface boundary:

- Specified temperature boundary condition, which uses the measured ground surface temperature.
- Specified heat flux boundary condition; the heat flux is calculated from the weather data based on basic mechanisms of heat transfer, which includes conduction, convection, radiation, sometimes, heat transfer due to evaporation.

The water flux at the surface boundary is treated in a similar way. The temperature and moisture content are considered as uniform and constant at the lower boundary. Some of these models consider the moisture transport, soil freezing/melting and snow fall (weather conditions). Ground temperatures have been simulated for a variety of surface covers, including pavement, bare soil, vegetated surface and several others. Most models had been validated against experimental data. Table 2.2 summarizes the developed models in chronological order and their features. Fischer (1983) reviewed most of the models introduced in Table 2.2. which were developed before the 1980s. Boike, et al. (2009) reviewed site and modeling based studies for heat and mass transfer process in permafrost-affected soils.

Table 2.2: Chronological list of the developed models and their features

Year	Author	Surface Cover	Specified Temperature Upper Boundary	Specified Heat Flux Upper Boundary Considering Evaporation (or Evapotranspiration for vegetated surface)	Moisture transport	Soil freezing	Snow cover
2011	Xu and Spitler	Bare Soil		✓	✓	✓	✓
2008	Herb et al.	Asphalt, Concrete, Bare Soil and others		✓	✓		
2007	Gui et al.	Pavement					
2005	Minhoto et al.	Pavement					
2001	Hermansson	Pavement				✓	
1999	Mengelkamp et al.	Partly Vegetated Surface		✓	✓		
1998	Best	Vegetated Surface		✓			
1996	Wu et al.	Mulched and bare soils					
1992	Asaeda and Ca	Bare Soil, Asphalt and Concrete		✓	✓		
1991	Pikul	Vegetated or bare soil		✓	✓		
1990	Sikora et al.		✓				
1990	Thunholm	Vegetated or bare soil		✓	✓	✓	✓
1987	Nobel and Geller	Vegetated desert Soil		✓			
1986	Bristow and Campbell			✓	✓		
1981	Hartley		✓		✓		
1980	Ahmed		✓		✓		
1979	Sophocleous		✓		✓		
1978	Deardorff	Vegetated Surface		✓	✓	✓	
1978	Schroeder			✓	✓		
1978	Taylor and Luthin					✓	
1976	Van Bavel and Hillel			✓	✓		
1975	Shapiro		✓		✓		
1970	Dempsey	Pavement		✓	✓	✓	
1969	Cassel et al.		✓		✓		
1964	Taylor and Cary						
1958	de Vries						
1957	Philip and de Vries						

As shown in Table 2.2, several models had been developed for simulating soil temperatures under different surface covers. Here, I will discuss a few of the most directly applicable works in more detail.

2.2.2.1. Thunholm (1990)

Thunholm (1990) developed a one dimensional explicit finite difference model to simulate transient heat and water flows in the soil. A maximum of 22 soil layers with varied thickness and properties are used. The model calculates the heat flux at the earth surface, which is composed of radiation heat flux, convection heat flux and evaporation heat flux. The freezing/thawing of moisture in the soil and snow fall are considered in the model. A freezing-point curve is used to estimate the unfrozen water content of the frozen soil. A simple snow model was developed. When the air temperature exceeds 2.0 °C (35.6 °F), all precipitation is calculated as rain, while below -2.0 °C (28.4 °F), all the precipitation is calculated as snow. Between the -2 °C (28.4 °F) and 2 °C (35.6 °F), the content of the snow in the precipitation is linearly proportional to the temperature change. The model requires weather data as inputs, which includes air temperature, relative humidity, wind speed, cloudiness and precipitation rate. He used the model to estimate the soil temperature at 30.0 cm (11.8 inches) deep for a year and compared the simulation result to the measured results for one site in Sweden, near Umea. The temperature differences of simulated and measured results are within the range of ± 2.0°C (± 3.6 °F). This model has some limitations:

1. It simplified the snow accumulation/melting process, thus, it over predicts the soil temperature by 1.0 °C (1.8 °F) during April (end of the snow melting period).

2. It underestimates the soil temperature in autumn when the grass has grown tall and impedes the net radiation from the soil surface.

3. This model did not consider the effect of ground cover on the ground temperature predictions.

2.2.2.2. Pikul(1991)

Pikul (1991) presented a resistance heat flux model for predicting soil surface temperature and evaporation rate. Pikul used a full surface energy balance (solar radiation, thermal radiation, convection, evaporation, and conduction) combined with a simplified model of soil moisture. The soil moisture model relies on a resistance to soil wetness that is empirically calculated from the cumulative net radiation since the last rainfall. The model was experimentally validated using measured results at two sites in Eastern Oregon; hourly temperature predictions were within ± 2.5°C (± 4.5 °F) and daily evaporation predictions were within ±0.15 mm/day for a three month period (August - October). This model did not consider the soil freezing/thawing and snow cover effect. It cannot be easily adjusted to estimate ground temperatures under different land covers.

2.2.2.3. Herb, et al. Model (2008)

Herb, et al. (2008) developed a one-dimensional implicit finite difference model to calculate the hourly ground temperature to a depth of 10 m (32.8 ft). The simulation soil domain is divided into two layers: a layer near the surface with smaller cells and another layer with larger cells towards the lower boundary of the soil domain. Vertical soil moisture migration is modeled; the precipitation is considered in the modeling of moisture transport. A full energy balance is applied on the surface boundary and an adiabatic condition is applied on the lower boundary. The vertical heat transfer at the soil surface includes long wave radiation, short wave radiation, evaporation, convection.

The model considers the effect of ground surface conditions. By changing the soil thermal diffusivity, solar radiation absorptivity, vegetation density and other parameters, the model can be used to estimate ground temperature under various land covers (asphalt, concrete, bare soil, lawn, tall grass prairie, corn and soy bean crops and forest). These parameter values are calibrated by minimizing the root mean square error (RMSE) of the simulated and measured soil temperature results. The model has RMSEs of 1.0 - 3.0 °C (1.8 - 5.4 °F) compared to the measured results. This model has some limitations:

1. It did not consider soil freezing/thawing and snow fall; it is only validated against measured results from April to October (summer time).

2. Only one location for each surface cover has been investigated. The model needs to validate against more measured results in various climate types.

2.2.2.4. Xu and Spitler Model (2011)

Xu and Spitler (2011) developed a two-dimensional numerical model using the finite difference method. The model utilizes weather data as inputs and implements a full heat balance at the earth surface which includes solar radiation, convection, thermal radiation, and conduction to model the soil temperature. The Xu and Spitler model considers moisture transport, soil freezing/thawing and snow accumulation/melting. In this model, the approach proposed by Philip and De Vries (1957) is used to model the moisture transport due to moisture gradients and temperature gradients in the soil. The precipitation, evaporation and condensation at the surface is considered in modeling of the moisture transport. Freezing and thawing of the soil is considered by using the effective heat capacity method (Lamberg, et al. 2004). This method adjusts the value of specific heat over a small temperature range to account for the latent heat effect during the soil freezing/thawing. The model of snow accumulation and melting has been adapted from the experimentally-validated model developed by Liu, et al. (2007a; 2007b).

The model is used to investigate the importance of each factor to determine the level of detail required for accurate predictions of undisturbed ground temperature during the heating season.

Simulation results were compared to measured soil temperatures at depths of 0.5 m (20 ") and 1.0 m (40 ") for three locations in Montana. By comparison, they demonstrated the importance of considering the soil freezing/thawing and snow cover for these locations in cold climate. They found inclusion of moisture transport to be of not much importance for the three locations they tested. Xu and Spitler achieved a good model accuracy, gives RMSE of less than 2.0 °C (3.6 °F) for most cases, by incorporating model features such as snow accumulation/melting, soil freezing/thawing and moisture transport. However, this study has some limitations that need to be addressed;

1. This model does not consider evapotranspiration. It is applied only for November-April; when the evapotranspiration could be assumed to have a negligible effect on moisture transport and temperatures.

2. Only green-field-type sites have been investigated. Sites with difference surface cover should be investigated.

3. Only three locations, all with fine grained soils in the northern US were investigated. Locations with other climate types and soil types should be investigated.

2.2.2.5. Existing Software

Ground temperature estimation is an important topic to the meteorologists, climatologists, agronomist, soil scientists and engineers. Several software previously have been developed in different fields. In the field of meteorology, the software such as GDAS, GEFS, GFS, NAM, RAP and RUC were developed by National Climatic Data Center to forecast weather conditions. In the field of agriculture, models such as HYDRUS-1D, CERES, DSSAT had been developed and discussed in several papers (Sandor and Fodor, 2012; Jones, et al. 2003; Hoffmann, et al, 1993). However, none of those works are closely related to this research, which aims at estimation of the ground temperature for engineering applications, most of the work been done focused on the estimates of the moisture transport in the soil rather than the heat transfer process.

2.2.2.6. Summary

The developed numerical models are based on transient heat and mass transfer equation as shown in Equation 2-8. Most of these models implement an energy balance in the earth surface which includes the heat transfer due to evaporation, short wave solar radiation, long wave radiation, convection and conduction. There are two factors needs to be considered in the numerical modeling: weather conditions (freezing/thawing of moisture in the soil , the effect of the snow cover and moisture transport) and ground covers. Most models developed only considered part of these factors. Xu and Spitler (2011) found that inclusion of moisture transport might not be of much importance for estimation of ground temperatures. They also demonstrated the importance of considering the soil freezing/thawing and snow cover for these locations in cold climate. Herb et al (2008) found out the ground temperatures are greatly affected by the land cover.

The numerical model requires weather data as inputs. The number of locations for which weather data is available is growing in tremendous pace and it seems possible to estimate the soil temperature world-wide using the numerical models. However, it is preferred, for engineering application, which the soil temperature be presented in an equation form with the parameters provided in a table or a map.

2.3 Common Procedures for Estimating Ground Temperatures

In the U.S., the most commonly used approach uses a simple (one-year period) harmonic relationship introduced in Section 2.2.1.1 which was developed based on pure heat conduction theory. The analytical solution is presented in Equation 2-10, which shows the undisturbed ground temperature has the amplitude decaying exponentially with depth:

$$T_s(z,t) = T_{s,avg} - e^{-z\sqrt{\frac{\pi}{\alpha_s t_p}}} T_{s,amplitude} \cos\left(\frac{2\pi}{t_p} t - PL - z\sqrt{\frac{\pi}{\alpha_s t_p}}\right) \qquad (2-10)$$

Where:

$T_s(z,t)$ is the monthly average undisturbed soil temperature at the depth of z and time t of the year , in °C or °F;

z is the soil depth, in m or ft;

t is the time of year, starting from January 1st, in hr;

t_p is the period of soil temperature cycle (8760), in hr;

α_s is the soil diffusivity, in m^2/s or ft^2/s;

$T_{s,avg}$ is the annual average soil temperature of different depth and time, in °C or °F;

$T_{s,amplitude}$ is the surface amplitude, which can be assume to be half of the difference between the maximum and minimum monthly average temperatures in a year, in °C or °F;

PL is the phase angle of the annual soil temperature cycle, in radians;

This solution was developed based on two assumptions that:

1. Ground temperature is assumed to vary sinusoidally over the year, with a period of one year. The average annual temperature, surface amplitude and the phase angle are model parameters for any given location.

2. The sinusoidal temperature at the ground surface is assumed to decay exponentially with depth, depending on the soil diffusivity.

Though this model can be traced back as far as Fourier (1822, cited by Narasimhan 2010), the main contribution of Kusuda and Achenbach (1965) was to utilize measured earth temperature data for 63 stations in the continental U.S. and, using least squares analysis, estimating the three parameters: average annual temperature, amplitude at the earth's surface, and phase angle. They also compared their estimates of the parameters from ground temperature measurements to simplified estimates that might be made with conventional weather data.

In order to use the simple harmonic model for estimation of ground temperatures, the three parameters: average annual temperature, amplitude at the earth's surface, and phase angle needs to be known. The results provided by ASHRAE are discussed in the next few sections.

2.3.1. Average Annual Ground Temperature

Figure 17 of Chapter 34 of the 2011 ASHRAE Handbook– HVAC Applications is reproduced as Figure 2.1. The source for this map is not given. This figure first appeared in Chapter 29 of the 1995 ASHRAE Handbook- HVAC Application (Figure 20); it is mentioned below that figure that "Courtesy National Ground Water Association", no further information is given in the handbook. A review of earlier version ASHRAE handbooks has not turned up any additional information. However, the accompanying text does give its accuracy as "within 4°F" (2 °C). The same map appears as Figure 1.8 on page 16 of a DOE report (Armitage, et al. 1980); it is named as "Ground water temperature in wells ranging from 50 ft to 150 ft (15 m to 30 m) in depth". Not many details are given to show how the map was compiled; on page 11 of the report, it is mentioned that "Limitations of data and funds often make such detailed studies impractical for large areas. However, generalized maps of aquifer can be made using basic geologic data and yield data from existing wells. Those maps can be used to estimate the well yield at a certain location within a specific range". This suggests the map might be compiled using measured well water temperature data taken from some existing wells. And ASHRAE uses the well water temperature to approximate the annual averaged ground temperatures. Collins (1925) developed a similar map which was based on average annual air temperatures, Figure 2.2. He assumed the well water temperatures at depths of 9-18 m (30-60 ft) would be generally exceed 1.0 or 2.0 °C (1.8 or 3.6 °F) the mean annual air temperature according to the study of C.E. Van Orstrand over 3000 records of temperature of ground water. Then well water temperature is then used to approximate the annual average ground temperature. The 2011 ASHRAE map has more contours and more contour detail than the 1925 map, suggesting, at the least, that it is not simply a redrawn version of the map.

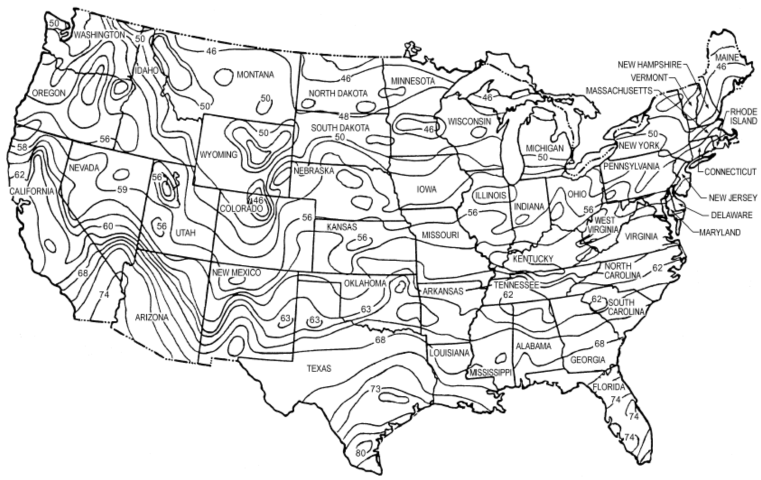

Figure 2.1 Approximate groundwater temperatures (°F) in the continental US

©ASHRAE, www.ashrae.org. (2011) ASHRAE Handbook—(HVAC Applications).

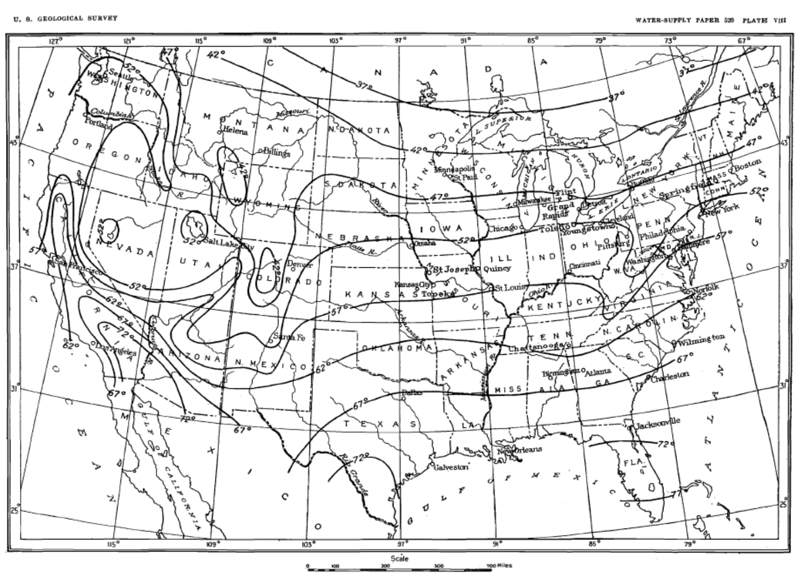

Figure 2.2 1925 map of annual average air temperature

(Collins 1925)

2.3.2. Annual Amplitude at the Ground Surface

The annual amplitude of the ground surface temperature is another parameter in the simple harmonic model. In the current ASHRAE Handbook series, the amplitude appears in Figure 13 of Chapter 18 of the 2013 ASHRAE Handbook – Fundamentals. Both the IP and SI versions are reproduced in Figure 2.3. Figure 2.4 shows the original basis for these maps – a map presented on Page 87 by Chang (1958) for temperature ranges at 10 cm (4”) depth. It should be noted that Chang has plotted range – i.e. twice the amplitude. Comparing, for example, the iso-amplitude line passing through the southern tip of Lake Michigan, Chang, at 10 cm (4”) depth gave the range as 25°C (45°F). The ASHRAE maps give the amplitude at the surface as 12°C (22°F), or approximately half the range. Regarding the original basis, this is confirmed by going back to the 1977 Fundamentals Handbook, where it states “This map is part of one prepared in Ref 7 giving annual ranges in ground temperature at a depth of 10 cm (4 in) Reference 7 is Chang (1958) and the map shown in Figure 2.4 is the referenced map. However, the Chang's map was constructed using measured data from only 20 selected stations in a world-wide range, therefore, the accuracy of this map needs to be further studied.

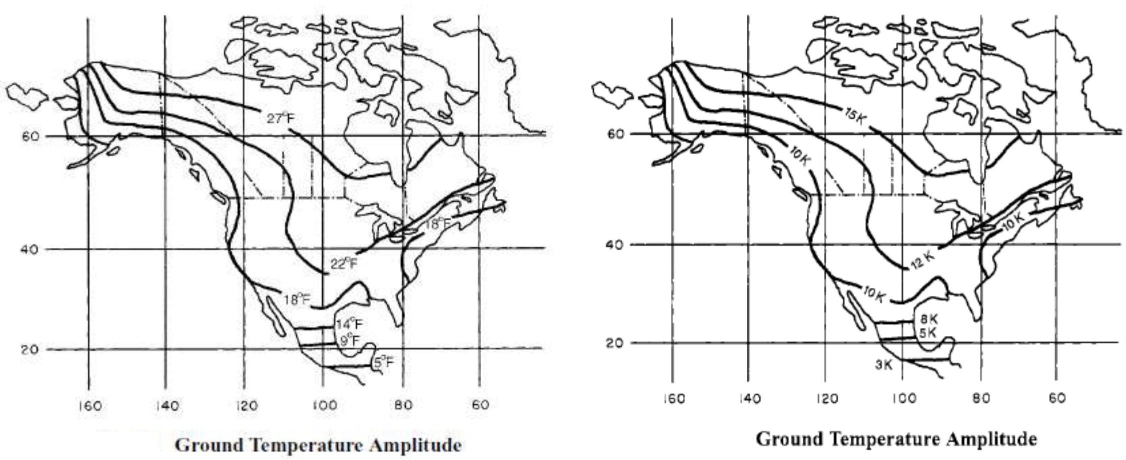

Figure 2.3 IP and SI versions of the ground temperature amplitude

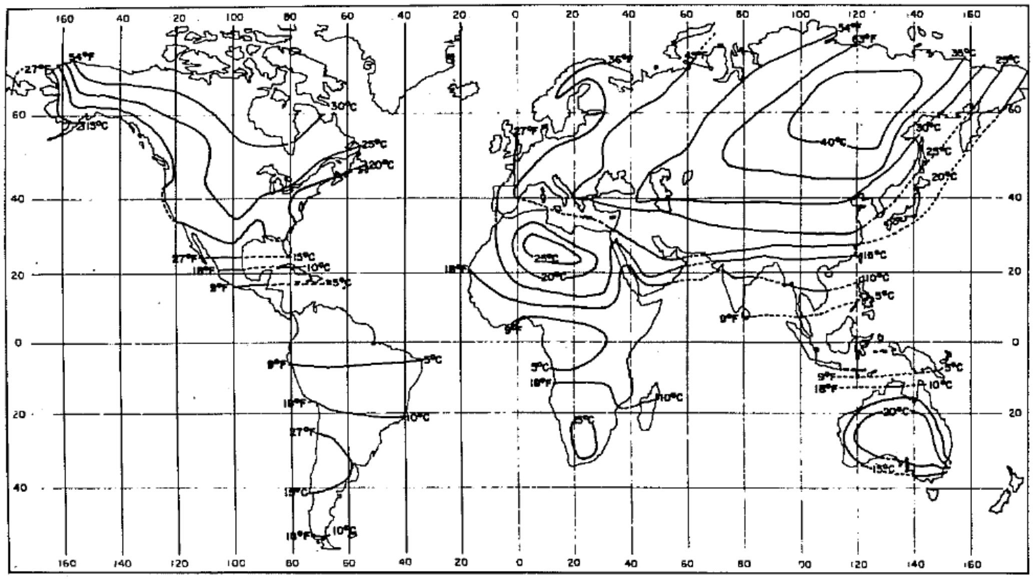

Figure 2.4 Range (i.e. twice the amplitude) at 10 cm (4”) depth from Chang (1958)

2.3.3. Phase Angle

The phase angle term sets the number of days after the beginning of the year when the minimum soil temperature at the ground surface occurs. Kusuda and Achenbach (1965) fitted this parameter for 28 locations, based on air temperatures during 1931-1960 in the continental U.S., and came up with values between 0.55 and 0.65 radians. This is equivalent to a range between 32 and 38 days. However, they showed that this did not correlate well to the actual phase delay for the ground surface temperatures, which had values approximately between 0.43 and 0.72 radians or 25-42 days.

For many applications the exact value of the phase angle is not important, and these values are not presented anywhere in the ASHRAE Handbook series. Bose et al. (1988) seems to presume that the peak heating load will occur near the minimum temperature. However, for applications such as hourly energy analysis, a reasonable value of the phase angle is needed, and simply assuming a value from the range given by Kusuda and Achenbach may not be satisfactory, particularly for southern hemisphere locations. Likewise, values for tropical locations or arctic locations might vary substantially from the continental US.

2.3.4. Summary

The simple harmonic model assumes a sinusoidal ground surface temperature and pure conduction heat transfer. It relies on three parameters: annual average soil temperature, soil surface amplitude and phase angle to estimate the soil temperature profiles. These parameters are represented in maps for the continental US or North America in the ASHRAE handbooks. The results presentation in small maps can be quite difficult to read for a specific location. Furthermore, the source of some of the results is unknown, and where the source is known, the results were published more than half a century ago.

2.4. Summary of the Literature Review

To summarize, the currently available undisturbed ground temperatures are rather limited. The measurements of ground temperature can be quite useful. However, observational records of ground temperature are scarce. The ground temperature varies with weather conditions (soil freezing/thawing, snow fall, and precipitation), earth surface conditions and soil properties. Therefore, the measurement of ground temperature profile it is neither easy nor practical for most engineering design studies. Modeling can be a useful tool for calculating diurnal and seasonal variations of the soil temperature at different depths under various land covers.

There are two methods usually used for estimating the ground temperature: analytical solutions and numerical solutions. The simple harmonic model is a commonly used analytical model, since it is simple in form and convenient for engineering applications. It relies on three parameters: annual average ground temperature, temperature amplitude at the ground surface and phase lag to predict the ground temperature. ASHRAE handbook series presents these parameters in maps, however, only for the continental US or North America. The results presentation in small maps can be quite difficult to read for a specific location. Furthermore, the source of some of the results is unknown, and where the source is known, the results were published more than half a century ago. Also, the simple harmonic model is still based on pure conduction and neglects the effects of solar radiation, snow cover, freezing and evapotranspiration. As discussed by Signorelli and Kohl (2004), the effects of these phenomena on undisturbed ground temperature may cause deviations on the order of 1-4 °C (2-7°F) the application purpose. Moreover, the simple harmonic model considers the effects of weather conditions and soil properties. It did not consider the effect of the land covers. As discussed by Herb et al. (2008), the variation of the land covers would cause deviations on the order of 3.0 - 6.0 °C (5.4 - 10.8 °F) in average surface temperature, 5.0- 12.0 °C (9.0 - 21.6 °F) in surface amplitude.

The numerical models developed are based on transient heat and mass transfer equation. Most models developed implement an energy balance in the earth surface which includes the heat transfer due to evaporation, short wave solar radiation, long wave radiation, convection heat transfer and conduction heat transfer. There are two factors needs to be considered in the numerical modeling: weather conditions (freezing/thawing of moisture in the soil , the effect of the snow cover and moisture transport) and ground covers. Most models developed only considered part of these factors. Xu and Spitler (2011) found that inclusion of moisture transport might not be of much importance for estimation of ground temperatures. They also demonstrated the importance of considering the soil freezing/thawing and snow cover for these locations in cold climate. Herb et al (2008) found out the ground temperatures are greatly affected by the land cover. The numerical model requires weather data as inputs. The number of locations for which weather data is available is growing in tremendous pace and it seems possible to estimate the soil temperature world-wide using the numerical models. However, it is preferred, for engineering application that the soil temperature is presented in an equation form with the parameters provided in tables or a maps.

CHAPTER III

NUMERICAL MODEL AND SIMPLIFIED DESIGN MODEL DEVELOPMENT AND EXPERIMENTAL VALIDATION

A numerical ground heat transfer model has been developed for estimating the undisturbed ground temperatures under short and tall grass covers; it is validated against experimental results measured at the grass-covered sites. This numerical model should be usable for other surface conditions such as bare soil, asphalt and concrete, but will require additional validation. The numerical model is a one-dimensional explicit finite volume model utilizing a full surface heat balance coupled with weather files to calculate the soil temperatures. The model reads the incident short-wave radiation on a horizontal surface, air temperature, relative humidity and wind speed as inputs from the weather files. Vegetation density and snow depth are determined as described in Chapter 4. Freezing and melting of moisture are considered in the model; snow cover is treated as a boundary condition. Moisture transport within the ground is not modeled and a fixed moisture content is assumed. Soil properties are estimated from the measured ground temperatures using the procedure recommended by Kusuda and Achenbach (1965)

3.1 Numerical Model

On the basis of a grid and domain independency study, for grass-covered soil with possible freezing/thawing, the simulation domain is 20 meters (65.6') deep. It is divided into three layers - a Near-Earth-Surface layer, a center layer and a Near-Bottom-Surface layer as shown in Figure 3.1. The model utilizes a uniform fine grid, with cells of thickness 0.015 m (0.6") in the near Earth surface layer (2 m (6.6') deep) and near bottom surface layer (0.2 m (8") deep). Thus, there are 133 and 13 cells in these two layers respectively. In the center layer (17.8 m (58.4') thick), the smallest cells are 0.015 m (0.6") in depth located at the top and bottom of the center layer. The cells expand at a constant ratio towards the centerline of the center layer; the largest cell at the center of the center layer is 0.901 m(35.5") thick. The numerical model is based on an explicit finite volume formulation; therefore, the maximum time step required to be numerically stable and convergent can be determined from the size of the cell and the soil diffusivity. In fact, I found that decreasing the time step to 4/7 of that required for stability improved the accuracy of the model.

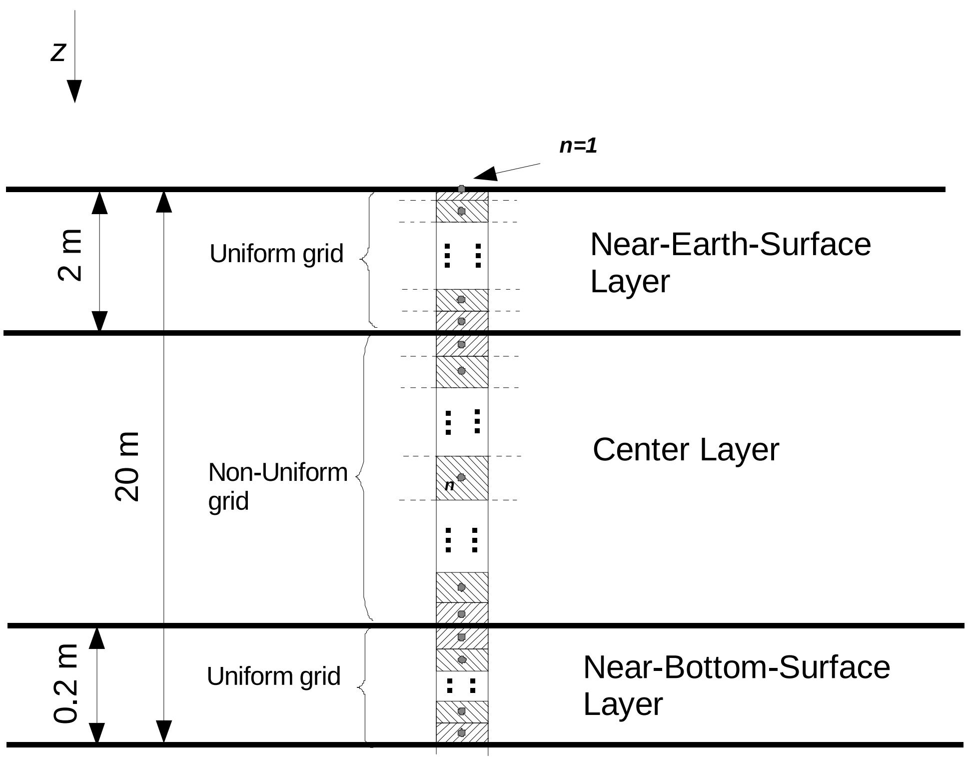

Figure 3.1: Non-uniform grid detailed plot for grass covered sites

3.1.1 Ground Domain

The numerical model is developed based on a one dimensional transient heat conduction equation and discretised using the explicit finite volume method. As freezing and melting of moisture in the soil are important in colder climates (Xu and Spitler 2014), this factor is considered using the enthalpy method (Pedersen 1972) which explicitly tracks both the enthalpy of the soil and the soil temperature. The enthalpy of each cell is computed as:

$$h_{s,n}\left(T_{s,n}\right) = h'_{s,n}\left(T'_{s,n}\ \right) + \left(2k_{gs}\frac{T_{s,n+1}-T_{s,n}}{\Delta y_{n+1}+\Delta y_n} + 2k_{gs}\frac{T_{s,n-1}-T_{s,n}}{\Delta y_{n-1}+\Delta y_n}\right)\frac{\Delta t}{\Delta y_n} \qquad (3-1)$$

Where:

$h_{s,n}$ is the soil enthalpy at current time step, in J/m^3 or Btu/ft^3;

$h'_{s,n}$ is the soil enthalpy at previous time step, in J/m^3 or Btu/ft^3;

$T_{s,n}$ is the soil temperature of the cell n at current time step, in °C or °F;

$T'_{s,n}$ is the soil temperature of the cell n at previous time step, in °C or °F;

Δy_n is the length of cell n in the depth direction, in m or ft;

Δt is the simulation time step, in s;

k_{gs} is soil conductivity, in W/m-K or Btu/ft-hr-°F;

ρ_{gs} is soil density, in Kg/m^3 or lb/ft^3;

$C_{p,gs}$ is soil heat capacity, in J/kg-K or Btu/lb-°F;

After the cell enthalpy is computed with Equation 3-1, the cell temperature is computed with the relationship plotted in Figure 3.2.

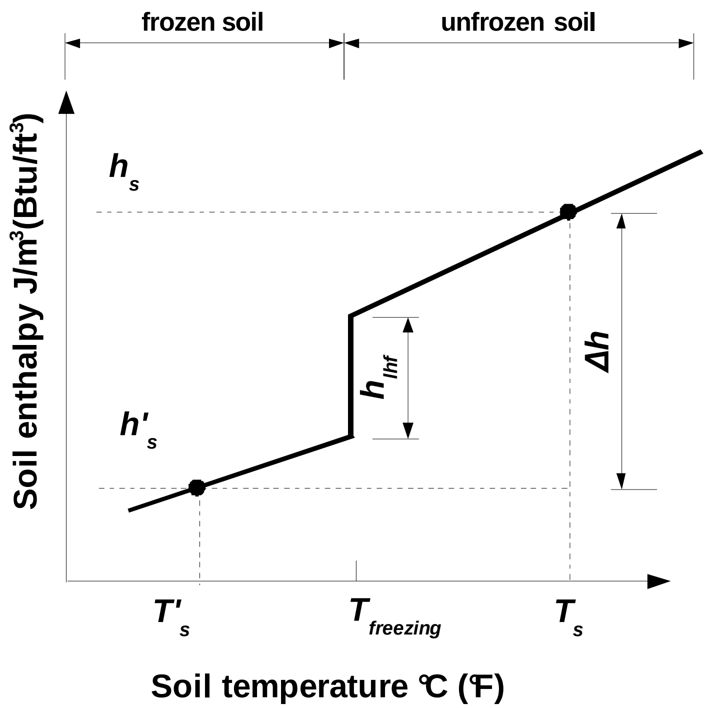

Figure 3.2: Soil enthalpy vs. soil temperature

In order to find the soil temperature at earth's surface directly, a half cell is used at the earth surface. The cell at the earth surface is the first cell in the y direction, so $n = 1$. The enthalpy for the earth surface cell can be estimated using Equation 3-2:

$$h_{s,n}(T_{s,n}) = h'_{s,n}(T'_{s,n}) + \left(q_{net,gs} + 2k_{gs}\frac{T_{s,n+1} - T_{s,n}}{\Delta y_{n+1} + \Delta y_n}\right)\frac{\Delta t}{\Delta y_n} \qquad (3-2)$$

Where:

$q_{net,gs}$ is the surface heat flux (net heat gain) at the earth surface, in W/m^2 or Btu/hr-ft^2;

3.1.2. Surface Heat Balance

For the most part, my formulation for calculating the surface heat flux follows that of Herb, et al. (2008) unless there is snow cover. The Herb et al. model and Deardorff (1978) considers neither freezing/thawing of moisture in the soil nor snow accumulation/melting at the ground surface;

these features are included in the numerical model. According to Xu and Spitler (2014), in cold regions, inclusion of these two factors lead to model RMSE of less than about 2.0°C (3.6°F). When snow cover is present, the snow surface temperature is assumed to be equal to the air temperature, and the net heat flow through the snow $q_{net,gs}$ is proportional to the temperature gradient in the snow layer (Thunholm 1990). The snow depths, which vary with time of year and from site to site, are used as inputs to the model. An automatic procedure for estimating the snow depth of each site has been developed; the methodology is described in the Chapter 4.

When there is no snow cover, I use the Herb et al. method, which treats the plant canopy as a separate layer for which a heat balance is performed, as shown in Figure 3.3. The canopy temperature, T_f, ground surface temperature, T_{gs}, the net heat transfer rate at the canopy layer, $q_{net,f}$, and the net heat transfer rate at the ground surface, $q_{net,gs}$, are all calculated simultaneously using heat balances on the canopy layer and on the ground surface. In Equation 3-2, the net heat transfer rate at the ground surface, $q_{net,gs}$, is required as input for estimations of ground surface temperature $T_{s,1}$ at each time step. Figure 3.3 shows that the net heat flux at the ground surface is the summation of the absorbed radiative heat coming from the sky and the canopy layer minus the radiation heat emitted by the ground surface and the heat lost to the environment by convection and evaporation. These heat transfer terms can be estimated from hourly measured weather data, ground surface temperature at previous time step $\mathrm{T}'_{\mathrm{s,n}}$ and the canopy temperature, T_f at current time step. The ground surface temperatures and the canopy temperature are calculated at a time step of 100 second. During this period, the ground surface temperatures would not vary much so it is reasonable to approximate the surface heat transfer rate using previous time step's surface temperature.

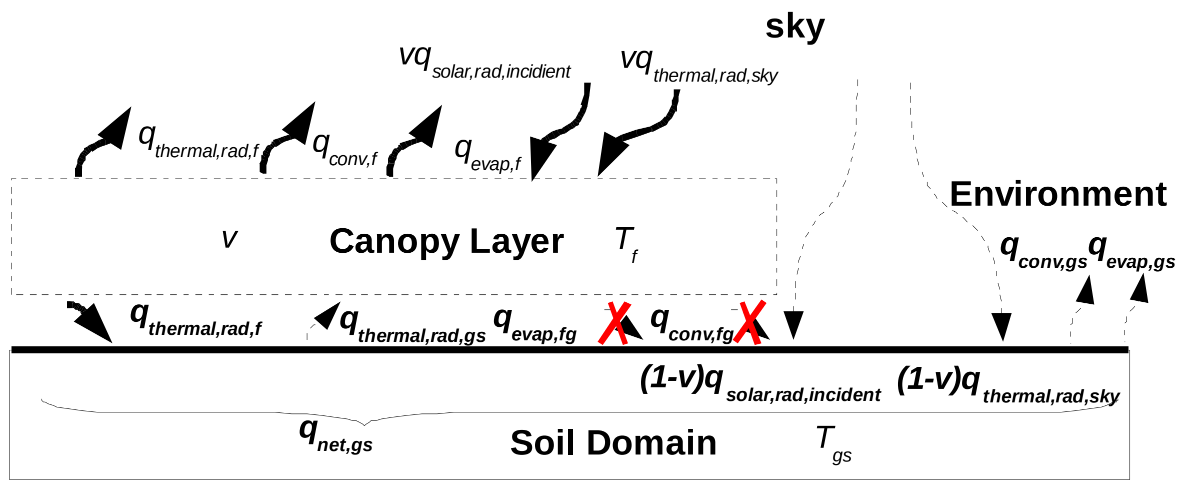

Figure 3.3: Major heat flux components for the plant canopy model

Based on the heat balance at the canopy layer, the canopy temperature, T_f, is calculated at each time step. The canopy is approximated as a 2-sided surface with one temperature. The parameter vegetation density v is an area average shielding factor defining the fraction of incoming radiation that is blocked by the canopy layer. This factor also helps to define the percentage of ground surface area where the convection and evaporation heat transfer at the canopy surface occurs. At the ground surface that is not covered by the canopy, it convects and evaporates heat with the environment directly.

If the ground is totally covered by the canopy, vegetation density $v = 1$; all of the short wave and long wave radiation coming from the sky enters the canopy layer; the canopy surface convects and evaporates heat to the surroundings; there are no convection or evaporation heat transfers between the ground surface and the environment. The canopy layer and the ground surface exchange heat only by radiation; convective and evaporative heat exchange between canopy and the ground surface is assumed to be negligible (Best, 1998). If the ground is bare soil or covered by concrete or asphalt, vegetation density $v = 0$, the canopy layer disappear, the ground surface directly exchange heat with sky and environment. If the ground is partially covered by the canopy, then $0 < v < 1$; the solar irradiation and long wave irradiation from the sky can affect both the canopy layer (v) and the ground surface $(1 - v)$. Total horizontal solar irradiation is simply an input from the weather file. From a long wave radiation perspective, the earth's atmosphere is modeled as a surface with an effective emissivity and temperature as shown in Equation 3-3. The temperature is simply the local air temperature. The effective emissivity of the air for clear sky conditions (*CR* = 0) is calculated using the expression given by Staley and Jurica (1972). The effective emissivity of the air for non-clear sky conditions is calculated using Equation 3-4:

$$q_{thermal,rad,sky} = \varepsilon\sigma T_{ak}^4 \qquad (3-3)$$

$$\varepsilon = CR + 0.67(1 - CR)e_a^{0.08} \qquad (3-4)$$

Where:

$q_{thermal,rad,sky}$ is the thermal radiation coming from the sky, in W/m^2;

ε is the effective emissivity used for estimating the long wave radiation coming from the sky, dimensionless;

σ is the Stefan-Boltzmann constant, which is 5.67×10^{-8} W/m^2-K^4;

T_{ak} is the air temperature, in Kelvin;

CR is cloud cover, range from 0 (clear sky) to 1 (totally cloudy sky), this value is estimated using Crawford and Duchon model (1998), dimensionless;

e_a is the atmospheric water vapor pressure, in 10^{-2} Pa;

The heat transfer at the canopy layer and the ground surface are greatly affected by the vegetation density v. Herb et al. (2008) calibrated this parameter using measured results at one site for each ground cover condition and recommended that for short grass covered sites a vegetation density of 1.0 be used; for tall grass covered sites, a vegetation density of 0.95 was recommended. However, my calibrations of the vegetation density using measured results at 19 sites in the U.S. show that the best parameter value varies from site to site. The vegetation density of each site is closely related to the site's climate type. Thus, an automatic procedure for generating the vegetation density for each site based on the climate type has been developed; the methodology is described in Chapter 4.

3.1.2.1. Canopy Layer

The canopy layer is assumed to have negligible thermal mass, so that all the heat transfer terms balance instantaneously; the net heat gain at the canopy layer is a function of the canopy temperature $q_{net,f}(T_f) = 0$. Thus, the foliage temperature can be calculated from Equation 3-5:

$$q_{solar,rad,f} + q_{thermal,rad,sky,f} - 2q_{thermal,rad,f}(T_f) + q_{thermal,rad,gs} - q_{conv,f}(T_f) - q_{evap,f}(T_f) = 0 \quad (3-5)$$

Where:

$q_{net,f}$ is the total heat transfer enters the canopy layer, in W/m^2 or Btu/hr-ft^2;

$q_{solar,rad,f}$ is the solar radiation absorbed by the foliage of the canopy layer, in W/m^2 or Btu/hr-ft^2;

$q_{thermal,rad,sky,f}$ is the thermal radiation emitted from the sky and enters the foliage, in W/m^2 or Btu/hr-ft^2;

$q_{thermal,rad,f}$ is the thermal radiation emitted from the foliage, in W/m^2 or Btu/hr-ft^2;

$q_{conv,f}$ is convective heat loss through the foliage surface to the surrounding air, in W/m^2 or Btu/hr-ft^2;

$q_{evap,f}$ is the heat loss through evaporation at the foliage surface to the surrounding air, in W/m^2 or Btu/hr-ft^2;

A detailed discussion of the calculation of each heat flux term in Equation 3-5 is given by Herb et al. (2008). The short wave radiation from the sky $vq_{solar,rad,incident}$ is partially absorbed by the canopy layer; an absorptivity of 0.8 is used as suggested by Herb et al.. I also used the suggestions of Herb et al. for emissivity of the canopy layer (0.95), emissivity of the ground surface (0.94); the absorptivity to the long wave radiation form the sky of the canopy layer is 0.95, and the absorptive of ground surface is 0.94. Since there are so many opportunities for re-reflection between the canopy layer and the ground surface, it is assumed that the canopy absorbs all the radiative heat from the ground surface; the ground surface absorbs all the radiative heat from the canopy.

For short grass covered sites, I use the aerodynamic resistance, which determines the heat and moisture transfer from the canopy surface into the air as a function of wind speed, to calculate the convective heat flux (Herb et al. 2008):

$$q_{conv,f} = v h_{conv,f}\left(T_f - T_a\right) \qquad (3-6)$$

$$h_{conv,f} = \frac{\rho_a C_{pa}}{r_a} \qquad (3-7)$$

$$r_a = \frac{1}{\left(C_f u_a\right)} \qquad (3-8)$$

Where:

$q_{conv,f}$ is the convective heat transfer rate, in W/m^2 or Btu/hr-ft^2;

$h_{conv,f}$ is the convective heat transfer coefficient, in W/m^2-K or Btu/hr-ft^2-°F;

v is the vegetation density which defines the fraction of radiation blocked by the canopy layer, dimensionless;

ρ_a is the air density, in kg/m^3 or lb/ft^3;

C_{pa} is the air heat capacity, in J/kg-K or Btu/lb-°F;

r_a is the aerodynamic resistance used to determine the heat and moisture transfer from the canopy surface to the air, in s/m or s/ft;

C_f is the dimensionless heat transfer coefficient given by Deardorff (1978) which considers both the effect of forced convection and free convection, dimensionless;

T_a is the air temperature, in m/s or ft/s;

u_a is the wind speed, in m/s or ft/s;

Combine Equations 3-6, 3-7and 3-8, it is found that the convective heat transfer rate is estimated as being almost linearly proportional to the wind speed. For a dense cover of short grass, Best et al. (1998) suggested that the convection and evaporation heat transfer between the canopy and the ground is much smaller than the heat transfers from the canopy into the atmosphere. Thus, the heat transfers between the vegetation and the ground are neglected in Equations 3-6 and 3-9; only the heat transfers from the canopy into the atmosphere are calculated.

The evaporative heat transfer coefficient is analogous to the convective heat transfer coefficient. Since the humidity ratio of the air at the canopy surface w_f is not estimated in the model. In Equations 3-9, 3-10 and 3-11, we add a stomata resistance to the heat transfer network and use the saturated humidity ratio $w_{sat}(T_f)$ to calculate the evaporation heat transfer rate (Herb et al. 2008). The stomata resistance determines the heat and water vapor transfer through the pores of the canopy to the surface of the canopy; it is a function of solar radiation and the soil moisture as shown in Equation 3-11:

$$q_{evap,f} = v h_{evap,f}\left(w_{sat}(T_f) - w_a\right) \qquad (3-9)$$

$$h_{evap,f} = \rho_a L_v/(r_a + r_s) \qquad (3-10)$$

$$r_s = 200\left(\frac{R_{s,max}}{(R_s + 0.03R_{s,max})} + \left(\frac{\theta_{wp}}{\theta_s}\right)^2\right) \qquad (3-11)$$

Where:

$q_{evap,f}$ is the evaporative heat transfer rate, in W/m^2 or Btu/hr-ft^2;

$h_{evap,f}$ is the evaporative heat transfer coefficient, in W/m^2 or Btu/hr-ft^2;

L_v is the latent heat of vaporization of water, in J/kg or Btu/lb;

w_a is the humidity ratio of the air, in kg/kg or lb/lb;

w_{sat} is the saturated humidity ratio, in kg/kg or lb/lb;

r_s is the stomata resistance, which determines the heat and water vapor transfer through the pores of the canopy to the surface of the canopy in s/m;

$R_{s,max}$ is the maximum daytime shortwave radiation heat, in W/m^2 or Btu/hr-ft^2;

R_s is the measured hourly shortwave radiation heat, in W/m^2 or Btu/hr-ft^2;

θ_{wp} is the minimum soil moisture content the plant requires so as not to wilt, in m^3/m^3;

θ_s is the soil moisture content, in m^3/m^3;

In Equations 3-6, 3-7, 3-8, 3-9, 3-10, and 3-11, it calculates the convective and evaporative heat transfer between the canopy surface and the environment and neglects the heat transfer between the canopy to the air inside the canopy layer. For dense short grass covered sites, it is a reasonable assumption since the heat exchange area is quite small and the air barely flows in the canopy layer. For tall grass covered sites, the leaf area significantly increases and there are more air flows so the heat flux between the canopy and the air in the canopy needs to be estimated and included in the energy balance equation. For tall grass covered sites, I use equations 3-12, 3-13, 3-14, and 3-15 suggested by Deardorff (1978) to estimate the convective and evaporative heat transfer rate:

$$q_{conv,f} = \frac{1.1 N v \rho_a C_{pa}\left(T_f - T_{af}\right)}{r_a} \qquad (3-12)$$

$$q_{evap,f} = \frac{N v \rho_a L_v \left(w_{sat}(T_f) - w_a\right)}{(r_a + r_s)} \qquad (3-13)$$

$$T_{af} = (1 - v)T_a + v\left(0.3T_a + 0.6T_f + 0.1T_s\right) \qquad (3-14)$$

$$u_{af} = 0.3u_a \qquad (3-15)$$

Where:

T_{af} is the air temperature in the canopy layer, in °C or °F;

w_{af} is the humidity ratio of the air in the canopy layer, in kg/kg or lb/lb;

u_{af} is the wind speed in the canopy layer, in w/s or ft/s;

In Equation 3-12, the factor 1.1 roughly accounts for the effects of the stalks, stems, twigs, and limbs which exchange heat but do not transpire. N is the net leaf area index, which is defined as the total one-sided leaf area of the foliage relative to the ground area of the same region, as suggested by Allen and lemon (1972) and Monteith et al. (1965), for tall vegetations, $N = 7$. N does not much exceed 7 since there is not enough sunlight to support additional growth within the canopy. In Equation 3-14, Deardorff (1978) estimate the air temperature in the canopy layer using the canopy temperature, the air temperature above the canopy layer and the ground surface temperature. In Equation 3-15, the wind speed in the canopy is estimated from the wind speed above the canopy using a wind sheltering factor 0.3. Equation 3-15 is used with Equation 3-8 to estimate the aerodynamic resistance r_a.

3.1.2.2. Ground Surface

The net heat transfer rate at the ground surface $q_{net,gs}$ can be calculated from Equations 3-16 and 3-17 once the canopy temperature T_f is calculated using Equation 3-5:

$$q_{net,gs} = q_{solar,rad,gs} - q_{thermal,rad,net} - q_{conv,gs} - q_{evap,gs} \qquad (3-16)$$

$$q_{thermal,rad,net} = q_{thermal,rad,gs} - \left(q_{thermal,rad,sky,gs} + q_{thermal,rad,f}(T_f)\right) \qquad (3-17)$$

Where:

$q_{solar,rad,gs}$ is the solar radiation absorbed by the ground surface, in W/m^2 or Btu/hr-ft^2;

$q_{thermal,rad,net}$ is the net long wave radiation, in W/m^2 or Btu/hr-ft^2;

$q_{thermal,rad,sky,gs}$ is the thermal radiation emitted from the sky and is absorbed by the ground surface, in W/m^2 or Btu/hr-ft^2;

$q_{thermal,rad,f}$ is the thermal radiation emitted by the canopy layer and is absorbed by the ground surface, in W/m^2 or Btu/hr-ft^2;

$q_{thermal,rad,gs}$ is the thermal radiation emitted by the ground surface, in W/m^2 or Btu/hr-ft^2;

$q_{conv,gs}$ is the convective heat loss from the ground surface to the canopy layer, in W/m^2 or Btu/hr-ft^2;

$q_{evap,gs}$ is the heat loss through evaporation at the ground surface to the canopy layer, in W/m^2 or Btu/hr-ft^2;

The short wave radiation from the sky which reaches the ground surface $(1-v)q_{solar,rad,incident}$ is partially absorbed by the ground surface. An absorptivity 0.88 is used as suggested by Herb et al.(2008). The long wave radiation from the sky $(1-v)q_{thermal,rad,sky}$ is assumed to be partially absorbed by the ground surface using the absorptivity of 0.94 which equals to the ground surface emissivity. The evaporative heat transfer component $q_{evap,gs}$ includes both the forced convection driven by wind and natural convection driven by the temperature difference between the ground surface and the environment (Ryan, et al. 1974). If the ground is covered by asphalt or concrete, this term will be neglected. The convective heat transfer coefficient is determined from the evaporative (mass convection) heat transfer coefficient using the Chilton-Colburn heat and mass analogy.

The heat balance for whole cells with conduction heat transfer and for cells at the ground surface has been discussed. The cell at the bottom boundary is affected by the conduction heat flow from the cell above it and the geothermal heat flux from the Earth's core. The heat flux from the Earth's interior can be calculated by multiplying the soil thermal conductivity by the geothermal gradient. A typical value for the geothermal gradient of 25°C/km (1.4°F/100 ft) is used.

The model developed is derived based on the Herb et al. model (2008), but several features such as soil freezing/thawing, snow accumulation/melting are included, model parameters are adjusted appropriately so that the numerical model could be used to generate a world-wide dataset of ground temperatures in a variety of climate types.

3.2. Two-Harmonic Model

Although the numerical model provides ground temperature estimates with a good accuracy, a simpler form is preferred for many engineering applications. Usually, the one-harmonic formula would be sufficiently accurate for approximating the actual ground temperature variation. When precipitation, snow fall and soil freezing/thawing occurs in some of the locations, so a two-order harmonic model is preferred. Thus, the two-harmonic model is used here for the estimations of ground temperature for engineering applications. Equation 3-18 relies on few parameters: annual average soil temperatures, surface amplitude, phase delay to estimate the ground temperature:

$$T_s(z,t) = T_{s,avg} - \sum_{n=1}^{2} e^{-z\sqrt{\frac{n\pi}{\alpha_s t_p}}} T_{s,amplitude,n} \cos\left[\frac{2\pi n}{t_p}(t - PL_n) - z\sqrt{\frac{n\pi}{\alpha_s t_p}}\right] \quad (3-18)$$

Where:

$T_s(z,t)$ is the undisturbed soil temperature at the depth of z and time t of the year , in °C or °F;

z is the soil depth, in m or ft;

t is the time of year, starting from January 1st, in days;

t_p is the period of soil temperature cycle (365), in days;

α_s is the soil diffusivity, in m^2/day or ft^2/day;

$T_{s,avg}$ is the annual average soil temperature of different depth and time, in °C or °F;

$T_{s,amplitude,n}$ is the n^{th} order surface amplitude, which can be assume to be half of the difference between the maximum and minimum monthly average temperatures in a year, in °C or °F;

PL_n is the phase angle of the annual soil temperature cycle, in days;

These parameter values are estimated using the computed results from the one-dimensional numerical model. Mathematically, this is done by minimizing the sum of the squares of the errors between the numerical model and the two-harmonic model:

$$SSQE = \sum_{i=1}^{m} \sum_{t=1}^{k} \left(T_{s,NM}(z(i), t) - T_{s,THM}(z(i), t) \right)^2 \qquad (3-19)$$

Where:

$SSQE$ is the sum of square of the error;

m is the number of depths where the parameters are tuned at, this is done for four depths, so $m = 4$, unitless;

$z(i)$ is the depth where the soil temperature are estimated at, currently, $z(1) = 0.05$; $z(2) = 0.2$; $z(3) = 0.5$ and $z(4) = 1.0$, in m;

k is period of time, this is done for entire year, so $k = 365$, in day;

t is the day of the year, from 1 $\cdots$ 365;

$T_{s,NM}(z(i), t)$ is the computed undisturbed ground temperature from the numerical model which is a function of depth $z(i)$ and days of the year t, in °C or °F;

$T_{s,THM}$ is the computed undisturbed ground temperature from the two harmonic model which is a function of depth $z(i)$ and days of the year t as shown in Equation 1 when *n*=1 and *n*=2 are used, in °C or °F;

This is done at four depths and for a period of an entire year treating the annual average soil temperature, annual surface temperature amplitude and phase delay as the independent parameters that are adjusted to minimize the SSQE. The minimization is done with the Nelder-Mead Simplex method. The undisturbed soil temperature can then be calculated from the two-harmonic model with the estimated parameters. This parameter estimation procedure seems to work reasonably well, but it is limited by the accuracy of the numerical model used with measured weather data as inputs and the simplified form of the model itself.

3.3 Model Verifications

Section 3.3 introduces the numerical model verifications. Section 3.3.1 shows the results of the independency study, which includes the time step independency test, domain depth independency test and grid size independency test. These independency tests are designed for showing the numerical model results are independent of the time step, domain depth and grid size being used. The temperature convergence criterion for the independency tests is set to be ± 0.1 °C. In Section 3.3.2, a simple boundary condition is set for the numerical model; the numerical model result is then compared to an analytical solution result.

3.3.1. Independency study

Figure 3.4 shows the calculated one year soil temperature using the numerical model at the depth of 50 cm (20") in Minnesota, U.S. For the test, the soil domain is set to be 20.0 meters (65.6 ft) in depth. Uniform grid is used; grid size Δx is set to be 0.015 m. The soil diffusivity α_s is 5.0×10^{-7} m^2/s, which is a typical value chosen for clay loam soil. Explicit method is used in the numerical model; therefore, the maximum time step can be determined from the relation $\frac{1}{2}\Delta x^2/\alpha_s$, which is 225 s. Three time steps (120, 150 and 180 s) are used; all of them are less than the required maximum time step 225 s. As shown in the figure, the simulation results starts to converge (temperature difference < ±0.1 °C (± 0.2 °F)) at time step of 150 s.

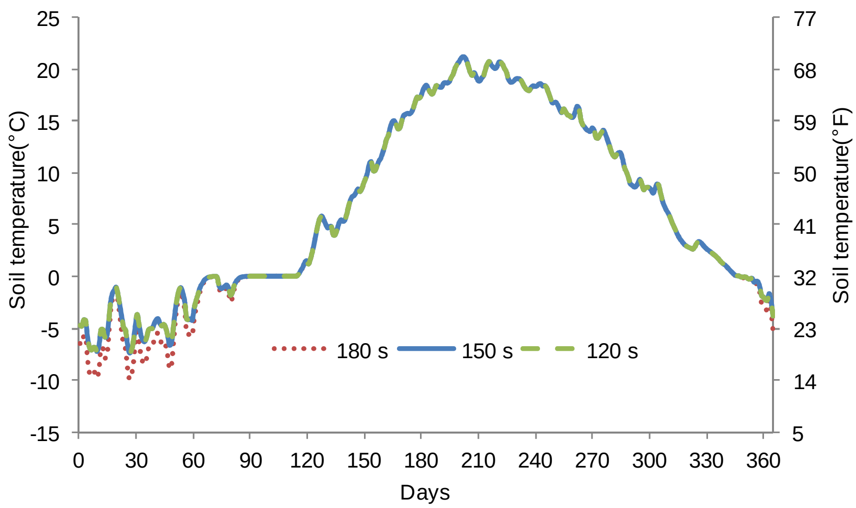

Figure 3.4: Time step independency study

Figure 3.5 shows the results of the grid independency test. Grid sizes of 0.025 m, 0.015 m and 0.005 m (1.0", 0.6" and 0.2") are used. The soil domain is set to be 20.0 meters (65.6 ft) deep, so 800, 1334 and 4000 uniform grids are used respectively. Figure 3.5 shows that model results converge when using uniform grid size of 0.025, 0.015 and 0.005 m (1.0", 0.6" and 0.2"). In order to save the computational time, the non-uniform grid is implemented in the numerical model. As shown in Figure 3.5, the simulation results using 227 cell non-uniform grid - "0.015 m_Non Uniform" (as described in Section 3.1) matches the results run with a grid of 4000 uniform cells - "0.005 m - Uniform". This test served to gain some confidence in the non-uniform grid utilized for the numerical model.

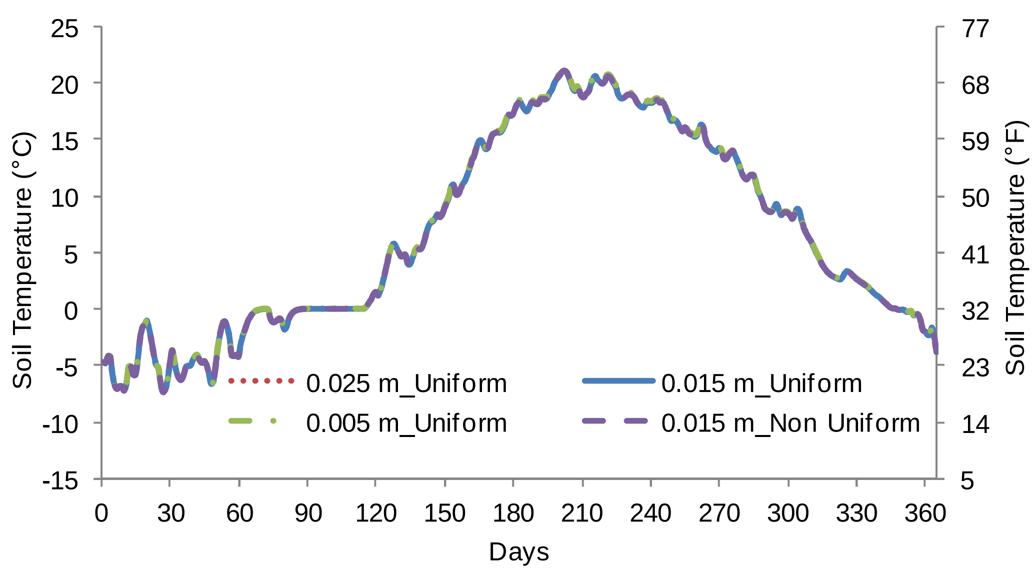

Figure 3.5: Grid size independency study

Figure 3.6 shows the simulation results of the domain depth independency test. The soil domain is set to be 15.0, 20.0 and 50.0 meters (49.2, 65.6 and 164.0 ft) deep. Non-uniform grid is used in the simulation. In Figure 3.6, the maximum absolute difference of the simulation results "15 m" and "50 m" is 0.18 °C (in day 147), which exceeds the convergence criterion - 0.1 °C. The maximum absolute difference of the simulation results "20 m" and "50 m" is 0.00008 °C, which is within the convergence criterion. Thus, a domain depth of 20 meters (65.6 ft) was chosen.

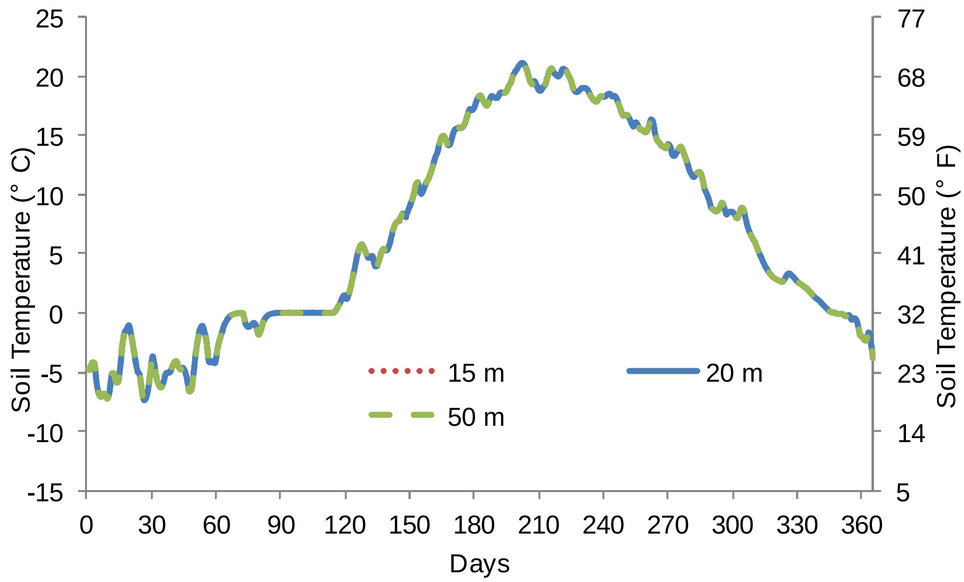

Figure 3.6: Domain depth independency study

3.3.2. Comparision with Analytical Solution

In this section, the numerical model is validated against an analytical solution (Cengel and Ghajar, 2011; page 251), by comparing the temperature response of the soil to a constant heat pulse at the earth surface using the two models using Equation 3-20:

$$T_s(z,t) = T_i + \frac{q_s}{k_s}\left[\sqrt{\frac{4\alpha_s t}{\pi}} exp\left(-\frac{z^2}{4\alpha_s t}\right) - zerfc\left(\frac{z}{2\sqrt{\alpha_s t}}\right)\right] \qquad (3-20)$$

Where:

$T_s(z,t)$ is the soil temperature at depth z and time t, in °C or °F;

T_i is the soil initial temperature, in °C or °F;

q_s is the heat transfer rate, in W/m^3 or Btu/hr-ft^3;

k_s is the soil thermal conductivity, in W/m^2-K or Btu/hr-ft^2-°F;

α_s is the soil thermal diffusivity, in m^2/s or ft^2/s;

During the test, both the numerical model and analytical model are set to an initial uniform soil temperature and a constant soil temperature at the bottom boundary, 15 °C (59 °F). A constant heat flux is imposed at the earth surface - 10 W/m^2 (3.2 Btu/hr•ft^2). The results of the validation are shown in Figure 3.7. Figure 3.7 shows that estimated soil temperature at the depth of 50 cm (20") using both models for a period of 720 hours; both model results are plotted in two continuous lines. The differences of the two results are presented in a dotted line using the second vertical axis shown at the right side of the plot. It shows that the numerical model results agree quite well with the analytical results with a negligible difference of less than 0.00015 °C (0.00027 °F).

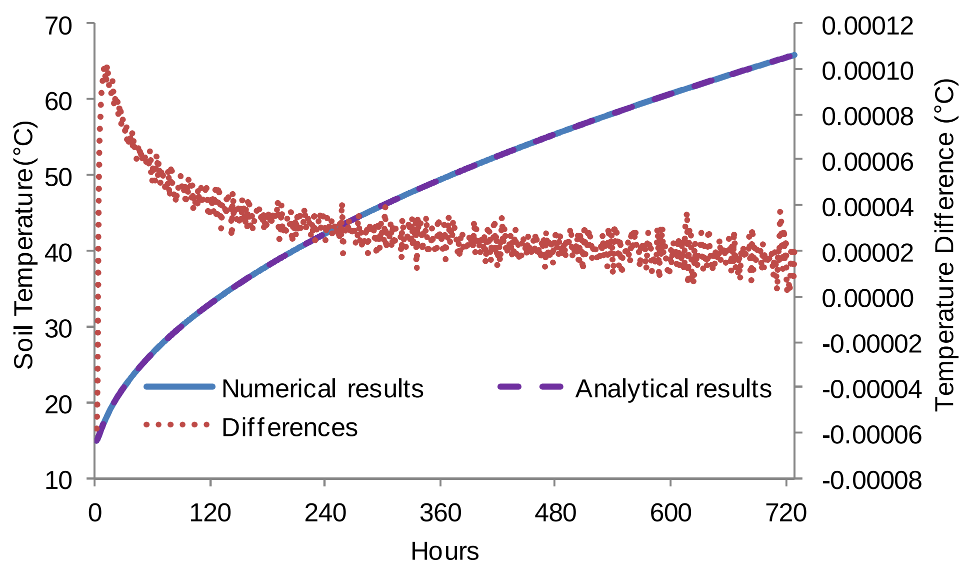

Figure 3.7: Comparison of estimated soil temperature at 50 cm (20") depth using numerical model and analytical solutions

3.4. Experimental Validation

The undisturbed ground temperatures predicted from the numerical method are validated here against temperature measurements provided by Soil Climate Analysis Network[1] (SCAN). Nineteen geographically diverse measurement sites are chosen for validating the model results over a range of weather conditions. The results presented in this article are generated using the weather data collected at the SCAN sites (NRCS 2013). The name, longitude, latitude and altitude of the nineteen SCAN measurement sites are listed in Table 3.1. The ground is covered either by mowed grass or tall grass at the SCAN sites, the sites covered by tall grass is bolded and marked with * in the table. The geographical locations of these SCAN sites are labeled in a map shown in Figure 3.8.

In Table 3.1, these nineteen SCAN sites are at first classified into six climate types BSk, Csb, Cfa, Dfa, Dfb, Dfc according to Köppen-Geiger climate classification system (Kottek et al. 2006). Four sites with BSk and Csb climate types are categorized into the arid or dry summer climates; eight sites with Cfa climate types are categorized into the warm climates; seven sites with Dfa, Dfb, Dfc are categorized into snow climates. The sites are categorized so that the model accuracy in different climate types can be evaluated accordingly.

[1] The SCAN sites (http://www.wcc.nrcs.usda.gov/scan/) provide a significant amount of data at 191 sites at six standard depths: 5, 10, 20, 50, 100 and 200 cm for about the last 15 years. The SCAN data provides detailed information on soil properties, weather conditions and undisturbed ground temperature inside United States.

Table 3.1: Soil Climate Analysis Network (SCAN) measurement sites

Climate types	States in the U.S.	Name of Measurement Site	Köppen-Geiger Climate Classification	Latitude(°North)	Longitude (°West)	Altitude, m (ft)
Arid or dry summer climates	Arizona	Walnut Gulch	BSk	31.73	110.05	1372 (4500)
	Colorado	Nunn	BSk	40.87	104.73	1798 (5900)
	New Mexico	Los Lunas PMC	BSk	34.77	106.77	1477 (4846)
	Oregon	Lyn Hart Ranch	Csb	42.02	121.40	1247(4180)
Warm climates	Alabama	WTARS	Cfa	34.90	86.53	191 (627)
	Arkansas	UAPB Lonoke Farm	Cfa	34.85	91.88	76 (249)
	Georgia	Watkinsville	Cfa	33.88	83.43	235 (771)
	Kentucky	Mammoth Cave	Cfa	37.18	86.03	244 (801)
	Maryland	Powder Mill	Cfa	39.02	76.85	32 (105)
	Oklahoma	Fort Reno*	Cfa	35.55	98.02	427 (1401)
	South Carolina	Pee Dee	Cfa	34.30	79.73	37 (121)
	Virginia	Tide Water AREC	Cfa	36.68	76.77	24 (79)
Snow climates	Iowa	Ames*	Dfa	42.02	93.73	327(1073)
	Minnesota	Cresent Lake*	Dfb	45.42	93.95	299 (981)
	North Dakota	Mandan	Dfb	46.77	100.92	588 (1929)
	Nebraska	Rogers Farm	Dfa	40.85	96.47	370 (1214)
	South Dakota	EROS Data Center	Dfa	43.57	96.62	488 (1601)
	Alaska	Aniak*	Dfc	61.58	159.58	24(80)
	Alaska	Nenana	Dfc	64.68	148.92	127(415)

Note: Sites covered by tall grass are bolded and labeled with *, all others are covered by short (mowed) grass

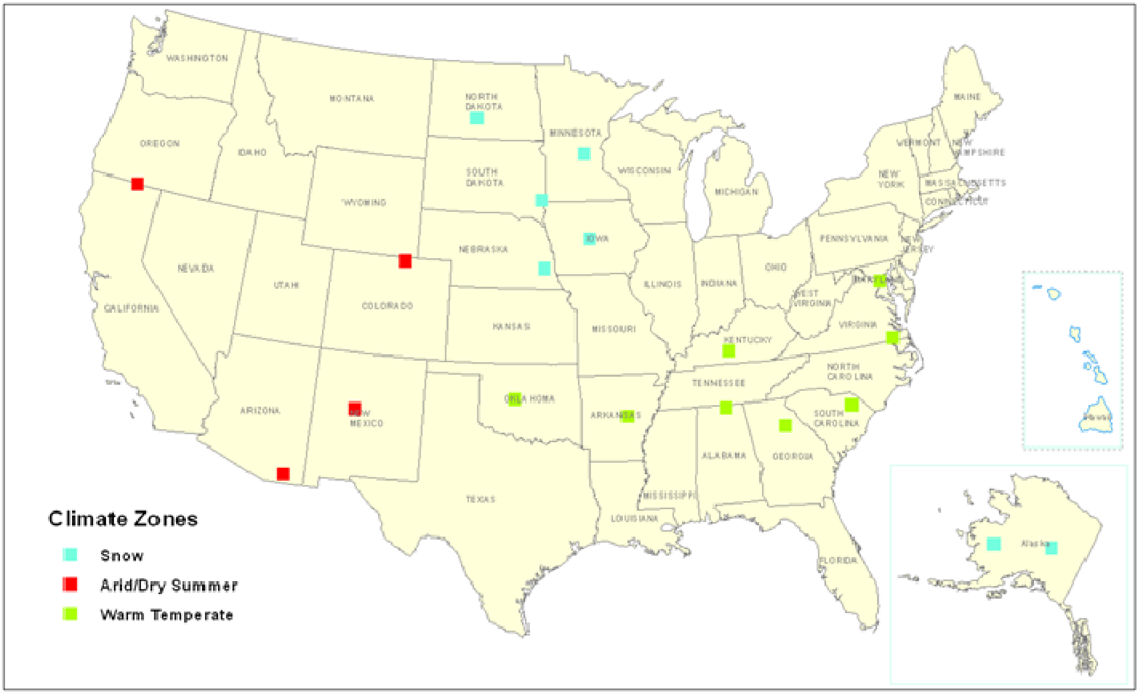

Figure 3.8: Map of United States with SCAN sites located (Wikipedia 2013)

Note: The sites in arid climates are circled in red polygon, the sites in warm climates are circled in green polygon, and the sites in snow climates are circled in blue polygon

3.4.1. Model Input

The weather data such as air temperature, air relative humidity, wind speed, solar radiation are also measured at the SCAN sites, only few meters away from where the ground temperature are measured at. These weather data are used as inputs in the numerical model. The soil thermal diffusivity used in the models is estimated using the measured ground temperature using the procedure recommended by Kusuda and Achenbach (1965). The annual average soil temperature, annual surface temperature amplitude, phase delay and the soil thermal diffusivity are treated as independent parameters that are adjusted to minimize the sum of the squares of the errors of the harmonic model and the measured results. This is done at 5, 20, 50 and 100 cm (2, 8, 20 and 40") depths and for a period of an entire year. The estimated soil thermal diffusivity for the 19 sites ranges from 0.24×10^{-6} m^2/s to 1.49×10^{-6} m^2/s (2.58×10^{-6} ft^2/s to 16.04×10^{-6} ft^2/s).

In the two sites in Alaska, the ground is covered by heavy snows in winter; the estimated soil thermal diffusivity in winter is much lower than it is in summer. It is not possible to find one value that would represent both. A typical value of 0.49×10^{-6} m^2/s (5.27×10^{-6} ft^2/s) is used for these two sites. According to Hendrickx et al. (2003), this value is given for 60% saturated silt and clay soil.

3.4.2. Sample Results

In order to demonstrate the accuracy of the numerical model and two-harmonic model, two models results are both compared to the experimental results at the depths of 5cm (2") and 50cm (20") at a SCAN site (WTARS) in Madison, Alabama in year 2004. This site is covered by short grass and is located in Cfa (warm temperate, fully humid, hot summer) climates according to Köppen-Geiger climate classification scheme. The soil diffusivity used in the simulation is 3.8×10^{-7} m^2/s (3.6×10^{-6} ft^2/s).

3.4.2.1 SCAN site - WTARS, Alabama

Although I concluded the two-order harmonics model will be used, here the one- harmonic, two-harmonic and five--harmonic model results at the depth of 5cm (2") and 50cm (20") will all be compared to the experimental results to demonstrate the two-harmonic model is sufficient for representing the variation of the ground temperatures at different depths and time of year. The model parameter values used for the three models have been summarized in Table 3.2.

Table 3.2: Two-harmonic model parameters for WTARS, Alabama[2]

<table>
<tr><th rowspan="2">Site</th><th rowspan="2">Surface cover</th><th rowspan="2">Climate type - Köppen Geiger</th><th rowspan="2">$T_{s,avg}$, ℃ (℉)</th><th colspan="5">$T_{s,amplitude,n}$,℃ (℉)</th><th colspan="5">PL_n(day)</th></tr>
<tr><th>n=1</th><th>n=2</th><th>n=3</th><th>n=4</th><th>n=5</th><th>n=1</th><th>n=2</th><th>n=3</th><th>n=4</th><th>n=5</th></tr>
<tr><td>WTARS Alabama</td><td>short grass</td><td>Cfa</td><td>17.1 (62.8)</td><td>10.1 (18.2)</td><td>1.4 (2.5)</td><td>0.6 (1.1)</td><td>0.5 (0.9)</td><td>-0.4 ('-0.7)</td><td>19.7</td><td>24.3</td><td>- 4.8</td><td>12.2</td><td>5.1</td></tr>
</table>

The root mean square errors of the harmonic model compared to the numerical model at the depth of 5 cm (2") and 50 cm (20") are summarized in Table 3.3.

Table 3.3: RMSEs of the harmonic models for WTARS, Alabama[3]

Model	Root mean square errors, ℃ (℉)	
	at depth, 5 cm (2")	at depth, 50 cm (20")
One harmonic	2.0 (3.6)	1.5 (2.6)
Two harmonic	1.9 (3.4)	1.3 (2.4)
Five harmonic	1.8 (3.2)	1.2 (2.2)

As it is shown in Table 3.3, the RMSEs of the harmonic models are relatively high at the depth of 5 cm in the range of 1.8°C - 2.0°C (3.2°F - 3.6°F). At deeper depth, the RMSEs of the harmonic models are in the range of 1.2°C - 1.5°C (2.2°F - 2.6°F). In this case, using five-harmonic model would help reducing the model RMSEs by 0.3°C (0.5°F) compared to the one-harmonic model. Figures 5 and 6 present the comparison of the numerical model results and two-harmonic model results against the experimental results at the depths of 5cm (2") and 50cm (20").

[2] Model parameters are derived using measured weather data at the SCAN site at year 2004.
[3] RMSEs in this table are computed using model parameters in Table 3.2 and experimental results measured at year 2004

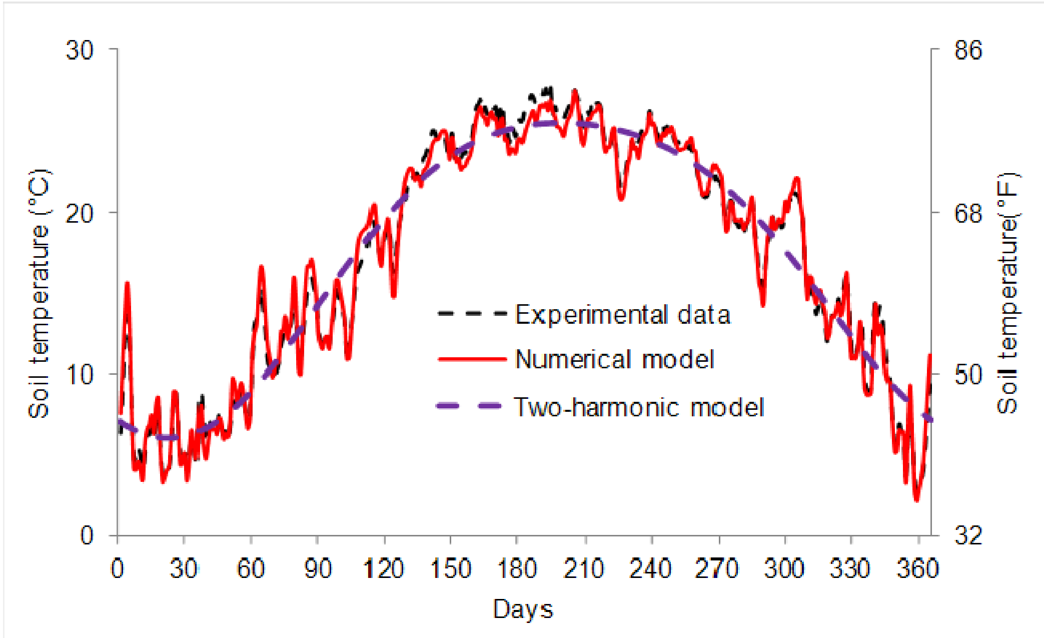

Figure 3.9: Soil temperature at 5cm (2") depth at WTARS, Alabama (SCAN site) at year 2004

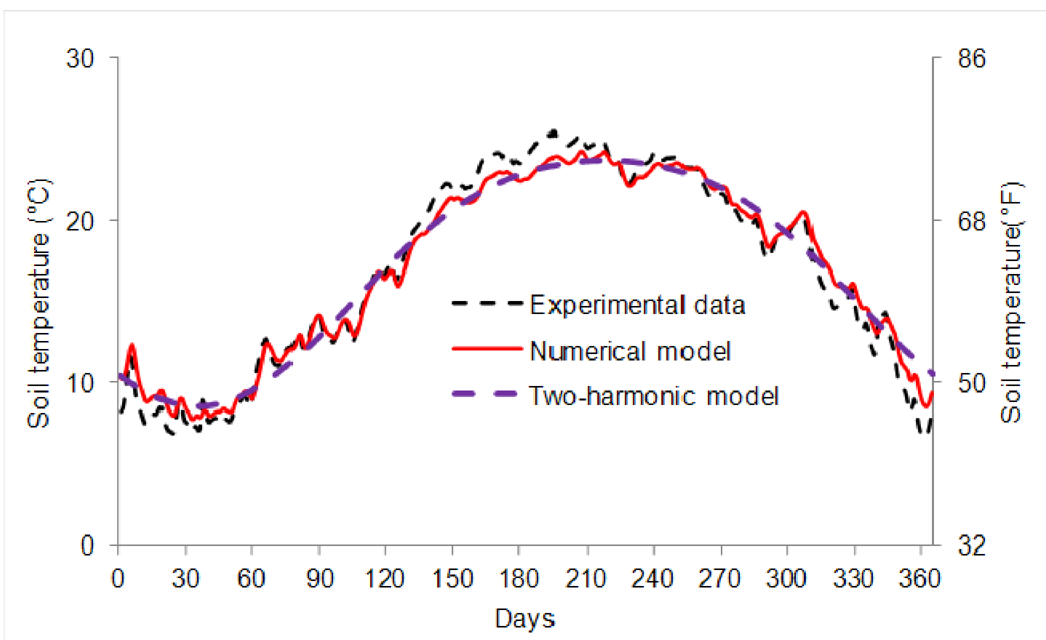

Figure 3.10: Soil temperature at 50cm (20") depth at WTARS, Alabama (SCAN site) at year 2004

In Figures 3.9 and 3.10, clearly the numerical model results match the experimental results better than the two-harmonic model does. The two-harmonic model can not be used to represent the daily variation of the soil temperature; it matches the experimental results better at the depth of 50cm (20") than at the depth of 5cm (2") where the daily temperature variation has been damped out through the soil layer.

3.4.2.2. SCAN site - Nenana, Alaska

In order to understand better how the numerical model and the harmonic models behavior in cold climates, the same validation test is done at another SCAN site - Nenana in Yukon-Koyukuk, Alaska in year 2013. This site is located in Dfc (snowy, fully humid, cool summer and cold winter) climates according to Köppen-Geiger climate classification scheme. The model parameter values used for the three models have been summarized in Table 3.4.

Table 3.4: Two-harmonic model parameters for Nenana, Alaska[4]

Site	Surface cover	Climate type - Köppen Geiger	$T_{s,avg}$, ℃ (℉)	$T_{s,amplitude,n}$, ℃ (℉)					PL_n(day)				
				n=1	n=2	n=3	n=4	n=5	n=1	n=2	n=3	n=4	n=5
Nenana, Alaska	short grass	Dfc	1.7 (3.0)	9.1 (16.3)	-3.3 ('-5.9)	-1.2 ('-2.1)	-0.4 ('-0.7)	0.7 (1.3)	59.1	4.7	22.2	40.7	1.6

The root mean square errors of one-harmonic, two-harmonic and five-harmonic models compared to the experimental results at the depth of 5cm (2") and 50cm (20") are summarized in Table 3.5.

[4] Model parameters are derived using measured weather data at the SCAN site at year 2013

Table 3.5: RMSEs of the harmonic models for Nenana, Alaska[5]

Model	Root mean square errors, ℃ (℉)	
	at depth, 5 cm (2")	at depth, 50 cm (20")
One harmonic	4.0 (7.3)	1.9 (3.5)
Two harmonic	2.9 (5.2)	1.3 (2.4)
Five harmonic	2.8 (5.0)	1.3 (2.3)

In cold climates, the RMSEs of the harmonic models are relatively high at the depth of 5cm (2") ranges from 2.8°C to 4.0°C (5.0°F to 7.2°F). At deeper depth, the RMSEs of the harmonic models are in the range of 1.3°C - 1.9°C (2.4°F to 3.5°F). Using the two-harmonic model reduces the RMSEs by 1.1°C (2.1°F) at the depth of 5 cm (2") and 0.6°C (1.1°F) at the depth of 50cm (20") compared to the one-harmonic model. Increase the harmonic from two to five would not obviously affect the model accuracy. The same tests are done for all the other seventeen sites, similar conclusion can be drawn. Therefore, it is recommended that two-harmonic model to be used. Figures 3.11 and 3.12 show the comparison of the numerical model and the two-harmonic model to the experimental results at the Nenana, Alaska site at the depth of 5cm (2") and 50cm (20").

[5] RMSEs in this table are computed using model parameters in Table 3.4 and experimental results measured at year 2013

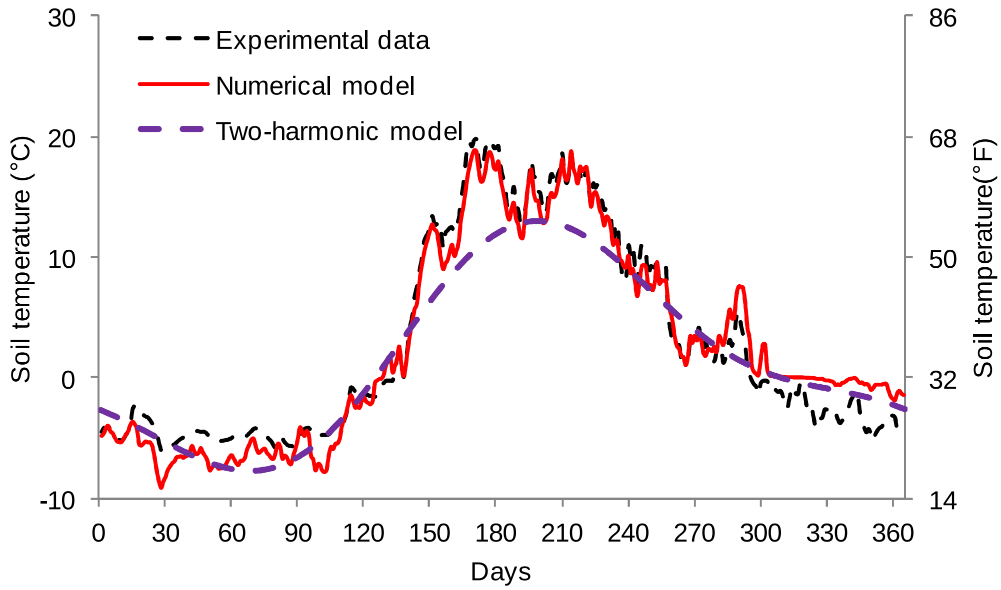

Figure 3.11: Soil temperature at 5cm (2") depth at Nenana, Alaska (SCAN site) at year 2013

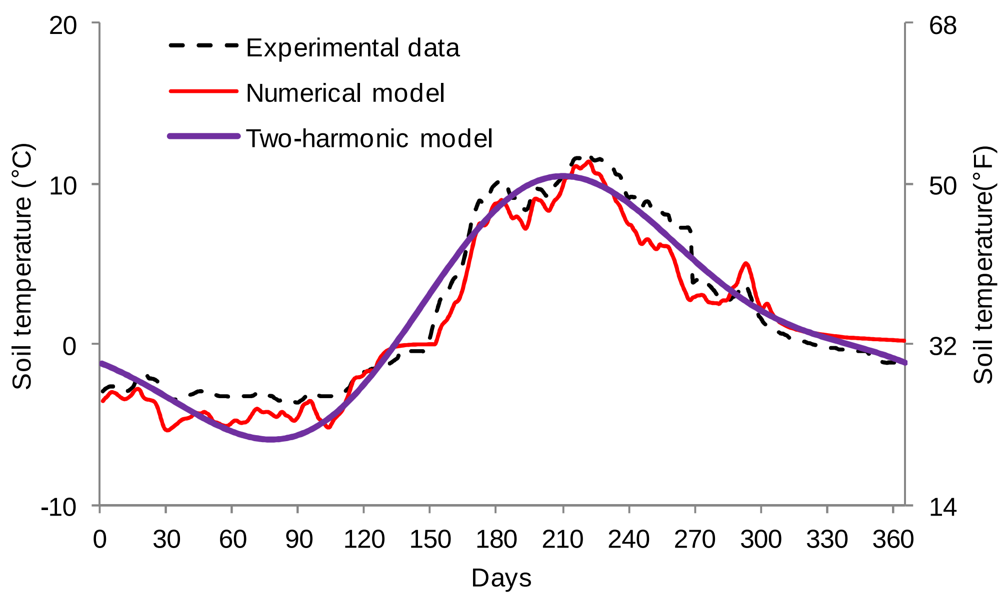

Figure 3.12: Soil temperature at 50cm (20") depth at Nenana, Alaska (SCAN site) at year 2013

In this site, the numerical model results match the experimental results well as usual. The two-harmonic model under predicts the numerical model results at the depth of 5cm (2") and the two-harmonic model over predict the numerical model results at the depth of 50cm (20"). This is because when soil freezing/thawing and snow accumulation/melting occur, the soil becomes rather inhomogeneous; the harmonic model is not able to account for these factors.

3.4.3. Validation of All Sites

For all the nineteen SCAN sites presented in Table 3.1, the numerical model is run with the actual measured weather data at each site for a single year between 2001-2013. The simulation results are then compared to the single year measured ground temperatures at each site; the root mean square errors (RMSEs) of the numerical model at the 5, 20, 50 and 100cm (2, 8, 20 and 40") depths are summarized in Table 3.6. The years of the measured weather data and ground temperatures that are used for the validation are also summarized in Table 3.6.

Table 3.6: RMSEs of the numerical model at 5, 20, 50 and 100cm (2, 8, 20 and 40") depths[6]

Climate zone	States in the U.S.	Site name	Year	RMSEs of each location, ℃ (℉)				Mean RMSE for climate type, ℃ (℉)			
				5 (2)	20 (8)	50 (20)	100 (40)	5 (2)	20 (8)	50 (20)	100 (40)
Arid or dry summer climates (4)	Arizona	Walnut Gulch	2005	1.7	2.0	1.1	1.4	1.6	1.5	1.1	1.2
	Colorado	Nunn	2008	1.8	1.6	1.6	1.4				
	New Mexico	Los Lunas PMC	2010	1.4	1.0	0.8	1.1				
	Oregon	Lyn Hart Ranch	2005	1.4	1.2	1.0	0.8				
Warm temperate climates (8)	Alabama	WTARS	2004	0.7	0.6	0.9	0.4	1.4	1.2	1.3	1.1
	Arkansas	UAPB Lonoke Farm	2001	2.2	1.8	1.7	1.4				
	Georgia	Watkinsville	2006	1.0	0.9	1.1	1.0				
	Kentucky	Mammoth Cave	2004	0.9	0.9	0.8	0.7				
	Maryland	Powder Mill	2002	0.9	0.8	1.0	0.6				
	Oklahoma	Fort Reno*	2001	2.1	1.8	2.0	1.8				
	South Carolina	Pee Dee	2001	2.3	2.2	2.1	1.9				
	Virginia	Tide Water AREC	2001	1.3	1.0	0.8	1.0				
Snow climates (7)	Iowa	Ames*	2005	2.4	2.5	2.2	1.6	1.8	1.7	1.7	1.6
	Minnesota	Cresent Lake*	2003	2.1	2.1	2.2	1.8				
	North Dakota	Mandan	2006	1.7	2.2	2.6	2.0				
	Nebraska	Rogers Farm	2006	1.5	1.1	1.2	1.3				
	South Dakota	EROS Data Center	2009	1.3	1.3	1.0	0.9				
	Alaska	Aniak*	2013	2.2	1.6	1.0					
	Alaska	Nenana	2013	1.7	1.4	1.3	1.9				
All sites								1.6	1.5	1.4	1.3

Table 3.6 summarizes the root mean square errors (RMSEs) of the numerical model compared to the measured results at the depth of 5, 20, 50 and 100cm (2, 8, 20 and 40") in nineteen SCAN sites. The mean RMSEs of all sites and at four depths are all in the range of 1.3°C-1.6°C (2.3°F-2.9°F). These sites are located in three climate types (arid climates, warm temperate climates and snow climates). In the arid climates, the mean model RMSEs of four SCAN sites are within

[6] RMSEs in this table are computed using model parameters derived from weather data measured at the SCAN sites for a specific year and experimental results measured for that specific year.

1.2°C-1.6°C (2.2°F-2.9°F) at four depths. In warm temperate climates, the model averaged RMSEs are 1.1°C-1.4°C (2.0°F-2.5°F); in snow climates, the model RMSEs averaged for seven sites are 1.6°C-1.8°C (2.9°F-3.2°F) at four depths. The model has relative lower RMSEs at shallow depth and higher ones at deeper depth. It is known that the two-harmonic model is chosen to be used. In Table 3.7, the RMSEs of the model at the 19 SCAN sites are summarized.

Table 3.7: RMSEs of the two-harmonic model[7]

Climate zone	States in the U.S.	Site name	RMSEs of each location, ℃ (℉)				Mean RMSE for climate type, ℃ (℉)			
			5 (2)	20 (8)	50 (20)	100 (40)	5 (2)	20 (8)	50 (20)	100 (40)
Arid or dry summer climates (4)	Arizona	Walnut Gulch	2.8	2.6	1.5	1.5	2.5	2.0	1.4	1.3
	Colorado	Nunn	2.7	2.0	1.8	1.5				
	New Mexico	Los Lunas PMC	2.3	1.6	1.1	1.4				
	Oregon	Lyn Hart Ranch	2.1	1.7	1.1	0.9				
Warm temperate climates (8)	Alabama	WTARS	1.9	1.5	1.3	0.5	2.3	1.9	1.7	1.3
	Arkansas	UAPB Lonoke Farm	3.0	2.5	2.0	1.6				
	Georgia	Watkinsville	1.8	1.4	1.3	1.2				
	Kentucky	Mammoth Cave	2.1	1.8	1.3	0.9				
	Maryland	Powder Mill	2.2	1.7	1.4	0.8				
	Oklahoma	Fort Reno*	2.3	2.1	2.2	2.1				
	South Carolina	Pee Dee	2.7	2.5	2.3	2.0				
	Virginia	Tide Water AREC	2.4	1.9	1.5	1.5				
Snow climates (7)	Iowa	Ames*	2.5	2.5	2.2	1.7	2.4	1.9	1.6	1.6
	Minnesota	Cresent Lake*	2.5	2.2	1.9	1.5				
	North Dakota	Mandan	2.8	2.3	2.0	1.6				
	Nebraska	Rogers Farm	2.1	1.4	1.4	1.6				
	South Dakota	EROS Data Center	1.8	1.7	1.2	1.2				
	Alaska	Aniak*	2.6	1.5	1.4					
	Alaska	Nenana	2.9	1.9	1.3	1.9				
All sites							2.4	1.9	1.6	1.4

[7] RMSEs in this table are computed using model parameters derived from weather data measured at the sites for a specific year and experimental results measured for that specific year.

Table 3.8: RMSEs of the one-harmonic model[8]

Climate zone	States in the U.S.	Site name	RMSEs of each location, ℃ (℉)				Mean RMSE for climate type, ℃ (℉)			
			5 (2)	20 (8)	50 (20)	100 (40)	5 (2)	20 (8)	50 (20)	100 (40)
Arid or dry summer climates (4)	Arizona	Walnut Gulch	2.8	2.6	1.6	1.5	2.7	2.2	1.6	1.5
	Colorado	Nunn	2.7	2.1	1.8	1.5				
	New Mexico	Los Lunas PMC	2.4	1.8	1.3	1.5				
	Oregon	Lyn Hart Ranch	3.0	2.4	1.8	1.3				
Warm temperate climates (8)	Alabama	WTARS	2.0	1.7	1.5	0.6	2.4	2.0	1.8	1.4
	Arkansas	UAPB Lonoke Farm	3.0	2.5	2.1	1.7				
	Georgia	Watkinsville	1.8	1.4	1.3	1.2				
	Kentucky	Mammoth Cave	2.5	2.2	1.7	1.2				
	Maryland	Powder Mill	2.3	1.8	1.5	0.9				
	Oklahoma	Fort Reno*	2.4	2.1	2.3	2.2				
	South Carolina	Pee Dee	2.8	2.5	2.3	2.0				
	Virginia	Tide Water AREC	2.4	1.9	1.5	1.5				
Snow climates (7)	Iowa	Ames*	2.5	2.5	2.2	1.7	2.8	2.2	1.8	1.6
	Minnesota	Cresent Lake*	2.6	2.3	2.0	1.6				
	North Dakota	Mandan	3.0	2.4	2.0	1.7				
	Nebraska	Rogers Farm	2.4	1.6	1.5	1.6				
	South Dakota	EROS Data Center	1.9	1.9	1.5	1.3				
	Alaska	Aniak*	3.0	2.1	1.7					
	Alaska	Nenana	4.0	2.9	1.9	1.8				
All sites							2.6	2.1	1.8	1.5

In Table 3.7, it is found that both models give good estimations of the ground temperatures compared to the measured results. The mean RMSEs of the two-harmonic model of all sites in all three climates at the four depths are in the range of 1.4°C-2.4°C (2.5°F-4.3°F). The two-harmonic

[8] RMSEs in this table are computed using model parameters derived from weather data measured at the SCAN sites for a specific year and experimental results measured for that specific year.

model give mean RMSEs of all sites 0.1°C-0.8°C (0.2°F-1.4°F) higher than the numerical model does. This is because the accuracy of the two-harmonic model is limited not only by the accuracy of the numerical model used with measured weather data as inputs, but also and the simplified form of the model itself. In order to demonstrate the necessity of using the two-harmonic model, the RMSEs of the one-harmonic model is also presented, as shown in Table 3.8.

By comparing the results of Tables 3.7 and 3.8, I conclude that for the 19 SCAN sites studied, using the two-harmonic model could help reducing the mean model RMSEs from 1.5°C-2.6°C (2.7°F-4.7°F) to 1.4°C-2.4°C (2.5°F-4.3°F) at 5-100cm (2-40") depths. Implementing higher order harmonic model does not affect the mean model RMSEs of all sites to a large degree; however, it significantly improves the results in some sites - Lyn Hart Ranch, Oregon and Nenana, Alaska. In the site - Lyn Hart Ranch, Oregon, the one-harmonic model RMSEs at four depths are 1.3°C-3.0°C (2.3°F-5.4°F); the two-harmonic model RMSEs at four depths are 0.9°C-2.1°C (1.6°F-3.8°F). Using the two-harmonic model reduces the model RMSEs by 0.4°C-0.9°C (0.7°F-1.6°F) at four depths. In the sites - Nenana, Alaska, using the two-harmonic model reduces the model RMSEs by 1.1°C, 1.0°C, 0.6°C and -0.1°C (2.0°F, 1.8°F, 1.1°F and -0.2°F). Thus, the two-harmonic model is preferred to be used for engineering application.

The numerical model developed in this article is initially based on the Herb et al. method. I include several factors that are not considered in the Herb et al. model, such as soil freezing/thawing, snow cover effect. I also found out that the vegetation density needs to be adjusted for different sites located in different climate types. By considering these factors, the new model I developed gives much lower RMSEs. Figures 3.13, 3.14, 3.15 and 3.16 present the mean RMSEs of the Herb et al. model, numerical model, one-harmonic model and two-harmonic model in all three climates, the arid climates, warm temperate climates and the snow climates. In Figure 3.13, Herb et al. model gives RMSEs of all three climate as 2.6°C, 2.4°C, 2.2°C and 1.7°C (4.7°F, 4.3°F, 4.0°F and 3.1°F) at 5, 20, 50 and 100cm (2, 8, 20 and 40") depth. The numerical model gives averaged model RMSEs of all climates within 1.3°C-1.6°C (2.3°F-2.9°F) at the four depths, which are 0.4°C-1.0°C (0.7°F-1.8°F) lower than the Herb et al. model RMSEs. This is quite obvious in the snow climates, as shown in Figure 3.16. The Herb et al. model gives RMSEs of 2.3°C - 3.8°C (4.1°F - 6.8°F) at the four depths; the numerical model gives the RMSEs of 1.6°C - 1.8°C (2.7°F - 3.2°F) at the four depths.

In Figure 3.13, the two-harmonic model gives mean RMSEs of all three climates which are1.4°C-2.4°C (2.5°F-4.3°F) at the four depths, which is about 0.2°C (0.4°F) lower than the one-harmonic mean model RMSEs of all three climates at the four depths. The advantage of using higher order harmonic model is more evident in the arid climates and snow climates as shown in Figures 3.14 and 3.16.

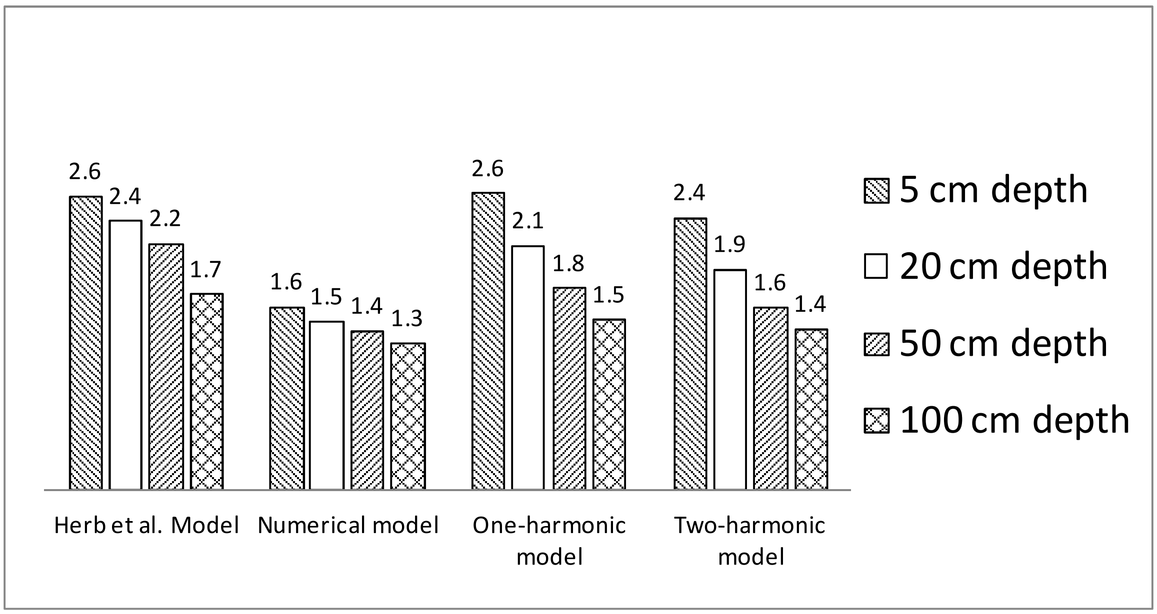

Figure 3.13: Mean RMSEs of the simulation results at four depths, in all three climates – arid or dry summer climates, warm temperate climates and snow climates

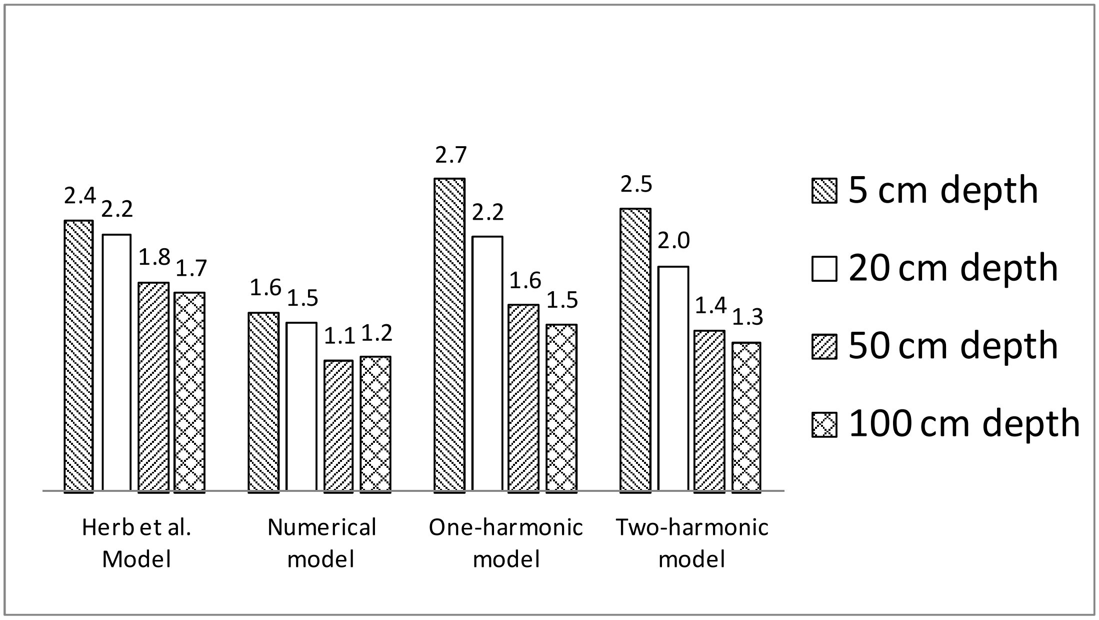

Figure 3.14: Mean RMSEs of the simulation results at four depths, in arid or dry summer climates

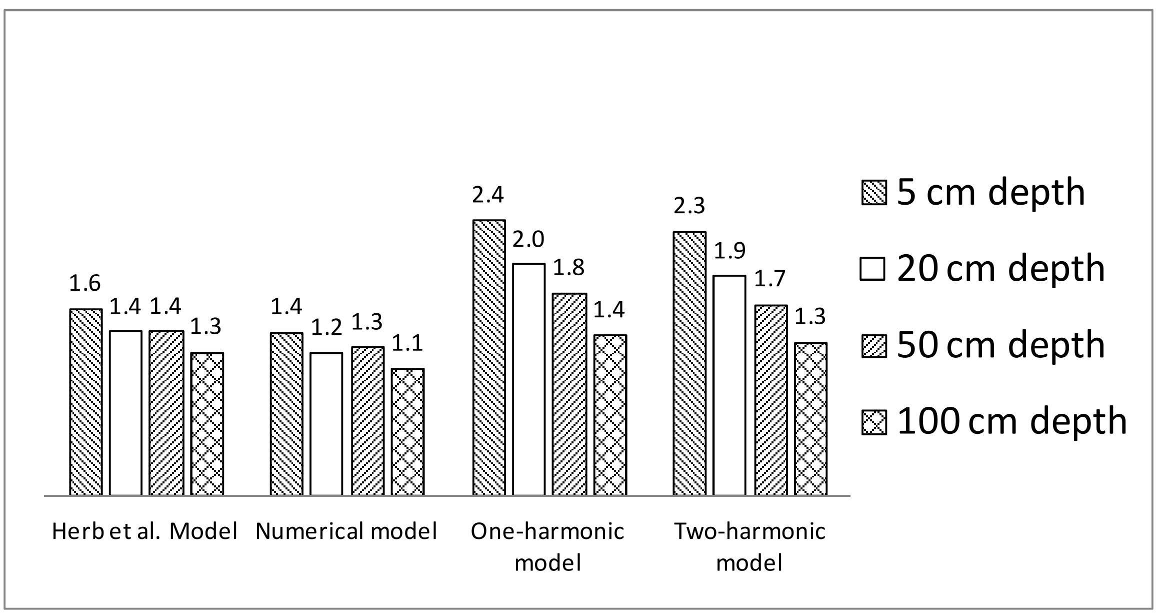

Figure 3.15: Mean RMSEs of the simulation results at four depths, in warm temperate climates

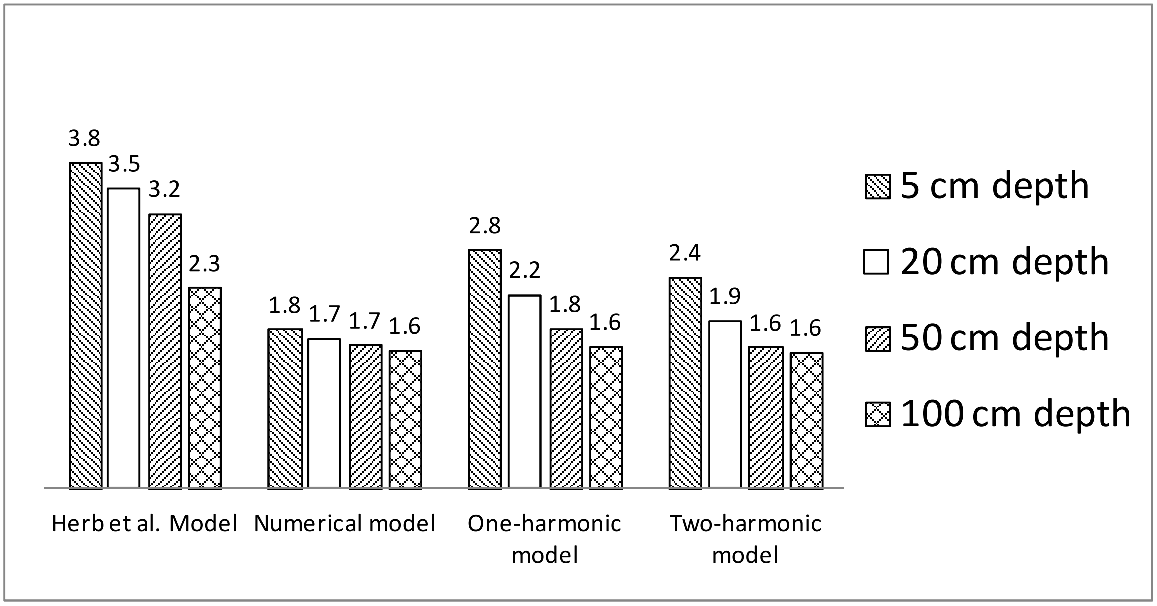

Figure 3.16: Mean RMSEs of the simulation results at four depths, in snow climates

In all, the numerical model and two-harmonic model give satisfactory model RMSEs at the four depths. In all three climates – arid or dry summer climates, warm temperate climates and snow climates, the numerical model gives mean model RMSEs of 1.3°C-1.6°C (2.3°F-2.9°F) at 5, 20, 50 and 100cm (2, 8, 20 and 40 ") depths; the two-harmonic model gives mean model RMSEs of 1.4°C-2.4°C (2.5°F-4.3°F) at the four depths. Both the numerical models and the two-harmonic model have lower RMSEs at deeper depths.

3.4.4. Case Study in Arid Climates, Warm Climates and Snow Climates

In Section 3.4.4.1, 3.4.4.2 and 3.4.4.3, I will demonstrate a case study result in each climate type to show the benefit of including the vegetation density adjustment procedure, tall grass cover effect and snow cover model and snow depth estimation procedures.

3.4.4.1. Arid Climate

Figures 3.17 and 3.18 show the comparison of the estimated and measured ground temperature at the depth of 5 cm (2") and 100 cm (40") at a SCAN site (Los Lunas PMC) in New Mexico in year 2010. This site is located in the arid and cold steppe climate. As mentioned above, the numerical model results are generated assuming the ground is covered by short grass ($\mu = 1$). However, in arid climate, the grass is usually shorter and drier due to the dry weather condition. In order to estimate the soil temperature under "shorter grass" in the arid climate, the vegetation density needs to be adjusted to a lower value 0.9. The model is run with vegetation densities of 0.9 and 1.0 and compared to the measured results as shown in Figures 3.17 and 3.18, at the depths of 5 cm (2") and 100 cm depths(40"). The model result agrees better with the measured result using vegetation density of 0.9.

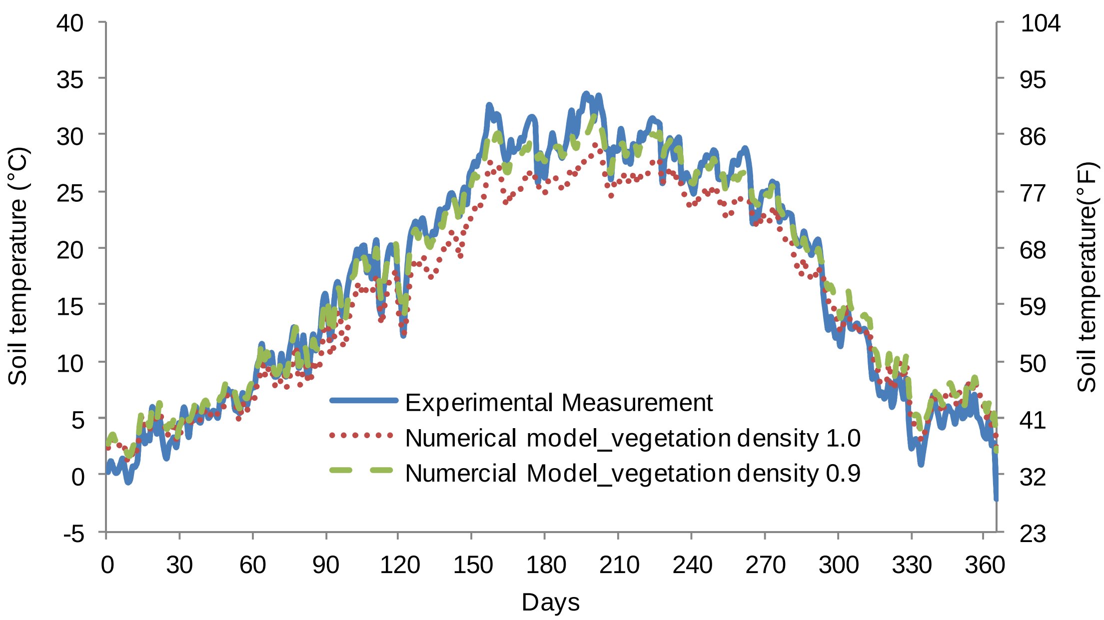

Figure 3.17: Soil temperature at 5 cm (2") depth, at Los Lunas PMC SCAN site, New Mexico at year 2010

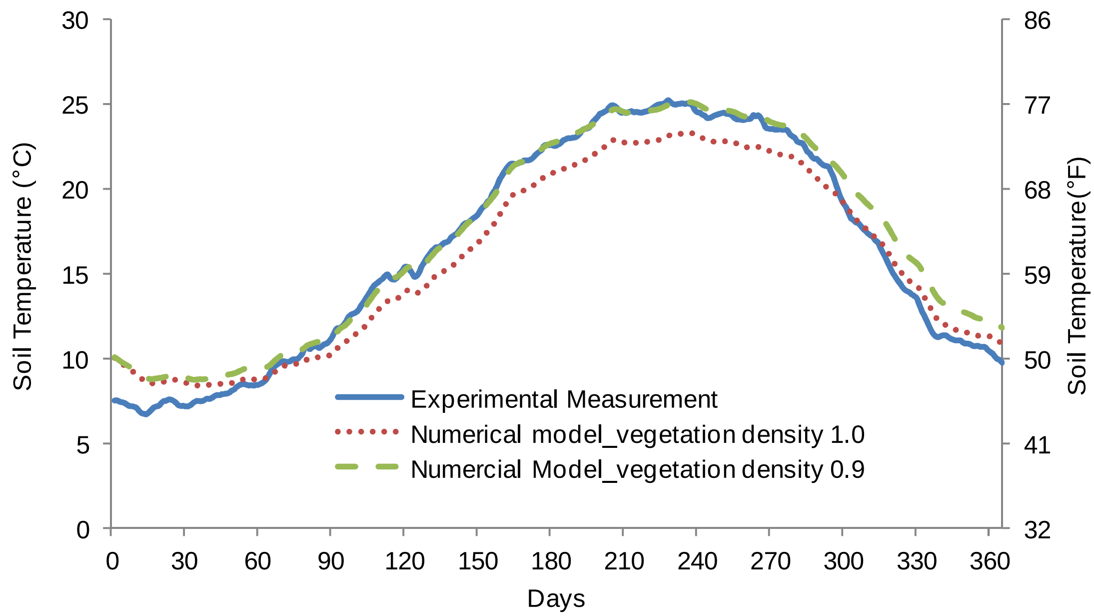

Figure 3.18: Soil temperature at 100 cm (40") depth, at Los Lunas PMC SCAN site, New Mexico, at year 2010

3.4.4.2. Warm Climates

In the Oklahoma site, I found that the photograph taken at the SCAN site shows that the grass grows to over 30 cm (11.8") tall during some time of the year. The ground is covered by tall grass. When the grass is tall, it provides shading on the shorter grass; this effect needs to be considered in the model. To explore the effects of shading, the simulation results with and without shading are compared to the measured results as shown in Figures 3.19 and 3.20 at the depths of 5cm (2") and 100 cm(40"). As expected, the model result with the shading effect agrees better with the measured result, especially during the summer time. If the shading effect is considered, the model RMSE is reduced from 3.4°C (6.1°F) to 2.0°C (3.6°F). Therefore, to estimate ground temperature under the tall grass, the shading effects needs to be included.

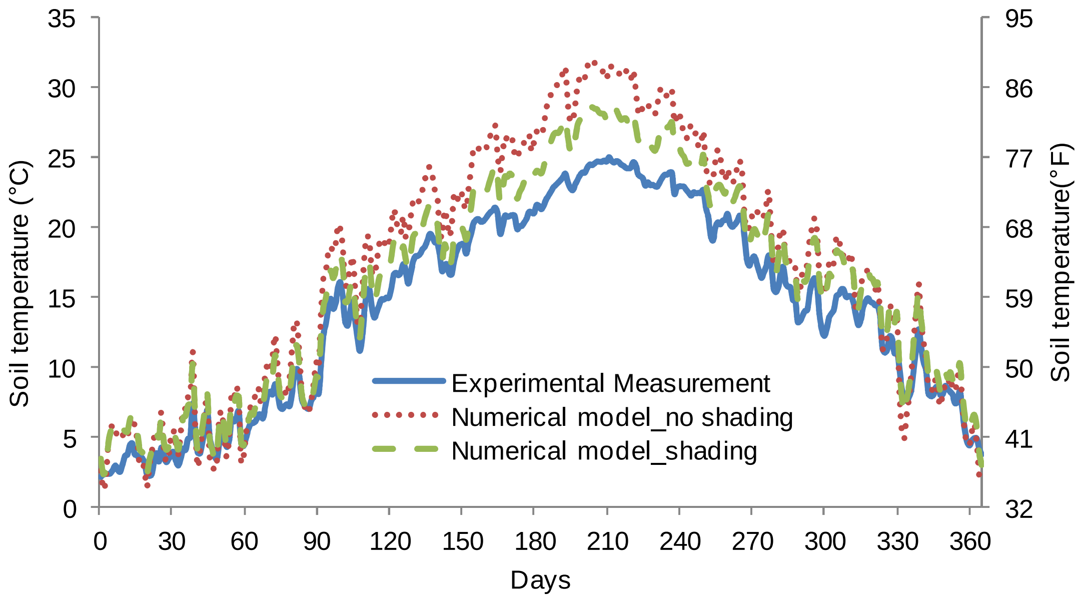

Figure 3.19: Soil temperature at 5 cm (2") depth, at Fort Reno SCAN site, Oklahoma at year 2001

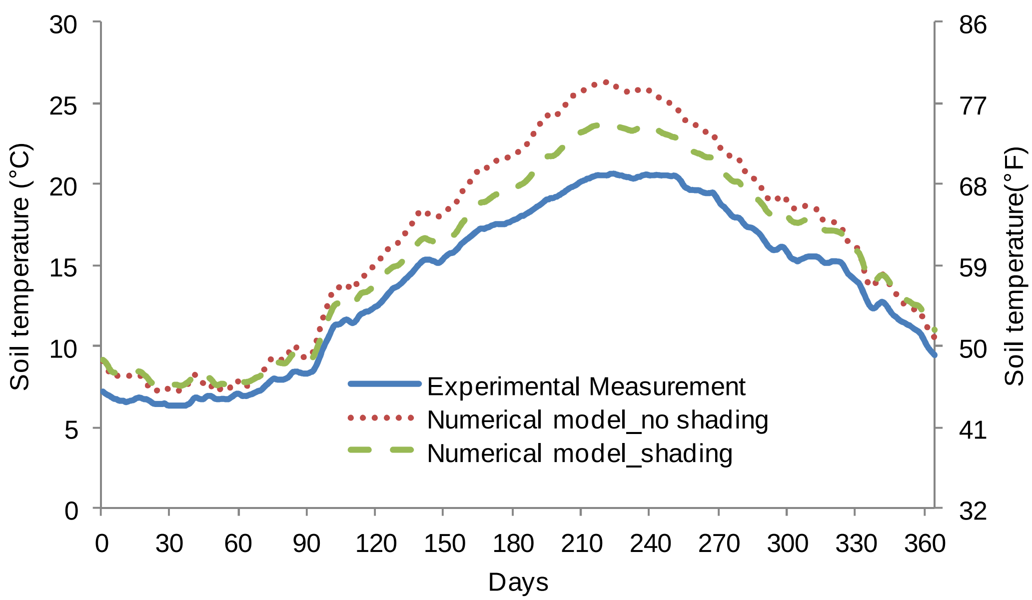

Figure 3.20: Soil temperature at 100 cm (40") depth, at Fort Reno SCAN site, Oklahoma at year 2001

3.4.4.3. Snow Climates

To explore the effect of snow cover, the simulation results with and without snow cover are plotted in Figures 3.21 and 3.22 and are compared to the measured results. Figures 3.21 and 3.22 shows the ground temperature at the depths of 5 cm (2") and 50 cm(20") at a SCAN site (Aniak) in Alaska for year 2013. For this case, the snow depth is estimated using the estimation procedure described in Chapter 4. As shown in Figure 3.21, during the winter time (day 30 to 60), the simulation results with snow cover (green line) matches better with the experiment results (blue line) at the depth of 5 cm (2"). However, in Figure 3.22, at the depth of 50cm (20"), it can also be found that the model results match the measured results better with the snow cover effect considered. It is found that using the snow cover model reduce the averaged model RMSEs at the depth of 5cm, 20cm and 50cm (2”, 8” and 20”) from 3.3°C (5.9°F) to 1.6°C (2.9°F).

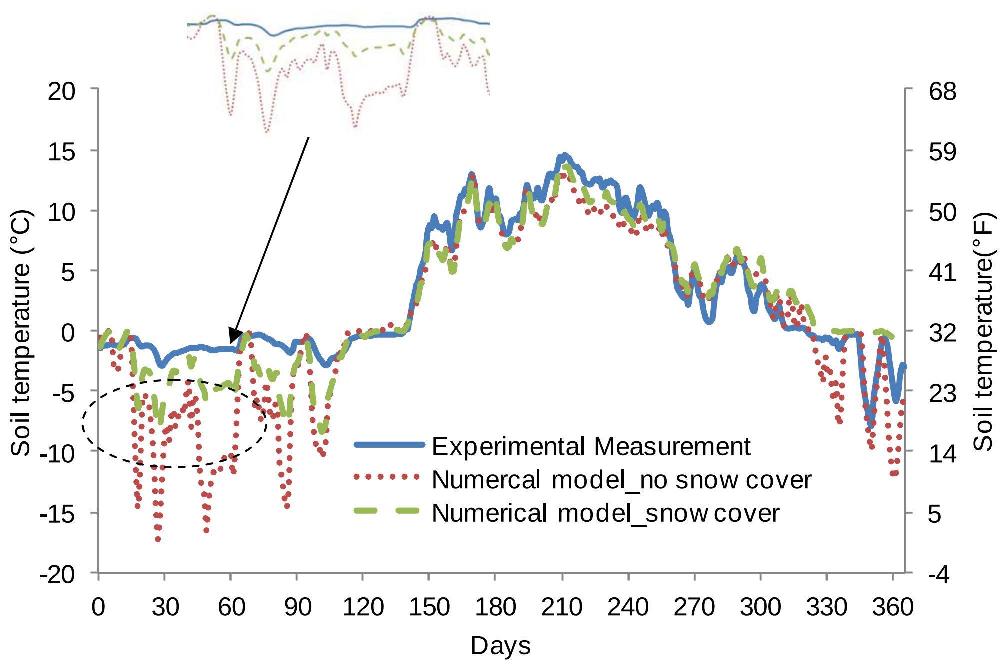

Figure 3.21: Soil temperature at 5 cm (2") depth, at at Aniak SCAN site, Alaska at year 2013

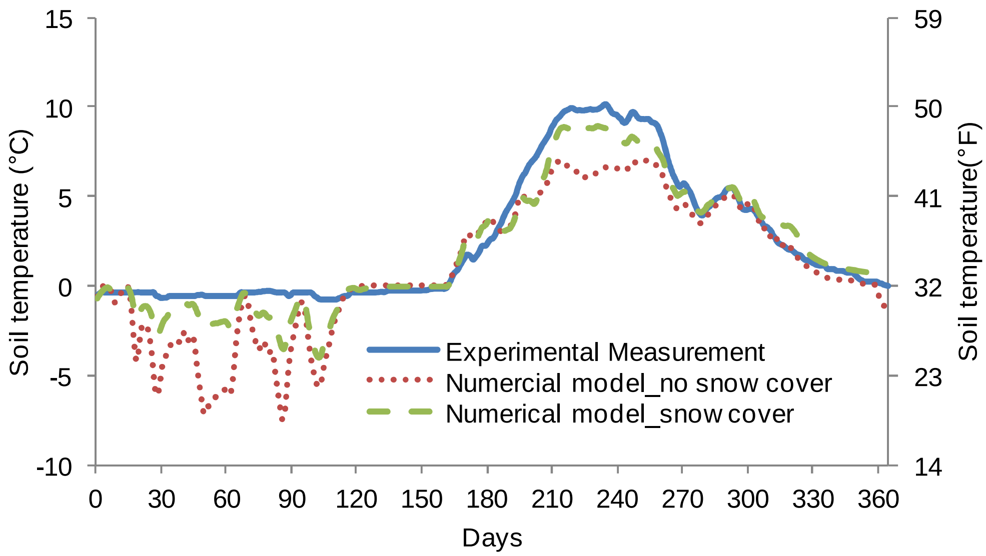

Figure 3.22: Soil temperature at 50 cm (20") depth, at Aniak SCAN site, Alaska at year 2013

3.5 Conclusions

In this thesis, a one dimensional numerical model using the finite volume method is developed for predicting soil temperatures for different climate types. The model utilizes weather data as inputs and implements a full heat balance at the earth surface which includes solar radiation, convection, thermal radiation and conduction to simulate the soil temperature. It is used to predict ground temperature under short grass, tall grass, bare soil, asphalt and concrete; currently, the model is mainly validated against results measured at grass-covered sites. The soil freezing/thawing and snow accumulation/melting are modeled. It is found that the vegetation density needs to be adjusted from site to site depends on the climate types and treated as an input to the numerical model. Moisture transport is not accounted for due to the lack of precipitation data at the sites. The soil diffusivity used in the simulation is estimated from the measured ground surface temperature using a procedure recommended by Kusuda and Achenbach (1965).

Although the numerical model provides ground temperature estimates with a good accuracy, a simpler form is preferred for many engineering applications. Thus, a two-harmonic model is proposed to be used. The study result of nineteen SCAN sites shows that two-harmonic model is preferred to be used than one-harmonic model and five-harmonic model. The two-harmonic model relies on five parameters to estimate the ground temperatures, which are annual average soil temperatures, two surface amplitudes, and two phase delay. These parameters are estimated using the computed results from the numerical model.

The experimental validation of both the numerical model and the two-harmonic model for various climate types is also discussed. Nineteen geographically diverse measurement sites are chosen for validating the model results in three climates: arid climates, warm climates and snow climates. The numerical model and two-harmonic model give satisfactory model RMSEs at the four depths. In all three climates, the numerical model gives mean model RMSEs of 1.6°C, 1.5°C, 1.4°C and 1.3°C (2.9°F, 2.7°F, 2.5°F and 2.3°F) at 5, 20, 50 and 100cm (2, 8, 20 and 40") depths; the two-harmonic model gives mean model RMSEs of 2.4°C, 1.9°C, 1.6°C and 1.4°C (4.3°F, 3.4°F, 2.9°F and 2.5°F) at the four depths. Both models have lower RMSEs at deeper depths. The accuracy of the two-harmonic model is not only limited by the accuracy of the numerical model but also the simplified form of the model itself. Thus, the two-harmonic model gives 0.1°C-0.8°C (0.2°F-1.4°F) higher RMSEs than the numerical model at four depths. The two models described in this article for the estimations of the ground temperatures give lower mean model RMSEs of all sites than some existing method (Herb et al. 2008); it is also proved that the models can be applied in a diversity of climate types.

The numerical model relies on vegetation density and snow depth which vary from site to site as input to estimate the ground temperatures. These cannot be read from the weather files. Therefore, in Chapter 4, automatic procedures have been developed for choose these values for each site depending on its climate types. The numerical model described in this thesis will then be run with these values and typical year weather files to estimate typical year ground temperatures for the 19 SCAN sites. The results will be validated against measured results at the 19 SCAN sites. In Chapter 5, the two-harmonic model RMSEs will be compared to the RMSEs of other existing procedures to demonstrate the validity of the proposed method. Furthermore, a correction factor will be introduced in the two-harmonic model, so the new model can be used for estimating the maximum/minimum ground temperatures of multiple years.

CHAPTER IV

METHODOLOGY FOR DEVELOPING A WORLD-WIDE DATASET

Despite the need for the ground temperatures, availability of ground temperature estimates for engineers is surprising limited. The ASHRAE handbooks only presents ground temperatures based on measured results more than half a century ago and only applied to the continental US or North America. The results presentation in small maps can be quite difficult to read for a specific location. The ASHRAE district heating manual (ASHRAE 2013b) developed ground temperature dataset based on an over simplified assumption that works well in warm temperate climates, but leads to significant errors in estimated results in cold climates and arid climates. In addition, the ground temperatures are represented as the three parameters of the Fourier (1822) model is still based on pure conduction and neglects the effects of solar radiation, snow cover, soil freezing/thawing and evapotranspiration. As discussed by Signorelli and Kohl (2004), the effects of these phenomena on undisturbed ground temperature may cause deviations on the order of 1-4 K or 2-7°F. Lord Kelvin presented the same model but with higher order harmonics (Thomson 1862), which could be used to improve these results (Thomson 1862; Jacovides, et al. 1996; Elias, et al. 2004; Droulia, et al. 2009). Therefore, the main objective of this research is to provide a new set of typical year ground temperature estimates for use by engineers using a two-harmonic model (Xing and Spitler 2014a); this simplified design model has been validated against

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measured ground temperatures for nineteen geographically diverse measurement sites in United States in Chapter 3.

A one-dimensional finite volume model used for generating the coefficients of the simplified design model for undisturbed ground temperatures was validated in Chapter 3. This validation was done for each site using weather data measured at the site for the period of comparison. The finite volume model was run with soil thermal diffusivity tuned from the measured ground temperatures at the site.

As my overall goal is to use the finite volume model in conjunction with typical meteorological year-type data for more than 4000 sites worldwide, it is not feasible to tune the soil thermal diffusivity for each site. Furthermore, in the work described in this thesis, I found it necessary to develop automated heuristic procedures for predicting vegetation density and snow cover. Besides the typical meteorological year type weather files, these procedures make use of a database of Köppen-Geiger climate classifications (Kottek et al. 2006).

So, the focus of this thesis is two-fold: the methodology required to automatically generate a set of undisturbed ground temperature simplified design model coefficients for 4112 worldwide and validation of this methodology. The resulting coefficients cover greenfield sites with short grass or tall grass. The final results - that is coefficients for the 4112 sites - are covered in Appendix A and B.

The results in this thesis cover typical weather year cases that are appropriate for energy calculations. It is also desirable to be able to forecast temperatures for more extreme cases that represent worst-case design considerations. In Chapter 5, a procedure for developing design (extreme) year is presented.

4.1 Methodology

The approach taken in this thesis to generating a world-wide dataset of undisturbed ground temperature parameters involves the use of typical weather year files. The typical year weather files are all in similar format and include the following types:

- 3012 International Weather for Energy Calculations-2 (IWEC-2) weather files in a world-wide range outside of United States and Canada developed by ASHRAE 1577-RP (Huang 2011). The IWEC-2 weather files contain hourly values of weather for a one-year period which is derived from International Surface Hourly (ISH) data base available for 1983-2007. To be noted, since ISH contains no measured solar radiation, the total horizontal solar given in the weather files is derived using Zhang-Huang model (Zhang et al. 2002, 2003), based on the total cloud cover, dry-bulb temperature, relative humidity, and wind speed read from the weather files as inputs, the model relies on few constant values which are calibrated using measured hourly total horizontal solar radiation.
- 1020 Typical Meteorological Year (TMY3) weather file for United States and its territories released by National Renewable Energy laboratory (Wilcox and Marion 2008). The TMY3 weather files are compiled from a dataset derived from the 1961-2005 National Solar Radiation Data Base (NSRDB) archives. The solar radiation data provided in the weather files are modeled using the NREL Meteorological-Statistical solar model (METSTAT) (Maxwell 1998) and the SUNY satellite model (Wilcox 2007). The METSTAT model uses observed total or opaque cloud cover, perceptible water vapor, snow depth, etc as inputs to estimate the solar radiation. The SUNY satellite produces results by using input such as aerosol, water vapor and ozone read from the Geostationary Operational Environmental Satellite (GOES) images.
- 80 Canadian Weather for Energy Calculations (CWEC)-type files (Numerical Logics 1999) are available from the EnergyPlus website. The CWEC files contain hourly weather

observations that are derived from the Canadian Energy and Engineering Data Sets (CWEEDS) from the 1953-1995 period of record. The CWEC files are produced using a methodology similar to the TMY2 (NSRDB 1992); the solar radiation data provided in the weather files are simulated using the METSTAT method (Maxwell 1998).

There is a large amount of weather data being collected worldwide; these weather data are used for producing hourly "typical year" weather files. The three types of typical year weather files used here are derived all in a similar way based on the Sandia method (Wilcox and Marion 2008), which selects the individual months from different years occurring in the period of record. For example, in a case where 30 years of data are available, all 30 Januarys will be examined; the most typical January will be selected to be included in the TMY. The selected typical months are chosen using statistics determined by considering five elements: global horizontal radiation, direct normal radiation, dry bulb temperature, dew point temperature, and wind speed. These elements are considered the most important for simulating solar energy conversion systems and building systems. Because the TMY algorithm assigns priority to the solar radiation elements, the selected months may not be typical for other elements. The weighting factors of the five elements are slightly different in the three types of typical year weather files.

One of the assumptions in this work that is only indirectly proven is that typical weather year data are sufficient for predicting typical undisturbed ground temperatures. In this thesis, the validation of the proposed procedure shows that the typical year weather files can be used for predicting the typical year ground temperatures with a good accuracy. The mean model RMSEs of the nineteen sites, which are located in all three climates – warm temperate climates, arid or dry summer climates and snow climates, are less than 2.0°C (3.6°F).

Two models are developed in Chapter 3: a one dimensional numerical model is used to estimate the coefficients of the simplified design model (two-harmonic model) and the simplified design model. The procedure described in this thesis relies on these two models to generate a world-wide ground temperature dataset. In Chapter 3, the models use the soil diffusivity estimated from the measured ground surface temperature at each site to predict the ground temperature distributions. The soil properties are calculated using the procedure recommended by Kusuda and Achenbach (1965). The soil diffusivity varies from sites to sites. However, in order to generate typical ground temperature in a world-wide range, it is not practical to do so for each site. Therefore, a constant soil diffusivity is now assumed at each site with a typical value of 4.9×10^{-7} m^2/s (5.3×10^{-6} ft^2/s). This value is equivalent to the one given by Hendrickx et al. (2003) for 60% saturated silt and clay soil. The validity of this assumption will be discussed in the results section of this Chapter.

The numerical model requires vegetation density and snow depth as inputs in order to predict the ground temperatures with good accuracy. The vegetation density presents the fraction of ground area covered by grass or other vegetation. All the three typical year weather files which are used as inputs to the model do not include vegetation density. The IWEC-2 weather files contain one column for indicating whether snow fall occurs however, the files do not contain information for snow depth. The TMY3 and CWEC weather files contain one column for snow depth at each site. I randomly select 20 files for TMY3 and 10 files for CWEC in the snow climates where snow fall is expected, respectively. It is found that the snow depth is 0 cm for all year for all locations. I concluded that despite the presence of a column for snow depth, the snow depth data could not be relied upon.

Therefore, I found it necessary to develop automated heuristic procedures for predicting vegetation density and snow cover for each site. Besides the typical meteorological year type weather files, these procedures make use of a database of Köppen-Geiger climate classifications (Kottek et al. 2006). In the results section, it is demonstrated that implementing these procedures greatly improves the model prediction accuracy in the arid climates where grass grows shorter due to the lack of water and snow climates where snow falls occasionally or usually occurs.

4.1.1. Köppen-Geiger Climate Classification

The vegetation density and snow depth are correlated to the Köppen-Geiger climate type (Kottek et al. 2006). The Köppen-Geiger climate classification is first published by Russian German climatologist Wladimir Köppen in 1884. At a later time, German climatologist Rudolf Geiger collaborated with Köppen to modify the classification system. The systems use the average annual and monthly air temperatures and precipitation data to classify the climates in different locations. The climate is then classified into five groups:

- Group A: Equatorial climates
- Group B: Arid climates
- Group C: Warm temperate climates
- Group D: Snow climates
- Group E: Polar climates

Each group has several types; each particular climate type is represented by two-letter symbol as demonstrated in Table 4.1.

Table 4.1: Köppen-Geiger climate groups and type

Köppen-Geiger climates group	Type
A: Equatorial climates	Af: Rainforest, fully humid
	Am: Monsoon
	As: Savannah with dry summer
	Aw: Savannah with dry winter
B: Arid climates	BS: Steppe climate
	BW: Desert climate
C: Warm temperate climates	Cs: Dry summer
	Cw: Dry winter
	Cf: Fully humid
D: Snow climates	Ds: Dry summer
	Dw: Dry winter
	Df: Fully humid
E: Polar climates	ET: Tundra climate
	EF: Frost climate

Each group and climate type is further divided into several subtypes by appending one more label, the meaning of which is given in Table 4.2.

Table 4.2: Description of Köppen-Geiger climate subtypes

Subtypes	Description
h	Hot steppe/desert
k	Cold steppe/desert
a	Hot summer
b	Warm summer
c	Cool summer and cold winter
d	extremely continental

The Köppen-Geiger climate types are provided by the University of Vienna (2014) in an ASCII database that covers the land surface of the earth on a grid with dimensions of 0.5° latitude and 0.5° longitude. The characterization was done by Kottek et al. (2006) using 1995-2000 data. In the next two sections, I describe procedures that utilize the Köppen-Geiger classification. I obtain it for each location by taking the actual longitude and latitude, then selecting the classification corresponding to the nearest grid point. It might be noted that all the typical year weather files also contain a Köppen-Geiger classification, but this is derived algorithmically from the typical weather year data rather the long-term weather data.

4.1.2. Vegetation Density

The surface heat balance used here is largely based on the Herb, et al. (2008), as described in detail in Chapter 3. The Herb et al. model uses a vegetation density parameter to represent the canopy layer when modeling the radiative, convective and evaporative transport. Herb et al. calibrated the vegetation density factor for a range of sites. For the short grass and tall grass sites, the calibrated value of the parameter was 0.95 and 1.0 respectively.

The focus of this thesis is the procedures used in generating the world-wide database of undisturbed ground temperature parameters. For this application involving thousands of sites with no soil temperature measurements, it is impossible to calibrate the model in the way done by Herb, et al. Instead, taking advantage of the Köppen-Geiger database (Kottek, et al. 2006) I divided the world into two groups of climates: those that are arid or which have dry summers and other climates, as summarized in Table 4.3. In the arid climates or climates with dry summer, the vegetation grows shorter due to the dry weather. Thus, for the short grass covered sites, the vegetation density needs to be re-adjusted to 0.9 as shown in Table 4.3; for tall grass covered sites, the vegetation density is 1.0. In other climates, the vegetation density is assigned to 1.0.

Table 4.3: Vegetation density value in different Köppen-Geiger climates

Groups	Köppen-Geiger climate type	Summer	Vegetation density μ	
			short grass	tall grass
Arid or dry summer climates	A: Equatorial climates, As	dry	0.9	1.0
	B: Arid climates, BSh, BSk, BWh, BWk	all		
	C: Warm climates, Csa, Csb	dry		
	D: Snow climates, Dsa, Dsb, Dsc	dry		
Other climates	A: Equatorial climates, Af, Am, Aw	Not dry	1.0	1.0
	C: Warm climates, Cwa, Cwb, Cwc, Cfa, Cfb, Cfc	Not dry		
	D: Snow climates, Dfa, Dfb, Dfc, Dfd	Not dry		
	E: Polar climates, ET, EF	all		

The measured results at 19 Soil Climate Analysis Network[9] (SCAN) sites are used for estimating the vegetation density values 0.9 and 1.0 used for the two groups of climates. The names of these SCAN sites, the states they belongs to, the Köppen-Geiger climate type of each sites are summarized in Table 4.4. The SCAN site Ward Farm located in Alaska, belong to "Dsc" Köppen-

[9] SCAN (NRCS 2013) provides a significant amount of data (191 at six standard depths: 5, 10, 20, 50, 100 and 200 cm for about the last 15 years. The SCAN data provides detailed information on soil properties, weather conditions and undisturbed ground temperature inside United States.

Geiger climate type, which means it is in snow climates which has dry summer "Dsc" according to Köppen-Geiger climate type. Thus it is categorized into the arid or dry summer climates group; in this group.

Table 4.4: 19 Soil Climate Analysis Network sites

Climates	States in the U.S.	Site name	Köppen-Geiger climate type
Arid or dry summer climates (5)	Arizona	Walnut Gulch	BSk
	Colorado	Nunn	BSk
	New Mexico	Los Lunas PMC	BSk
	Oregon	Lynhart Ranch	Csb
	Alaska	Ward Farm*	Dsc
Other climates (14)	Alabama	WTARS	Cfa
	Arkansas	UAPB Lonoke Farm	Cfa
	Georgia	Watkinsville	Cfa
	Kentuky	Mammoth Cave	Cfa
	Maryland	Powder Mill	Cfa
	Oklahoma	Fort Reno*	Cfa
	South Carolina	Pee Dee	Cfa
	Virginia	TideWater AREC	Cfa
	Iowa	Ames*	Dfa
	Minnesota	Cresent Lake*	Dfb
	North Dakota	Mandan	Dfb
	Nebraska	Rogers Farm	Dfa
	South Dakota	EROS Data Center	Dfa
	Alaska	Aniak*	Dfc

Note: Sites covered by tall grass are bolded and labeled with *, all others are covered by short (mowed) grass

For each site, there are only 3-8 years of measured ground temperature available. Although it is desirable to have longer sets of measured soil temperatures, but this is the best ground temperature data that can be found which covers different climates, measured at different depths and for multiple years. These measured results are averaged and compiled into a typical year ground temperature file. For example, in the case of the site in Tide Water AREC, Virginia that contains 8 years of data, all temperatures on 1 Januarys are averaged and this becomes the typical 1 January temperature. The other days of the year are treated like a same manner, and then the 365 typical days temperature are compiled to form a complete year.

Some local stations measures ground temperature for a longer period up to 20 years - such as Oklahoma Mesonet. They measured ground temperatures in Oklahoma, which covers two Köppen-Geiger climate types - Cfa and BSk at a shallower depth of 5, 10 and 30 cm (2, 4 and 12"). These ground temperatures are also used for the validation of the simplified design model, the model RMSEs for these sites are summarized in Chapter 5.

The simplified design model mean model RMSEs of the four depths (5, 20, 50 and 100 cm) for the 19 sites, are calculated over the range of vegetation density parameters of 0.5-1.0 and plotted in Figures 4.1 and 4.2. Figure 4.1 shows the model RMSEs against the vegetation density used in the model in five locations at arid or dry summer climates. Figure 4.1 shows the average model RMSEs of the four sites (Alaska, Ward Farm tall grass covered site is excluded) reaches the lowest when the vegetation density of 0.9 is used. For the site Los Lunas PMC, New Mexico, by observing the site picture provided on the SCAN website, it is found that this site is covered by much less vegetation compared to the other sites, thus it is found in Figure 4.1 that the vegetation density is found to be 0.8. For the site Alaska, Ward Farm, since it is covered by tall grass, the vegetation density which presents the percentage of radiation heat blocked by the grass is found to be 1.0 as expected. In Figure 4.2, it is found that a higher vegetation density will be used for these locations since at more humid places the vegetation usually grows better. It is shown that the averaged model RMSEs of 14 sites decreases as the vegetation density increases from 0.5 to 1.0. Thus, a vegetation density of 1.0 will be used for these sites.

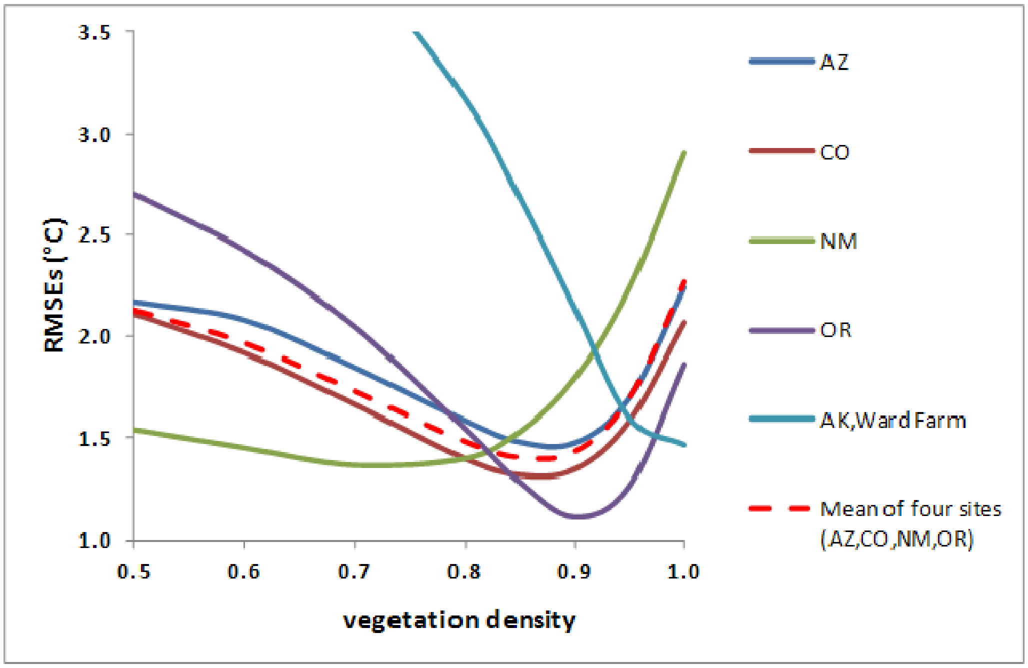

Figure 4.1: Vegetation density VS. simplified design model RMSEs, arid or dry summer climates

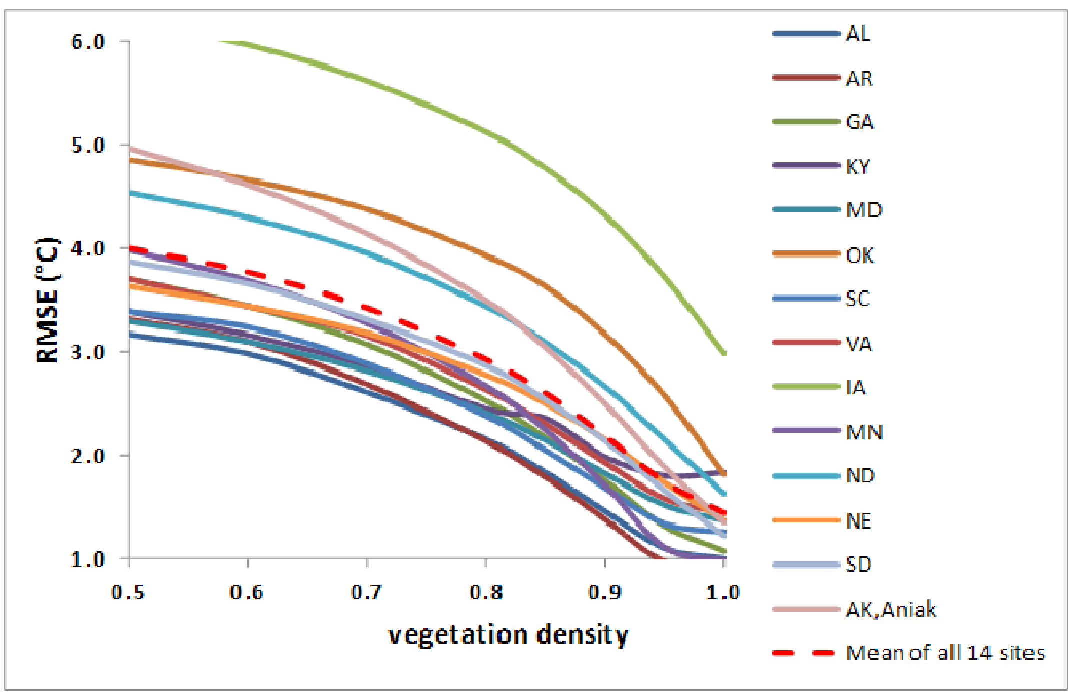

Figure 4.2: Vegetation density VS. simplified design model RMSEs, other climates

As shown in Figures 4.1, in the arid or dry summer climates, as suggested by Herb et al. (2008), if vegetation density of 1.0 is used, the mean model RMSEs of all sites and all four depths are 2.2°C (4.0°F). If proper vegetation density 0.9 is chosen, the mean model RMSEs are lower to 1.4°C (2.5°F). This is a great improvement in the existing model (Herb et al. 2008).

The typical weather files run as an input to the model contains the precipitation data for some of the sites. The IWEC typical year weather files contain the hourly precipitation data. The TMY3 weather files contain a column for hourly precipitation data, however, the nineteen SCAN sites studied, ten of the nineteen TMY3 weather files used is with missing precipitation data. Huang (2011) also commented that a significant number of North American may be failing to report rainfall at all, study shows that 26.8% of the US and Canadian stations did so. If these missing precipitation data are filled in the future, the model RMSEs might be further reduced if daily or monthly precipitation data are used for adjusting the vegetation density at different time of year for each site.

4.1.3 Snow Depth

Snow accumulation reduces the surface solar absorptivity and adds an insulation layer; therefore, it can also be important in cold climates. As suggested by Xu and Spitler (2014), if hourly precipitation data are available, inclusion of freezing and snow cover lead to model RMSE of less than about 2.0°C (3.6°F). Xu and Spitler implemented a detailed snow accumulation and melting model adapted from the experimentally-validated model developed by Liu et al. (2007a; 2007b). Since the precipitation data which is required as inputs to the Xu and Spitler model are missing in a significant number of North American stations (Huang 2011), I propose a simple model to account for the snow cover effect at the ground surface.

In order to include the effect of the snow cover, the surface heat balance equation described in Chapter 3 are modified to account for the thermal resistance of the snow (Thunholm 1990).

When the ground is covered by snow, the snow surface temperature is set equal to the air temperature. The surface energy balance equation is not used; the heat flow through the snow is proportional to the temperature gradient in the snow cover. The thermal conductivity of the snow is set to be 0.3 W/m-K (0.17 Btu/ft-hr-°F). The model relies on snow depth as inputs to calculate the conduction heat transfer through the snow cover. As discussed previously, the IWEC-2 weather files does not contain the snow depth data, the TMY3 and CWEC weather files contain one column for snow depth at each site, but these data could not be totally relied upon. Given the lack of data, a simple heuristic procedure for estimating the thickness of the snow cover is developed here.

This model will only be implemented in sites which belong to the Köppen-Geiger snow climates and polar climates, where the snow fall regularly occurs. Table 4.5 listed the Köppen-Geiger climate type each site could belong to, then categorize them into two groups: snow or polar climates and no-snow or polar climates. The snow or polar climates contains the Köppen-Geiger snow climates and Köppen-Geiger polar climates. In this group, the snow depth at the site will be calculated using Equations 4-1 and 4-2. In the no-snow or polar climates group, the snow depth will be assumed to be 0 cm all the time.

Table 4.5: Snow depth calculation in different Köppen-Geiger climates

Groups	Köppen-Geiger climate type	Snow depth
Snow or polar climates	D: Snow climates, Dsa, Dsb, Dsc, Dfa, Dfb, Dfc, Dfd E: Polar climates, ET, EF	Equations 4-1 and 4-2
Other climates	A: Equatorial climates, As, Af, Am, Aw B: Arid climates, BSh, BSk, BWh, BWk C: Warm climates, Csa, Csb, Cwa, Cwb, Cwc, Cfa, Cfb, Cfc	0

In Equation 4-2, if the monthly averaged air temperature $T_{air,i}$ is greater than or equal to 0°C, then assuming snow fall doesn't occur, the snow depth is 0cm. Otherwise, a monthly averaged snow depth is estimated using Equation 4-1. in which the change of the snow depth month i and month i-1 $\left(z_{snow,i} - z_{snow,i-1}\right)$ is linearly correlated to the change of the monthly averaged air temperature $\left(T_{air,i} - T_{air,i-1}\right)$:

$$z_{snow,i} - z_{snow,i-1} = \beta\left(T_{air,i} - T_{air,i-1}\right) \quad \text{if} \quad T_{air,i} < 0 \qquad (4-1)$$

$$z_{snow,i} = 0 \quad \text{if} \quad T_{air,i} \geq 0 \qquad (4-2)$$

Where:

$z_{snow,i}$ is the monthly averaged snow depth at the month i, in m or in;

$T_{air,i}$ is the monthly averaged air temperature at the month i, in °C or °F;

β is a constant ratio which relates the change of the snow depth to the change of the air temperature, which is -0.01 m/°C (-0.22 in/°F);

ΔT_{air} is the variation of the monthly average air temperature, in °C or °F;

Figure 4.3 shows sample results of estimated snow depth, for a site Aniak, Alaska located in snow climates using Equations 4-1 and 4-2. As shown in Figure 4.3, from January to February, when the air temperature increases, the monthly averaged snow depth decreases. From the end of April until October, the estimated snow depth is 0cm. As the air temperature drops again since the end of October, the estimated snow depth starts to increase.

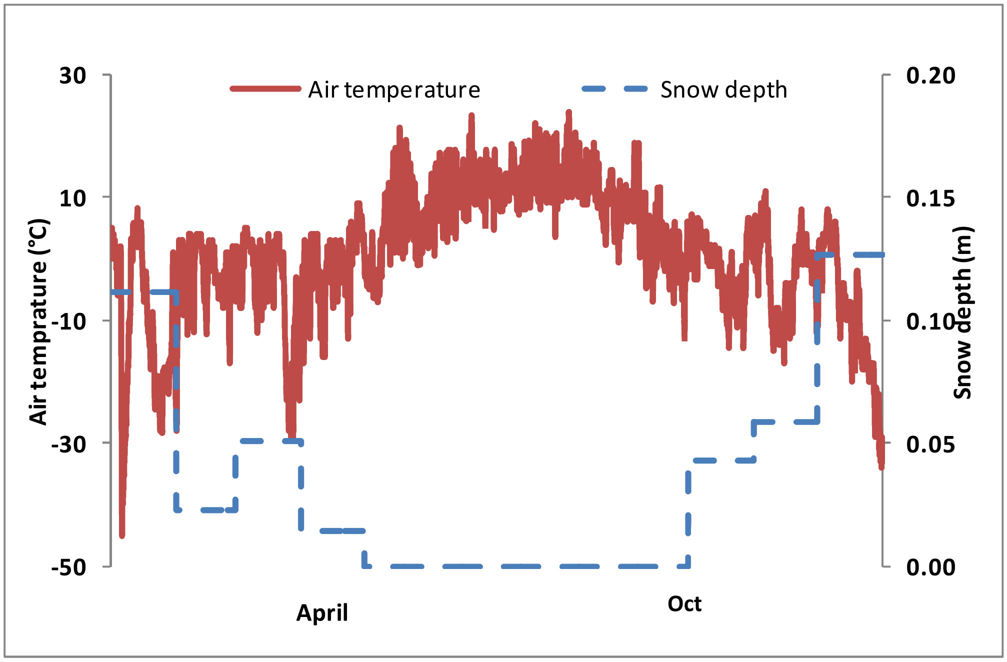

Figure 4.3: Estimated snow depth vs. air temperature at SCAN site - Aniak, Alaska

Equation 4-1 relies on the empirical coefficients β to estimate the snow depth for sites located in Köppen-Geiger snow or polar climates. The value of the coefficient β is found using the measured ground temperature data at the 7 SCAN sites which are located in the snow climates Köppen-Geiger. The detailed information of these SCAN sites are given in Table 4.4. As shown in Figure 4.4, using the coefficient of 0.00 (no snow cover), -0.01 and -0.02 all gives similar mean model RMSEs of the 7 SCAN sites. Implementing the model does not reduce the model mean RMSEs of all sites to a large degree, but it greatly improves the model accuracy at two sites - Ward Farm, Alaska and Minnesota. Using the coefficient of -0.02 gives about 0.5°C-0.9°C (0.9°F-1.6°F) lower RMSEs for these two sites. At the same time, it slightly increases the model RMSEs of the site Aniak, Alaska by 0.3°C (0.5°F). It is found that using a coefficient of -0.01 gives the lowest mean model RMSEs of the seven sites; thus, the value of -0.01 is used in Equation 4-1.

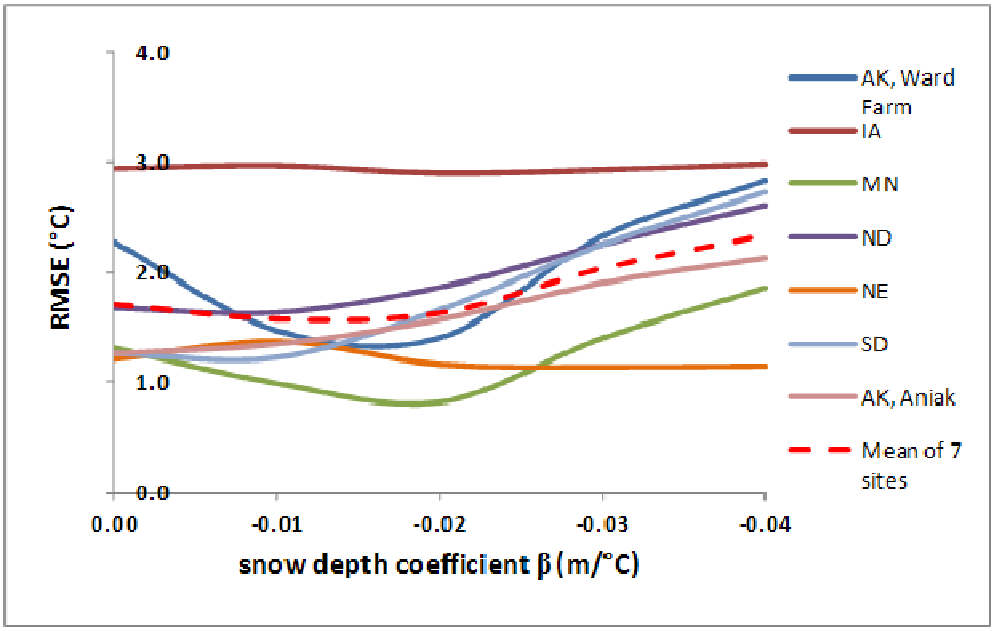

Figure 4.4: Snow depth coefficient β VS. model RMSEs, snow or polar climates

The measured snow depths are missing in the typical year weather files, thus, Equations 4-1 and 4-2 are provided to give a rough estimation of the snow depth. The goal is not to estimate the detailed snow depth, but to use these results to calculate the ground temperatures with a good accuracy. It is found that with the estimated snow depth, in Ward Farm, Alaska, and the model RMSEs are reduced by 0.8°C. If the missing measured snow depths in the typical year weather files are filled in the future, these data but not the estimated snow depth using Equations 4-1 and 4-2 could be used with the simple snow model to help further reducing the model RMSEs. On the other hand, if the missing hourly precipitation data in the weather files are filled in the future, a more detailed snow accumulation/melting model (Xu and Spitler 2014) which relies on precipitation data as inputs could be used for estimations of snow depths.

4.2. Experimental Validations

The procedure described in this article is used for generating typical year ground temperatures over a world-wide range using the typical year weather files. This automatic procedure assumes the soil diffusivity is the same for each site. A heuristic method for predicting the varying vegetation density and snow depth of each site is also included in the procedure. These developed procedures are now validated against measured results at nineteen SCAN sites. Table 4.4 summarizes the name of these SCAN sites and these sites are categorized into two groups of climates so as to the values of the vegetation density is assigned for each group.

Table 4.6: SCAN measurement sites and typical meteorological year weather sites

Climate types	States in the U.S.	SCAN Sites	Köppen-Geiger climate classification	Years of SCAN sites measurement data	Typical Meteorological Year weather sites
Arid or dry summer climates (BSk/Csb/Dsc)	Arizona	Walnut Gulch	BSk	3	Douglas-Bisbee.Douglas.Intl.AP
	Colorado	Nunn	BSk	4	Greeley-Weld.County.AWOS
	New Mexico	Los Lunas PMC	BSk	3	Albuquerque.Intl.AP
	Oregon	Lyn Hart Ranch	Csb	6	Klamath.Falls.Intl.AP
	Alaska	Ward Farm*	Dsc	5	Big.Delta-Allen.AAF
Warm climates (Cfa)	Alabama	WTARS	Cfa	4	Huntsville.Intl.AP-Jones.Field
	Arkansas	UAPB Lonoke Farm	Cfa	5	Little.Rock-Adams.Field
	Georgia	Watkinsville	Cfa	6	Athens-Ben.Epps.AP
	Kentucky	Mammoth Cave	Cfa	6	Bowling.Green-Warren.County
	Maryland	Powder Mill	Cfa	4	Baltimore-Washington.Intl.AP
	Oklahoma	Fort Reno*	Cfa	3	Oklahoma.City-Will.Rogers.World.AP
	South Carolina	Pee Dee	Cfa	5	Florence.Rgnl.AP
	Virginia	TideWater AREC	Cfa	8	Franklin.Muni.AP
Snow climates (Dfa/Dfb/Dfc)	Iowa	Ames*	Dfa	4	Webster.City.Muni.AP
	Minnesota	Cresent Lake*	Dfb	5	St.Cloud.Muni.AP
	North Dakota	Mandan	Dfb	3	Bismarck.Muni.AP
	Nebraska	Rogers Farm	Dfa	4	Lincoln.Muni.AP
	South Dakota	EROS Data Center	Dfa	8	Sioux.Falls-Foss.Field
	Alaska	Aniak*	Dfc	3	Aniak.AP

Notes: The sites covered by tall grass are labeled with *, otherwise it is covered by short (mowed) grass

In Table 4.6, more details about the 19 SCAN sites are given. These sites are categorized into three climates types - arid or dry summer climates, warm climates and snow climates in order to evaluate the performance of the simplified design model in different climates. The years of the experimental data available for each site are summarized. Table 4.6 also lists the name of the typical meteorological year weather files which used as an input the models; the weather data such as air temperature, air relative humidity, wind speed, solar radiation are read from these files. The TMY weather stations are all located less than 48.3 km (30.0 miles) away from the SCAN sites.

The generated ground temperatures are presented in a simplified design model (two-harmonic model) as shown in Equation 4-3 with few constant values:

$$T_s(z,t) = T_{s,avg} - \sum_{n=1}^{2} e^{-z\sqrt{\frac{n\pi}{\alpha_s t_p}}} T_{s,amplitude,n} \cos\left[\frac{2\pi n}{t_p}(t - PL_n) - z\sqrt{\frac{n\pi}{\alpha_s t_p}}\right] \quad (4-3)$$

In Equation 4-3, n is the number of harmonics that are used. If only n = 1 is used, then Equation 4-3 becomes the one-harmonic model that is commonly used in US.. In the simplified design model, n =1 and n = 2 are used. The result of the equation depends on having the three types of parameters: annual average soil temperature $T_{s,avg,n}$, surface temperature amplitude $T_{s,amplitude,n}$ and phase delay PL_n. These parameter values for the nineteen SCAN sites are listed in Table 4.7. The parameters are computed assuming a constant soil diffusivity 4.9×10^{-7} m^2/s (5.3×10^{-6} ft^2/s) for each location. This value is calculated for 60% saturated silt and clay soil using Hendrickx et al. model (2003).

Table 4.7: Estimated constant values used in the simplified design model, fixed soil diffusivity[10]

Climate zone	States in the U.S.	$T_{s,avg}$, ℃	$T_{s,amplitude,n}$ ℃		PL_n, day	
			n=1	n=2	n=1	n=2
Arid or dry summer climates (5)	Arizona	20.4	9.8	1.2	11.2	7.5
	Colorado	11.5	12.9	-1.4	19.6	44.4
	New Mexico	16.4	12.0	1.1	17.5	-27.1
	Oregon	11.8	11.3	-2.0	19.9	36.4
	Alaska*	1.9	9.7	-1.6	27.7	13.2
Warm climates (8)	Alabama	16.8	10.6	0.8	19.4	10.7
	Arkansas	17.7	11.2	1.1	21.7	-0.1
	Georgia	17.8	9.4	0.8	18.3	-0.1
	Kentucky	15.3	11.9	1.3	28.1	2.6
	Maryland	14.4	11.8	0.5	22.2	-2.0
	Oklahoma*	16.4	10.9	1.3	23.2	-6.7
	South Carolina	19.0	9.3	1.0	21.8	-20.8
	Virginia	17.3	9.6	1.1	24.3	-20.9
Snow climates (6)	Iowa*	10.8	13.4	0.7	27.5	1.9
	Minnesota*	7.2	12.8	-1.3	30.1	17.5
	North Dakota	8.2	13.4	-1.4	24.9	7.0
	Nebraska	12.2	14.0	0.9	18.0	1.0
	South Dakota	9.6	14.1	-0.7	25.8	7.8
	Alaska*	1.7	6.3	-2.2	32.3	30.0

The constant values listed in Table 4.7 are used with the Equation 4-3 to estimate typical year ground temperatures for the 19 SCAN sites. These results are then compared to the measured results – ground temperatures averaged of several years to represent the measured typical year ground temperatures; the model RMSEs are summarized in Table 4.8.

[10] Model parameters are derived from TMY weather data

Table 4.8: RMSEs of the simplified design model, fixed soil diffusivity, in °C[11]

Climate zone	States in the U.S.	At 5 cm depth	At 20 cm depth	At 50 cm depth	At 100 cm depth	At 5 cm depth	At 20 cm depth	At 50 cm depth	At 100 cm depth
Arid or dry summer climates (5)	Arizona	2.0	1.7	0.9	1.0	1.8	1.4	1.1	1.1
	Colorado	1.5	1.2	1.5	1.2				
	New Mexico	2.7	1.7	1.2	1.3				
	Oregon	1.4	1.2	0.8	1.0				
	Alaska*	1.5	1.4						
Warm climates (8)	Alabama	1.2	1.0	0.9	0.9	1.4	1.3	1.3	1.3
	Arkansas	1.2	1.1	0.9	0.7				
	Georgia	1.1	1.0	1.1	1.2				
	Kentucky	2.1	2.0	1.7	1.4				
	Maryland	1.2	1.2	1.8	1.2				
	Oklahoma*	1.9	1.7	1.9	1.8				
	South Carolina	1.2	1.2	1.2	1.4				
	Virginia	1.4	1.2	1.2	1.9				
Snow climates (6)	Iowa*	3.9	2.8	2.8	2.2	1.8	1.6	1.5	1.4
	Minnesota*	1.2	0.9	0.9	0.9				
	North Dakota	1.6	1.6	1.6	1.7				
	Nebraska	1.7	1.5	1.1	1.2				
	South Dakota	1.2	1.2	1.2	1.2				
	Alaska*	1.1	1.5						

In Table 4.8, it shows that the in the arid or dry summer climates, the model RMSEs are in the range of 1.1°C-1.8°C (2.0°F-3.2°F) at the 5cm-100cm (2"-40") depths. In the snow climates, the mean model RMSEs at the 5cm-100cm (2"-40") depths are in the range of 1.4°C-1.8°C (2.7°F-3.2°F). In warm climates, the model has relative lower RMSEs of 1.3°C-1.4°C (2.3°F-2.5°F) at the four depths.

[11] RMSEs in this table are computed using model parameters derived from TMY data and experimental results averaged over periods of 3-8 years. See the first paragraph of Section 4.3 for a fuller explanation.

4.2.1. Soil Diffusivity

Usually, the soil diffusivity varies with location, depth and time. The harmonic model discussed in this thesis assumes it is constant with depth and time at any location; it allows the soil diffusivity to vary for different location. In Table 4.8, it is demonstrated assuming the soil diffusivity as constant for different locations gives gives mean RMSEs of each climates less than 1.8°C (3.2°F). In Tables 4.9 and 4.10, the model results estimated using site specified soil diffusivity are presented in order to demonstrate the validity of this assumption.

At the nineteen SCAN sites, the site specified soil diffusivity are found to be in a range of 2.4 $\times 10^{-7}$ m^2/s to 1.5×10^{-6} m^2/s (2.6 $\times 10^{-6}$ ft^2/s to 1.6 $\times 10^{-5}$ ft^2/s). The soil diffusivities are estimated using the measured ground surface temperature using the procedure recommended by Kusuda and Achenbach (1965). Table 4.9 lists the parameter values used in Equation 4-3 for the nineteen SCAN sites which are generated using the site specified soil diffusivity. These constant values presented in Table 4.9 are used with the simplified design model - Equation 4-3 to estimate the ground temperatures at the nineteen SCAN sites. The model RMSEs using the fixed soil diffusivity and site specified soil diffusivity are both summarized in Table 4.10 for comparison purpose.

Table 4.10 shows that using fixed soil diffusivity would slightly change the model RMSEs for most of the sites. In North Dakota and Virginia, the site specified soil diffusivity are the mostly different from the fixed soil diffusivity assumed, are about 0.49 and 3.06 times of the fixed value. There are larger discrepancies in the model results, with up to 0.6°C (1.1°F) difference of the model RMSEs at the four depths. It is found that using site specified soil properties would not greatly reduce the model RMSEs, it is quite reasonable to assume fixed soil diffusivity for different locations in a world-wide range.

Table 4.9: Estimated constant values used in the simplified design method - site specified soil diffusivity[12]

Climate zone	States in the U.S.	Soil diffusivity, × 10^{-6} m^2/s (ft^2/s)	$T_{s,avg}$, ℃	$T_{s,amplitude,n}$ ℃		PL_n, day	
				n=1	*n*=2	*n*=1	*n*=2
Arid or dry summer climates (5)	Arizona	0.33	20.3	9.9	1.3	10.5	6.7
	Colorado	0.68	11.6	12.7	-1.4	20.2	43.8
	New Mexico	0.45	16.4	12.0	1.1	17.3	-27.8
	Oregon	0.51	11.8	11.3	-2.0	20.0	36.3
	Alaska*	0.49	1.9	9.7	-1.6	27.7	13.2
Warm climates (8)	Alabama	0.38	16.7	10.8	0.8	18.8	10.0
	Arkansas	0.66	17.7	11.0	1.0	22.6	7.0
	Georgia	0.60	17.8	9.3	0.8	18.7	0.2
	Kentucky	0.51	15.3	11.9	1.3	28.1	2.2
	Maryland	0.64	14.4	11.6	0.4	22.8	10.1
	Oklahoma*	0.75	16.5	10.6	1.2	24.6	-6.1
	South Carolina	1.01	19.1	8.9	0.9	23.8	-18.1
	Virginia	1.49	17.4	8.9	1.0	27.9	-17.9
Snow climates (6)	Iowa*	0.35	10.9	13.6	0.7	26.5	2.6
	Minnesota*	0.59	7.1	13.1	-1.2	29.3	15.6
	North Dakota	0.24	8.0	14.0	-1.3	23.6	6.8
	Nebraska	0.42	12.2	14.1	0.9	17.5	-4.3
	South Dakota	0.51	9.6	14.1	-0.7	25.9	10.8
	Alaska*	0.49	1.7	6.3	-2.2	32.3	30.0

[12] Model parameters are derived from TMY weather data

Table 4.10: RMSEs of the simplified design model - fixed soil diffusivity and site specified soil diffusivity, in °C[13]

Climate zone	States in the U.S.	Fixed soil diffusivity				Site specified diffusivity			
		At 5 cm depth	At 20 cm depth	At 50 cm depth	At 100 cm depth	At 5 cm depth	At 20 cm depth	At 50 cm depth	At 100 cm depth
Arid or dry summer climates (5)	Arizona	2.0	1.7	0.9	1.0	2.0	1.7	1.0	1.1
	Colorado	1.5	1.2	1.5	1.2	1.6	1.2	1.3	0.8
	New Mexico	2.7	1.7	1.2	1.3	2.6	1.7	1.2	1.4
	Oregon	1.4	1.2	0.8	1.0	1.4	1.2	0.8	1.0
	Alaska*	1.5	1.4			1.5	1.4		
Warm climates (8)	Alabama	1.2	1.0	0.9	0.9	1.2	1.1	0.9	1.0
	Arkansas	1.2	1.1	0.9	0.7	1.3	1.1	0.8	0.4
	Georgia	1.1	1.0	1.1	1.2	1.1	1.0	1.1	1.2
	Kentucky	2.1	2.0	1.7	1.4	2.1	2.0	1.7	1.4
	Maryland	1.2	1.2	1.8	1.2	1.2	1.2	1.7	1.1
	Oklahoma*	1.9	1.7	1.9	1.8	1.9	1.8	1.9	1.8
	South Carolina	1.2	1.2	1.2	1.4	1.4	1.3	1.1	0.9
	Virginia	1.4	1.2	1.2	1.9	1.7	1.4	1.1	1.3
Snow climates (6)	Iowa*	3.9	2.8	2.8	2.2	3.9	2.8	2.6	1.9
	Minnesota*	1.2	0.9	0.9	0.9	1.4	1.0	1.1	0.9
	North Dakota	1.6	1.6	1.6	1.7	1.6	1.6	1.5	1.3
	Nebraska	1.7	1.5	1.1	1.2	1.6	1.4	1.0	1.0
	South Dakota	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Alaska*	1.1	1.5			1.1	1.5		

4.2.2. Vegetation Density

The numerical model used for estimating the parameters of the simplified design model is based on Herb et al. model (2008). In Herb et al. model, the parameter vegetation density significantly affects the model results. The vegetation density varies with locations and cannot be read from the weather files. Herb et al. calibrate this parameter using measured results at two sites and suggest using 1.0 for short grass covered sites and 0.95 for tall grass covered sites. Table 4.11

[13] RMSEs in this table are computed using model parameters derived from TMY data and experimental results averaged over periods of 3-8 years. See the first paragraph of Section 4.3 for a fuller explanation.

summarized the RMSEs of the simplified design model uses the vegetation density suggested by Herb et al. (2008).

Since the vegetation density varies with location, especially differs for sites in different climates. Therefore, in this thesis, I propose an automatic procedure of estimating the vegetation density for sites located in different climates. The sites are categorized into two groups of climates: arid or dry summer climates, where due to the dry weather, the grass grows shorter and the vegetation density is smaller at these sites. For these sites, if the ground is covered by short grass, the vegetation density is set to be 0.9; if the ground is covered by tall grass, the vegetation density is set to be 1.0. In other climates, the vegetation density is set to be 1.0 as what suggested by Herb et al.. Here, the results of using this new procedure will be compared to the Herb et al. results to demonstrate the necessarily of including this procedure. Since the new procedure only re-adjust the vegetation density in the arid or dry summer climates group, so the four SCAN sites located in this group are studied here. (The sites covered by tall grass in Alaska is excluded since the vegetation density is not re-adjusted)

Table 4.11: Simplified design model RMSEs - with and without vegetation density estimation procedure, arid or dry summer climates, in °C[14]

Climate zone	States in the U.S.	Köppen-Geiger climate type	W/ vegetation density estimation				W/O vegetation density estimation			
			At 5 cm depth	At 20 cm depth	At 50 cm depth	At 100 cm depth	At 5 cm depth	At 20 cm depth	At 50 cm depth	At 100 cm depth
Arid or dry summer climates (4)	Arizona	BSk	2.0	1.7	0.9	1.0	2.2	2.5	2.0	2.2
	Colorado	BSk	1.5	1.2	1.5	1.2	2.1	2.1	2.1	2.0
	New Mexico	BSk	2.7	1.7	1.2	1.3	3.9	2.8	2.3	2.4
	Oregon	Csb	1.4	1.2	0.8	1.0	2.3	2.0	1.7	1.4

[14] RMSEs in this table are computed using model parameters derived from TMY data and experimental results averaged over periods of 3-8 years. See the first paragraph of Section 4.3 for a fuller explanation.

Figure 4.5 plotted the mean model RMSEs at the four sites in arid or dry summer climates at 5, 20, 50 and 100cm (2, 8, 20 and 40") depths with and without the vegetation density estimation procedure. It shows that using the automatic procedure to estimate the vegetation density could help reducing averaged model RMSEs from 2.0°C- 2.6°C (3.6°F-4.7°F) to 1.1°C-1.9°C (2.0°F-3.4°F) at the four depths.

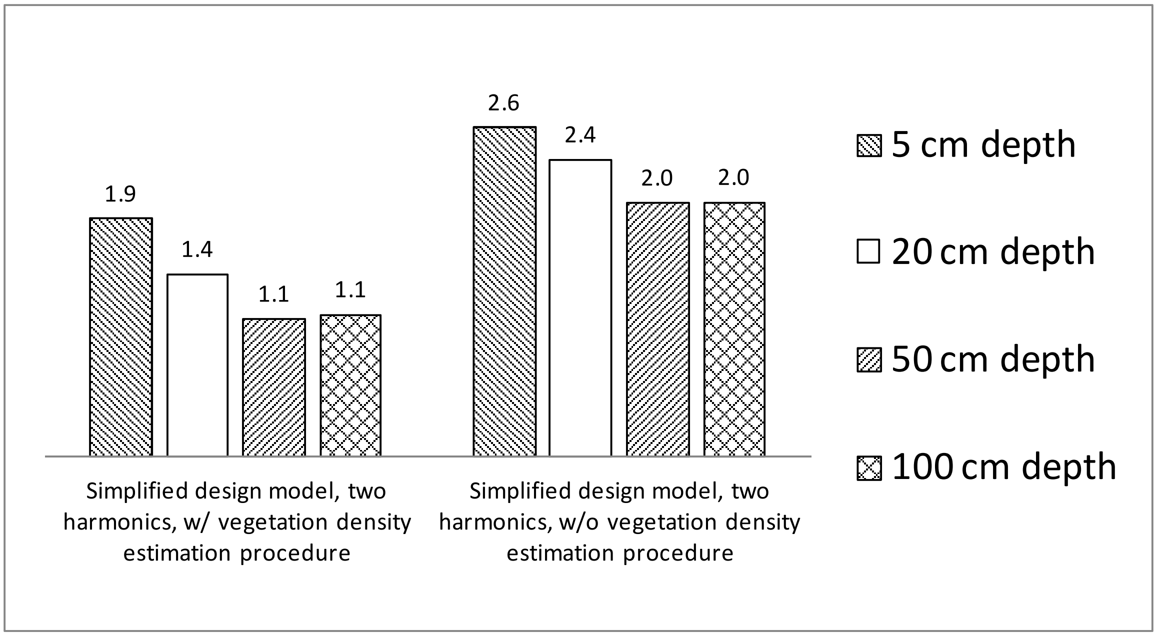

Figure 4.5: Mean RMSEs of the simplified design model w/ and w/o vegetation density estimation procedure, arid or dry summer climates, in °C

Figure 4.6 presents the mean model RMSEs of the four depths at each of the four sites with and without the vegetation density estimation procedure for each of the four sites located in Arizona, Colorado, New Mexico and Oregon. These are the mean RMSEs of the four depths for each location listed in Table 4.11. It is found that for the four sites, implementing the vegetation density estimation procedure will help reducing the RMSEs by 1.3°C (2.3°F) at the most, at the site Los Lunas PMC, New Mexico.

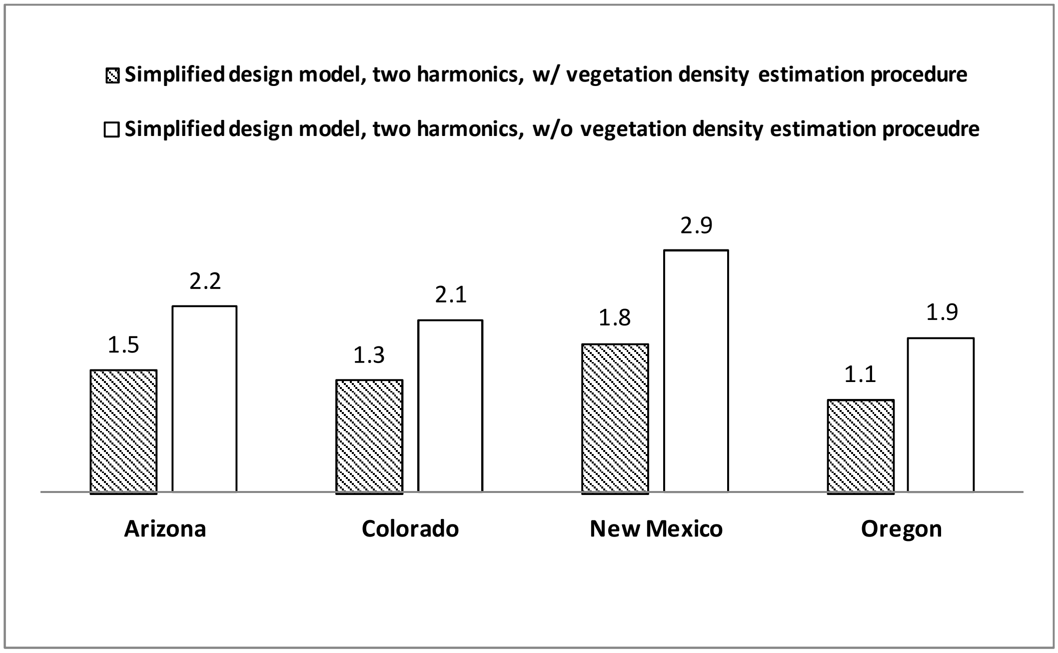

Figure 4.6: Mean RMSEs of the simplified design model of the four depths w/ and w/o vegetation density estimation procedure, arid or dry summer climates, in °C

4.2.3 Snow Depth

When validating the procedure in snow climates, it is found that the snow accumulation which adds an insulation layer to the ground surface is important to be simulated. Given the lack of precipitation data and snow depth data, a simple model that has two parts has been developed. The first part is a simple heuristic procedure for estimating the thickness of the snow cover, and the second part involves modifying the surface heat balance equation to account for the thermal resistance of snow. This procedure is only applied to snow or polar climates. Therefore, the model results with and without this simple snow model included are both compared to measured results at 7 SCAN sites located in snow climates; the model RMSEs are summarized in Table 4.12.

Table 4.12: RMSEs of the simplified design model - with and without snow model, snow climates, in °C[15]

Climate zone	States in the U.S.	Köppen-Geiger climate type	W/ snow model				W/O snow model			
			At 5 cm depth	At 20 cm depth	At 50 cm depth	At 100 cm depth	At 5 cm depth	At 20 cm depth	At 50 cm depth	At 100 cm depth
Snow climates (7)	Alaska (Ward Farm)	Dsc	1.5	1.4			2.3	2.3		
	Iowa	Dfa	3.9	2.8	2.8	2.2	3.9	2.6	2.7	2.3
	Minnesota	Dfb	1.2	0.9	0.9	0.9	1.6	1.2	1.3	1.2
	North Dakota	Dfb	1.6	1.6	1.6	1.7	1.6	1.6	1.7	1.8
	Nebraska	Dfa	1.7	1.5	1.1	1.2	1.4	1.2	0.9	1.3
	South Dakota	Dfa	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.2
	Alaska (Aniak)	Dfc	1.1	1.5			1.1	1.4		

The mean model RMSEs of the 7 SCAN sites with and without snow depth estimated at the 5cm-100 cm (2'-40") depths are both presented in Figure 4.7. It is found that by implementing the snow depth estimation procedure, the averaged model RMSEs of the seven sites are reduced by 0.1°C-0.2°C (0.2°F-0.4°F). Figure 4.8 plotted the mean model RMSEs of each site at the four depths calculated from the RMSEs of each site listed in Table 4.12. It shows that of the seven locations, the RMSE is slightly or significantly improved by 0.1°C-0.8°C (0.2°F-1.4°F) for 4 locations - South Dakota, North Dakota, Minnesota and Ward Farm, Alaska, these are the sites with heavy snows. For the rest of the locations with marginal snow fall, the snow model makes little change.

[15] RMSEs in this table are computed using model parameters derived from TMY data and experimental results averaged over periods of 3-8 years. See the first paragraph of Section 4.3 for a fuller explanation.

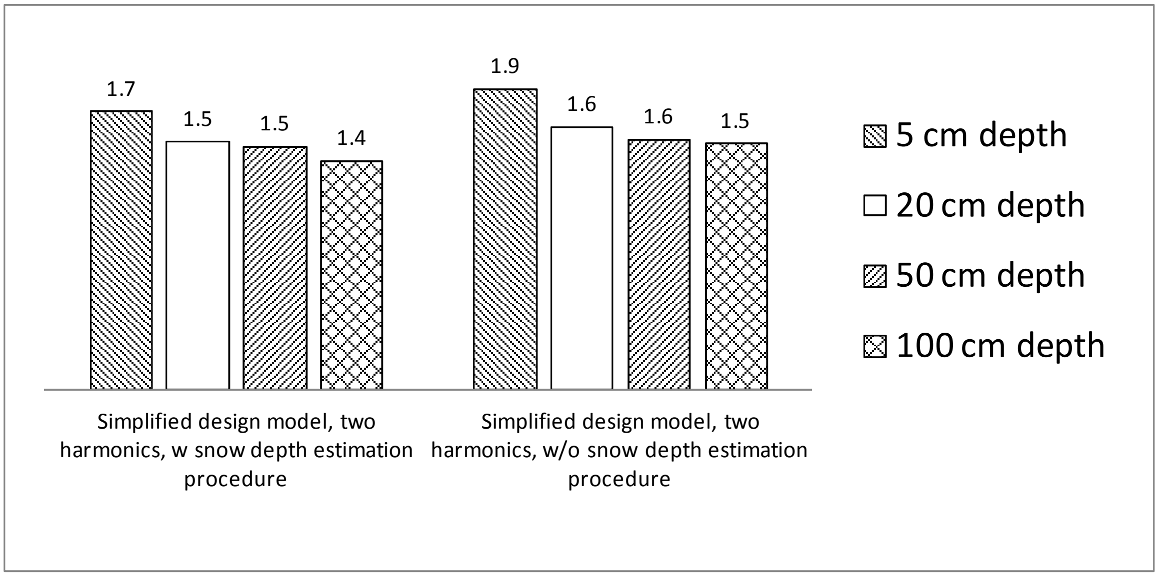

Figure 4.7: Mean RMSEs of the simplified design model with and without snow model, snow climates, in °C

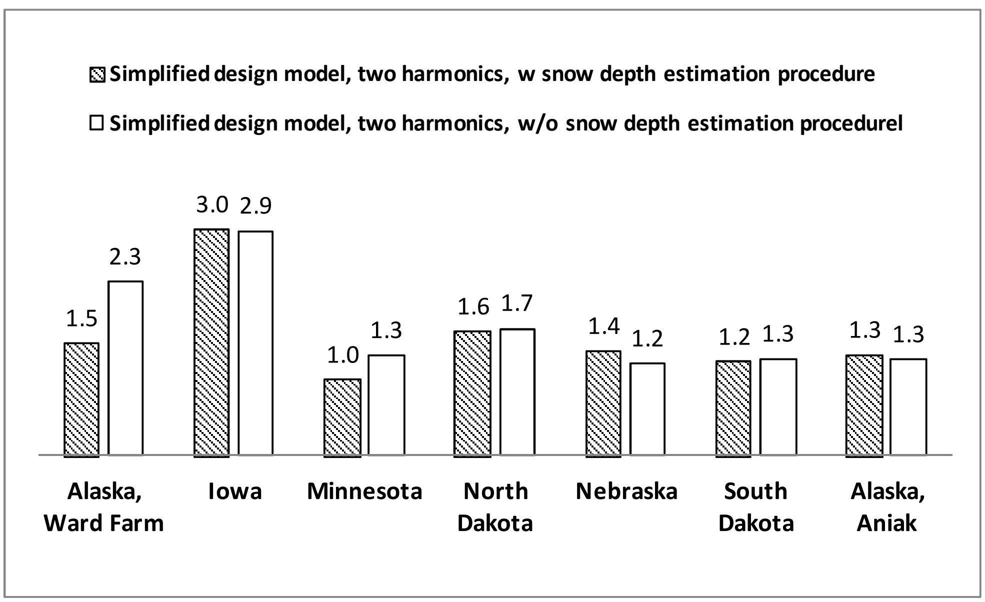

Figure 4.8: Mean RMSEs of the simplified design model of the four depths with and without snow model, snow climates, in °C

4.3. Experimental Data Uncertainty

The soil temperature data is measured using electronic thermistor to automatically record soil temperature on a scheduled timeframe. The resolution of the thermistor is ±0.1°C (±0.2°F) over the measurement range -10°C (-4°F) to +65°C (149°F). The accuracy of the thermistor is ±1.0°C (±1.8°F) over the full measurement range. The ground temperatures has been measured since the 1990s, however, almost for all the 200 sites, there are discontinued data in some of the years. For the nineteen SCAN sites being studied, the measured soil temperature at 5, 20, 50 and 100 cm (2", 8", 20" and 40") depths are only available for 3 -8 years. So the question would be how accurate it is to use 3-8 years typical year and maximum/minimum ground temperature to represent the ground temperature over a long period of time which could be 20 or 30 years?

In order to answer this question, fives SCAN sites with 8-11 years measured data available has been studied. The sites in South Dakota, Texas, Virginia and Wyoming, there are 8 years measured data available, there are 11 years measured data available from the site in Washington. For those sites, the typical year ground temperature calculated from the 1, 3, 6 years measured results are compared to the one estimated from 8 or 11 years and the maximum RMSEs of the five sites at different depths are summarized in Table 4.13.

Table 4.13: RMSEs of estimated typical year ground temperature from measured results

Measurement depth, cm (inch)	RMSE of typical year ground temperature, ℃ (℉)		
	1 year	3 years	6 years
5 (2)	2.8	1.1	0.8
20 (8)	2.2	1.3	0.6
50 (20)	1.7	1.0	0.5
100 (40)	1.2	0.9	0.4

The results shown in Table 4.13 are presented in Figure 4.9.

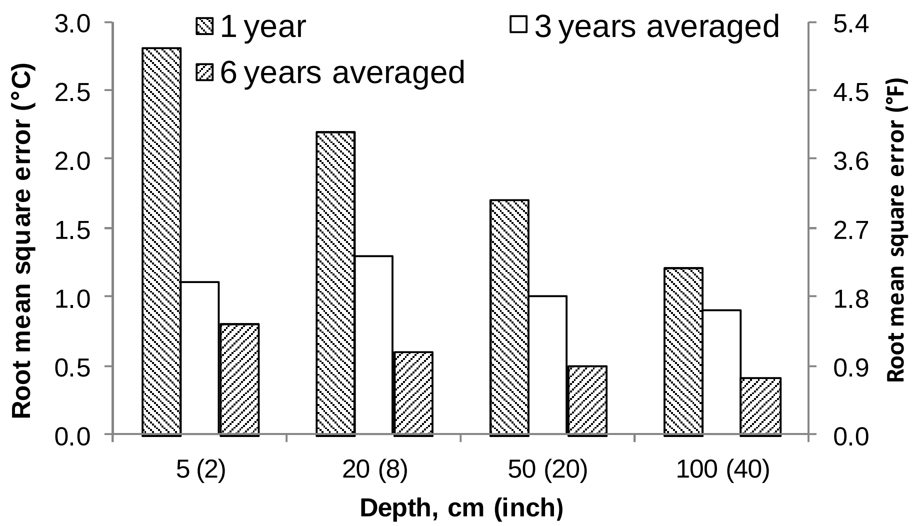

Figure 4.9: RMSEs of estimated typical year ground temperature from measured results

As shown in Table 4.13 and Figure 4.19, at 5 cm (2") depth, using 1 year measured results to estimate the typical year ground temperature will give a RMSE of 2.8 °C compared to the one estimated from 8 years or 11 years measured results. The RMSEs of the results reduces at deeper depths and as more years of measured data are used. At all four depths, when at least 3 years measured results are used for estimating the typical year ground temperature, the RMSEs of the result will be less than 1.0 °C.

Table 4.14: RMSEs of estimated maximum and minimum ground temperature of multiple years from measured results

Measurement depth, cm (inch)	RMSE of maximum temperature of multiple years, ℃ (℉)			RMSE of minimum temperature of multiple years, ℃ (℉)		
	1 year	3 years	6 years	1 year	3 years	6 years
5 (2)	4.9	3.2	2.6	3.3	1.6	0.8
20 (8)	4.2	1.2	1.1	3.3	2.0	2.0
50 (20)	2.8	1.0	1.0	2.3	2.3	1.3
100 (40)	2.5	0.9	0.8	1.7	0.6	0.6

The results shown in Table 4.14 are presented in Figures 4.10 and 4.11.

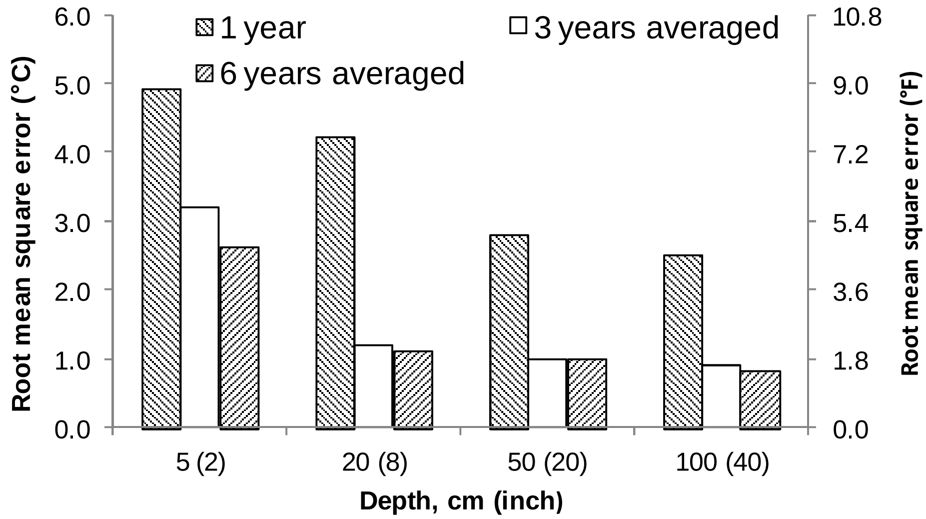

Figure 4.10: RMSEs of estimated maximum ground temperatures of multiple years from measured results at four depths

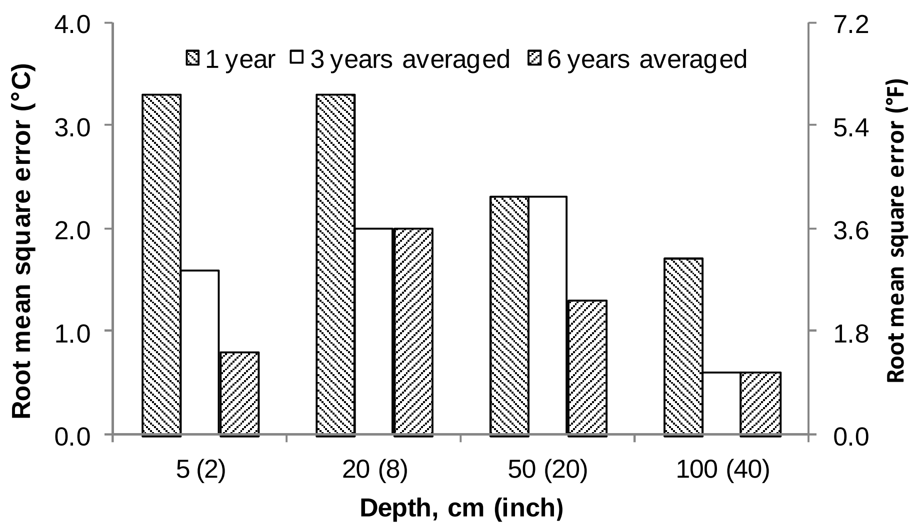

Figure 4.11: RMSEs of estimated minimum ground temperatures of multiple years from measured results

As shown in Table 4.10 and Figures 4.11 and 4.20, at 5 cm (2") depth, using 1 year measured results to estimate the maximum and minimum soil temperature of multiple years will give a RMSE of 4.9 °C and 3.3 °C respectively compared to the one estimated from 8 years or 11 years measured results. The RMSEs of the results reduces at deeper depths and as more years of measured data are used. At depths of 50 cm and 100 cm, when at least 3 years measured results are used for estimating the peak ground temperature of multiple years, the RMSEs of the result will be less than 2.0 °C.

4.4 Conclusions

In Chapter 3, a simplified design method for estimations of ground temperatures is provided for use by engineers. This new procedure relies on two orders harmonic relationship (Equation 4-3) and five weather related constants - annual average undisturbed ground temperature, two annual amplitude of surface temperature variations and two phase angles to predict the ground temperatures. A numerical model run with weather files to generate these model parameters has also been developed.

The numerical model is now run with typical year weather files to generate typical year ground temperature estimates around the world. However, the model relies on soil diffusivity, vegetation density and snow depth, which varies for each site in order to generate model results. These values can not be read from the weather files. Therefore, automated procedures to estimate these parameters for each site have been developed in this paper:

- A constant soil diffusivity is now assumed at each site with a typical value of 4.9×10^{-7} m^2/s (5.3×10^{-6} ft^2/s). According to Hendrickx et al. (2003), this value equals to the one given for 60% saturated silt and clay soil.

- The site around the world is divided into two groups - arid or dry summer climates and other climates. In the arid or dry summer climates group, the vegetation density is set to be 0.9; in other climates, the vegetation density is set to be 1.0.
- A simple snow model has been developed. The model takes the snow depth as inputs; a simple heuristic procedure for estimating the thickness of the snow cover is also developed.

These procedures are validated against measured results at nineteen SCAN sites. These SCAN sites are categorized into three climates - arid or dry summer climates, warm climates and snow climates to demonstrate the performance of the procedures in different climates. It is found that the simplified design model mean model RMSEs in arid or dry summer climates are 1.1°C-1.8°C (2.0°F-3.2°F); the model mean RMSEs in warm climates are 1.3°C -1.4°C (2.3°F - 2.5°F) and are 1.4°C - 1.8°C (2.5°F - 3.2°F) in snow climates.

I also quantify the improvements of model results by including each individual procedure. It is found that assuming constant soil diffusivity would only slightly vary the model RMSEs in different sites, by 0.6°C (1.1°F) at the most. Implementing the vegetation density estimation procedure will help reducing the mean model RMSEs of the four depths in the arid or dry summer climates by 1.3°C (2.3°F) at the most, at the site Los Lunas PMC, New Mexico. In the snow climates, the snow model included would help reducing the mean model RMSEs of the four depths by 0.8°C(1.4°F) at the most at a site Ward Farm, Alaska.

CHAPTER V

EXPERIMENTAL VALIDATION OF A WORLD-WIDE DATASET

In US, the commonly used analytical approach is the one-harmonic model first proposed by Fourier (1822, as cited by Narasimhan 2010). The model relies on three parameters - annual average ground temperature, annual amplitude of ground temperature at the surface and the phase angle to estimate the ground temperatures. The average undisturbed ground temperature and annual amplitude of surface temperature variation are read from very small maps for the continental US (Figure 17 of Chapter 34 of the 2011 ASHRAE Handbook - HVAC Applications) or North America (Figure 13 of Chapter 18 of the 2013 ASHRAE Handbook - Fundamentals). ASHRAE published a district heating guide (ASHRAE 2013b) which also uses one-harmonic model to estimate the undisturbed ground temperatures. This is done for all 5564 weather stations world-wide listed in Chapter 14 of 2009 ASHRAE handbook - fundamentals. More details of the commonly used method in US are given in the literature review. In this Chapter, the estimated ground temperatures using the commonly used approach in US are also compared to the measured results at the nineteen SCAN sites. The root mean square errors (RMSEs) of the proposed procedure and the US procedures are compared and discussed.

Furthermore, for the ground heat exchanger design and energy analysis work, the estimations of the peak (maximum/minimum) ground temperatures of multiple years are also important. The commonly used approach in US is not designed for predicting the ground temperatures under severe weather conditions. Thus, a correction factor is introduced in the two-harmonic model proposed in Chapter 4; the newly developed simplified design model can both be used for estimations of typical year ground temperatures and maximum/minimum ground temperatures of multiple years.

5.1 Simplified Design Model

In Chapter 4, a two-harmonic model has been developed for estimations of a typical year ground temperature. These constant values for 4112 sites world-wide covered by short and tall grass are summarized in Tables in Appendix A and are presented in continental maps in Appendix B. In Equation 5-1, a correction factor β is now introduced into the two-harmonic model; the modified model is named as the simplified design model. This model can be used both for estimating the typical year ground temperature and the peak ground temperature of multiple years:

$$T_s(z,t) = T_{s,avg} - \beta \sum_{n=1}^{2} e^{-z\sqrt{\frac{n\pi}{\alpha_s t_p}}} T_{s,amplitude,n} \cos\left(\frac{2\pi n}{t_p} t - PL_n - z\sqrt{\frac{n\pi}{\alpha_s t_p}}\right) \quad (5-1)$$

Where:

$T_s(z,t)$ is the undisturbed soil temperature at the depth of z and time t of the year , in °C or °F;

β is the correction factor, unitless;

z is the soil depth, in m or ft;

t is the time of year, starting from January 1st, in hr;

t_p is the period of soil temperature cycle (365), in day;

α_s is the soil diffusivity, in m^2/day or ft^2/day;

$T_{s,avg}$ is the annual average soil temperature of different depth and time, in °C or °F;

$T_{s,amplitude,n}$ is the n^{th} order surface amplitude, which can be assume to be half of the difference between the maximum and minimum monthly average temperatures in a year, in °C or °F;

PL_n is the phase angle of the annual soil temperature cycle, in radians;

In Equation 5-1, if β =1, the simplified design model is the same as the two harmonic model described in Chapter 4 and it can be used for the estimations of the typical year ground temperatures. To estimate the peak ground temperatures of multiple years, β = 1.6 is chosen. The simplified design model is validated against typical year ground temperatures and peak ground temperatures of multiple years summarized from 3-8 years of measured results at nineteen SCAN sites and 7-20 years of measured results at twelve Mesonet[16] sites in this article.

5.2. Experimental Validation

The measured results used for validation purposes are provided by Soil Climate Analysis Network (SCAN), United States Department of Agriculture (USDA). Nineteen geographically diverse measurement sites are chosen over a range of weather conditions. These SCAN sites are categorized into three climates (arid or dry-summer climates, warm climates and snow climates), based the Köppen -Geiger climate classification system (Kottek et al. 2006) as shown in Table 5.1. More detailed descriptions of the experimental data and the Köppen-Geiger climate classification are given in Chapter 4.

[16] Oklahoma Mesonet – A network which consists of 120 automated stations covering Oklahoma. These stations record the local weather (including precipitation), soil temperatures, and soil moisture. Soil temperatures under the sod and bare soil at the depth of 5 cm, 10 cm and 30 cm are measured on 15-minute intervals.

Table 5.1: Nineteen SCAN sites and TMY3 weather stations

Climate zone	States in the U.S.	SCAN site name	Köppen-Geiger climate type	Typical Meteorological Year Weather Sites
Arid or dry summer climates (5)	Arizona	Walnut Gulch	BSk	Douglas-Bisbee.Douglas.Intl.AP
	Colorado	Nunn	BSk	Greeley-Weld.County.AWOS
	New Mexico	Los Lunas PMC	BSk	Albuquerque.Intl.AP
	Oregon	Lynhart Ranch	Csb	Klamath.Falls.Intl.AP
	Alaska*	Ward Farm	Dsc	Big.Delta-Allen.AAF
Warm climates (8)	Alabama	WTARS	Cfa	Huntsville.Intl.AP-Jones.Field
	Arkansas	UAPB Lonoke Farm	Cfa	Little.Rock-Adams.Field
	Georgia	Watkinsville	Cfa	Athens-Ben.Epps.AP
	Kentucky	Mammoth Cave	Cfa	Bowling.Green-Warren.County
	Maryland	Powder Mill	Cfa	Baltimore-Washington.Intl.AP
	Oklahoma*	Fort Reno	Cfa	Oklahoma.City-Will.Rogers.World.AP
	South Carolina	Pee Dee	Cfa	Florence.Rgnl.AP
	Virginia	TideWater AREC	Cfa	Franklin.Muni.AP
Snow climates (6)	Iowa*	Ames	Dfa	Webster.City.Muni.AP
	Minnesota*	Cresent Lake	Dfb	St.Cloud.Muni.AP
	North Dakota	Mandon	Dfb	Bismarck.Muni.AP
	Nebraska	Rogers Farm	Dfa	Lincoln.Muni.AP
	South Dakota	EROS Data Center	Dfa	Sioux.Falls-Foss.Field
	Alaska*	Aniak	Dfc	Aniak.AP

Notes: The sites covered by tall grass is bolded and labeled with *, otherwise it is covered by short (mowed) grass

The simplified design model relies on few constant values: annual average soil temperature $T_{s,avg}$, surface temperature amplitude $T_{s,amplitude,n}$ and phase delay PL_n to predict the ground temperatures. These constant values are estimated using the procedure described in Chapter 4 and nineteen Typical Meteorological Year 3[17] (TMY3) weather files. The name of these weather files

[17] The TMY3 weather data files used are provided by National Solar Radiation Data Base; there are now files for over 1000 locations within the United State. For international locations, 227 IWEC (International Weather for Energy Calculations) files for locations outside the U.S. and Canada have been release by ASHRAE. ASHRAE has already released IWEC2 files for over 2500 locations worldwide.

are listed in Table 1. Each TMY3 weather file is chosen so that the location of the weather station is no more than 48.3 km (30.0 miles) away from the SCAN site.

5.2.1 Typical Year - Ground Temperature

In Chapter 3 and Chapter 4 I proposed a new procedure to predict the typical year ground temperature under short and tall grass covers. A numerical model is first developed for the estimations of ground temperatures; it considers a wide variety of factors such as soil freezing/thawing, snow cover which could greatly affect the temperature prediction accuracy; the vertical soil moisture transport is not modeled. The numerical model relies on weather data such as air temperature, air relative humidity, wind speed, solar radiation, etc which can be read from the typical year weather files in order to estimate the ground temperatures. The soil property, vegetation density and snow depth covers the ground surface is also required as model inputs. When generating a world-wide dataset of typical year ground temperatures, the soil property is assumed to be constant for different time of year and is the same for every site around the world. An automatic procedure for choosing vegetation density and estimating snow depth at each site based on the Köppen-Geiger climate type is also developed. The constant values generated for the nineteen SCAN sites are presented in Table 5.2.

Table 5.2: Constant values used in Equation 5-1, simplified design model- 19 SCAN sites[18]

Climate zone	States in the U.S.	$T_{s,avg}$, ℃	$T_{s,amplitude,n}$ ℃		PL_n, day	
			n=1	n=2	n=1	n=2
Arid or dry summer climates (5)	Arizona	20.4	9.8	1.2	11.2	7.5
	Colorado	11.5	12.9	-1.4	19.6	44.4
	New Mexico	16.4	12.0	1.1	17.5	-27.1
	Oregon	11.8	11.3	-2.0	19.9	36.4
	Alaska*	1.9	9.7	-1.6	27.7	13.2
Warm climates (8)	Alabama	16.8	10.6	0.8	19.4	10.7
	Arkansas	17.7	11.2	1.1	21.7	-0.1
	Georgia	17.8	9.4	0.8	18.3	-0.1
	Kentucky	15.3	11.9	1.3	28.1	2.6
	Maryland	14.4	11.8	0.5	22.2	-2.0
	Oklahoma*	16.4	10.9	1.3	23.2	-6.7
	South Carolina	19.0	9.3	1.0	21.8	-20.8
	Virginia	17.3	9.6	1.1	24.3	-20.9
Snow climates (6)	Iowa*	10.8	13.4	0.7	27.5	1.9
	Minnesota*	7.2	12.8	-1.3	30.1	17.5
	North Dakota	8.2	13.4	-1.4	24.9	7.0
	Nebraska	12.2	14.0	0.9	18.0	1.0
	South Dakota	9.6	14.1	-0.7	25.8	7.8
	Alaska*	1.7	6.3	-2.2	32.3	30.0

These constant values (along with soil diffusivity) are used with the simplified design model presented in Equation 5-1 to estimate the typical year ground temperature for the 19 SCAN sites. According to Chapter 4, a constant soil diffusivity is now assumed at each site with a typical value of 4.9×10^{-7} m^2/s (5.3×10^{-6} ft^2/s). According to Hendrickx et al. (2003), this value equals to the one given for 60% saturated silt and clay soil. The estimated ground temperatures are

[18] Model parameters are derived from TMY weather data.

compared to the measured results at the nineteen SCAN sites. It is found that the mean RMSEs of the two-harmonic model results at all sites – three climates are 1.3°C-1.6°C (2.3°F-2.9°F).

In the U.S., the ground temperatures are usually represented with a three parameter one-harmonic model, as shown in Equation 5-2:

$$T_s(z,t) = T_{s,avg} - e^{-z\sqrt{\frac{\pi}{\alpha_s t_p}}} T_{s,amplitude,1} \cos\left[\frac{2\pi}{t_p}(t - PL_1) - z\sqrt{\frac{\pi}{\alpha_s t_p}}\right] \qquad (5-2)$$

The one-harmonic model relies on three constant values to estimate the ground temperature. The two constant values annual average ground temperature $T_{s,avg}$ and annual amplitude of ground temperature at the surface $T_{s,amplitude,1}$ can be read from the maps presented in the ASHRAE Handbooks. These values read for the nineteen SCAN sites are summarized in Table 5.3. The phase angle term PL_1 set the number of days after the beginning of the year when the minimum soil temperature at the ground surface occurs; Kusuda and Achenbach (1965) fitted this parameter for 28 locations, based on air temperatures during 1931-1960 in the continental US, and came up with values between 0.55 and 0.65 radians. This is equivalent to a range between 32 and 38 days, a typical value of 35 days is chosen here. These constant values for sites in Alaska are not available in the ASHRAE Handbooks.

Table 5.3: Constant values used in Equation 5-2, ASHRAE Handbook - 19 SCAN sites

Climate zone	States in the U.S.	$T_{s,avg}$, ℃ (℉)	$T_{s,amplitude,n}$ ℃ (℉)	$PL_{n,}$ day
			n=1	*n=1*
Arid or dry summer climates (5)	Arizona	21.1	9.0	35
	Colorado	11.1	12.0	35
	New Mexico	17.2	11.0	35
	Oregon	13.3	10.0	35
	Alaska*			
Warm climates (8)	Alabama	16.7	11.0	35
	Arkansas	17.8	11.0	35
	Georgia	17.8	11.0	35
	Kentucky	14.4	11.0	35
	Maryland	13.9	9.0	35
	Oklahoma*	17.2	11.5	35
	South Carolina	17.8	10.0	35
	Virginia	15.0	10.0	35
Snow climates (6)	Iowa*	11.1	14.0	35
	Minnesota*	7.8	13.5	35
	North Dakota	8.3	13.5	35
	Nebraska	12.3	13.0	35
	South Dakota	10.0	13.5	35
	Alaska*			

ASHRAE also published a district heating guide (2013) which suggests using a one-harmonic model and some weather related constants to estimate the undisturbed ground temperatures:

$$T_s(z,t) = T_{s,avg} + e^{-z\sqrt{\frac{\pi}{\alpha_s t_p}}} T_{s,amplitude,1} \sin\left[\frac{2\pi}{t_p}(t - PL_1') - z\sqrt{\frac{\pi}{\alpha_s t_p}}\right] \qquad (5-3)$$

Equation 5-3 is slightly different from Equation 5-2; it uses a sine function instead of a cosine function to represent the ground temperature variation. The three model parameters annual average ground temperature $T_{s,avg}$, annual amplitude of ground temperature at the surface $T_{s,amplitude,1}$ and the phase angle PL_1' for the 19 SCAN sites can be read from the book and are summarized in Table 5.4. The ASHRAE district heating manual presents the constant values for all 5564 weather stations domestic and international listed in Chapter 14 of 2009 ASHRAE Handbook - fundamentals. The constant values at the TMY3 sites listed in Table 5.1 are chosen here for estimating the ground temperatures at the SCAN sites near the TMY weather stations. In Table 5.4, the constant values at the seventeen TMY3 sites are listed; the constant values for a site in Virginia and a site in Alaska are not available in the ASHRAE district heating manual.

Table 5.4: Constant values used in Equation 5-3, ASHRAE District Heating Manual - 19 SCAN sites

Climate zone	States in the U.S.	$T_{s,avg}$, ℃ (℉)	$T_{s,amplitude,n}$ ℃ (℉)	$PL_{n,}$ day
			n=1	*n=1*
Arid or dry summer climates (5)	Arizona	17.2	9.3	106
	Colorado	9.3	12.4	106
	New Mexico	14.1	11.3	104
	Oregon	8.4	9.5	109
	Alaska*	-1.5	17.1	99
Warm climates (8)	Alabama	16.2	10.3	107
	Arkansas	17.0	11.0	107
	Georgia	16.8	9.7	107
	Kentucky	14.0	11.2	107
	Maryland	13.2	11.6	110
	Oklahoma*	15.9	11.6	107
	South Carolina	17.7	9.4	107
	Virginia			
Snow climates (6)	Iowa*	9.8	14.3	107
	Minnesota*	6.0	15.7	107
	North Dakota	6.2	15.6	107
	Nebraska	10.9	14.1	107
	South Dakota	8.0	15.2	107
	Alaska*			

Measurements of ground temperature data can be quite useful for research purpose. However, ground temperature profile varies with weather conditions (precipitation, snow fall, etc), soil freezing/thawing, earth surface conditions and soil properties. Therefore, the measurement of ground temperature profile is neither easy nor practical for most engineering design studies. The available measurement data is presented in the simplified design model (Equation 5-1) so it can be used for engineering work. The five constant values used in the simplified design model are computed using the measured results; this is the best results that can be achieved using the two-harmonic relationship even if the measurement data are available. The constant values tuned from the measured results at the 19 SCAN sites are listed in Table 5.5.

Table 5.5: Constant values used in Equation 5-1, tuned from measured results - 19 SCAN sites

Climate zone	States in the U.S.	$T_{s,avg}$, ℃ (℉)	$T_{s,amplitude,n}$ ℃ (℉)		PL_n, day	
			n=1	*n*=2	*n*=1	*n*=2
Arid or dry summer climates (5)	Arizona	20.6	10.4	1.2	9.9	31.1
	Colorado	11.4	13.4	-1.4	12.2	42.8
	New Mexico	17.0	13.8	1.7	12.1	-13.8
	Oregon	11.2	12.3	-1.7	16.3	40.7
	Alaska*	2.8	8.8	-2.3	29.8	11.7
Warm climates (8)	Alabama	17.1	10.4	-0.5	18.5	64.7
	Arkansas	17.9	11.7	-0.6	16.9	76.9
	Georgia	17.5	10.8	-0.4	21.1	87.0
	Kentucky	15.6	11.7	-0.3	14.6	94.7
	Maryland	14.0	12.0	-0.5	15.9	67.6
	Oklahoma*	15.0	10.5	-0.5	17.8	69.3
	South Carolina	18.9	10.9	-0.4	18.7	66.7
	Virginia	17.0	11.2	-0.1	20.5	82.5
Snow climates (6)	Iowa*	9.5	9.4	-0.6	26.8	37.8
	Minnesota*	7.8	12.2	-1.3	27.2	13.4
	North Dakota	7.7	11.6	-0.9	20.3	17.5
	Nebraska	12.2	12.7	-0.8	18.1	33.0
	South Dakota	9.1	13.1	-1.1	20.6	14.3
	Alaska*	2.0	5.5	-1.8	35.4	35.9

Using the simplified design model and constant values presented in Table 5.2, the typical year ground temperatures at the 19 SCAN sites are estimated. These results are compared to the measured results at nineteen SCAN sites at 5cm, 20cm, 50cm and 100 cm (2", 8", 20" and 40") depths. The mean models RMSEs of all sites (all three climates) at four depths are plotted in Figure 5.1 and are labeled as "simplified design model, two-harmonic". This method gives mean RMSEs of all three climates 1.3°C-1.6°C (2.3°F-2.9°F) at 5cm- 100cm (2"-40") depths.

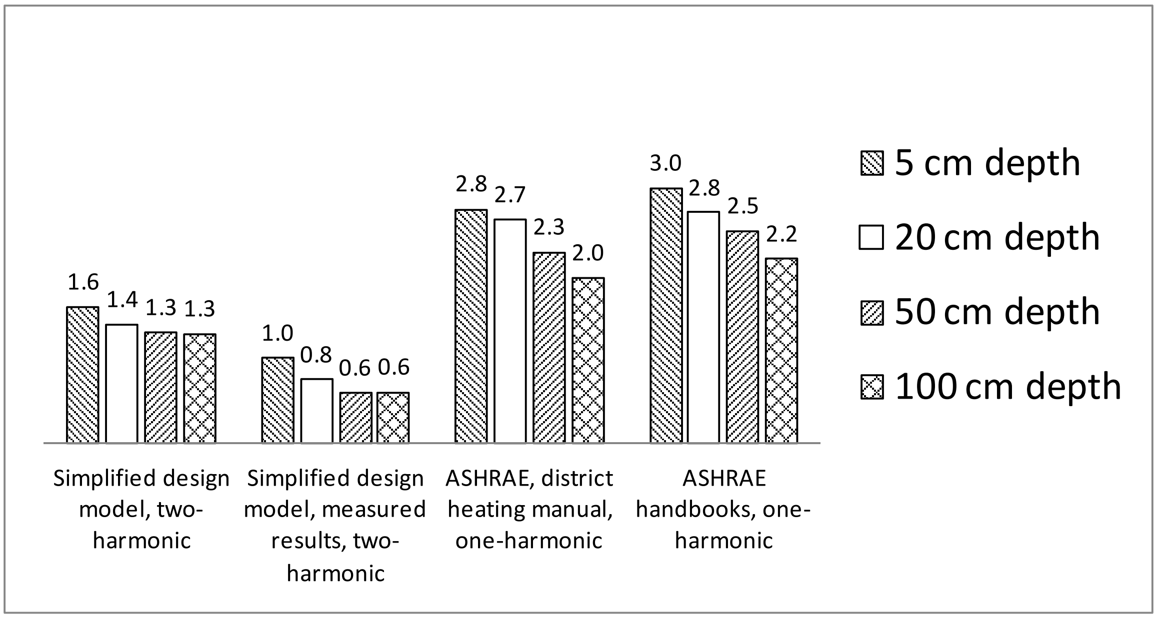

Figure 5.1: Mean RMSEs of model results for nineteen SCAN sites located in all three climates – arid or dry summer climates, warm temperate climates and snow climates

Figure 5.1 also presents the mean model RMSEs of all three climates for the "best" measured results that can be used for engineering applications. Using the simplified design model (Equation 5-1) and model parameters generated using the measured results at the SCAN sites which are presented in Table 5.5, the "best" simplified design model results give mean model RMSEs of all three climates 0.6°C-1.0°C (1.1°F-1.8°F) at the four depths, this result is labeled as "simplified design model, measured results, two harmonics" in Figure 5.1. The simplified design model gives 0.6°C-0.7°C (1.1°F-1.3°F) higher RMSEs than the "best" simplified design model results tuned from the measured ground temperatures at the SCAN sites. The accuracy of both methods is limited by the simplified form of the design model. Furthermore, the "simplified design model, two harmonics" result is limited by the accuracy of the numerical model discussed in Chapter 3 used with typical year weather data, from which the constant values used in the simplified design model are generated from. Therefore, the procedure described in this thesis gives higher model RMSEs. Since the available well-formatted measured ground temperatures are quite limited, it is not practical to tune the simplified design model using measured results at each site worldwide even though it gives relatively lower RMSEs.

The result estimated using one-harmonic model (Equation 5-2) and constant values read from the ASHRAE Handbooks (Table 5.3) are also compared to the measured results at the nineteen SCAN sites, the mean model RMSEs of all sites are 2.2°C-3.0°C (4.0°F - 5.4°F) at 5cm-100cm (2" - 40") depths. The results estimated using one-harmonic model and constant values read from the ASHRAE district heating manual are with mean model RMSEs of all three climates as 2.0°C-2.8°C (3.6°F-5.0°F) at the four depths. Overall, the ASHRAE district heating manual and ASHRAE Handbook procedures give similar mean model RMSEs, which are 0.7°C-1.4°C (1.3°F-2.5°F) higher than the ones given by the simplified design model. Based on the 19 case study results, the simplified design model is preferred to be used for generating world-wide dataset of ground temperatures.

In order to evaluate the accuracy of the simplified design model in different climates, the nineteen SCAN sites are categorized into three climates: arid or dry summer climates, warm climates and snow climates based on the Köppen-Geiger climate system. The comparison results of mean model RMSEs of each climates using the four methods " simplified design model, two-harmonic", "simplified design model, measured results, two-harmonic", "ASHRAE, district heating manual, one-harmonic" and "ASHRAE Handbooks, one-harmonic" in these three climates are plotted in Figures 5.2, 5.3 and 5.4 respectively. Overall, the "simplified design model, measured results, two harmonic" gives the lowest mean model RMSEs of each climates, in the range of 0.5°C-1.2°C (0.9°F-2.2°F) at the four depths. The simplified design model gives the second lowest RMSEs, which are 1.1°C–1.8°C (2.0°F-3.2°F). The ASHRAE Handbook and ASHRAE district heating manual give much higher RMSEs in the range of 1.1°C-4.3°C (2.0°F-7.7°F).

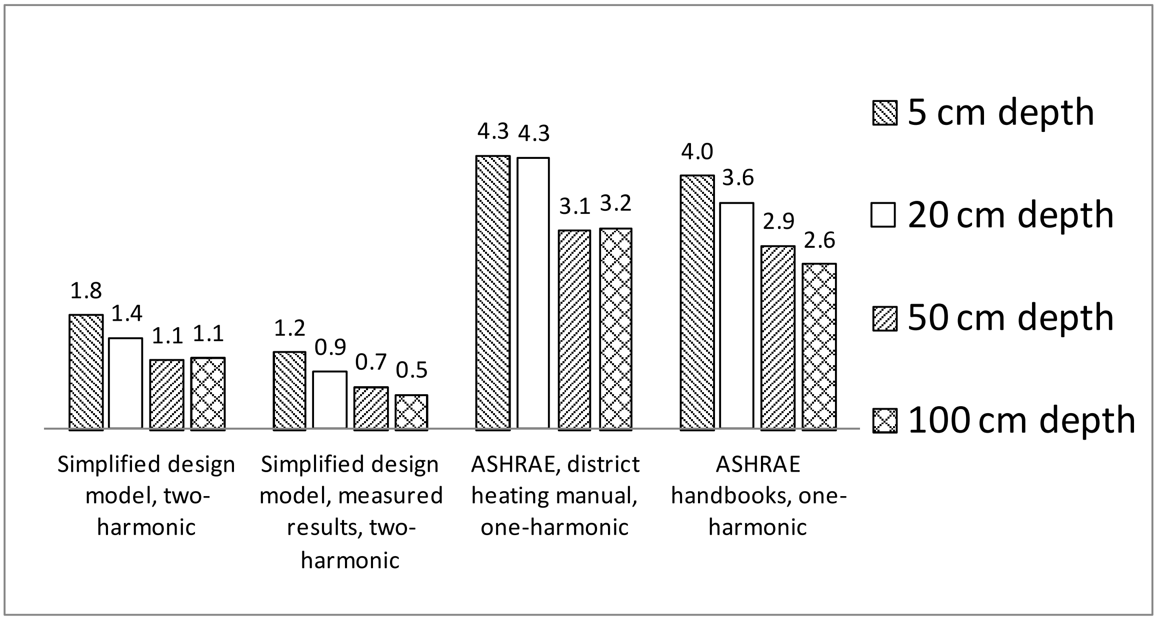

Figure 5.2: Mean model RMSEs of all sites in arid or dry summer climates

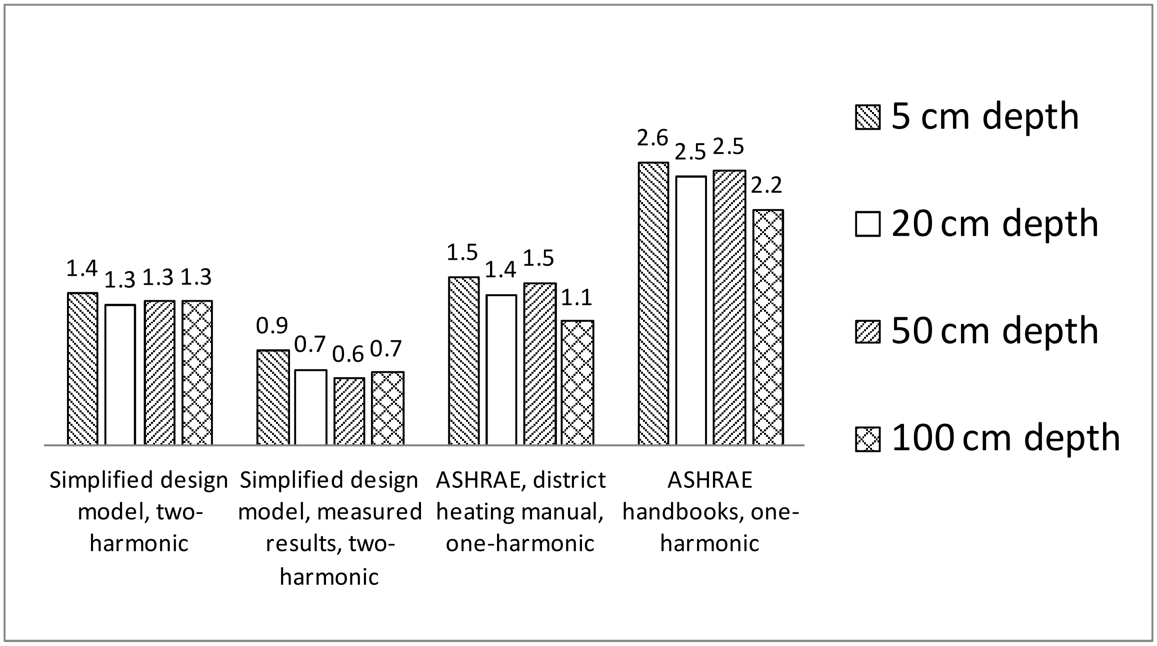

Figure 5.3: Mean model RMSEs of all sites in warm temperate climates

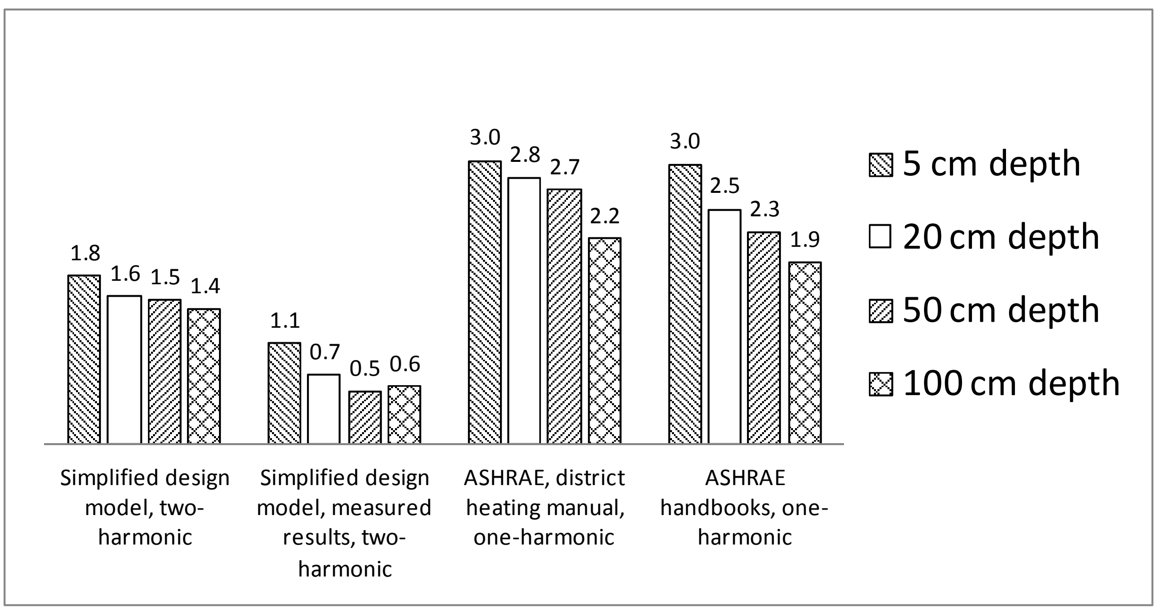

Figure 5.4: Mean model RMSEs of all sites in snow climates

In Figures 5.2, 5.3 and 5.4, it is found that the simplified design model gives relatively higher mean model RMSEs in the arid or dry summer climates and snow climates, which are 1.4°C–1.8°C (2.5°F-3.2°F) at the four depths. This is 0.1°C-0.4°C (0.2°F-0.7°F) higher than the model mean RMSEs given in the warm climates. In all, the method described in this thesis gives quite satisfactory results in all three climates – arid or dry summer climates, warm temperate climates and snow climates, with mean model RMSEs of each climate less than 2.0°C (3.6°C) at the four depths. There are two commonly used approaches presented in ASHRAE handbooks and ASHRAE district heating manual for the estimations of the ground temperatures. It is found that the method described in this thesis gives much lower mean model RMSEs in all three climates compared to the two existing methods.

The results of the ASHRAE Handbooks procedure gives RMSEs of 2.2°C-4.0°C (4.0°F-7.2°F) in these three climates. It relies on a one-harmonic model and three constant values to estimate the ground temperature, which are annual average ground temperature, annual amplitude of ground temperature at the surface and the phase angle. The annual average undisturbed ground temperature and annual amplitude of surface temperature variation are read from very small maps for the continental US or North America. These maps can be traced back to research in the 1920s (Collins 1925) and 1950s (Chang 1958). Collins (1925) developed a map for US. based on average annual air temperature, assuming the well water temperatures at the depths of 30-60 ft (annual average ground temperature) would be equivalent to average annual air temperatures. Chang (1958) presents the temperature ranges (twice the amplitude) worldwide at 10 cm (4") depth. This map is derived based on measured results at only 10 sites worldwide. The limited measured data are used for developing the surface amplitude map, which lower the accuracy of this method.

The ASHRAE district heating manual also tends to give higher RMSEs in the arid or dry summer climates and snow climates, in the range of 2.2°C-4.3°C (4.0°F-7.7°F). This is 1.1°C-2.8°C (2.0°F-5.0°F) higher than the model RMSEs given in the warm climates. The ASHRAE district heating manual procedures also relies on the one-harmonic model to predict the ground temperatures. The three constant values used in the model are computed by performing a best fit to the average monthly air temperature using the least squares method by assuming that the ground surface temperature equals to the air temperature. Based on the validation results, it is found that this is a more valid assumption in the warm climate rather than in the arid or dry summer climates and snow climates.

The accuracy of the method described in this thesis is limited by both the accuracy of the ground temperature estimates generated by the numerical model and the simplified form of the design model itself. The simplified design model proposed to be used is still based on pure conduction and neglects the effects of solar radiation, snow cover, soil freezing/thawing and evapotranspiration. As discussed by Signorelli and Kohl (2004), the effects of these phenomena on undisturbed ground temperature may cause deviations on the order of 1-4 K or 2-7°F. Therefore, a more complex analytical model might be used in the future work. Furthermore, the numerical model could possibly be improved by including a more complex scheme of estimating the vegetation density and snow depth which covers the ground surfaces. In the arid or dry summer climates, the vegetation density which is required as input to the model is assumed to be constant all the year. This could be improved by correlating the vegetation density to the daily or monthly precipitation data. In snow climates, a more complex snow model used by Xu and Spitler (2014) can be implemented.

Figures 5.5 and 5.6 demonstrate the RMSEs of the four methods for the nineteen SCAN sites at 50cm (20") and 100cm (40") depths. At the two depths, the RMSEs of the procedure results described in this thesis "simplified design model, two harmonic" are in the range of 0.7°C-2.8°C (1.3°F-5.0°F). The ASHRAE Handbooks and ASHRAE district heating manual procedures are giving RMSEs in the range of 0.7°C-4.1°C (1.3°F-7.4°F), which is 0.0°C-1.3°C (0.0°F-2.4°F) higher than the simplified design model RMSEs.

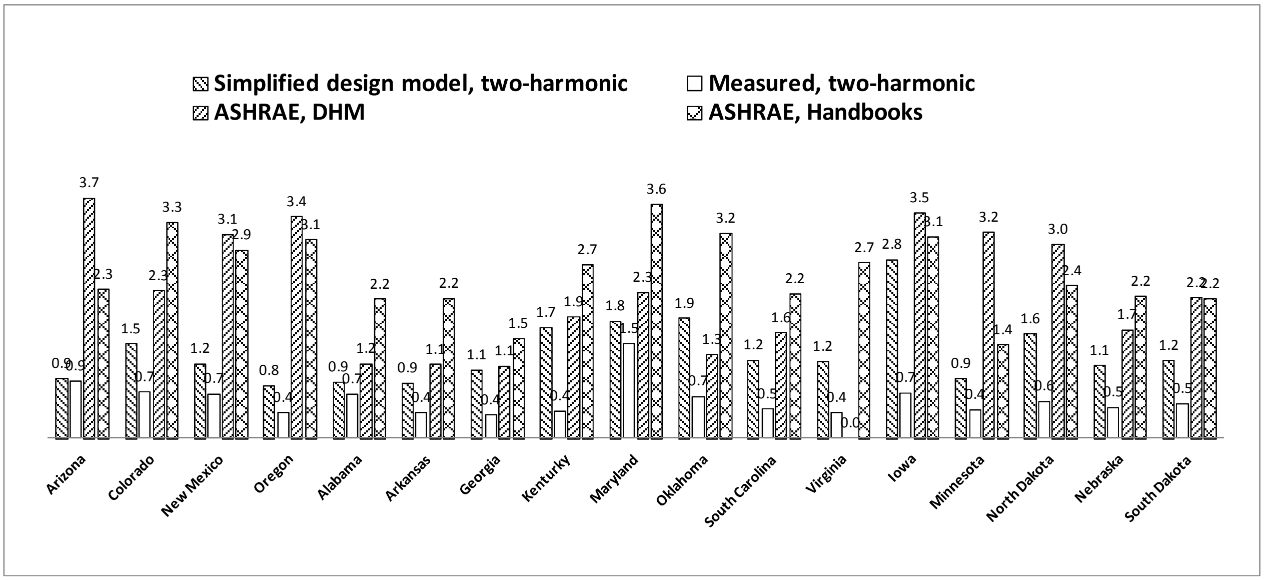

Figure 5.5: Model RMSEs for nineteen SCAN sites at 50cm (20") depth

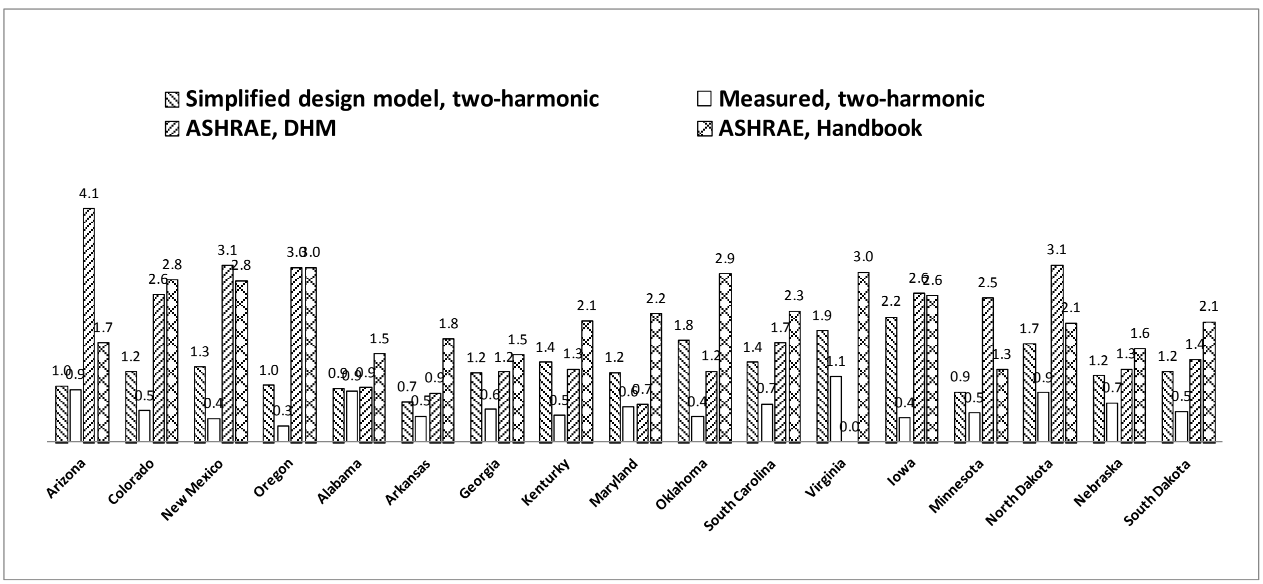

Figure 5.6: Model RMSEs for nineteen SCAN sites at 100cm (40") depth

The ground temperatures estimated at shallow depths can be estimated using the simplified design model shown in Equation 5-1. At deeper depths, the ground temperature are estimated using the constant annual average ground temperature $T_{s,avg}$ presented in Equation 5-1 imposed with a geothermal gradient. The geothermal gradient is the rate of increasing temperature with respect to the increasing depths towards the interior core of the Earth. It is about 25°C/km (1.4°F/100ft) in most of the world (Fridleifsson et al. 2008). The ground temperatures at a deeper depth is more affected by the estimated annual average ground temperature $T_{s,avg}$. These estimated values using the four methods at the nineteen SCAN sites are summarized in Table 5.6.

Table 5.6: Annual average near-surface ground temperature $T_{s,avg}$ - 19 SCAN sites[19]

Climate zone	States in the U.S.	Measured results at SCAN sites	Simplified design model	ASHRAE, district heating manual	ASHRAE, Handbooks
Arid and dry climates (5)	Arizona	20.6	20.4	17.2	21.1
	Colorado	11.4	11.5	9.3	11.1
	New Mexico	17.0	16.4	14.1	17.2
	Oregon	11.2	11.8	8.4	13.3
	Alaska*	2.8	1.9	-1.5	
Warm temperate climates (8)	Alabama	17.1	16.8	16.2	16.7
	Arkansas	17.9	17.7	17.0	17.8
	Georgia	17.5	17.8	16.8	17.8
	Kentucky	15.6	15.3	14.0	14.4
	Maryland	14.0	14.4	13.2	13.9
	Oklahoma*	15.0	16.4	15.9	17.2
	South Carolina	18.9	19.0	17.7	17.8
	Virginia	17.0	17.3		15.0
Snow climates (6)	Iowa*	9.5	10.8	9.8	11.1
	Minnesota*	7.8	7.2	6.0	7.8
	North Dakota	7.7	8.2	6.2	8.3
	Nebraska	12.2	12.2	10.9	12.3
	South Dakota	9.1	9.6	8.0	10.0
	Alaska*	2.0	1.7		

In Table 5.6, the experiment results are the averaged ground temperature of 3-8 years measured results at 5cm, 20cm, 50cm and 100cm (2", 8", 20" and 40") depths. The estimated values using the procedure described in Chapter 4, given in the ASHRAE district heating manual and ASHRAE Handbooks are compared to these summarized measurement results. The mean model

[19] RMSEs in this table are computed using model parameters derived from TMY data and experimental results averaged over periods of 3-8 years. See the first paragraph of Section 4.3 for a fuller explanation.

RMSEs of all 19 sites is summarized. Overall, Xing and Spitler procedure estimated the annual average ground temperature $T_{s,avg}$ with the lowest mean model RMSEs of all sites which is 0.6°C (1.1°F), the ASHRAE Handbook estimated value seems to be quite reasonable with mean model RMSEs of all sites of 1.2°C (2.2°F). The mean model RMSEs of all sites using the ASHRAE district heating manual method is much higher as 2.6°C (4.7°F). Thus, the new procedure is preferred to be used for estimating the annual average ground temperature which can be used in the deep ground temperature estimations.

5.2.2 Extreme Hot/Cold Year - Ground Temperature

For the ground heat exchanger design and energy analysis work, both the typical-year ground temperature and the peak (maximum/minimum) ground temperature of multiple years needs to be estimated. The simplified design model used for the estimations of these ground temperatures is proposed and presented in Equation 5-1. A correction factor β is used in the simplified design model. When $\beta = 1$, the simplified design model can be used to estimate the typical year ground temperatures. The value of $\beta = 1.6$ is chosen for the estimations of the peak ground temperature of multiple years, this value is found using peak ground temperatures of multiple years summarized from 3-8 years of measured results at 5cm -100cm (2"-40") depths at nineteen SCAN sites and 7-20 years of measured results at 5cm-30cm (2"-12") depths at twelve Oklahoma Mesonet sites (2010).

The information of the nineteen SCAN sites are summarized in Table 5.1; the information of the Oklahoma Mesonet sites are summarized in Table 5.7. There are data available for 120 Mesonet stations. The further distance between the TMY3 sites and the Mesonet sites, the weather data is less preferable to be used as an input for the validation of the model. Thus, we selected twelve of them which are located to a TMY3 site at a distance of no more than 48.3km (30.0miles) away; the same criterion is used to select the SCAN sites for the validation of the model in Chapters 3 and 4. The names of these Mesonet sites and the Köppen-Geiger climate types of each site are listed in Table 5.7. One Mesonet site is located in the arid or dry summer climates, 11 sites are located in the warm climates. The TMY3 weather files used as inputs are also summarized in Table 5.7.

Table 5.7: Twelve Oklahoma Mesonet sites and TMY3 weather stations

Climate zone	Mesonet site name	Köppen-Geiger climate types	Years of measurement data			Typical Meteorological Year Weather Sites
			5cm (2") depth	10cm (4") depth	30cm (12") depth	
Arid or dry summer climates (1)	Woodward	BSk	18	20	20	Gage Airport
Warm climates (11)	Altus	Cfa	15	16	20	Altus AFB
	Apache	Cfa	20	20	20	Fort Sill Post Field AF
	Blackwell*	Cfa	15	19	15	Ponca City Municipal AP
	Fairview	Cfa	14	19	-	Vance AFB
	Hobart	Cfa	16	17	17	Hobart Municipal AP
	McAlester	Cfa	12	18	12	McAlester Municipal AP
	Nowata	Cfa	15	20	20	Bartlesville/Phille
	Oklahoma city North	Cfa	7	7	7	Oklahoma City Tinker AFB
	Oklahoma city West*	Cfa	7	7	7	Oklahoma City Will Rogers World Airport
	Stillwater	Cfa	19	20	20	Stillwater Rgnl
	Weatherford	Cfa	13	19	14	Clinton-Sherman

The constant values for these twelve Oklahoma Mesonet sites are generated using the procedure described in Chapter 4 and the TMY3 weather files listed in Table 5.8. These factors can be used with the simplified design model to predict the typical year ground temperatures for the twelve Mesonet sites when the correction factor β=1.

Table 5.8: Constant values used in Equation 5-1, simplified design model - 12 Oklahoma Mesonet sites[20]

Climate zone	Mesonet site name	$T_{s,avg}$, ℃ (℉)	$T_{s,amplitude,n}$ ℃ (℉)		PL_n, day	
			n=1	*n*=2	*n*=1	*n*=2
Arid or dry summer climates (1)	Woodward	17.3	13.7	1.0	16.5	-10.9
Warm climates (11)	Altus	18.3	12.3	0.1	20.7	1.9
	Apache	17.7	12.3	0.1	22.0	9.9
	Blackwell*	16.7	11.7	1.4	26.3	-25.3
	Fairview	15.7	13.0	-1.0	24.4	51.4
	Hobart	17.4	12.6	1.3	24.0	-21.9
	McAlester	17.9	10.8	0.7	20.6	8.1
	Nowata	15.5	11.7	0.6	14.7	11.8
	Oklahoma city North	16.5	12.4	-0.6	21.1	8.2
	Oklahoma city West*	15.9	11.5	0.2	24.6	10.4
	Stillwater	17.0	12.4	1.3	19.4	-26.1
	Weatherford	16.1	12.5	0.7	23.4	8.0

The simplified design model RMSEs compared to the typical year ground temperatures measured at the 12 Oklahoma Mesonet set has been summarized in Table 5.9. The constant values in Table 5.8 are used in the simplified design model for the estimations of the ground temperatures. It can be seen in Table 5.9, the procedure consistently gives good estimations of the ground temperature for the 12 sites with model RMSEs ranges from 0.7°C-2.4°C (1.3°F-4.3°F) at the 5, 10 and 30cm (2, 4 and 12”) depths.

[20] Model parameters are derived from TMY weather data.

Table 5.9: RMSEs of simplified design model, simplified design model - 12 Oklahoma Mesonet sites[21]

Climate zone	Mesonet site name	At the depth of		
		5cm (2")	10cm (4")	30cm (12")
Arid or dry summer climates (1)	Woodward	1.2	1.1	0.9
Warm climates (11)	Altus	1.7	1.7	1.5
	Apache	1.6	1.6	1.3
	Blackwell*	1.3	1.3	
	Fairview	1.4	1.3	1.1
	Hobart	0.9	0.8	0.7
	McAlester	1.1	1.3	1.1
	Nowata	1.2	1.2	1.0
	Oklahoma city North	1.5	1.6	1.6
	Oklahoma city West*	1.1	1.0	0.9
	Stillwater	0.9	0.8	0.8
	Weatherford	2.4	2.2	2.1

Table 5.10 summarizes number of years of measurement data (including both the SCAN sites data and Mesonet data), number of sites available at six depths - 5cm, 10cm, 20cm, 30cm, 50cm and 100 cm (2", 4", 8", 12", 20" and 40"). For example, at 5cm (2") depth, there are 260 years of measured results available collected from 29 SCAN sites or Mesonet sites. The maximum and minimum ground temperatures of these sites for each year are summarized. In the simplified design model, the constants values listed in Table 8 are used with the correction factor of 1.5-2.0. The estimated maximum/minimum ground temperature of multiple years for each site is computed; when the estimated maximum ground temperature is higher than the annual maximum measured ground temperature, and the estimated minimum ground temperature is lower than the

[21] RMSEs in this table are computed using model parameters derived from TMY data and experimental results averaged over periods of 7-20 years.

annual minimum measured ground temperature, then it is claimed that the predicted peak ground temperature meet the design condition of that year. In this way, the number of years when the estimated peak ground temperature meet the design condition is summarized. For example, at 5 cm depth, when the correction factor is 1.5, 217years/260years - 83.5% of the years the estimated ground temperature meet the design condition.

In Table 5.10, it shows that if a correction factor of 1.5 is chosen, 82.0% to 93.6% of the time the estimated maximum/minimum ground temperature will meet the design condition; if the correction factor is set to be 1.6, then the design method will be successful for 88.9% to 98.0% of the time. If the correction factor is 1.7, then 92.6% to 100% of the time the estimated results will meet the design condition. The commonly used methods in U.S. - ASHRAE handbooks and ASHRAE district heating manual methods only estimate the ground temperatures for a typical year. If the air conditioning systems are designed based on these estimated results, it wouldn't be adequate to meet the severe weather conditions. In this article, by introduce the correction factor of 1.6 in the simplified design model, about 90% of the times the estimated ground temperatures using the simplified design model will meet the design condition; that allows the engineers to design a adequate system that works through most of the severe weather conditions. It is also found that the correction factor is correlated to the depth. The ground surface temperature corresponds faster to the change of the weather conditions, so the correction factor at the surface is usually larger and smaller at deeper depths. The correction factor is also related to the climates. In warm temperate climates, the correction factor is smaller. In arid or snow climates, the correction factor turns to be larger. It is recommended that for the future work, the correction factor can be correlated to the depth and the climate types in order to further improve the accuracy of the simplified design model.

Table 5.10: Simplified design model correction factors used for estimations of peak ground temperature of multiple years

At depths, cm (inches)	Number of years of measurement	Number of sites	1.5	1.6	1.7	1.8	1.9	2
5 (2)	260	29	83.5%	93.5%	96.5%	98.5%	99.6%	99.6%
10 (4)	202	12	93.6%	98.0%	100.0%	100.0%	100.0%	100.0%
20 (8)	89	19	82.0%	91.0%	96.6%	97.8%	100.0%	100.0%
30 (12)	172	11	93.6%	96.5%	98.3%	99.4%	100.0%	100.0%
50 (20)	81	19	87.7%	93.8%	97.5%	100.0%	100.0%	100.0%
100 (40)	81	19	86.4%	88.9%	92.6%	96.3%	100.0%	100.0%

5.3. Conclusions

Chapter 3 and Chapter 4 proposed an automatic procedure of generating a world-wide dataset of typical year ground temperatures. It suggests using a two-harmonic model and five weather related constants - annual average undisturbed ground temperature, two annual amplitude of surface temperature variations and two phase angles to predict the ground temperatures. Appendix A listed these constant values in tables for 4112 short grass or tall grass covered sites worldwide where the typical year's weather files are available. Appendix B presents these constant values in continental maps. In this paper, a correction factor β is now introduced into the two-harmonic model described in Chapter 3 and Chapter 4. This simplified design model can both be used for the estimations of typical year ground temperatures and the predictions of the maximum/minimum ground temperatures of multiple years.

The simplified design model is validated against measured results at 5cm, 20cm, 50cm and 100cm (2", 8", 20" and 40") depths at nineteen geographically diverse SCAN sites in US. For the typical year ground temperature estimations, the correction factor is set to be 1 in the simplified design model. The simplified design model gives mean model RMSEs of all nineteen SCAN sites (three climates – arid or dry summer climates, warm temperate climates and snow climates) as

1.3°C-1.6°C (2.3°F-2.9°F) at the four depths. There are two methods commonly used in US for the estimations of the typical year ground temperatures - ASHRAE district heating manual procedure and ASHRAE Handbook procedure. They both rely on a one-harmonic relationship and three constant values to estimate the ground temperatures. The ASHARE district heating manual procedure gives mean model RMSEs of all nineteen SCAN sites (three climates) as 2.0°C-2.8°C (3.6°F-5.0°F); ASHRAE Handbook procedure gives mean model RMSEs of all nineteen SCAN sites (three climates) as 2.2°C-3.0°C (4.0°F-5.4°F). Overall, the ASHRAE district heating manual and ASHRAE Handbook procedures give similar model RMSEs, the design method described in this article gives RMSEs 0.7°C-1.4°C (1.3°F-2.5°F) lower than the existing procedure. Therefore, based on the validation work of the 19 SCAN sites, the simplified design model is preferred to be used with parameters generated using procedures described in Chapter 4 for estimations of ground temperatures in a world-wide range.

For the estimations of the peak (maximum/minimum) ground temperature of multiple years, the correction factor in the simplified design model is set to be 1.6. The model is verified using peak ground temperatures of multiple years summarized from 3-8 years of measured results at 5cm-100cm (2"-40") depths at nineteen SCAN sites and 7-20 years of measured results at 5cm-30cm (2"-12") depths at twelve Mesonet sites. It is found that 88.9% to 98.0% of the time the estimated maximum/minimum ground temperature will meet the worst design condition.

CHAPTER VI

IMPACT OF SIMPLIFIED DESIGN MODEL DEVELOPMENT ON HORIZONTAL GROUND HEAT EXCHANGER DESIGN

In Chapter 5, a simplified design model has been developed; the model relies on five parameters to estimate the ground temperature, which are annual average ground temperatures, two amplitude of the ground temperature at the earth surface and two phase lag. These parameters are estimated using numerical model results run with the TMY3 weather files. The simplified design model gives more accurate ground temperature estimations than the commonly used approach which are presented in the ASHRAE handbooks and ASHRAE district heating manual.

The ground temperatures estimated using the simplified design model can be used for the design of the horizontal ground heat exchangers. In this chapter, the impact of the simplified design model development on the horizontal ground heat exchanger design will be investigated and discussed. This study involves developing a horizontal ground heat exchanger (HGHX) simulation tool as an aid in the design of horizontal ground heat exchangers. This simulation tool is developed based upon the foundation heat exchanger (FHX) simulation tool introduced in Xing et al. (2012).

6.1 HGHX Simulation Tool

The HGHX simulation tool is developed based upon the FHX simulation tool (Xing et al. 2012). The foundation heat exchanger is a relatively new type of ground heat exchanger that utilizes the excavation often made for basements and foundation in order to reduce the high cost of trench excavation. Horizontal ground heat exchangers are similar to FHX in geometry, without the presence of a basement in close proximity to the heat exchanger tubing. Therefore, the foundation assumed in the foundation heat exchanger simulation tool is removed in order to simulate the horizontal ground heat exchangers. The HGHX simulation tool allows users to perform a simulation of the horizontal ground heat exchangers to determine the monthly average and peak fluid temperatures entering the heat pump. By changing the length of the HGHX pipes, the user can limit the temperature to within their equipment constraints.

6.2 Parametric Study

The HGHX simulation tool requires monthly average and peak building heating and cooling loads as inputs. This study involved developing hourly building loads for a single-story house located in twelve SCAN sites in the U.S. using Energy Plus house model. The monthly time step simulation tool simplifies the hourly loads, which are treated as monthly constant loads applied over the whole month and monthly peak loads typically applied over a period of 1-8 hours at the end of the month. The procedure for determining the peak load magnitude and duration is described by Cullin and Spitler (2011).

A prototype house was created in the Energy Plus environment. The house has a rectangular plan, 15.24 m × 9.75 m (50 ft × 32 ft), with a floor area of 148.6 m^2 (1598.6 ft^2). The height of the house is 2.7 m (8.9 ft). 25% of the wall area is covered by glazing on the north and south facades, and 10% of the east and west facades are glazed. The windows have a U-value of 2.5 W/(m^2-K) (14.2 Btu/(hr-ft^2-°F) and a solar heat gain coefficient of 0.36. The wall and roof are constructed with insulated panels with an R-value of 7.40 K/m^2-W (R42). The occupant density was set presuming a family of four in the household, and combined lighting and casual gains of 8.2 W/m^2 (25.9 Btu/ (hr•ft^2) and constant infiltration rate of 0.5 ACH. Schedules for the people, equipment, and lighting were created assuming a typical residential schedule. In heating, the set point temperature is 20°C (68 °F). In cooling, the system is turned on when temperature reaches 23°C (73.4°F).

The soil is assumed to be clay loam, with thermal conductivity of 1.08 W/m-K and volumetric heat capacity of 2.479 MJ/m^3-K. 3/4 inch diameter HDPE piping is used; the pipes are buried at a single trench at the depths of 0.9m and 1.5 m (3.0ft and 4.9ft). The fluid running in the tubes is water mixed with 10% propylene glycol. The constraining temperature for the water to air heat pump is set to be minimum entering fluid temperature (EFT) of 0°C (32°F) and a maximum EFT of 35°C (95°F).

Three sets of ground temperature are used for estimating the required lengths of the ground heat exchangers for houses located in each SCAN site. These ground temperature are: measured ground temperature, ground temperature estimated from the simplified design model and ground temperature estimated from the commonly used approach. The sized lengths of the ground heat exchangers are summarized in Table 6.1. In the snow climates, the sized horizontal ground exchangers become very long as expected (more than 200 m (656 ft) long), it seems it is less preferable to install the horizontal ground heat exchanger in the snow climate. Thus, I haven't included the sizing work done for the snow climate; this part will be further investigated in the future.

Table 6.1: Required lengths of the HGHX tubing using typical year ground temperatures

Climate zone	States in the U.S.	SCAN site name	Köppen-Geiger climate type	Two harmonic models, measured results	ASHRAE, Handbooks	ASHRAE, District heating manual	Simplified design model
Arid or dry summer climates (4)	Arizona	Walnut Gulch	BSk	118.0	109.0	86.0	110.0
	Colorado	Nunn	BSk	240.0	250.0	375.0	231.0
	New Mexico	Los Lunas PMC	BSk	86.5	75.0	84.0	77.3
	Oregon	Lyn Hart Ranch	Csb	165.0	101.0	235.0	134.0
Warm climates (8)	Alabama	WTARS	Cfa	86.0	91.5	92.0	91.1
	Arkansas	UAPB Lonoke Farm	Cfa	107.0	103.0	96.0	101.5
	Georgia	Watkinsville	Cfa	80.0	84.0	75.0	77.8
	Kentucky	Mammoth Cave	Cfa	136.0	132.0	152.0	138.0
	Maryland	Powder Mill	Cfa	132.0	104.0	138.0	123.5
	Oklahoma*	Fort Reno	Cfa	109.0	87.5	105.5	99.5
	South Carolina	Pee Dee	Cfa	99.0	86.0	85.5	93.5
	Virginia	TideWater AREC	Cfa	87.0	73.5		84.5

Table 6.2 shows the percentage error of the estimated HGHX pipe lengths using simplified design method and commonly used approach (ASHRAE handbooks). The simplified design model gives errors in the range of ± 11%, except for one case in Oregon, which is about 19% error. The ASHRAE Handbooks approach gives errors in the range of ± 39%; the ASHRAE district heating manual approach gives errors in the range of ± 56%. In Oregon, all three methods give a relatively high error, the reason for this need to be further investigated.

Table 6.2: Percentage error of estimated HGHX pipe lengths using simplified design method, ASHRAE Handbook method and ASHRAE district heating manual method

Climate zone	States in the U.S.	SCAN site name	Köppen-Geiger climate type	ASHRAE, Handbooks	ASHRAE, District heating manual	Simplified design model (Xing and Spitler 2014)
Arid or dry summer climates (4)	Arizona	Walnut Gulch	BSk	-7.6%	-27.1%	-6.8%
	Colorado	Nunn	BSk	4.2%	56.3%	-3.8%
	New Mexico	Los Lunas PMC	BSk	-13.3%	-2.9%	-10.6%
	Oregon	Lyn Hart Ranch	Csb	-38.8%	42.4%	-18.8%
Warm climates (8)	Alabama	WTARS	Cfa	6.4%	7.0%	5.9%
	Arkansas	UAPB Lonoke Farm	Cfa	-3.7%	-10.3%	-5.1%
	Georgia	Watkinsville	Cfa	5.0%	-6.3%	-2.8%
	Kentucky	Mammoth Cave	Cfa	-2.9%	11.8%	1.5%
	Maryland	Powder Mill	Cfa	-21.2%	4.5%	-6.4%
	Oklahoma*	Fort Reno	Cfa	-19.7%	-3.2%	-8.7%
	South Carolina	Pee Dee	Cfa	-13.1%	-13.6%	-5.6%
	Virginia	TideWater AREC	Cfa	-15.5%		-2.9%

The results listed in Table 6.2 are plotted in Figure 6.1. The RMSEs of the percentage error using the simplified design model is about 7.9%; the RMSEs of the percentage error using the ASHRAE, Handbook method is 16.1%; the RMSEs of the percentage error using the ASHRAE district heating manual method is about 23.8%. The maximum percentage error using the simplified design model is 18.8%; the maximum percentage error using the ASHRAE Handbook method is 38.8%; the maximum percentage error using the ASHRAE district heating manual is 56.3%.

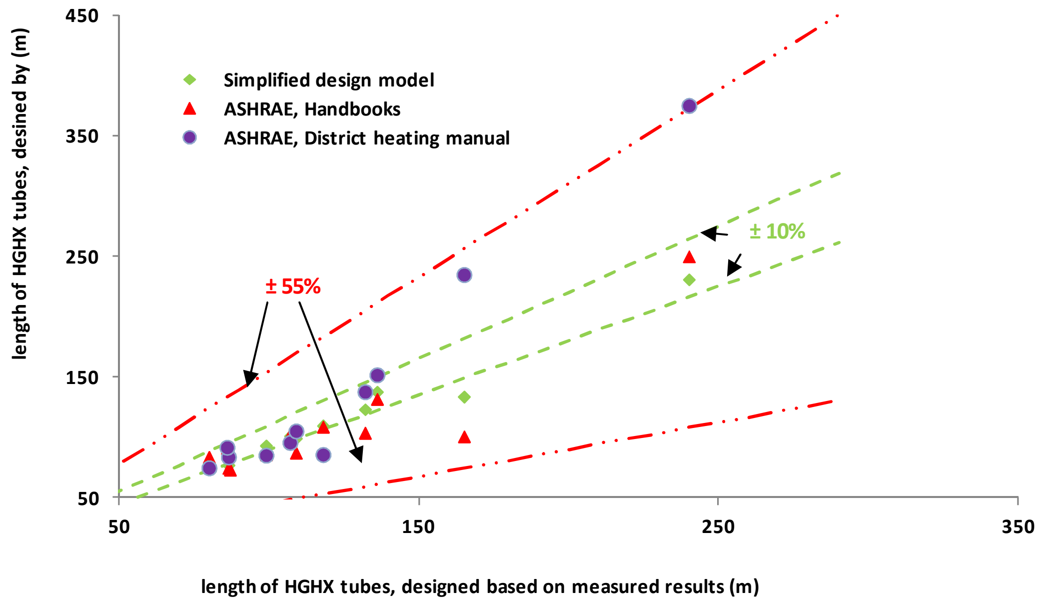

Figure 6.1: Estimated HGHX pipe lengths using simplified design method, ASHRAE Handbook method and ASHRAE district heating manual method

6.3 Conclusions

In this chapter, the impact of the simplified design model development on the sizing of the horizontal ground heat exchangers is explored. A HGHX simulation tool has been developed based on an FHX simulation tool developed by Xing et al (2012). The HGHX simulation tool requires building heating and cooling loads as inputs. This study involved developing hourly building loads for a single-story house located in all ten SCAN sites using Energy Plus house model. The results shows that using simplified design model to estimate ground temperature reduces the maximum sizing errors from ±56% to ±19% and the root mean square of the sizing error from 24% to 8%. The future work would be investigating the sizing case in snow climate where longer or more FHX tubes will be needed. The impact of the simplified design model development on the vertical ground heat exchanger design can be investigated in the future

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

In this thesis, a one dimensional numerical model using the finite volume method is developed for predicting soil temperatures for different climate types. The model utilizes weather data as inputs and implements a full heat balance at the earth surface which includes solar radiation, convection, thermal radiation and conduction to simulate the soil temperature. It is used to predict ground temperature under short grass, tall grass, bare soil, asphalt and concrete; currently, the model is mainly validated against results measured at grass covered sites. The soil freezing/thawing and snow accumulation/melting are modeled. It is found that the vegetation density needs to be adjusted from site to site depends on the climate types and treated as an input to the numerical model. Moisture transport is not accounted for due to the lack of precipitation data at the sites. The soil diffusivity used in the simulation is estimated from the measured ground surface temperature using a procedure recommended by Kusuda and Achenbach (1965).

Although the numerical model provides ground temperature estimates with a good accuracy, a simpler form is preferred for many engineering applications. Thus, a two-harmonic model is proposed to be used. The study result of nineteen SCAN sites shows that two-harmonic model is preferred to be used than one-harmonic model and five-harmonic model. The two-harmonic model relies on five parameters to estimate the ground temperatures, which are annual average soil temperatures, two surface amplitudes, two phase delay. These parameters are estimated using the computed results from the numerical model.

The experimental validation of both the numerical model and the two-harmonic model for various climate types is also discussed. Nineteen geographically diverse measurement sites are chosen for validating the model results in three climates: arid climates, warm climates and snow climates. The numerical model is run with weather data for a specific year at the site where the ground temperature is measured at. Both the numerical model and two-harmonic model are compared to experimental results measured at the sites for that specific year and give satisfactory model RMSEs at the four depths. In all three climates, the numerical model gives mean model RMSEs of 1.6°C, 1.5°C, 1.4°C and 1.3°C (2.9°F, 2.7°F, 2.5°F and 2.3°F) at 5, 20, 50 and 100cm (2, 8, 20 and 40") depths; the two-harmonic model gives mean model RMSEs of 2.4°C, 1.9°C, 1.6°C and 1.4°C (4.3°F, 3.4°F, 2.9°F and 2.5°F) at the four depths. Both models have lower RMSEs at deeper depths. The two models described in this article for the estimations of the ground temperatures give lower mean model RMSEs of all sites than some existing method (Herb et al. 2008); it is also proved that the models can be applied in a diversity of climate types.

The numerical model developed is also run with typical year weather file to generate typical year ground temperature estimates around the world. However, the model relies on soil diffusivity, vegetation density and snow depth, which varies for each site to generate model results. These values cannot be read from the weather files. Therefore, an automated procedure to estimate these parameters for each site has been developed in this paper:

- A constant soil diffusivity is now assumed at each site with a typical value of 4.9×10^{-7} m^2/s (5.3×10^{-6} ft^2/s). According to Hendrickx et al. (2003), this value equals to the one given for 60% saturated silt and clay soil.

- The site around the world is divided into two groups - arid or dry summer climates and no-arid or dry summer climates depends on the Köppen-Geiger climates each site belongs to. In the arid or dry summer climates group, if the ground is covered by short grass, the vegetation density is set to be 0.9; if the ground is covered by tall grass, the vegetation density is set to be 1.0. In the no-arid or dry summer climates group, the vegetation density is set to be 1.0.

- In the Köppen-Geiger snow climates or polar climates, the snow depth is assumed to be constant at each month. If the monthly averaged air temperature is less than 0, then the variation of the snow depth of two months is linearly correlated to the variation of the monthly averaged air temperature. Otherwise, the snow depth is set to be 0 cm.

These procedures are described in details in Chapter 4. The model is run with the typical year weather data and the model results are compared to typical year ground temperatures averaged from multiple years measured results at the nineteen SCAN sites. These SCAN sites are categorized into three climates - arid or dry summer climates, warm climates and snow climates to demonstrate the performance of the procedure in different climate types. It is found that the simplified design model mean model RMSEs in arid or dry summer climates are 1.1°C-1.8°C (2.0°F-3.2°F); the model mean RMSEs in warm climates are 1.3°C -1.4°C (2.3°F-2.5°F) and are 1.4°C-1.8°C (2.5°F-3.2°F) in snow climates.

I also quantify the improvements of model results by including each individual procedure and found that assuming constant soil diffusivity would only slightly vary the model RMSEs in different sites, by 0.6°C (1.1°F) at the most. Implementing the vegetation density estimation procedure will help reducing the mean model RMSEs of the four depths in the arid or dry summer climates by 1.3°C (2.3°F) at the most, at the site Los Lunas PMC, New Mexico. In the snow climates, the snow model included would help reducing the mean model RMSEs of the four depths by 0.8°C (1.4°F) at the most at a site Ward Farm, Alaska.

The simplified design model gives mean model RMSEs of all nineteen SCAN sites (three climates – arid or dry summer climates, warm temperate climates and snow climates) as 1.3°C-1.6°C (2.3°F-2.9°F) at the four depths. There are two methods commonly used in US for the estimations of the typical year ground temperatures - ASHRAE district heating manual procedure and ASHRAE Handbook procedure. They both rely on a one-harmonic relationship and three constant values to estimate the ground temperatures. The ASHARE district heating manual procedure gives mean model RMSEs of all nineteen SCAN sites (three climates) as 2.0°C-2.8°C (3.6°F-5.0°F); ASHRAE Handbook procedure gives mean model RMSEs all nineteen SCAN sites (three climates) as 2.2°C-3.0°C (4.0°F-5.4°F). Overall, the ASHRAE district heating manual and ASHRAE Handbook procedures give similar model RMSEs, the design method described in this article gives RMSEs 0.7°C-1.4°C (1.3°F-2.5°F) lower than the existing procedure. Therefore, based on the validation work of the 19 SCAN sites, the simplified design model is preferred to be used for estimations of ground temperatures in a world-wide range.

A correction factor β is now introduced into the two-harmonic model so this simplified design model can be used for estimating the typical year ground temperatures and maximum/minimum ground temperatures of multiple years. For the estimations of typical year ground temperatures, the correction factor is set to be 1; for estimations of the peak (maximum/minimum) ground temperature of multiple years, the correction factor in the simplified design model is set to be 1.6. The model is verified using peak ground temperatures of multiple years summarized from 3-8 years of measured results at 5cm -100cm (2"-40") depths at nineteen SCAN sites and 7-20 years of measured results at 5cm-30cm (2"-12") depths at twelve Mesonet sites. It is found that 88.9% to 98.0% of the time the estimated maximum/minimum ground temperature will meet the worst design condition.

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APPENDICES

Appendix A: Model parameters for short grass and tall grass covered sites, tables

The following table contains the weather related constant values $T_{s,avg}$, $T_{s,amplitude,n}$, and PL_n required for use of simplified design model (Equations 5-1) for estimation of typical year ground temperature and maximum/minimum ground temperature of multiple years. These constants have been computed for all 4,112 locations worldwide where the weather files are available (1020 TMY3 type files, 80 CWEC-type files, 3012 IWEC2 type files). These constants were derived by performing a best fit to the ground temperature estimated from the numerical model; more details are given in Chapter 3 and 4. Table A-1 is the country name; Table A-2 is the region name; Table A-3 is the parameter values for short grass covered sites; Table A-4 is the parameter values for tall grass covered sites.

Table A-1: Country names

Code	Country Name	Code	Country Name
ABW	Aruba	LAO	Lao People's Democratic Republic
AFG	Afghanistan	LBN	Lebanon
AGO	Angola	LBR	Liberia
AIA	Anguilla	LBY	Libyan Arab Jamahiriya
ALA	Åland Islands	LCA	Saint Lucia
ALB	Albania	LIE	Liechtenstein
AND	Andorra	LKA	Sri Lanka
ANT	Netherlands Antilles	LSO	Lesotho
ARE	United Arab Emirates	LTU	Lithuania
ARG	Argentina	LUX	Luxembourg
ARM	Armenia	LVA	Latvia
ASM	American Samoa	MAC	Macao
ATA	Antarctica	MAR	Morocco
ATF	French Southern Territories	MCO	Monaco
ATG	Antigua and Barbuda	MDA	Moldova, Republic of
AUS	Australia	MDG	Madagascar
AUT	Austria	MDV	Maldives
AZE	Azerbaijan	MEX	Mexico
BDI	Burundi	MHL	Marshall Islands
BEL	Belgium	MKD	Macedonia, the former Yugoslav Republic of
BEN	Benin	MLI	Mali
BFA	Burkina Faso	MLT	Malta
BGD	Bangladesh	MMR	Myanmar
BGR	Bulgaria	MNE	Montenegro
BHR	Bahrain	MNG	Mongolia
BHS	Bahamas	MNP	Northern Mariana Islands
BIH	Bosnia and Herzegovina	MOZ	Mozambique
BLR	Belarus	MRT	Mauritania
BLZ	Belize	MSR	Montserrat
BMU	Bermuda	MTQ	Martinique
BOL	Bolivia	MUS	Mauritius
BRA	Brazil	MWI	Malawi
BRB	Barbados	MYS	Malaysia
BRN	Brunei Darussalam	MYT	Mayotte
BTN	Bhutan	NAM	Namibia
BVT	Bouvet Island	NCL	New Caledonia
BWA	Botswana	NER	Niger
CAF	Central African Republic	NFK	Norfolk Island

Code	Country Name	Code	Country Name
CAN	Canada	NGA	Nigeria
CCK	Cocos (Keeling) Islands	NIC	Nicaragua
CHE	Switzerland	NIU	Niue
CHL	Chile	NLD	Netherlands
CHN	China	NOR	Norway
CIV	Côte d'Ivoire	NPL	Nepal
CMR	Cameroon	NRU	Nauru
COD	Congo, the Democratic Republic of the	NZL	New Zealand
COG	Congo	OMN	Oman
COK	Cook Islands	PAK	Pakistan
COL	Colombia	PAN	Panama
COM	Comoros	PCN	Pitcairn
CPV	Cape Verde	PER	Peru
CRI	Costa Rica	PHL	Philippines
CUB	Cuba	PLW	Palau
CXR	Christmas Island	PNG	Papua New Guinea
CYM	Cayman Islands	POL	Poland
CYP	Cyprus	PRI	Puerto Rico
CZE	Czech Republic	PRK	Korea, Democratic People's Republic of
DEU	Germany	PRT	Portugal
DJI	Djibouti	PRY	Paraguay
DMA	Dominica	PSE	Palestinian Territory, Occupied
DNK	Denmark	PYF	French Polynesia
DOM	Dominican Republic	QAT	Qatar
DZA	Algeria	REU	Réunion
ECU	Ecuador	ROU	Romania
EGY	Egypt	RUS	Russian Federation
ERI	Eritrea	RWA	Rwanda
ESH	Western Sahara	SAU	Saudi Arabia
ESP	Spain	SDN	Sudan
EST	Estonia	SEN	Senegal
ETH	Ethiopia	SGP	Singapore
FIN	Finland	SGS	South Georgia and the South Sandwich Islands
FJI	Fiji	SHN	Saint Helena
FLK	Falkland Islands (Malvinas)	SJM	Svalbard and Jan Mayen
FRA	France	SLB	Solomon Islands
FRO	Faroe Islands	SLE	Sierra Leone
FSM	Micronesia, Federated States of	SLV	El Salvador
GAB	Gabon	SMR	San Marino

Code	Country Name	Code	Country Name
GBR	United Kingdom	SOM	Somalia
GEO	Georgia	SPM	Saint Pierre and Miquelon
GGY	Guernsey	SRB	Serbia
GHA	Ghana	STP	Sao Tome and Principe
GIB	Gibraltar	SUR	Suriname
GIN	Guinea	SVK	Slovakia
GLP	Guadeloupe	SVN	Slovenia
GMB	Gambia	SWE	Sweden
GNB	Guinea-Bissau	SWZ	Swaziland
GNQ	Equatorial Guinea	SYC	Seychelles
GRC	Greece	SYR	Syrian Arab Republic
GRD	Grenada	TCA	Turks and Caicos Islands
GRL	Greenland	TCD	Chad
GTM	Guatemala	TGO	Togo
GUF	French Guiana	THA	Thailand
GUM	Guam	TJK	Tajikistan
GUY	Guyana	TKL	Tokelau
HKG	Hong Kong	TKM	Turkmenistan
HMD	Heard Island and McDonald Islands	TLS	Timor-Leste
HND	Honduras	TON	Tonga
HRV	Croatia	TTO	Trinidad and Tobago
HTI	Haiti	TUN	Tunisia
HUN	Hungary	TUR	Turkey
IDN	Indonesia	TUV	Tuvalu
IMN	Isle of Man	TWN	Taiwan, Province of China
IND	India	TZA	Tanzania, United Republic of
IOT	British Indian Ocean Territory	UGA	Uganda
IRL	Ireland	UKR	Ukraine
IRN	Iran, Islamic Republic of	UMI	United States Minor Outlying Islands
IRQ	Iraq	URY	Uruguay
ISL	Iceland	USA	United States
ISR	Israel	UZB	Uzbekistan
ITA	Italy	VAT	Holy See (Vatican City State)
JAM	Jamaica	VCT	Saint Vincent and the Grenadines
JEY	Jersey	VEN	Venezuela
JOR	Jordan	VGB	Virgin Islands, British
JPN	Japan	VIR	Virgin Islands, U.S.
KAZ	Kazakhstan	VNM	Viet Nam
KEN	Kenya	VUT	Vanuatu
KGZ	Kyrgyzstan	WLF	Wallis and Futuna

Code	Country Name	Code	Country Name
KHM	Cambodia	WSM	Samoa
KIR	Kiribati	YEM	Yemen
KNA	Saint Kitts and Nevis	ZAF	South Africa
KOR	Korea, Republic of	ZMB	Zambia
KWT	Kuwait	ZWE	Zimbabwe

Table A-2: Region names

Code	Region Name
1	AFRICA
2	ANTARCTICA
3	ASIA
4	EUROPE
5	NORTH AND CENTRAL AMERICA
6	SOUTH AMERICA
7	SOUTH WEST PACIFIC

Table A-3: Constant values for short grass

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
1	BEN	COTONOU	6.35	2.38	28.0	-1.5	0.7	56	32
1	BEN	PARAKOU	9.35	2.62	27.6	-2.2	1.0	69	21
1	BFA	BOBO-DIOULASSO	11.17	-4.32	27.8	-1.7	1.8	99	24
1	BFA	DORI	14.03	-0.03	30.9	4.2	3.0	-11	17
1	BFA	OUAGADOUGOU	12.35	-1.52	30.2	2.4	2.6	-32	23
1	BWA	FRANCISTOWN	-21.22	27.50	24.0	-4.6	1.8	1	6
1	BWA	MAUN	-19.98	23.42	26.2	-4.6	2.2	-5	4
1	BWA	SERETSE-KHAMA-INTER	-24.55	25.92	22.9	-6.0	1.4	4	3
1	CIV	ABIDJAN	5.25	-3.93	27.8	-1.8	0.7	64	30
1	DZA	ANNABA	36.83	7.82	19.8	7.7	0.8	31	-33
1	DZA	BATNA	35.75	6.32	17.9	10.8	-1.5	23	53
1	DZA	BECHAR	31.50	-2.25	22.9	11.5	0.8	21	-23
1	DZA	BEJAIA-AP	36.72	5.07	19.9	8.3	1.1	31	-22
1	DZA	BISKRA	34.80	5.73	24.0	11.3	-1.1	22	48
1	DZA	BORDJ-BOU-ARRERIDJ	36.07	4.77	17.7	11.0	1.8	24	-35
1	DZA	CHLEF	36.22	1.33	21.3	10.2	0.0	25	1
1	DZA	CONSTANTINE	36.28	6.62	18.3	10.6	-0.9	23	47
1	DZA	DAR-EL-BEIDA	36.68	3.22	19.9	8.0	1.1	28	-33
1	DZA	DJANET	24.27	9.47	25.4	9.7	2.1	14	17
1	DZA	EL-BAYADH	33.67	1.00	17.5	12.0	-1.2	23	43
1	DZA	EL-GOLEA	30.57	2.87	24.0	12.3	1.2	20	-16
1	DZA	EL-OUED	33.50	6.78	24.0	11.5	1.0	21	-26
1	DZA	GHARDAIA	32.40	3.80	23.6	11.7	1.0	21	-25
1	DZA	HASSI-MESSAOUD	31.67	6.15	25.0	12.1	1.0	20	-13
1	DZA	ILLIZI	26.50	8.42	26.5	10.4	1.6	18	5
1	DZA	IN-AMENAS	28.05	9.63	24.3	10.9	1.3	18	-6
1	DZA	IN-SALAH	27.23	2.50	27.5	11.2	1.4	19	-24
1	DZA	JIJEL-ACHOUAT	36.80	5.88	20.6	8.4	1.0	29	-26
1	DZA	MASCARA-MATEMORE	35.60	0.30	19.6	10.1	-1.6	24	49
1	DZA	MECHERIA	33.58	-0.28	18.7	11.1	1.5	21	-33
1	DZA	ORAN-SENIA	35.63	-0.60	20.0	7.8	1.4	27	-36
1	DZA	SETIF	36.18	5.25	16.8	10.8	-1.5	23	36
1	DZA	SKIKDA	36.88	6.90	20.9	7.5	0.7	34	-29
1	DZA	TAMANRASSET	22.80	5.43	23.9	8.4	1.2	15	12
1	DZA	TEBESSA	35.42	8.12	18.9	10.9	0.8	22	-32
1	DZA	TIARET	35.35	1.47	17.2	10.9	-1.0	25	44
1	DZA	TLEMCEN-ZENATA	35.02	-1.47	20.6	8.3	1.2	26	-33
1	DZA	TOUGGOURT	33.12	6.13	23.9	11.6	1.2	20	-27

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
1	EGY	ALEXANDRIA-NOUZHA	31.20	29.95	22.2	7.0	0.7	31	-4
1	EGY	ASSWAN	23.97	32.78	27.6	9.0	1.7	19	10
1	EGY	ASYUT	27.05	31.02	24.3	9.2	1.1	19	7
1	EGY	BAHARIA	28.33	28.90	24.4	8.7	1.1	16	5
1	EGY	BALTIM	31.55	31.10	22.7	6.8	0.9	33	6
1	EGY	CAIRO-AP	30.13	31.40	24.0	7.7	0.7	21	9
1	EGY	DAKHLA	25.48	29.00	26.0	9.8	1.3	17	10
1	EGY	EL-ARISH	31.08	33.82	22.2	6.9	0.8	28	10
1	EGY	EL-TOR	28.23	33.62	24.5	6.9	0.6	24	12
1	EGY	HURGUADA	27.15	33.72	25.9	7.8	0.7	26	10
1	EGY	ISMAILIA	30.60	32.25	23.6	8.0	0.8	26	5
1	EGY	KHARGA	25.45	30.53	27.0	9.7	1.3	18	19
1	EGY	KOSSEIR	26.13	34.15	26.0	6.5	0.5	27	6
1	EGY	LUXOR	25.67	32.70	27.0	9.5	1.4	18	11
1	EGY	MERSA-MATRUH	31.33	27.22	21.8	7.2	0.6	34	-10
1	EGY	MINYA	28.08	30.73	24.1	9.0	0.8	21	2
1	EGY	PORT-SAID-EL-GAMIL	31.28	32.23	23.0	6.9	0.5	35	5
1	EGY	SIWA	29.20	25.32	24.8	9.6	1.1	20	2
1	ESH	DAKHLA	23.72	-15.93	22.1	2.4	0.0	37	14
1	ESP	FUERTEVENTURA-AP	28.45	-13.87	22.9	4.1	1.2	40	-10
1	ESP	LA-PALMA-AP	28.62	-17.75	22.3	3.7	0.6	41	-24
1	ESP	LANZAROTE-AP	28.95	-13.60	22.1	3.5	1.1	43	-12
1	ESP	LAS-PALMAS-DE-GRAN	27.93	-15.38	22.3	3.4	0.6	41	-15
1	ESP	MELILLA	35.28	-2.95	20.9	7.0	-1.0	29	46
1	ESP	STA-CRUZ-DE-TENERI	28.45	-16.25	23.4	4.3	0.4	38	-26
1	ESP	TENERIFE-LOS-RODEOS	28.47	-16.32	17.9	3.9	0.6	38	-19
1	ESP	TENERIFE-SUR	28.05	-16.57	23.3	3.6	0.5	37	-8
1	FRA	SERGE-FROLOW(ILE-T)	-15.80	54.50	26.2	-2.4	0.3	49	0
1	KEN	GARISSA	-0.47	39.63	30.3	-1.9	0.7	37	6
1	KEN	KISUMU	-0.10	34.75	24.3	-0.6	0.6	24	-10
1	KEN	KITALE	1.02	35.00	19.9	-0.8	0.6	51	-5
1	KEN	LODWAR	3.12	35.62	31.5	-0.1	0.6	14	-2
1	KEN	MAKINDU	-2.28	37.83	23.4	-1.2	0.7	12	-5
1	KEN	MARSABIT	2.30	37.90	21.8	0.0	0.4	-7	13
1	KEN	MERU	0.08	37.65	21.8	-0.7	1.2	57	3
1	KEN	MOMBASA	-4.03	39.62	27.9	-1.5	0.9	24	16
1	KEN	MOYALE	3.53	39.03	24.2	-2.3	1.0	36	-38
1	KEN	NAIROBI-KENYATTA-AP	-1.32	36.92	20.1	-1.0	0.8	35	-5
1	KEN	NAKURU	-0.27	36.10	19.8	-1.0	0.6	60	-23
1	KEN	NYERI	-0.50	36.97	18.4	-1.0	0.9	38	3

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
1	KEN	VOI	-3.40	38.57	25.4	-1.6	0.6	34	11
1	LBY	AGEDABIA	30.72	20.17	23.0	8.3	1.1	25	5
1	LBY	BENINA	32.10	20.27	22.1	8.0	0.4	29	9
1	LBY	GHADAMES	30.13	9.50	24.6	10.9	1.2	19	-5
1	LBY	KUFRA	24.22	23.30	25.5	9.2	1.2	15	10
1	LBY	MISURATA	32.42	15.05	22.8	7.6	0.7	30	9
1	LBY	NALUT	31.87	10.98	21.4	9.7	0.9	26	-10
1	LBY	SEBHA	27.02	14.45	25.1	10.2	1.5	19	9
1	LBY	SIRTE	31.20	16.58	22.8	7.1	1.0	33	-2
1	LBY	TRIPOLI-INTL-AP	32.70	13.08	22.9	9.1	1.5	24	3
1	LBY	ZUARA	32.88	12.08	22.9	8.0	1.1	33	-16
1	MAR	AGADIR-AL-MASSIRA	30.32	-9.40	22.2	5.7	0.7	24	-8
1	MAR	AL-HOCEIMA	35.18	-3.85	20.1	6.6	1.0	26	-31
1	MAR	BENI-MELLAL	32.37	-6.40	22.1	9.4	1.1	22	-26
1	MAR	CASABLANCA	33.57	-7.67	20.3	5.9	0.7	27	-17
1	MAR	ERRACHIDIA	31.93	-4.40	22.2	11.5	0.8	20	-18
1	MAR	ESSAOUIRA	31.52	-9.78	20.3	3.3	0.9	29	-3
1	MAR	FES-SAIS	33.93	-4.98	19.5	9.1	0.9	28	-27
1	MAR	MARRAKECH	31.62	-8.03	22.8	8.7	1.5	23	-30
1	MAR	MEKNES	33.88	-5.53	19.7	8.5	-1.0	23	45
1	MAR	MIDELT	32.68	-4.73	18.1	9.8	1.1	24	-21
1	MAR	NADOR-AROUI	34.98	-3.02	20.5	6.9	1.4	30	-21
1	MAR	NOUASSEUR	33.37	-7.58	19.8	6.4	0.8	28	-12
1	MAR	OUARZAZATE	30.93	-6.90	21.5	10.0	1.5	18	-31
1	MAR	OUJDA	34.78	-1.93	19.2	8.1	1.2	29	-34
1	MAR	RABAT-SALE	34.05	-6.77	19.6	6.1	0.7	27	-9
1	MAR	SAFI	32.28	-9.23	20.7	5.9	0.9	30	-24
1	MAR	SIDI-IFNI	29.37	-10.18	21.2	2.4	0.7	26	11
1	MAR	TAN-TAN	28.45	-11.15	20.6	3.6	0.5	44	2
1	MAR	TANGER(AERODROME)	35.73	-5.90	19.6	6.7	0.6	28	-29
1	MAR	TAZA	34.22	-4.00	21.3	9.7	1.7	23	-36
1	MAR	TETUAN-SANIA-RAMEL	35.58	-5.33	20.4	6.7	-0.8	28	53
1	MDG	ANTANANARIVO-IVATO	-18.80	47.48	19.5	-3.3	0.9	21	18
1	MDG	MAHAJANGA	-15.67	46.35	27.0	-1.8	0.7	34	24
1	MDG	TAOLAGNARO	-25.03	46.95	24.0	-2.9	0.3	23	20
1	MDG	TOAMASINA	-18.12	49.40	24.7	-3.2	0.2	33	-13
1	MLI	BAMAKO-SENOU	12.53	-7.95	28.3	2.7	2.0	-51	16
1	MLI	MOPTI	14.52	-4.10	30.9	3.9	2.3	-9	21
1	MOZ	MAPUTO-MAVALANE	-25.92	32.57	24.0	-3.6	0.7	26	-8
1	MRT	NOUADHIBOU	20.93	-17.03	23.7	2.2	0.6	54	-17

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
1	MRT	NOUAKCHOTT	18.10	-15.95	27.3	3.5	1.5	42	-4
1	MUS	AGALEGA	-10.43	56.75	27.3	-1.8	0.2	38	15
1	MUS	PLAISANCE(MAURITIU)	-20.43	57.68	24.4	-2.8	0.0	36	-7
1	MUS	RODRIGUES	-19.68	63.42	24.8	-2.4	0.4	47	-8
1	MUS	ST-BRANDON(ST-RA)	-16.45	59.62	26.0	-1.8	0.2	43	-25
1	MUS	VACOAS(MAURITIUS)	-20.30	57.50	23.3	-3.0	0.1	32	15
1	MYT	DZAOUDZI-PAMANZI(M)	-12.80	45.28	26.9	-1.6	1.0	48	35
1	NAM	GROOTFONTEIN	-19.60	18.12	24.0	-4.3	1.4	-7	10
1	NAM	LUDERITZ(DIAZ-POIN)	-26.63	15.10	17.9	-2.4	-0.2	29	4
1	NAM	RUNDU	-17.92	19.77	25.3	-4.4	2.4	-9	9
1	NAM	WINDHOEK	-22.57	17.10	22.8	-5.5	1.4	-4	9
1	NER	AGADEZ	16.97	7.98	29.3	6.6	2.4	6	17
1	NER	BIRNI-NKONNI	13.80	5.25	30.8	3.6	2.6	-15	20
1	NER	MAGARIA	12.98	8.93	28.9	4.7	2.9	-7	18
1	NER	MAINE-SOROA	13.23	11.98	29.1	4.8	2.8	-6	23
1	NER	MARADI	13.47	7.08	29.7	4.4	2.5	-10	15
1	NER	NIAMEY-AERO	13.48	2.17	31.0	3.0	2.8	-18	19
1	NER	TAHOUA	14.90	5.25	30.6	4.1	2.6	-11	19
1	NER	TILLABERY	14.20	1.45	31.8	3.5	2.7	-11	20
1	NER	ZINDER	13.78	8.98	29.7	4.5	2.9	-10	18
1	REU	SAINT-DENIS-GILLOT	-20.88	55.52	25.5	-3.4	0.4	29	6
1	SEN	CAP-SKIRRING	12.40	-16.75	26.9	1.7	0.6	35	9
1	SEN	DAKAR-YOFF	14.73	-17.50	26.7	3.7	0.6	55	25
1	SEN	DIOURBEL	14.65	-16.23	31.2	2.8	1.4	10	21
1	SEN	KAOLACK	14.13	-16.07	31.0	2.3	1.7	13	17
1	SEN	LINGUERE	15.38	-15.12	32.0	3.3	1.5	-2	23
1	SEN	MATAM	15.65	-13.25	32.2	4.3	2.3	-11	21
1	SEN	PODOR	16.65	-14.97	30.6	4.2	1.9	8	20
1	SEN	SAINT-LOUIS	16.05	-16.45	26.8	3.5	0.9	51	-4
1	SEN	TAMBACOUNDA	13.77	-13.68	29.9	2.8	1.7	-45	24
1	SEN	ZIGUINCHOR	12.55	-16.27	27.8	1.6	0.9	13	27
1	SHN	WIDE-AWAKE-FIELD(A)	-7.97	-14.40	25.6	-1.9	0.1	96	-15
1	SYC	SEYCHELLES-INTL-AP	-4.67	55.52	27.7	-1.1	0.7	45	12
1	TCD	NDJAMENA	12.13	15.03	30.5	3.3	3.0	-17	23
1	TGO	LOME	6.17	1.25	27.6	-1.7	0.7	54	27
1	TUN	BIZERTE	37.25	9.80	20.1	8.4	0.9	31	-32
1	TUN	DJERBA-MELLITA	33.87	10.77	22.8	8.1	1.1	32	-13
1	TUN	GABES	33.88	10.10	22.3	8.4	1.1	29	-16
1	TUN	GAFSA	34.42	8.82	21.4	10.4	0.7	22	-22
1	TUN	JENDOUBA	36.48	8.80	21.0	9.9	1.0	26	-41

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
1	TUN	KAIROUAN	35.67	10.10	22.7	9.5	1.0	27	-31
1	TUN	KELIBIA	36.85	11.08	20.3	7.9	-0.7	33	52
1	TUN	MEDENINE	33.35	10.48	22.8	9.5	1.5	25	-12
1	TUN	MONASTIR-SKANES	35.67	10.75	21.7	8.4	1.0	32	-27
1	TUN	REMADA	32.32	10.40	22.8	9.6	1.4	24	-8
1	TUN	SFAX-EL-MAOU	34.72	10.68	21.8	8.8	0.9	27	-21
1	TUN	SIDI-BOUZID	35.00	9.48	21.8	10.1	0.7	23	-34
1	TUN	TABARKA	36.95	8.75	20.3	8.0	0.9	28	-38
1	TUN	THALA	35.55	8.68	16.1	9.9	-0.1	26	1
1	TUN	TOZEUR	33.92	8.17	23.6	10.3	1.2	22	-22
1	TUN	TUNIS-CARTHAGE	36.83	10.23	20.9	8.6	-0.1	30	4
1	TZA	DAR-ES-SALAAM-AP	-6.87	39.20	25.9	-1.8	-0.1	38	-7
1	ZAF	BETHLEHEM	-28.25	28.33	15.2	-5.9	1.3	12	0
1	ZAF	BLOEMFONTEIN-AP	-29.10	26.30	18.4	-7.9	1.1	8	-5
1	ZAF	CAPE-COLUMBINE	-32.83	17.85	17.2	-3.2	0.4	22	-22
1	ZAF	CAPE-TOWN-INTL-AP	-33.97	18.60	18.8	-5.2	0.1	17	15
1	ZAF	DE-AAR	-30.65	24.00	19.5	-7.8	0.7	12	-17
1	ZAF	DURBAN-INTL-AP	-29.97	30.95	21.8	-3.5	0.8	27	-14
1	ZAF	EAST-LONDON	-33.03	27.83	19.4	-3.4	0.5	32	-16
1	ZAF	GEORGE-AP	-34.02	22.38	17.0	-3.7	0.0	27	11
1	ZAF	GOUGH-ISLAND	-40.35	-9.88	12.8	-3.0	-0.2	38	34
1	ZAF	KIMBERLEY	-28.80	24.77	20.8	-8.0	1.5	8	-13
1	ZAF	MARION-ISLAND	-46.88	37.87	7.4	-2.3	-0.1	42	12
1	ZAF	MOSSEL-BAY(CAPE-ST)	-34.18	22.15	18.3	-3.2	-0.6	34	36
1	ZAF	PIETERSBURG	-23.83	29.42	20.9	-4.9	1.1	9	-11
1	ZAF	PORT-ELIZABETH	-33.98	25.62	18.4	-3.6	0.0	28	8
1	ZAF	PRETORIA	-25.73	28.18	19.9	-5.2	1.5	6	-7
1	ZAF	SPRINGBOK	-29.67	17.90	19.4	-6.2	0.9	21	3
1	ZAF	UPINGTON	-28.40	21.27	22.6	-8.1	1.0	14	-10
1	ZWE	BEITBRIDGE	-22.22	30.00	26.5	-5.5	1.4	4	-1
1	ZWE	BULAWAYO-AP	-20.02	28.62	21.9	-4.0	1.6	-4	4
1	ZWE	GWERU	-19.45	29.85	18.6	-3.5	1.3	-3	3
1	ZWE	HARARE(KUTSAGA)	-17.92	31.13	20.1	-3.2	1.5	-2	12
1	ZWE	KAROI	-16.83	29.62	20.2	-2.9	2.0	-10	18
1	ZWE	MASVINGO	-20.07	30.87	21.5	-4.3	1.4	-3	6
1	ZWE	RUSAPE	-18.53	32.13	18.9	-3.7	1.1	-7	10
2		BASE ARTURO PRAT	-62.50	-59.68	-0.9	-2.3	0.5	29	25
2		BERNARDO O`HIGGINS	-63.32	-57.90	-1.9	-3.6	1.0	27	18
2		CASEY	-66.28	110.52	-7.5	-6.4	-2.5	16	11
2		DAVIS	-68.58	77.95	-8.4	-8.0	-2.9	17	6

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
2		FREI CHI BASE	-62.18	-58.98	-1.2	-2.5	0.4	38	22
2		HALLEY	-75.50	-26.65	-16.1	-9.6	-2.3	15	7
2		NEUMAYER	-70.67	-8.25	-13.1	-8.3	-2.1	25	0
3	ARE	ABU-DHABI-BATEEN-AP	24.43	54.47	29.1	7.9	0.5	27	-1
3	ARE	ABU-DHABI-INTL-AP	24.43	54.65	29.2	8.0	0.9	24	6
3	ARE	AL-AIN-INTL-AP	24.27	55.60	30.0	9.1	0.9	22	15
3	ARE	DUBAI-INTL-AP	25.25	55.33	29.3	7.9	0.6	25	8
3	ARE	SHARJAH-INTL-AP	25.33	55.52	28.7	8.3	0.6	24	7
3	BHR	BAHRAIN-INTL-AP	26.27	50.65	28.2	8.8	0.9	27	24
3	CHN	ABAG-QI	44.02	114.95	5.3	16.5	0.2	24	8
3	CHN	AIHUI	50.25	127.45	4.7	14.0	-1.8	30	30
3	CHN	AKQI	40.93	78.45	9.8	13.6	1.0	19	23
3	CHN	ALAR	40.50	81.05	14.2	17.2	2.3	15	15
3	CHN	ALTAY	47.73	88.08	7.3	14.7	-1.9	28	7
3	CHN	ANDA	46.38	125.32	7.7	15.0	-1.6	26	13
3	CHN	ANDIR	37.93	83.65	14.3	16.8	1.1	14	6
3	CHN	ANKANG	32.72	109.03	17.6	10.9	0.5	18	-18
3	CHN	ANQING	30.53	117.05	18.7	11.1	0.7	23	3
3	CHN	ANYANG	36.05	114.40	15.8	12.9	1.2	18	1
3	CHN	ARXAN	47.17	119.93	1.9	11.9	-0.2	29	1
3	CHN	BACHU	39.80	78.57	15.2	16.6	2.7	15	9
3	CHN	BAILING-MIAO	41.70	110.43	8.4	15.5	-1.0	23	17
3	CHN	BAINGOIN	31.37	90.02	1.8	6.5	1.3	38	-46
3	CHN	BAISE	23.90	106.60	23.2	7.0	1.1	19	16
3	CHN	BALGUNTAY	42.67	86.33	9.8	14.8	0.8	18	9
3	CHN	BAODING	38.85	115.57	14.9	14.4	1.2	19	7
3	CHN	BAOJI	34.35	107.13	15.2	12.4	1.0	18	7
3	CHN	BAOQING	46.32	132.18	7.2	14.4	-1.7	29	19
3	CHN	BAOSHAN	25.12	99.18	18.2	6.3	0.9	21	2
3	CHN	BARKAM	31.90	102.23	11.3	8.5	1.2	14	-10
3	CHN	BATANG	30.00	99.10	15.7	7.9	0.8	15	2
3	CHN	BAYAN-MOD	40.75	104.50	10.6	16.6	0.0	18	-3
3	CHN	BAYANBULAK	43.03	84.15	0.2	9.3	1.1	30	38
3	CHN	BAYTIK-SHAN	45.37	90.53	6.0	13.2	-1.4	25	27
3	CHN	BEIHAI	21.48	109.10	23.7	6.4	1.0	25	24
3	CHN	BEIJING	39.93	116.28	13.9	14.4	1.3	18	7
3	CHN	BENGBU	32.95	117.37	17.5	11.6	1.0	23	14
3	CHN	BENXI	41.32	123.78	10.2	14.7	-0.6	25	-5
3	CHN	BIJIE	27.30	105.23	14.9	9.0	0.8	22	18
3	CHN	BOXIAN	33.88	115.77	16.9	12.1	1.0	20	4

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	BUGT(BAOGUOTU)	42.33	120.70	9.2	14.1	-1.0	25	9
3	CHN	BUGT(BOKETU)	48.77	121.92	3.3	12.1	-1.3	29	35
3	CHN	CANGZHOU	38.33	116.83	14.7	13.9	1.0	21	8
3	CHN	CHANG-DAO	37.93	120.72	13.4	12.7	1.2	31	22
3	CHN	CHANGBAI	41.35	128.17	5.8	13.1	-1.8	31	31
3	CHN	CHANGCHUN	43.90	125.22	8.7	14.4	-1.2	26	7
3	CHN	CHANGDE	29.05	111.68	19.1	10.4	0.3	24	4
3	CHN	CHANGLING	44.25	123.97	8.3	14.9	-1.4	28	8
3	CHN	CHANGSHA	28.23	112.87	18.9	10.8	0.8	27	9
3	CHN	CHANGTING	25.85	116.37	20.4	9.3	1.3	21	9
3	CHN	CHAOYANG	41.55	120.45	11.3	15.2	0.8	22	32
3	CHN	CHENGDE	40.98	117.95	12.0	15.1	0.5	19	8
3	CHN	CHENGDU	30.67	104.02	18.1	9.4	0.8	20	24
3	CHN	CHENGSHANTOU	37.40	122.68	12.8	10.9	0.9	37	-3
3	CHN	CHENZHOU	25.80	113.03	20.2	10.1	1.2	25	24
3	CHN	CHIFENG	42.27	118.97	10.4	16.1	-0.3	22	1
3	CHN	CHONGQING	29.58	106.47	20.0	9.7	1.0	21	-7
3	CHN	CHUXIONG	25.02	101.52	18.0	5.9	1.2	8	0
3	CHN	DA-QAIDAM	37.85	95.37	6.3	12.5	-1.5	25	32
3	CHN	DACHEN-DAO	28.45	121.88	18.1	9.1	0.3	38	16
3	CHN	DALIAN	38.90	121.63	12.1	13.3	1.4	28	8
3	CHN	DALI	25.70	100.18	17.3	5.9	0.7	16	15
3	CHN	DANDONG	40.05	124.33	10.5	13.9	0.5	27	-11
3	CHN	DANXIAN	19.52	109.58	24.9	4.7	1.3	14	22
3	CHN	DAOCHENG	29.05	100.30	7.0	8.8	0.8	27	28
3	CHN	DARLAG	33.75	99.65	1.4	7.2	1.0	33	-22
3	CHN	DATONG	40.10	113.33	10.6	15.6	0.1	19	10
3	CHN	DAWU	30.98	101.12	11.3	8.4	1.2	15	-3
3	CHN	DAXIAN	31.20	107.50	18.9	9.7	0.9	23	8
3	CHN	DEGE	31.80	98.57	8.6	8.8	0.9	20	1
3	CHN	DELINGHA	37.37	97.37	8.3	12.4	-0.5	20	47
3	CHN	DENGQEN	31.42	95.60	6.5	9.1	0.0	24	12
3	CHN	DEQEN	28.45	98.88	7.7	8.6	0.5	26	35
3	CHN	DINGHAI	30.03	122.12	18.0	10.0	0.3	35	0
3	CHN	DINGTAO	35.07	115.57	16.0	12.3	1.3	18	1
3	CHN	DONGFANG	19.10	108.62	26.0	4.6	1.2	21	26
3	CHN	DONGSHENG	39.83	109.98	9.8	14.5	-0.5	21	-1
3	CHN	DONGTAI	32.85	120.28	16.4	11.5	0.5	27	6
3	CHN	DULAN	36.30	98.10	7.1	11.1	-0.9	22	30
3	CHN	DUNHUANG	40.15	94.68	13.2	17.0	1.1	17	37

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	DUNHUA	43.37	128.20	6.6	13.8	-1.8	31	22
3	CHN	DUOLUN	42.18	116.47	5.8	12.8	-1.8	29	30
3	CHN	DUSHAN	25.83	107.55	16.8	8.2	1.0	24	21
3	CHN	EJIN-QI	41.95	101.07	11.7	18.5	0.4	18	8
3	CHN	EMEI-SHAN	29.52	103.33	6.0	7.5	-0.8	28	2
3	CHN	ENSHI	30.28	109.47	18.4	9.9	0.6	22	6
3	CHN	ERENHOT	43.65	112.00	8.0	17.4	-0.8	24	25
3	CHN	FANGXIAN	32.03	110.77	16.8	11.1	0.5	20	11
3	CHN	FENGJIE	31.02	109.53	18.4	9.8	0.9	23	2
3	CHN	FENGNING	41.22	116.63	9.5	14.1	-0.8	23	0
3	CHN	FOGANG	23.87	113.53	22.5	7.5	1.2	28	26
3	CHN	FUDING	27.33	120.20	20.1	9.0	0.2	30	-6
3	CHN	FUJIN	47.23	131.98	6.4	14.5	-1.8	31	27
3	CHN	FUYANG	32.87	115.73	16.9	11.9	0.6	23	4
3	CHN	FUYUN	46.98	89.52	7.1	17.9	-0.5	25	10
3	CHN	FUZHOU	26.08	119.28	21.3	8.5	-0.1	33	-11
3	CHN	GANGCA	37.33	100.13	2.5	8.0	1.4	33	-34
3	CHN	GANYU	34.83	119.13	15.3	12.0	0.8	27	6
3	CHN	GANZHOU	25.87	115.00	20.7	9.8	1.0	27	5
3	CHN	GAOYAO	23.05	112.47	23.4	7.4	1.3	27	17
3	CHN	GARZE	31.62	100.00	8.6	8.7	0.8	21	17
3	CHN	GENGMA	23.55	99.40	21.8	5.4	1.2	10	13
3	CHN	GOLMUD	36.42	94.90	9.2	12.8	0.4	19	-20
3	CHN	GUAIZIHU	41.37	102.37	12.1	18.1	-0.1	18	7
3	CHN	GUANGCHANG	26.85	116.33	20.2	10.2	1.4	22	0
3	CHN	GUANGHUA	32.38	111.67	17.7	11.1	0.7	23	13
3	CHN	GUANGNAN	24.07	105.07	18.3	6.8	1.5	14	11
3	CHN	GUANGZHOU	23.17	113.33	23.8	6.9	1.3	28	21
3	CHN	GUILIN	25.33	110.30	20.3	9.6	1.2	28	19
3	CHN	GUIPING	23.40	110.08	23.6	7.3	0.9	29	22
3	CHN	GUIYANG	26.58	106.73	16.4	8.7	1.1	23	18
3	CHN	GUSHI	32.17	115.67	17.3	11.8	0.6	23	16
3	CHN	HAIKOU	20.03	110.35	25.0	4.8	1.0	21	27
3	CHN	HAILAR	49.22	119.75	3.8	13.8	-1.3	29	21
3	CHN	HAILS	41.45	106.38	8.4	15.5	-0.9	21	18
3	CHN	HAILUN	47.43	126.97	5.8	14.5	-1.7	29	26
3	CHN	HAIYANG-DAO	39.05	123.22	12.5	12.9	1.1	31	6
3	CHN	HAIYANG	36.77	121.17	13.8	12.0	0.8	29	6
3	CHN	HALIUT	41.57	108.52	9.0	16.1	-0.9	21	18
3	CHN	HAMI	42.82	93.52	13.2	18.6	1.4	15	26

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	HANGZHOU	30.23	120.17	18.2	11.1	0.8	27	-5
3	CHN	HANZHONG	33.07	107.03	16.3	10.6	0.5	20	-5
3	CHN	HARBIN	45.75	126.77	7.7	14.7	-1.8	27	18
3	CHN	HECHI	24.70	108.05	22.4	7.9	0.6	27	14
3	CHN	HEFEI	31.87	117.23	17.5	11.7	0.6	23	9
3	CHN	HENAN	34.73	101.60	2.6	7.9	1.3	34	-37
3	CHN	HEQU	39.38	111.15	12.0	16.3	0.1	18	8
3	CHN	HEYUAN	23.80	114.73	23.2	7.2	1.3	30	12
3	CHN	HEZUO	35.00	102.90	5.5	9.7	-1.1	27	32
3	CHN	HOBOKSAR	46.78	85.72	7.2	14.8	-1.0	26	20
3	CHN	HOHHOT	40.82	111.68	10.2	15.8	-0.5	20	4
3	CHN	HOTAN	37.13	79.93	16.3	15.4	1.9	12	0
3	CHN	HUA-SHAN	34.48	110.08	8.6	10.6	-0.9	24	-26
3	CHN	HUADE	41.90	114.00	6.6	14.9	-0.9	24	30
3	CHN	HUADIAN	42.98	126.75	8.2	15.0	-1.7	26	15
3	CHN	HUAILAI	40.40	115.50	12.0	14.4	0.6	19	39
3	CHN	HUAJIALING	35.38	105.00	5.5	9.7	-1.1	30	25
3	CHN	HUANG-SHAN	30.13	118.15	10.4	9.4	0.7	25	21
3	CHN	HUILI	26.65	102.25	17.2	6.7	0.9	15	7
3	CHN	HUIMIN	37.50	117.53	14.3	13.9	1.2	20	3
3	CHN	HUIZE	26.42	103.28	14.6	6.5	1.0	14	2
3	CHN	HULIN	45.77	132.97	6.7	14.1	-1.8	31	29
3	CHN	HUMA	51.72	126.65	4.1	14.7	-1.6	28	29
3	CHN	HUOSHAN	31.40	116.33	17.3	11.2	0.5	21	7
3	CHN	JARTAI	39.78	105.75	11.4	17.6	1.2	21	44
3	CHN	JARUD-QI	44.57	120.90	9.7	16.5	-1.0	22	7
3	CHN	JI'AN(JIANGXI)	27.12	114.97	20.2	10.4	1.1	23	1
3	CHN	JI'AN(JILIN)	41.10	126.15	9.8	15.0	-1.0	27	11
3	CHN	JIANGCHENG	22.62	101.82	20.5	4.8	1.2	13	5
3	CHN	JIANGLING	30.33	112.18	18.3	10.8	0.6	25	15
3	CHN	JIEXIU	37.03	111.92	14.8	14.0	1.0	15	9
3	CHN	JINAN	36.60	117.05	16.2	12.8	0.9	18	11
3	CHN	JINGDEZHEN	29.30	117.20	19.4	10.8	1.1	25	-1
3	CHN	JINGHE	44.62	82.90	12.1	18.6	-1.1	21	-35
3	CHN	JINGHONG	22.00	100.78	24.5	3.9	1.8	1	2
3	CHN	JINING	41.03	113.07	7.1	13.0	-1.9	26	13
3	CHN	JINZHOU	41.13	121.12	11.3	14.6	0.5	24	32
3	CHN	JIULONG	29.00	101.50	11.2	6.4	0.9	17	10
3	CHN	JIUQUAN	39.77	98.48	10.8	16.1	0.1	21	2
3	CHN	JIUXIAN-SHAN	25.72	118.10	13.9	6.6	0.4	22	5

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	JIXI	45.28	130.95	7.0	14.3	-2.1	30	22
3	CHN	JURH	42.40	112.90	8.2	16.1	-1.3	23	22
3	CHN	KABA-HE	48.05	86.35	7.6	14.7	-1.7	29	11
3	CHN	KANGDING	30.05	101.97	8.6	8.5	0.9	23	13
3	CHN	KARAMAY	45.60	84.85	11.2	19.2	0.2	21	7
3	CHN	KASHI	39.47	75.98	15.4	15.2	1.7	15	6
3	CHN	KESHAN	48.05	125.88	5.8	14.7	-1.8	28	26
3	CHN	KORLA	41.75	86.13	15.0	16.6	1.2	13	5
3	CHN	KUANDIAN	40.72	124.78	9.4	14.1	-1.2	27	15
3	CHN	KUNMING	25.02	102.68	16.6	5.8	1.1	13	2
3	CHN	KUQA	41.72	82.95	14.4	16.1	1.6	14	8
3	CHN	LANCANG	22.57	99.93	21.7	4.8	1.4	11	13
3	CHN	LANGZHONG	31.58	105.97	18.9	9.8	0.5	20	2
3	CHN	LANZHOU	36.05	103.88	14.7	13.1	1.9	14	-3
3	CHN	LENGHU	38.83	93.38	6.6	13.5	-1.1	23	29
3	CHN	LETING	39.43	118.90	12.6	13.9	0.9	22	9
3	CHN	LHASA	29.67	91.13	10.4	9.2	1.6	19	7
3	CHN	LHUNZE	28.42	92.47	8.0	8.8	1.3	26	25
3	CHN	LIANGPING	30.68	107.80	18.3	9.7	0.7	22	-10
3	CHN	LIANPING	24.37	114.48	22.0	7.8	1.1	26	22
3	CHN	LIANXIAN	24.78	112.38	21.5	9.2	1.2	26	19
3	CHN	LIJING	26.83	100.47	14.5	5.6	0.4	12	6
3	CHN	LINCANG	23.95	100.22	19.6	5.1	1.1	12	5
3	CHN	LINDONG	43.98	119.40	8.2	14.5	-1.6	24	6
3	CHN	LINGLING	26.23	111.62	19.4	10.2	1.1	27	16
3	CHN	LINGXIAN	37.33	116.57	15.1	13.1	0.9	19	7
3	CHN	LINHAI	28.85	121.13	20.2	10.3	0.6	29	4
3	CHN	LINHE	40.77	107.40	12.2	16.5	0.1	18	2
3	CHN	LINJIANG	41.72	126.92	9.2	15.2	-1.2	26	19
3	CHN	LINXI	43.60	118.07	7.7	14.1	-1.6	28	16
3	CHN	LINYI	35.05	118.35	15.4	12.5	0.8	23	3
3	CHN	LISHI	37.50	111.10	12.0	14.5	1.3	19	30
3	CHN	LISHUI	28.45	119.92	20.1	10.5	0.7	26	-5
3	CHN	LITANG	30.00	100.27	6.2	7.6	0.6	23	-4
3	CHN	LIUZHOU	24.35	109.40	22.2	8.4	0.7	31	18
3	CHN	LIYANG	31.43	119.48	17.7	11.4	0.7	25	8
3	CHN	LONGKOU	37.62	120.32	14.0	13.2	1.3	27	25
3	CHN	LONGZHOU	22.37	106.75	23.8	6.3	1.3	25	25
3	CHN	LU-SHAN	29.58	115.98	13.9	9.5	0.2	25	9
3	CHN	LUODIAN	25.43	106.77	21.7	7.9	0.8	19	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	LUSHI	34.05	111.03	14.5	11.9	0.8	19	1
3	CHN	LUSI	32.07	121.60	16.7	10.7	0.5	32	-10
3	CHN	LUXI	24.53	103.77	16.6	6.5	1.3	14	17
3	CHN	LUZHOU	28.88	105.43	19.6	9.1	0.8	21	1
3	CHN	MACHENG	31.18	114.97	18.6	11.3	0.4	25	9
3	CHN	MADOI	34.92	98.22	-1.2	6.9	-0.2	31	13
3	CHN	MANDAL	42.53	110.13	8.5	16.3	-1.2	22	22
3	CHN	MANGNAI	38.25	90.85	6.9	12.9	-1.1	23	35
3	CHN	MAZONG-SHAN	41.80	97.03	7.9	15.1	-1.2	22	24
3	CHN	MEIXIAN	24.30	116.12	22.8	7.8	1.5	25	12
3	CHN	MENGJIN	34.82	112.43	15.8	12.1	1.1	22	20
3	CHN	MENGLA	21.50	101.58	23.5	3.9	1.6	8	8
3	CHN	MENGSHAN	24.20	110.52	21.6	8.0	1.2	25	11
3	CHN	MENGZI	23.38	103.38	20.3	4.7	1.1	11	6
3	CHN	MIANYANG	31.45	104.73	18.2	9.3	0.7	20	8
3	CHN	MINQIN	38.63	103.08	11.4	15.9	0.9	19	29
3	CHN	MOHE	52.13	122.52	1.7	12.7	-0.8	29	17
3	CHN	MUDANJIANG	44.57	129.60	7.5	14.5	-1.6	29	20
3	CHN	NAGQU	31.48	92.07	1.0	6.9	1.0	34	-32
3	CHN	NANCHANG	28.60	115.92	19.5	10.4	1.0	25	3
3	CHN	NANCHENG	27.58	116.65	19.4	10.5	1.0	22	1
3	CHN	NANCHONG	30.80	106.08	18.9	9.9	0.8	20	4
3	CHN	NANJING	32.00	118.80	17.1	11.5	0.6	26	-1
3	CHN	NANNING	22.63	108.22	23.1	7.3	1.2	24	16
3	CHN	NANPING	26.63	118.00	21.5	8.6	0.8	24	-5
3	CHN	NANYANG	33.03	112.58	16.6	11.9	0.6	20	15
3	CHN	NANYUE	27.30	112.70	13.9	9.2	1.0	24	25
3	CHN	NAPO	23.30	105.95	20.3	6.2	0.8	19	15
3	CHN	NARAN-BULAG	44.62	114.15	4.9	16.5	1.4	25	-30
3	CHN	NEIJIANG	29.58	105.05	19.3	8.9	0.6	21	-4
3	CHN	NENJIANG	49.17	125.23	4.7	14.2	-1.7	29	25
3	CHN	NYINGCHI	29.57	94.47	11.3	7.3	0.9	24	0
3	CHN	OTOG-QI	39.10	107.98	10.0	15.7	-0.2	20	5
3	CHN	PAGRI	27.73	89.08	1.9	5.9	1.0	39	-30
3	CHN	PINGLIANG	35.55	106.67	10.9	12.6	0.8	21	35
3	CHN	PINGTAN	25.52	119.78	20.9	8.1	-0.1	40	0
3	CHN	PINGWU	32.42	104.52	17.4	9.5	0.7	18	1
3	CHN	PISHAN	37.62	78.28	15.1	16.4	1.8	14	10
3	CHN	PUCHENG	27.92	118.53	19.2	9.5	1.0	24	6
3	CHN	QAMDO	31.15	97.17	10.3	9.3	1.0	20	8

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	QIAN-GORLOS	45.08	124.87	8.7	14.9	-1.5	26	15
3	CHN	QINGDAO	36.07	120.33	14.3	11.3	1.1	31	-9
3	CHN	QINGJIANG	33.60	119.03	16.1	11.6	0.8	26	7
3	CHN	QINGLONG	40.40	118.95	11.2	14.8	0.6	21	41
3	CHN	QINGYUAN	42.10	124.95	8.7	14.6	-1.3	25	17
3	CHN	QINZHOU	21.95	108.62	23.3	7.0	1.7	27	21
3	CHN	QIONGHAI	19.23	110.47	25.4	4.7	1.0	17	17
3	CHN	QIQIHAR	47.38	123.92	7.0	14.7	-1.6	28	25
3	CHN	QITAI	44.02	89.57	8.8	17.9	0.5	24	3
3	CHN	QUMARLEB	34.13	95.78	0.6	6.9	0.2	34	8
3	CHN	QUXIAN	28.97	118.87	18.9	10.5	0.5	26	-1
3	CHN	RIZHAO	35.43	119.53	14.5	11.6	1.1	30	0
3	CHN	RONGJIANG	25.97	108.53	20.5	8.9	0.9	23	19
3	CHN	RUILI	24.02	97.83	22.4	5.0	1.5	11	11
3	CHN	RUOERGAI	33.58	102.97	3.9	8.4	-1.3	33	36
3	CHN	RUOQIANG	39.03	88.17	15.4	17.3	1.7	15	16
3	CHN	SANGZHI	29.40	110.17	18.6	10.1	0.4	23	6
3	CHN	SANHU-DAO	16.53	111.62	27.6	2.7	0.9	12	31
3	CHN	SANSUI	26.97	108.67	16.6	9.9	0.6	24	27
3	CHN	SERTAR	32.28	100.33	3.3	8.0	1.1	34	-40
3	CHN	SHACHE	38.43	77.27	14.7	16.2	1.9	14	18
3	CHN	SHANGCHUAN-DAO	21.73	112.77	23.5	6.3	-0.1	30	-8
3	CHN	SHANGHAI-HONGQIAO	31.17	121.43	18.3	11.0	0.5	29	-1
3	CHN	SHANGHAI	31.40	121.47	18.5	10.8	0.9	29	5
3	CHN	SHANGZHI	45.22	127.97	6.4	14.4	-1.7	28	21
3	CHN	SHANTOU	23.40	116.68	22.8	6.8	0.7	31	26
3	CHN	SHANWEI	22.78	115.37	23.1	6.5	1.1	32	24
3	CHN	SHAOGUAN	24.80	113.58	21.7	8.9	1.2	26	11
3	CHN	SHAOWU	27.33	117.47	20.2	9.3	1.0	26	-6
3	CHN	SHAOYANG	27.23	111.47	19.0	10.2	0.6	25	7
3	CHN	SHENGSI	30.73	122.45	17.6	9.6	0.3	37	2
3	CHN	SHENGXIAN	29.60	120.82	18.5	10.9	0.7	25	0
3	CHN	SHENYANG	41.73	123.52	10.3	15.3	-0.5	26	2
3	CHN	SHENZHEN	22.55	114.10	23.9	6.7	1.2	28	15
3	CHN	SHEYANG	33.77	120.25	15.6	11.3	0.4	28	2
3	CHN	SHIJIAZHUANG	38.03	114.42	15.3	14.0	1.3	19	10
3	CHN	SHIPU	29.20	121.95	17.9	9.7	0.5	35	10
3	CHN	SHIQUANHE	32.50	80.08	3.1	9.7	-2.1	36	43
3	CHN	SHISANJIANFANG	43.22	91.73	12.0	17.9	1.2	19	9
3	CHN	SIMAO	22.77	100.98	20.2	4.6	1.5	7	9

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	SINAN	27.95	108.25	19.0	9.5	0.8	24	10
3	CHN	SIPING	43.18	124.33	9.4	14.6	-1.0	26	7
3	CHN	SOGXIAN	31.88	93.78	4.7	9.4	-1.4	31	40
3	CHN	SONGPAN	32.65	103.57	9.8	8.3	0.7	19	-17
3	CHN	SUIFENHE	44.38	131.15	5.9	12.9	-1.9	31	29
3	CHN	SUNWU	49.43	127.35	4.0	14.0	-1.4	29	29
3	CHN	TACHENG	46.73	83.00	9.8	14.4	-0.7	22	-12
3	CHN	TAI-SHAN	36.25	117.10	7.9	11.1	-0.8	28	10
3	CHN	TAILAI	46.40	123.42	8.3	15.1	-1.5	26	11
3	CHN	TAIYUAN	37.78	112.55	12.5	13.9	0.7	18	19
3	CHN	TANGSHAN	39.67	118.15	13.4	14.3	1.3	21	17
3	CHN	TENGCHONG	25.12	98.48	17.1	5.4	1.4	22	13
3	CHN	TIANJIN	39.10	117.17	14.4	14.5	1.4	20	6
3	CHN	TIANMU-SHAN	30.35	119.42	11.2	9.5	0.0	27	2
3	CHN	TIANSHUI	34.58	105.75	13.5	12.7	1.3	18	7
3	CHN	TIKANLIK	40.63	87.70	14.8	17.6	1.5	15	11
3	CHN	TINGRI	28.63	87.08	6.2	9.6	-0.5	32	7
3	CHN	TONGDAO	26.17	109.78	18.3	9.6	1.2	23	1
3	CHN	TONGDE	35.27	100.65	3.4	8.9	-1.4	30	46
3	CHN	TONGHE	45.97	128.73	6.2	14.4	-1.7	29	30
3	CHN	TONGLIAO	43.60	122.27	9.6	14.7	-1.3	24	4
3	CHN	TULIHE	50.45	121.70	1.1	11.8	-1.0	30	6
3	CHN	TUOTUOHE	34.22	92.43	-0.7	6.5	0.2	32	7
3	CHN	TURPAN	42.93	89.20	17.8	19.6	2.4	13	9
3	CHN	ULIASTAI	45.52	116.97	5.3	16.9	1.6	24	-31
3	CHN	URUMQI	43.80	87.65	9.8	16.9	-0.4	24	1
3	CHN	WANYUAN	32.07	108.03	16.9	10.3	0.2	20	10
3	CHN	WEICHANG	41.93	117.75	8.1	13.9	-1.5	26	14
3	CHN	WEIFANG	36.77	119.18	14.3	12.8	0.9	23	5
3	CHN	WEINING	26.87	104.28	12.7	6.8	0.9	19	14
3	CHN	WENZHOU	28.02	120.67	19.7	9.4	0.5	35	31
3	CHN	WUDAOLIANG	35.22	93.08	-2.4	7.4	0.7	33	43
3	CHN	WUDU	33.40	104.92	16.8	10.5	1.0	18	7
3	CHN	WUGANG	26.73	110.63	18.6	10.2	0.9	24	24
3	CHN	WUHAN	30.62	114.13	18.7	11.7	0.7	23	10
3	CHN	WUHU	31.33	118.35	17.6	11.4	0.8	24	7
3	CHN	WUSHAOLING	37.20	102.87	2.1	7.5	-1.1	34	51
3	CHN	WUTAI-SHAN	38.95	113.52	1.5	8.4	-0.9	31	33
3	CHN	WUYISHAN	27.77	118.03	20.2	9.3	1.1	26	9
3	CHN	WUZHOU	23.48	111.30	23.3	7.6	1.2	29	27

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	XAINZA	30.95	88.63	2.5	7.2	-1.7	34	48
3	CHN	XI-UJIMQIN-QI	44.58	117.60	5.5	13.6	-2.0	31	27
3	CHN	XIAMEN	24.48	118.08	22.4	7.3	0.8	37	41
3	CHN	XIAN	34.30	108.93	15.7	12.1	0.8	17	-8
3	CHN	XIAOERGOU	49.20	123.72	4.7	14.6	-1.5	29	27
3	CHN	XICHANG	27.90	102.27	19.5	6.4	0.9	7	-5
3	CHN	XIFENGZHEN	35.73	107.63	10.8	12.2	0.5	19	9
3	CHN	XIGAZE	29.25	88.88	10.3	8.9	1.3	15	-17
3	CHN	XIHUA	33.78	114.52	16.3	12.3	0.6	20	17
3	CHN	XILIN-HOT	43.95	116.12	6.2	16.7	-0.2	26	0
3	CHN	XIN-BARAG-YOUQI	48.67	116.82	4.6	17.5	1.1	24	-33
3	CHN	XINGREN	25.43	105.18	17.0	7.2	1.3	19	14
3	CHN	XINGTAI	37.07	114.50	16.3	13.5	1.1	19	7
3	CHN	XINING	36.62	101.77	9.0	11.7	0.4	19	-5
3	CHN	XINXIAN	36.23	115.67	15.0	13.1	1.1	20	11
3	CHN	XINYANG	32.13	114.05	17.1	11.5	0.3	20	7
3	CHN	XINYI	22.35	110.93	23.9	6.2	1.2	27	26
3	CHN	XISHA-DAO	16.83	112.33	27.6	2.6	0.7	15	24
3	CHN	XIUSHUI	29.03	114.58	19.0	10.6	0.8	23	4
3	CHN	XUNWU	24.95	115.65	20.6	8.5	1.4	23	9
3	CHN	XUZHOU	34.28	117.15	16.6	12.0	0.8	20	8
3	CHN	YA'AN	29.98	103.00	17.9	9.3	0.8	19	9
3	CHN	YAN'AN	36.60	109.50	12.3	13.2	0.8	17	7
3	CHN	YANCHI	37.80	107.38	11.1	15.3	1.1	20	30
3	CHN	YANGCHENG	35.48	112.40	14.0	12.5	0.7	19	5
3	CHN	YANGJIANG	21.87	111.97	23.5	6.1	1.2	29	23
3	CHN	YANJI	42.87	129.50	8.3	14.3	-1.2	28	25
3	CHN	YANZHOU	35.57	116.85	15.6	12.6	1.1	20	-7
3	CHN	YAXIAN	18.23	109.52	27.2	3.4	1.0	15	23
3	CHN	YIBIN	28.80	104.60	20.0	9.0	0.8	20	6
3	CHN	YICHANG	30.70	111.30	18.7	10.7	0.4	25	7
3	CHN	YICHUN(HEILONGJ)	47.72	128.90	5.5	14.2	-1.5	28	29
3	CHN	YICHUN(JIANGXI)	27.80	114.38	18.8	10.4	0.6	24	-4
3	CHN	YINCHUAN	38.47	106.20	12.6	15.4	1.1	17	27
3	CHN	YINGKOU	40.67	122.20	11.3	14.6	0.2	25	-7
3	CHN	YINING	43.95	81.33	11.3	14.3	0.9	22	34
3	CHN	YIWU	43.27	94.70	6.6	14.6	-0.9	25	24
3	CHN	YIYUAN	36.18	118.15	14.1	13.5	1.5	20	16
3	CHN	YONGAN	25.97	117.35	21.0	8.7	1.0	23	13
3	CHN	YOUYANG	28.83	108.77	17.1	9.3	0.2	24	6

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	YUANJIANG	23.60	101.98	25.6	5.4	1.5	8	5
3	CHN	YUANLING	28.47	110.40	18.6	9.9	0.6	24	7
3	CHN	YUANMOU	25.73	101.87	22.8	5.6	1.7	6	-2
3	CHN	YUANPING	38.75	112.70	11.5	14.2	0.9	20	46
3	CHN	YUEYANG	29.38	113.08	18.9	10.8	0.5	26	29
3	CHN	YULIN	38.23	109.70	11.7	16.2	0.6	19	31
3	CHN	YUMENZHEN	40.27	97.03	10.1	15.9	-0.9	22	-26
3	CHN	YUNCHENG	35.05	111.05	15.8	13.2	0.9	17	2
3	CHN	YUSHE	37.07	112.98	11.1	13.7	0.8	21	33
3	CHN	YUSHU	33.02	97.02	6.4	9.8	-1.0	23	27
3	CHN	YUXIAN	39.83	114.57	10.4	14.8	0.1	21	5
3	CHN	ZADOI	32.90	95.30	2.8	9.1	1.6	34	-34
3	CHN	ZAOYANG	32.15	112.67	17.7	11.1	0.8	25	14
3	CHN	ZHANG-PING	25.30	117.40	22.5	7.7	1.0	26	8
3	CHN	ZHANGJIAKOU	40.78	114.88	11.1	14.7	0.0	22	9
3	CHN	ZHANGWU	42.42	122.53	10.4	14.7	-0.5	25	0
3	CHN	ZHANGYE	38.93	100.43	11.4	15.2	0.9	17	18
3	CHN	ZHANJIANG	21.22	110.40	24.2	6.1	0.9	25	28
3	CHN	ZHANYI	25.58	103.83	16.0	6.1	1.3	10	8
3	CHN	ZHAOTONG	27.33	103.75	14.0	7.9	0.7	18	-2
3	CHN	ZHENGZHOU	34.72	113.65	16.4	12.4	0.8	18	-1
3	CHN	ZHIJIANG	27.45	109.68	18.5	10.2	0.5	22	7
3	CHN	ZHONGNING	37.48	105.68	13.0	14.9	1.4	16	17
3	CHN	ZHONGXIANG	31.17	112.57	18.0	11.2	0.8	24	13
3	CHN	ZHUMADIAN	33.00	114.02	16.6	11.9	0.4	23	1
3	CHN	ZUNYI	27.70	106.88	17.2	9.4	0.5	24	17
3	IND	AGARTALA	23.88	91.25	26.6	5.2	2.1	11	14
3	IND	AHMADABAD	23.07	72.63	29.8	5.5	3.0	-4	22
3	IND	AKOLA	20.70	77.07	30.1	4.6	3.1	-26	23
3	IND	AMRITSAR	31.63	74.87	24.3	10.2	2.0	13	20
3	IND	AURANGABAD-CHIKALTH	19.85	75.40	28.1	4.1	3.0	-30	20
3	IND	BALASORE	21.52	86.93	27.6	4.4	2.3	1	13
3	IND	BANGALORE	12.97	77.58	25.1	2.1	2.0	-47	10
3	IND	BELGAUM-SAMBRA	15.85	74.62	24.7	2.1	1.7	-54	14
3	IND	BHOPAL-BAIRAGARH	23.28	77.35	27.3	5.7	3.1	-12	24
3	IND	BHUBANESWAR	20.25	85.83	27.6	3.4	1.9	-8	15
3	IND	BHUJ-RUDRAMATA	23.25	69.67	28.3	5.9	3.2	6	19
3	IND	BIKANER	28.00	73.30	28.9	9.6	2.5	8	22
3	IND	BOMBAY-SANTACRUZ	19.12	72.85	28.2	2.1	1.7	4	30
3	IND	CALCUTTA-DUM-DUM	22.65	88.45	27.8	4.6	2.4	0	12

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	IND	CHITRADURGA	14.23	76.43	27.8	2.7	1.8	-59	10
3	IND	COCHIN-WILLINGDON	9.95	76.27	27.9	0.7	1.0	-68	18
3	IND	COIMBATORE-PEELAMED	11.03	77.05	27.2	1.5	1.6	-45	14
3	IND	CUDDALORE	11.77	79.77	29.6	2.4	0.6	1	25
3	IND	CWC-VISHAKHAPATNAM	17.70	83.30	28.6	2.3	1.2	1	15
3	IND	DEHRADUN	30.32	78.03	23.0	7.6	2.1	8	22
3	IND	GADAG	15.42	75.63	28.0	2.6	2.0	-60	9
3	IND	GAUHATI	26.10	91.58	25.3	5.3	1.6	17	11
3	IND	GOA-PANJIM	15.48	73.82	27.9	0.9	1.1	-22	24
3	IND	GWALIOR	26.23	78.25	28.6	8.9	2.7	2	20
3	IND	HISSAR	29.17	75.73	29.0	10.2	3.0	9	25
3	IND	HYDERABAD-AP	17.45	78.47	27.4	4.0	1.9	-32	19
3	IND	INDORE	22.72	75.80	26.9	5.2	3.2	-14	26
3	IND	JABALPUR	23.20	79.95	27.8	6.4	2.7	-7	22
3	IND	JAGDALPUR	19.08	82.03	26.6	3.9	2.2	-18	12
3	IND	JAIPUR-SANGANER	26.82	75.80	28.2	8.1	2.8	2	26
3	IND	JODHPUR	26.30	73.02	29.9	7.7	3.0	5	24
3	IND	KAKINADA	16.95	82.23	29.5	3.4	1.1	-6	22
3	IND	KOTA-AERODROME	25.15	75.85	29.7	7.3	3.4	-1	27
3	IND	KOZHIKODE	11.25	75.78	28.3	-1.4	1.3	98	21
3	IND	KURNOOL	15.80	78.07	31.5	3.2	2.2	-40	16
3	IND	LUCKNOW-AMAUSI	26.75	80.88	27.6	8.2	2.8	4	23
3	IND	MACHILIPATNAM	16.20	81.15	29.2	2.9	1.2	-9	22
3	IND	MADRAS-MINAMBAKKAM	13.00	80.18	29.1	2.7	0.8	-3	25
3	IND	MANGALORE-BAJPE	12.92	74.88	27.5	-0.8	1.1	88	24
3	IND	MINICOY	8.30	73.15	29.1	0.7	0.9	-28	28
3	IND	NAGPUR-SONEGAON	21.10	79.05	29.2	5.5	3.2	-21	24
3	IND	NELLORE	14.45	79.98	30.3	3.5	1.2	-7	20
3	IND	NEW-DELHI-SAFDARJUN	28.58	77.20	25.9	8.9	2.5	7	25
3	IND	PATIALA	30.33	76.47	24.9	9.2	2.1	11	19
3	IND	PATNA	25.60	85.10	26.8	6.9	2.5	6	19
3	IND	PBO-ANANTAPUR	14.58	77.63	30.5	3.4	1.8	-37	14
3	IND	POONA	18.53	73.85	25.9	3.3	2.5	-20	16
3	IND	RAJKOT	22.30	70.78	29.3	4.4	2.9	-4	25
3	IND	RATNAGIRI	16.98	73.33	27.7	1.3	1.3	-13	36
3	IND	SHOLAPUR	17.67	75.90	30.7	3.5	2.5	-40	18
3	IND	SRINAGAR	34.08	74.83	15.9	11.1	1.2	19	-5
3	IND	SURAT	21.20	72.83	30.1	3.8	2.5	-4	25
3	IND	THIRUVANANTHAPURAM	8.48	76.95	28.7	-1.6	0.5	79	33
3	IND	TIRUCHCHIRAPALLI	10.77	78.72	29.4	2.9	1.2	-10	12

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	IND	VERAVAL	20.90	70.37	29.0	3.1	1.8	14	27
3	IOT	DIEGO-GARCIA-NAF	-7.30	72.40	27.7	-0.6	0.3	26	7
3	IRN	ABADAN	30.37	48.25	27.1	12.4	1.3	20	0
3	IRN	AHWAZ	31.33	48.67	28.3	12.7	1.1	21	4
3	IRN	ANZALI	37.47	49.47	19.2	10.4	-0.3	28	-5
3	IRN	ARAK	34.10	49.77	17.7	13.4	0.7	22	2
3	IRN	BABULSAR	36.72	52.65	19.7	10.5	0.6	29	-21
3	IRN	BANDARABBASS	27.22	56.37	28.8	8.4	1.1	21	14
3	IRN	BIRJAND	32.87	59.20	19.7	12.2	1.0	13	18
3	IRN	KASHAN	33.98	51.45	23.7	13.8	1.2	18	-7
3	IRN	KERMANSHAH	34.27	47.12	18.4	13.4	0.9	24	-27
3	IRN	KERMAN	30.25	56.97	20.2	11.6	0.7	16	14
3	IRN	KHOY	38.55	44.97	16.9	14.9	1.2	21	20
3	IRN	MASHHAD	36.27	59.63	17.9	13.0	0.0	19	1
3	IRN	ORUMIEH	37.53	45.08	14.6	13.5	1.1	22	-9
3	IRN	RAMSAR	36.90	50.67	18.5	10.1	0.1	31	12
3	IRN	SABZEVAR	36.22	57.67	20.1	12.9	0.7	16	-18
3	IRN	SHAHRUD	36.42	54.95	18.0	13.0	1.6	18	2
3	IRN	SHIRAZ	29.53	52.53	22.1	12.1	0.8	22	-6
3	IRN	TABRIZ	38.08	46.28	15.6	13.5	1.0	25	-19
3	IRN	TEHRAN-MEHRABAD	35.68	51.32	19.8	13.4	1.0	22	-3
3	IRN	TORBAT-HEYDARIEH	35.27	59.22	17.6	12.7	1.2	18	4
3	IRN	ZAHEDAN	29.47	60.88	22.2	11.5	1.3	13	11
3	IRN	ZANJAN	36.68	48.48	13.6	13.9	0.8	24	17
3	JPN	ABASHIRI	44.02	144.28	8.0	11.6	-0.1	40	2
3	JPN	AIKAWA	38.03	138.23	14.7	10.3	0.1	39	11
3	JPN	AKITA	39.72	140.10	12.9	11.3	0.7	34	-13
3	JPN	AOMORI	40.82	140.77	11.6	11.0	0.8	34	-11
3	JPN	ASAHIKAWA	43.77	142.37	8.7	13.3	-1.3	33	20
3	JPN	CHOSHI	35.73	140.85	16.5	8.2	0.8	39	-1
3	JPN	FUKUE	32.70	128.83	17.7	8.8	0.5	37	-17
3	JPN	FUKUOKA	33.58	130.38	17.9	9.8	0.6	33	-27
3	JPN	FUTENMA	26.27	127.75	23.0	5.7	0.4	40	-4
3	JPN	HACHIJOJIMA-AP	33.12	139.78	19.5	7.5	0.6	41	-4
3	JPN	HACHIJOJIMA	33.12	139.78	19.2	7.5	0.6	42	-8
3	JPN	HACHINOHE	40.53	141.52	11.5	10.4	0.8	36	-2
3	JPN	HAKODATE	41.82	140.75	10.3	12.0	0.8	35	0
3	JPN	HAMADA	34.90	132.07	16.4	9.4	0.8	35	-35
3	JPN	HIROSHIMA	34.40	132.47	17.4	10.4	0.5	33	-18
3	JPN	ISHIGAKIJIMA	24.33	124.17	24.6	5.2	-0.4	33	-40

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	JPN	IWAKUNI	34.15	132.23	16.8	9.9	0.5	35	-21
3	JPN	IZUHARA	34.20	129.30	16.8	9.2	0.9	35	-11
3	JPN	KAGOSHIMA	31.55	130.55	19.6	9.0	0.8	34	-7
3	JPN	KANAZAWA	36.58	136.63	15.9	10.7	0.6	35	-42
3	JPN	KOFU	35.67	138.55	16.4	10.8	0.9	27	-11
3	JPN	KUMAMOTO	32.82	130.70	18.1	10.2	0.9	32	-10
3	JPN	KUSHIRO	42.98	144.38	7.3	10.4	0.7	44	-37
3	JPN	MAEBASHI	36.40	139.07	15.9	10.6	0.6	33	-2
3	JPN	MAIZURU	35.45	135.32	15.6	10.4	0.7	33	-22
3	JPN	MATSUE	35.45	133.07	16.0	10.1	0.6	33	-19
3	JPN	MATSUMOTO	36.25	137.97	12.9	12.3	0.8	29	16
3	JPN	MATSUYAMA	33.85	132.78	17.4	9.9	0.7	33	-20
3	JPN	MINAMIDAITOJIMA	25.83	131.23	23.9	5.2	0.1	38	-11
3	JPN	MIYAKOJIMA	24.80	125.28	24.0	5.3	0.4	35	27
3	JPN	MIYAKO	39.65	141.97	12.0	10.1	0.9	36	-15
3	JPN	MIYAZAKI	31.93	131.42	18.7	9.3	0.9	32	-12
3	JPN	MORIOKA	39.70	141.17	11.5	12.1	0.4	31	6
3	JPN	MUROTOMISAKI	33.25	134.18	17.7	8.4	0.6	37	-4
3	JPN	NAGASAKI	32.73	129.87	18.2	9.7	0.7	33	-11
3	JPN	NAGOYA	35.17	136.97	17.1	10.7	0.9	32	-16
3	JPN	NAHA	26.20	127.68	23.6	5.6	0.1	38	-16
3	JPN	NAZE	28.38	129.50	22.3	6.7	0.3	34	-17
3	JPN	NEMURO	43.33	145.58	7.3	9.9	0.7	49	-11
3	JPN	NIIGATA	37.92	139.05	14.9	10.8	0.7	34	-24
3	JPN	OITA	33.23	131.62	17.4	9.6	0.5	34	-15
3	JPN	OMAEZAKI	34.60	138.22	17.4	8.8	1.0	38	-3
3	JPN	ONAHAMA	36.95	140.90	14.6	9.2	0.9	39	-5
3	JPN	OSAKA	34.68	135.52	18.0	10.6	0.6	34	-16
3	JPN	OSHIMA	34.75	139.38	17.1	8.3	0.7	37	-13
3	JPN	OWASE	34.07	136.20	17.2	9.4	0.8	34	-10
3	JPN	RUMOI	43.95	141.63	9.1	12.1	-0.4	38	20
3	JPN	SAIGO	36.20	133.33	15.4	9.7	0.7	36	-26
3	JPN	SAKATA	38.92	139.85	13.7	10.8	0.6	35	-18
3	JPN	SAPPORO	43.07	141.33	9.9	12.5	0.0	35	-4
3	JPN	SENDAI	38.27	140.90	13.5	10.0	0.6	35	5
3	JPN	SHIMIZU	32.72	133.02	19.1	8.4	0.8	36	-8
3	JPN	SHIMONOSEKI	33.95	130.93	17.7	9.5	0.3	36	2
3	JPN	SHIONOMISAKI	33.45	135.77	18.3	8.4	1.0	38	-7
3	JPN	SUTTSU	42.80	140.22	9.6	11.3	0.8	39	-2
3	JPN	TAKADA	37.10	138.25	14.9	11.1	0.5	34	-23

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	JPN	TAKAMATSU	34.32	134.05	17.5	10.5	0.2	33	0
3	JPN	TANEGASHIMA	30.73	130.98	20.5	7.4	0.8	36	-12
3	JPN	TOKYO	35.68	139.77	17.4	9.4	0.7	34	-4
3	JPN	TOTTORI	35.48	134.20	16.1	10.4	0.5	33	-24
3	JPN	URAKAWA	42.17	142.78	9.3	10.9	0.3	41	-11
3	JPN	WAJIMA	37.40	136.90	14.7	10.4	0.6	36	-17
3	JPN	WAKAMATSU	37.48	139.92	13.0	12.6	1.0	30	-2
3	JPN	WAKKANAI	45.42	141.68	8.0	11.1	1.0	42	-32
3	JPN	YOKOSUKA	35.28	139.67	17.4	9.0	0.6	36	-22
3	KAZ	AKKOL	52.00	70.95	5.2	15.5	-1.0	25	18
3	KAZ	AKKUDUK	42.97	54.12	15.6	15.9	-0.1	17	9
3	KAZ	AKTOBE	50.28	57.15	7.1	14.3	-2.6	28	14
3	KAZ	ALMATY	43.23	76.93	11.1	14.2	-0.3	21	9
3	KAZ	ARALSKOE-MORE	46.78	61.65	11.1	18.3	-1.5	21	-8
3	KAZ	ASTANA	51.13	71.37	5.7	13.3	-1.9	31	15
3	KAZ	ATBASAR	51.82	68.37	5.6	13.2	-2.3	31	12
3	KAZ	ATYRAU	47.12	51.92	11.6	15.9	-1.3	20	3
3	KAZ	BALHASH	46.80	75.08	8.8	17.6	-0.8	24	11
3	KAZ	BALKASINO	52.53	68.75	4.2	12.5	-2.3	30	11
3	KAZ	BERLIK	49.88	69.52	6.2	14.1	-2.2	29	15
3	KAZ	BLACOVESCHENKA	54.37	66.97	4.6	13.1	-2.1	31	16
3	KAZ	BOLSHE-NARYMSKOE	49.20	84.52	5.7	14.4	-1.8	31	15
3	KAZ	CARDARA	41.37	68.00	17.1	15.1	0.4	16	27
3	KAZ	DZHAMBEJTY	50.25	52.57	8.3	14.5	-2.4	27	9
3	KAZ	DZHUSALY	45.50	64.08	12.4	17.6	-1.9	20	-16
3	KAZ	ESIL	51.88	66.33	6.0	13.9	-2.1	29	13
3	KAZ	FORT-SHEVCHENKO	44.55	50.25	14.6	14.3	0.7	21	-19
3	KAZ	IRTYSHSK	53.35	75.45	5.8	14.1	-2.1	29	18
3	KAZ	KARAGANDA	49.80	73.15	5.9	13.0	-1.9	30	21
3	KAZ	KAZALINSK	45.77	62.12	12.6	17.8	-1.1	17	-12
3	KAZ	KOKPEKTY	48.75	82.37	5.2	14.3	-1.6	31	23
3	KAZ	KOKSHETAY	53.28	69.38	5.5	15.4	-1.7	26	28
3	KAZ	KUSTANAI	53.22	63.62	5.6	13.2	-2.3	31	15
3	KAZ	KYZYLORDA	44.85	65.50	13.0	17.6	-1.5	18	-25
3	KAZ	KZYLZAR	48.30	69.65	7.9	17.4	-1.7	24	4
3	KAZ	LENINOGORSK	50.33	83.55	5.5	12.0	-2.2	31	22
3	KAZ	MUGODZARSKAJA	48.63	58.50	8.5	14.3	-1.8	24	8
3	KAZ	PAVLODAR	52.30	76.93	5.8	14.0	-2.5	28	16
3	KAZ	PETROPAVLOVSK	54.83	69.15	4.5	12.8	-1.9	29	14
3	KAZ	RUZAEVKA	52.82	66.97	5.2	13.6	-2.3	30	17

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	KAZ	SAM	45.40	56.12	12.5	17.6	-1.1	19	-3
3	KAZ	SEMIJARKA	50.87	78.35	6.5	14.6	-2.3	27	12
3	KAZ	SEMIPALATINSK	50.42	80.30	7.4	14.1	-2.1	25	5
3	KAZ	SUCINSK	52.95	70.22	4.4	12.6	-2.1	30	17
3	KAZ	TAIPAK	49.05	51.87	11.1	17.0	-1.4	20	-1
3	KAZ	TEMIR	49.15	57.12	7.2	14.3	-2.6	28	15
3	KAZ	TORGAI	49.63	63.50	8.2	17.8	-1.6	25	5
3	KAZ	TURKESTAN	43.27	68.22	16.0	16.4	1.0	14	15
3	KAZ	UIL	49.07	54.68	9.0	16.8	-2.1	24	9
3	KAZ	URALSK	51.25	51.28	7.5	14.1	-2.0	30	11
3	KAZ	URDZHAR	47.12	81.62	8.5	15.5	-1.9	27	9
3	KAZ	URICKY	53.32	65.55	5.2	13.2	-2.5	31	17
3	KAZ	ZHALTYR	51.62	69.80	5.5	13.7	-2.1	30	15
3	KAZ	ZHAMBYL	42.85	71.38	13.6	15.2	0.3	18	10
3	KAZ	ZHARKENT	44.17	80.07	11.8	14.7	0.8	21	32
3	KAZ	ZHARYK	48.85	72.87	6.9	13.9	-2.2	27	11
3	KAZ	ZHEZKAZGAN	47.80	67.72	9.0	17.3	-1.1	21	2
3	KAZ	ZLIKHA	45.25	67.07	12.2	17.4	-1.5	20	-14
3	KGZ	BISHKEK	42.85	74.53	12.7	13.7	0.9	21	41
3	KGZ	DZHALAL-ABAD	40.92	72.95	16.2	15.2	1.2	15	14
3	KGZ	NARYN	41.43	76.00	7.9	15.1	0.0	25	6
3	KGZ	TALAS	42.52	72.22	11.9	13.9	0.2	20	6
3	KGZ	TIAN-SHAN	41.88	78.23	-4.0	9.3	-1.9	39	-41
3	KGZ	TOKMAK	42.83	75.28	13.3	13.0	1.0	20	30
3	KOR	ANDONG	36.57	128.72	13.1	13.3	1.0	25	17
3	KOR	BUSAN	35.10	129.03	15.7	10.0	1.1	34	4
3	KOR	CHEONGJU	36.63	127.45	13.9	13.2	1.1	24	9
3	KOR	CHEORWON	38.15	127.30	11.5	13.8	0.7	24	6
3	KOR	CHUNCHEON	37.90	127.73	12.6	14.1	0.9	25	22
3	KOR	CHUPUNGNYEONG	36.22	128.00	12.8	12.8	1.0	25	14
3	KOR	DAEGU	35.88	128.62	15.5	11.5	0.7	26	6
3	KOR	DAEGWALLYEONG	37.68	128.77	8.9	11.6	-0.1	29	-9
3	KOR	DAEJEON	36.37	127.37	13.8	13.0	1.2	26	4
3	KOR	DONGHAE-RADAR	37.50	129.13	14.0	10.0	1.0	29	3
3	KOR	GANGNEUNG	37.75	128.90	14.3	11.7	1.6	27	11
3	KOR	GUNSAN	36.00	126.77	14.3	11.8	0.6	31	-5
3	KOR	GWANGJU	35.17	126.90	15.2	11.5	1.0	27	0
3	KOR	INCHEON	37.47	126.63	13.7	12.2	0.9	29	-5
3	KOR	JEJU	33.52	126.53	16.6	9.6	0.6	35	-16
3	KOR	JEONJU	35.82	127.15	14.8	13.0	1.2	26	6

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	KOR	JINJU	35.20	128.12	14.4	11.9	1.1	26	-13
3	KOR	MASAN	35.18	128.57	15.9	10.5	1.2	31	-9
3	KOR	MOKPO	34.82	126.38	15.3	11.0	0.8	32	-4
3	KOR	POHANG	36.03	129.38	15.6	10.5	1.1	26	-1
3	KOR	SEOGWIPO	33.25	126.57	17.9	9.0	0.8	36	-10
3	KOR	SEOSAN	36.77	126.50	13.2	12.1	0.8	28	-16
3	KOR	SEOUL	37.57	126.97	13.8	13.1	1.5	25	7
3	KOR	SOKCHO	38.25	128.57	13.3	11.1	1.5	29	6
3	KOR	SUWON	37.27	126.98	13.5	13.0	1.1	25	3
3	KOR	TONGYEONG	34.85	128.43	15.5	10.1	1.0	32	-6
3	KOR	ULJIN	36.98	129.42	13.9	10.1	1.2	29	-7
3	KOR	ULLEUNGDO	37.48	130.90	13.9	10.2	0.8	34	-4
3	KOR	ULSAN	35.55	129.32	15.5	10.9	1.0	28	-9
3	KOR	WANDO	34.40	126.70	15.5	10.1	1.1	31	-12
3	KOR	WONJU	37.33	127.95	13.1	13.7	1.0	21	3
3	KOR	YEONGWOL	37.18	128.47	12.2	13.6	1.2	25	17
3	KOR	YEOSU	34.73	127.75	15.4	9.9	1.2	32	0
3	KWT	KUWAIT-INTL-AP	29.22	47.98	27.6	12.0	1.0	21	3
3	MAC	TAIPA-GRANDE	22.17	113.57	23.4	6.9	0.8	33	30
3	MMR	YANGON	16.77	96.17	27.8	1.3	1.7	-53	15
3	MNG	ALTAI	46.40	96.25	2.8	12.8	0.1	26	2
3	MNG	ARVAIHEER	46.27	102.78	4.4	13.1	-1.7	24	37
3	MNG	BAITAG	46.12	91.47	7.2	17.5	0.2	23	2
3	MNG	BARUUN-URT	46.68	113.28	4.4	17.0	1.1	23	-28
3	MNG	BARUUNHARAA	48.92	106.07	4.3	14.3	-1.7	27	29
3	MNG	BARUUNTURUUN	49.65	94.40	1.3	18.7	2.7	22	18
3	MNG	BAYAN-OVOO	47.78	112.12	4.1	13.9	-1.8	30	28
3	MNG	BAYANBULAG	46.83	98.08	0.7	12.5	0.9	20	8
3	MNG	BAYANDELGER	45.73	112.37	5.2	16.4	-0.1	23	11
3	MNG	BAYANHONGOR	46.13	100.68	4.0	14.4	0.1	24	11
3	MNG	BULGAN	48.80	103.55	3.3	12.2	-1.4	29	36
3	MNG	CHOIBALSAN	48.08	114.55	4.4	17.2	0.1	23	6
3	MNG	CHOIR	46.45	108.22	4.3	15.6	1.6	25	-31
3	MNG	DALANZADGAD	43.58	104.42	8.0	16.0	-1.3	22	27
3	MNG	DASHBALBAR	49.55	114.40	3.7	13.3	-1.6	31	24
3	MNG	ERDENEMANDAL	48.53	101.38	3.2	11.4	-1.2	28	30
3	MNG	GALUUT	46.70	100.13	1.3	11.8	-1.2	29	13
3	MNG	HATGAL	50.43	100.15	-0.7	9.6	-0.3	28	13
3	MNG	HOVD	48.02	91.57	5.4	16.8	0.9	22	-16
3	MNG	HUJIRT	46.90	102.77	3.8	12.0	-1.9	29	24

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	MNG	HUTAG	49.38	102.70	4.7	14.0	-1.4	24	20
3	MNG	KHALKH-GOL	47.62	118.62	4.4	14.2	-1.7	30	25
3	MNG	MAANTI	47.30	107.48	1.8	15.5	1.3	23	-18
3	MNG	MANDALGOBI	45.77	106.28	4.7	15.2	0.1	22	6
3	MNG	MATAD	47.17	115.63	4.8	16.0	-0.2	26	6
3	MNG	MUREN	49.63	100.17	3.9	12.8	-1.2	26	24
3	MNG	OMNO-GOBI	49.02	91.72	3.1	14.9	1.0	24	-14
3	MNG	RINCHINLHUMBE	51.12	99.67	-0.3	12.6	-1.1	26	-4
3	MNG	SAIKHAN-OVOO	45.45	103.90	6.1	16.9	0.2	23	9
3	MNG	SAINSHAND	44.90	110.12	7.3	17.4	-0.9	23	44
3	MNG	TARIALAN	49.57	102.00	3.1	12.0	-0.9	27	39
3	MNG	TOSONTSENGEL	48.73	98.20	1.3	12.1	-0.2	29	17
3	MNG	TSETSERLEG	47.45	101.47	3.7	10.6	-1.6	29	28
3	MNG	TSOGT-OVOO	44.42	105.32	7.4	16.6	-1.6	23	40
3	MNG	ULAANBAATAR	47.92	106.87	2.6	15.3	1.0	22	2
3	MNG	ULAANGOM	49.80	92.08	1.3	19.0	2.9	25	26
3	MNG	ULGI	48.93	89.93	4.5	13.9	-1.1	24	34
3	MNG	ULIASTAI	47.75	96.85	2.6	12.3	-0.7	29	19
3	MNG	UNDERKHAAN	47.32	110.63	3.3	13.5	-1.3	28	30
3	MNG	ZAMYN-UUD	43.73	111.90	7.9	18.3	-0.3	23	3
3	OMN	KHASAB	26.20	56.23	30.0	7.4	0.8	24	18
3	OMN	MASIRAH	20.67	58.90	28.2	2.8	2.2	-2	32
3	OMN	SALALAH	17.03	54.08	28.0	2.8	1.7	-12	37
3	OMN	SEEB-INTL-AP	23.58	58.28	29.9	6.8	1.2	12	37
3	OMN	SOHAR-MAJIS	24.47	56.63	28.9	7.2	0.8	18	36
3	OMN	SUR	22.53	59.47	30.2	6.2	1.2	8	29
3	OMN	THUMRAIT	17.67	54.02	27.7	5.3	1.6	9	24
3	PAK	ISLAMABAD-AP	33.62	73.10	22.8	10.2	1.7	16	21
3	PAK	KARACHI-AP	24.90	67.13	28.3	5.4	2.0	8	18
3	PRK	ANJU	39.62	125.65	11.1	14.3	0.3	27	2
3	PRK	CHANGJIN	40.37	127.25	5.5	12.4	-2.1	34	32
3	PRK	CHANGJON	38.73	128.18	13.2	11.7	2.0	29	15
3	PRK	CHONGJIN	41.78	129.82	10.4	12.9	0.4	29	3
3	PRK	CHUNGGANG	41.78	126.88	9.3	16.0	-1.3	25	7
3	PRK	HAEJU	38.03	125.70	12.5	13.3	1.4	28	9
3	PRK	HAMHEUNG	39.93	127.55	12.0	13.1	1.1	27	14
3	PRK	HUICHON	40.17	126.25	11.5	15.3	0.5	24	16
3	PRK	HYESAN	41.40	128.17	8.0	15.3	-1.8	29	25
3	PRK	KAESONG	37.97	126.57	12.1	13.8	0.9	26	22
3	PRK	KANGGYE	40.97	126.60	11.5	15.9	-0.1	21	-3

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	PRK	KIMCHAEK	40.67	129.20	10.3	12.2	0.7	33	-4
3	PRK	KUSONG	39.98	125.25	10.6	14.7	-0.4	26	6
3	PRK	NAMPO	38.72	125.38	12.1	13.6	1.1	29	20
3	PRK	PUNGSAN	40.82	128.15	5.4	12.4	-1.9	33	29
3	PRK	PYONGGANG	38.42	127.28	10.3	13.5	-0.1	29	-5
3	PRK	PYONGYANG	39.03	125.78	11.8	14.2	0.5	26	16
3	PRK	RYONGYON	38.15	124.88	12.0	13.1	0.8	27	17
3	PRK	SAMJIYON	41.82	128.30	3.8	11.8	-1.6	34	34
3	PRK	SARIWON	38.52	125.77	12.0	14.2	0.9	25	25
3	PRK	SENBONG	42.32	130.40	8.8	12.6	-0.1	34	8
3	PRK	SINGYE	38.50	126.53	11.6	13.9	0.9	27	17
3	PRK	SINPO	40.03	128.18	11.2	12.4	0.7	32	0
3	PRK	SINUIJU	40.10	124.38	10.9	14.0	0.5	27	1
3	PRK	SUPUNG	40.45	124.93	10.7	14.7	0.0	25	8
3	PRK	WONSAN	39.18	127.43	12.4	11.9	1.3	27	16
3	PRK	YANGDOK	39.22	126.65	10.5	14.2	0.1	24	0
3	QAT	DOHA-INTL-AP	25.25	51.57	28.9	8.9	0.8	25	20
3	RUS	AGATA	66.88	93.47	-4.0	13.3	-2.8	41	-4
3	RUS	AGINSKOE	51.10	114.52	2.7	12.5	-1.3	29	26
3	RUS	AGZU	47.60	138.40	4.7	12.5	-2.0	33	44
3	RUS	AJAN	56.45	138.15	0.5	8.5	1.0	40	-24
3	RUS	AKJAR	51.87	58.18	5.2	12.7	-2.1	31	18
3	RUS	AKSA	50.27	113.27	2.8	12.2	-1.1	29	38
3	RUS	ALDAN	58.62	125.37	-0.7	11.6	-1.6	26	3
3	RUS	ALEJSKAJA	52.52	82.77	5.3	13.3	-1.9	29	17
3	RUS	ALEKSANDROVSK-SAHAL	50.90	142.17	3.5	10.8	-1.5	43	55
3	RUS	ALEKSANDROVSKIJ-ZAV	50.92	117.93	1.7	11.4	-0.8	30	22
3	RUS	ALEKSANDROVSKOE	60.43	77.87	2.4	11.2	-1.8	32	24
3	RUS	AMDERMA	69.75	61.70	-3.7	8.8	-1.3	54	-17
3	RUS	AMGA	60.90	131.98	-1.6	15.1	-2.3	27	-17
3	RUS	ANADYR	64.78	177.57	-2.4	10.4	-3.0	45	3
3	RUS	ANUCINO	43.97	133.07	6.9	14.5	-1.6	30	29
3	RUS	ARHARA	49.42	130.08	4.4	14.0	-1.3	29	29
3	RUS	ARKA	60.08	142.33	-0.4	11.3	-1.6	28	0
3	RUS	ASTRAHANKA	44.72	132.07	7.2	14.0	-1.7	33	29
3	RUS	BAEVO	53.27	80.77	4.8	12.8	-2.1	30	19
3	RUS	BAGDARIN	54.47	113.58	-0.5	11.8	-1.4	24	-3
3	RUS	BAJANDAJ	53.10	105.53	2.0	11.3	-0.8	28	22
3	RUS	BAKALY	55.18	53.80	5.5	12.1	-2.2	28	8
3	RUS	BAKCHAR	57.08	81.92	3.2	11.6	-1.5	28	34

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	BALAGANSK	54.00	103.07	2.8	12.6	-1.5	31	28
3	RUS	BARABINSK	55.33	78.37	4.0	12.7	-1.8	30	21
3	RUS	BARNAUL	53.43	83.52	5.7	13.2	-2.2	29	12
3	RUS	BATAMAJ	63.52	129.48	-2.8	15.1	-2.6	30	-10
3	RUS	BEREZOVO	63.93	65.05	0.2	9.7	-1.2	32	14
3	RUS	BIJSK-ZONALNAJA	52.68	84.95	5.5	13.2	-2.1	31	24
3	RUS	BIKIN	46.80	134.27	6.9	14.5	-1.5	27	26
3	RUS	BIROBIDZHAN	48.73	132.95	5.5	14.2	-1.8	29	31
3	RUS	BIRSK	55.42	55.53	5.5	12.4	-2.3	28	19
3	RUS	BLAGOVESCENSK	50.25	127.57	5.2	14.7	-2.0	28	28
3	RUS	BODAJBO	57.85	114.23	1.2	12.2	-1.1	27	3
3	RUS	BOGORODSKOE	52.38	140.47	2.9	12.4	-0.1	37	7
3	RUS	BOGUCANY	58.38	97.45	1.9	11.9	-1.3	30	19
3	RUS	BOLSHERECHE	56.10	74.63	4.1	12.4	-1.7	28	17
3	RUS	BOLSOJ-SANTAR	54.83	137.53	-0.3	9.0	-0.1	38	1
3	RUS	BOL`SIE-UKI	56.93	72.67	4.0	12.2	-1.8	29	21
3	RUS	BOMNAK	54.72	128.93	2.2	13.1	-1.2	28	16
3	RUS	BORZJA	50.40	116.52	3.1	12.8	-1.7	30	23
3	RUS	BOR	61.60	90.02	1.6	10.9	-1.1	32	21
3	RUS	BRATSK	56.28	101.75	2.5	11.2	-2.0	29	21
3	RUS	BUGARIHTA	54.05	115.02	0.1	13.1	-1.3	24	-7
3	RUS	BUGULMA	54.58	52.80	5.3	12.0	-2.1	29	19
3	RUS	BURUKAN	53.05	136.03	1.2	11.8	-0.4	31	-4
3	RUS	BUZULUK	52.82	52.22	6.7	13.6	-2.2	26	10
3	RUS	CEMAL	51.43	86.00	6.5	13.0	-1.7	28	16
3	RUS	CENTRALNYJ-RUDNIK	55.22	87.65	2.9	10.9	-2.0	32	33
3	RUS	CERLAK	54.17	74.80	4.7	13.6	-1.9	30	24
3	RUS	CERNUSKA	56.50	56.13	5.1	12.0	-1.7	28	20
3	RUS	CHANY	55.28	76.60	4.4	12.7	-1.6	30	18
3	RUS	CHARA	56.90	118.27	-1.2	12.8	-1.9	27	-6
3	RUS	CHELJABINSK-BALANDI	55.30	61.53	5.0	12.0	-1.6	26	15
3	RUS	CHERDYN	60.40	56.52	3.6	10.9	-2.5	28	27
3	RUS	CHERNISHEVSKIJ	63.03	112.50	-1.4	12.1	-1.5	29	1
3	RUS	CHERNJAEVO	52.78	126.00	2.8	13.7	-0.7	27	22
3	RUS	CHERSKIJ	68.75	161.28	-4.4	13.6	-3.2	39	-7
3	RUS	CHITA	52.08	113.48	3.3	13.1	-1.4	29	32
3	RUS	CHOKURDAH	70.62	147.88	-6.2	14.1	-2.8	43	-13
3	RUS	CJULBJU	57.77	130.90	-0.1	13.9	-1.8	26	-8
3	RUS	CULMAN	56.83	124.87	-1.4	12.2	-1.3	27	1
3	RUS	CULYM	55.10	80.97	4.1	12.0	-1.8	29	17

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	CURAPCA	62.03	132.60	-2.1	15.4	-2.5	28	-11
3	RUS	DALNERECHENSK	45.87	133.73	6.1	14.2	-1.9	31	28
3	RUS	DEMJANSKOE	59.60	69.28	2.6	11.6	-1.9	28	28
3	RUS	DUDINKA	69.40	86.17	-4.4	12.4	-3.4	50	2
3	RUS	DUVAN	55.70	57.90	4.4	11.5	-2.1	28	23
3	RUS	DZALINDA	53.47	123.90	2.9	12.6	-1.1	30	17
3	RUS	DZARDZAN	68.73	124.00	-4.3	14.4	-2.7	33	-13
3	RUS	EGVEKINOT	66.35	-179.12	-2.3	9.0	-2.8	45	-2
3	RUS	EKATERINBURG	56.83	60.63	4.9	12.0	-2.0	27	25
3	RUS	EKATERINO-NIKOLSKOE	47.73	130.97	5.8	14.0	-2.0	30	24
3	RUS	EKIMCHAN	53.07	132.98	0.9	12.2	-0.8	27	2
3	RUS	ELABUGA	55.77	52.07	5.7	12.2	-2.0	27	15
3	RUS	ENISEJSK	58.45	92.15	2.2	11.6	-0.9	30	37
3	RUS	ERBOGACEN	61.27	108.02	-1.1	11.8	-1.3	29	-4
3	RUS	EROFEJ-PAVLOVIC	53.97	121.93	2.1	12.8	-1.6	27	13
3	RUS	GAJNY	60.28	54.35	3.5	10.2	-1.8	28	33
3	RUS	GARI	59.43	62.33	3.8	11.6	-1.5	27	22
3	RUS	GLAZOV	58.13	52.58	4.6	11.4	-2.1	28	17
3	RUS	GMO-IM-EK-FEDOROV	77.72	104.30	-10.7	13.3	-1.9	39	21
3	RUS	GORIN	51.20	136.80	3.2	13.6	-1.1	32	25
3	RUS	GORJACINSK	52.98	108.28	2.3	9.8	-1.6	40	44
3	RUS	GVASJUGI	47.67	136.18	4.2	13.9	-1.6	31	36
3	RUS	HABAROVSK	48.52	135.17	5.3	14.0	-1.8	33	27
3	RUS	HADAMA	53.95	98.82	1.5	10.7	-1.4	30	15
3	RUS	HANTY-MANSIJSK	61.02	69.03	2.2	11.2	-1.6	28	35
3	RUS	HATANGA	71.98	102.47	-6.5	14.2	-2.3	43	-12
3	RUS	HILOK	51.35	110.47	1.9	11.4	-1.3	30	10
3	RUS	HOLMSK	47.05	142.05	6.3	11.4	-1.7	43	48
3	RUS	HORINSK	52.17	109.78	2.8	12.2	-1.5	30	21
3	RUS	HOSEDA-HARD	67.08	59.38	-1.6	9.3	-2.0	39	8
3	RUS	HULARIN	51.42	135.08	3.3	13.0	-1.5	32	31
3	RUS	IGNASINO	53.47	122.40	2.1	13.4	-1.4	28	11
3	RUS	ILYINSKIY	47.98	142.20	4.9	10.5	1.9	47	-39
3	RUS	IM-MV-POPOVA	73.33	70.05	-7.1	11.8	-0.9	51	-24
3	RUS	IM-POLINY-OSIPENKO	52.42	136.50	2.8	12.9	0.0	32	3
3	RUS	IRKUTSK	52.27	104.32	2.7	11.3	-1.1	29	34
3	RUS	ISILKUL	54.90	71.25	4.1	12.2	-1.8	31	18
3	RUS	ISIM	56.10	69.43	4.2	12.5	-1.9	31	19
3	RUS	ISIT	60.82	125.32	-0.6	13.5	-1.9	28	-1
3	RUS	IVDEL	60.68	60.45	2.6	11.3	-1.1	24	40

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	IZHEVSK	56.83	53.45	5.1	12.0	-2.0	27	15
3	RUS	JAKUTSK	62.02	129.72	-1.3	14.9	-2.0	26	-11
3	RUS	JANAUL	56.27	54.90	4.9	12.1	-2.0	29	22
3	RUS	JUZHNO-KURILSK	44.02	145.87	6.4	9.5	1.0	52	-27
3	RUS	JUZHNO-SAHALINSK	46.95	142.72	4.7	10.8	2.1	43	-45
3	RUS	KACUG	53.97	105.90	1.9	12.1	-0.8	28	3
3	RUS	KAJLASTUJ	49.83	118.38	3.8	13.7	-1.5	29	28
3	RUS	KALACINSK	55.03	74.58	4.3	12.7	-2.1	30	17
3	RUS	KALAKAN	55.12	116.77	-0.6	13.0	-1.6	27	-4
3	RUS	KAMEN-NA-OBI	53.82	81.27	4.4	13.2	-2.5	29	21
3	RUS	KAMENSKOE	62.43	166.08	-1.9	10.7	-2.1	39	2
3	RUS	KAMYSLOV	56.85	62.72	4.7	12.2	-2.0	26	18
3	RUS	KARASUK	53.70	78.07	5.1	13.5	-2.1	28	17
3	RUS	KARGASOK	59.05	80.95	2.5	11.7	-1.4	30	26
3	RUS	KAZACHINSK	56.32	107.62	1.5	11.6	-1.1	30	9
3	RUS	KEDON	64.00	158.92	-5.0	13.9	-2.7	35	-13
3	RUS	KEMEROVO	55.23	86.12	3.8	12.0	-2.2	32	25
3	RUS	KIRENSK	57.77	108.07	1.2	11.4	-1.0	30	14
3	RUS	KIROVSKIJ	45.08	133.53	6.7	14.2	-1.8	31	28
3	RUS	KIRS	59.37	52.22	4.0	10.7	-1.6	29	27
3	RUS	KJAHTA	50.37	106.45	3.9	12.3	-1.7	28	29
3	RUS	KJUSJUR	70.68	127.40	-5.2	14.2	-3.0	40	-15
3	RUS	KLJUCHI	56.32	160.83	2.3	10.0	-1.4	40	44
3	RUS	KLJUCI	52.25	79.13	6.3	13.8	-2.3	29	12
3	RUS	KOCHKI	54.30	80.50	4.2	12.8	-2.0	30	18
3	RUS	KOLBA	55.08	93.37	3.3	11.4	-1.9	30	23
3	RUS	KOLPASEVO	58.32	82.95	2.4	11.5	0.0	30	-6
3	RUS	KOLYVAN	55.30	82.75	4.2	12.5	-2.2	29	18
3	RUS	KORF	60.35	166.00	0.0	8.1	-0.7	39	24
3	RUS	KRASNOOZERSK	53.97	79.23	4.6	12.8	-1.8	30	20
3	RUS	KRASNOUFIMSK	56.65	57.78	4.8	12.0	-2.1	28	18
3	RUS	KRASNYJ-CHIKOJ	50.37	108.75	2.7	13.1	-0.9	29	28
3	RUS	KRASNYJ-JAR	46.53	135.32	5.6	14.4	-1.9	26	35
3	RUS	KRESCHENKA	55.85	80.03	3.7	11.9	-1.6	29	20
3	RUS	KUDYMKAR	58.98	54.65	4.0	10.9	-2.0	25	26
3	RUS	KUPINO	54.37	77.28	4.8	13.0	-2.0	29	16
3	RUS	KURGAN	55.47	65.40	4.7	12.5	-1.9	28	18
3	RUS	KUR	49.93	134.63	3.7	14.0	-1.2	30	28
3	RUS	KYRA	49.57	111.97	3.6	13.1	-1.8	29	32
3	RUS	KYSTOVKA	56.60	76.57	3.5	12.1	-1.7	31	17

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	KYZYL	51.72	94.50	3.5	14.1	-0.5	28	12
3	RUS	LENSK	60.72	114.88	0.3	11.9	-1.1	28	4
3	RUS	LEUSI	59.62	65.72	3.6	12.2	-1.7	26	26
3	RUS	LOSINOBORSKOE	58.43	89.37	2.5	10.9	-2.0	33	23
3	RUS	MAGADAN	59.55	150.78	-0.5	8.6	-0.7	34	10
3	RUS	MAGDAGACI	53.47	125.82	3.2	12.7	-1.8	30	17
3	RUS	MAGNITOGORSK	53.35	59.08	5.2	12.5	-2.3	29	9
3	RUS	MAJSK	57.78	77.28	3.2	11.5	-1.3	30	22
3	RUS	MAKUSINO	55.25	67.30	5.2	13.0	-2.3	27	9
3	RUS	MALYE-KARMAKULY	72.37	52.70	-2.3	6.5	-1.4	54	0
3	RUS	MAMA	58.32	112.87	0.8	11.8	-1.1	29	13
3	RUS	MARESALE	69.72	66.80	-4.8	10.3	-1.6	55	-9
3	RUS	MARIINSK	56.22	87.75	4.4	12.3	-1.8	28	23
3	RUS	MARKOVO	64.68	170.42	-2.8	12.4	-3.1	39	0
3	RUS	MASLJANINO	54.33	84.22	4.0	12.1	-1.8	28	21
3	RUS	MELEUZ	52.95	55.97	6.0	12.8	-2.1	30	17
3	RUS	MOGOCA	53.75	119.73	1.3	12.0	-0.7	27	15
3	RUS	MONDY	51.68	100.98	1.0	9.5	-1.0	32	4
3	RUS	MUZI	65.38	64.72	-0.5	9.9	-1.9	33	6
3	RUS	NAGORNYJ	55.97	124.88	-1.5	12.1	-1.5	27	-10
3	RUS	NAPAS	59.85	81.95	2.2	11.2	-1.9	30	20
3	RUS	NARJAN-MAR	67.63	53.03	-0.5	7.9	-1.5	36	7
3	RUS	NAZYVOEVSK	55.57	71.37	3.9	12.3	-1.9	30	22
3	RUS	NERCHINSKIJ-ZAVOD	51.32	119.62	2.6	12.2	-1.0	30	15
3	RUS	NIKOLAEVSK-NA-AMURE	53.15	140.70	1.9	11.2	-0.1	36	7
3	RUS	NIKOLSKOE	55.20	165.98	3.6	6.5	1.7	51	-38
3	RUS	NIZHNEANGARSK	55.78	109.55	1.9	10.6	-1.5	38	31
3	RUS	NIZHNEUDINSK	54.88	99.03	3.0	11.8	-1.4	28	34
3	RUS	NJAKSIMVOL	62.43	60.87	1.7	10.8	-1.4	27	20
3	RUS	NJURBA	63.28	118.33	-1.8	13.3	-1.7	28	-1
3	RUS	NOGLIKI	51.92	143.13	2.0	9.5	1.3	43	-25
3	RUS	NORSK	52.35	129.92	3.0	13.5	-1.2	30	13
3	RUS	NOVOKUZNETSK	53.82	86.88	4.8	12.2	-2.1	29	24
3	RUS	NOVOSELENGINSK	51.10	106.65	3.6	13.6	-1.3	28	21
3	RUS	NOVOSIBIRSK	55.08	82.90	4.1	12.1	-2.0	31	19
3	RUS	NOZOVKA	57.08	54.75	5.3	12.1	-1.8	26	15
3	RUS	OBLUCE	49.00	131.08	3.9	13.6	-1.3	30	36
3	RUS	ODESSKOE	54.20	72.97	4.8	13.2	-2.0	28	18
3	RUS	OHANSK	57.72	55.38	5.2	11.9	-2.0	26	21
3	RUS	OHOTSK	59.37	143.20	-0.1	9.0	-0.6	39	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	OJMJAKON	63.25	143.15	-6.2	17.4	-3.7	35	-21
3	RUS	OKTJABRSKOE	62.45	66.05	1.2	10.1	-1.7	32	21
3	RUS	OLEKMINSK	60.40	120.42	0.2	12.7	-1.6	27	6
3	RUS	OLENEK	68.50	112.43	-5.0	14.4	-3.0	36	-13
3	RUS	OLOVJANNAJA	50.95	115.58	3.3	13.0	-1.5	30	26
3	RUS	OMSK	55.02	73.38	4.7	13.0	-2.0	30	12
3	RUS	ORDYNSKOE	54.37	81.95	4.5	12.6	-2.3	32	20
3	RUS	ORENBURG	51.68	55.10	6.8	13.7	-2.4	28	11
3	RUS	ORLINGA	56.05	105.83	1.5	12.0	-1.8	30	2
3	RUS	OSTROV-DIKSON	73.50	80.40	-8.4	13.2	0.5	44	20
3	RUS	OSTROV-GOLOMJANNYJ	79.55	90.62	-11.5	12.4	-2.3	35	13
3	RUS	OSTROV-KOTELNYJ	76.00	137.87	-10.3	14.3	-0.7	42	-1
3	RUS	OSTROV-VIZE	79.50	76.98	-10.2	11.3	-2.1	37	11
3	RUS	OSTROV-VRANGELJA	70.98	-178.48	-7.6	11.5	-1.2	42	-25
3	RUS	OZERNAJA	51.48	156.48	3.2	7.1	1.8	54	-29
3	RUS	PARTIZANSK	43.15	133.02	7.0	13.1	-1.7	35	36
3	RUS	PECHORA	65.12	57.10	0.8	9.4	-1.5	33	18
3	RUS	PERM	57.95	56.20	4.4	11.9	-1.9	27	27
3	RUS	PERVOMAJSKOE	57.07	86.22	3.6	12.2	-2.0	30	27
3	RUS	PETROPAVLOVSK-KAMCH	53.08	158.58	3.6	8.6	2.1	43	-44
3	RUS	PETROVSKIJ-ZAVOD	51.32	108.87	1.7	11.9	-0.7	29	13
3	RUS	PILVO	50.05	142.17	3.6	10.4	-1.8	44	49
3	RUS	POGIBI	52.22	141.63	1.8	10.1	1.3	46	-25
3	RUS	POGRANICHNOE	50.40	143.77	1.5	8.1	1.4	47	-8
3	RUS	POGRANICHNYJ	44.40	131.38	7.2	13.9	-1.5	31	25
3	RUS	POJARKOVO	49.62	128.65	4.6	14.3	-1.4	30	34
3	RUS	POKROVSKAJA	61.48	129.15	-1.7	14.7	-2.0	27	-11
3	RUS	POLARGMO-IM-ET-K	80.62	58.05	-9.3	10.3	-2.2	40	13
3	RUS	POLTAVKA	54.37	71.75	4.6	13.2	-1.9	30	22
3	RUS	POLTAVKA	44.03	131.32	8.0	13.8	-1.0	28	19
3	RUS	PORONAJSK	49.22	143.10	3.1	10.0	0.0	46	19
3	RUS	POSET	42.65	130.80	8.7	13.0	1.0	33	-35
3	RUS	PREOBRAZHENIE	42.90	133.90	7.1	12.0	1.4	40	-38
3	RUS	PRIARGUNSK	50.40	119.07	2.8	13.5	-0.7	29	16
3	RUS	PUDINO	57.53	79.37	2.7	11.7	-1.0	30	22
3	RUS	REBRIHA	53.07	82.30	4.9	13.2	-2.4	28	18
3	RUS	ROMANOVKA	53.20	112.78	1.2	11.7	-1.0	28	11
3	RUS	RUBCOVSK	51.50	81.22	5.7	13.4	-2.3	29	16
3	RUS	RUDNAJA-PRISTAN	44.37	135.85	6.3	11.5	-2.0	38	47
3	RUS	SADRINSK	56.07	63.65	5.1	12.1	-1.8	27	8

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	SAIM	60.32	64.22	3.9	11.7	-2.0	25	19
3	RUS	SALEHARD	66.53	66.67	-1.7	10.3	-1.9	38	3
3	RUS	SAMARA	53.25	50.45	6.4	12.5	-2.3	28	7
3	RUS	SAMARY	57.35	58.22	4.4	12.0	-1.8	28	28
3	RUS	SANGARY	63.97	127.47	-2.0	14.3	-2.2	30	-4
3	RUS	SARAN-PAUL	64.28	60.88	0.8	10.2	-0.6	29	11
3	RUS	SARGATSKOE	55.60	73.48	3.9	12.5	-1.8	30	15
3	RUS	SEJMCHAN	62.92	152.42	-3.3	14.3	-2.9	33	-8
3	RUS	SEKTAGLI	50.43	131.02	3.4	14.3	-1.3	28	38
3	RUS	SELAGONCY	66.25	114.28	-4.7	15.1	-3.0	37	-12
3	RUS	SEVERNOE	56.35	78.35	4.0	12.6	-1.9	29	19
3	RUS	SEVERO-KURILSK	50.68	156.13	3.7	7.3	1.7	54	-33
3	RUS	SHILKA	51.87	116.03	2.6	12.8	-1.1	28	35
3	RUS	SIMUSIR	46.85	151.87	4.3	7.0	0.9	51	-29
3	RUS	SLAVGOROD	52.97	78.65	5.4	14.0	-2.2	29	17
3	RUS	SMIDOVICH	48.62	133.83	5.2	14.0	-1.5	31	29
3	RUS	SOFIJSKIJ-PRIISK	52.27	133.98	0.1	12.2	-1.0	27	-7
3	RUS	SOLNETHNAYA	54.03	108.27	2.0	9.7	-1.3	40	45
3	RUS	SOLOVEVSK	49.90	115.75	3.2	13.2	-1.3	30	18
3	RUS	SOSNOVO-OZERSKOE	52.53	111.55	1.3	10.7	-1.1	32	22
3	RUS	SOSVA	63.65	62.10	1.6	11.0	-1.5	33	27
3	RUS	SRETENSK	52.23	117.70	2.8	12.7	-1.3	28	26
3	RUS	STERLITAMAK	53.58	56.00	6.5	13.4	-2.2	28	12
3	RUS	SUMIHA	55.23	63.32	5.1	12.5	-2.0	25	9
3	RUS	SUNTAR	62.15	117.65	-0.5	13.3	-1.6	26	1
3	RUS	SURGUT	61.25	73.50	1.4	10.8	-1.8	32	22
3	RUS	SYKTYVKAR	61.72	50.83	3.4	10.4	-2.1	27	28
3	RUS	SYM	60.35	88.37	1.4	11.0	-1.6	31	15
3	RUS	TAJSHET	55.95	98.00	3.3	11.8	-1.6	29	32
3	RUS	TANGUJ	55.38	101.03	2.7	11.9	-1.5	31	23
3	RUS	TANHOJ	51.57	105.12	3.0	9.9	-1.2	36	29
3	RUS	TARA	56.90	74.38	3.7	12.1	-1.7	28	19
3	RUS	TARKO-SALE	64.92	77.82	-1.0	10.6	-2.1	34	5
3	RUS	TATARSK	55.20	75.97	4.2	12.9	-2.1	29	18
3	RUS	TAZOVSKOE	67.47	78.73	-3.5	11.6	-2.4	45	5
3	RUS	TERNEJ	45.00	136.60	5.9	11.5	-1.8	40	47
3	RUS	TEVRIZ	57.52	72.40	4.0	11.8	-1.9	32	29
3	RUS	TIKSI	71.58	128.92	-6.7	13.7	-2.3	47	-17
3	RUS	TISUL	55.75	88.32	4.2	11.8	-1.6	30	15
3	RUS	TIVJAKU	48.60	137.05	2.9	13.2	-1.1	30	37

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	TJUKALINSK	55.87	72.20	4.2	12.5	-1.7	30	21
3	RUS	TJUMEN	57.12	65.43	4.6	12.3	-1.8	27	22
3	RUS	TOBOLSK	58.15	68.25	3.6	12.1	-1.9	26	25
3	RUS	TOGUCHIN	55.23	84.40	4.0	12.0	-2.2	29	24
3	RUS	TOKO	56.28	131.13	-3.4	14.4	-2.6	32	-11
3	RUS	TOMPO	63.95	135.87	-4.8	16.3	-3.6	34	-12
3	RUS	TOMSK	56.50	84.92	4.0	12.0	-1.9	30	26
3	RUS	TROICKO-PECHERSKOE	62.70	56.20	1.9	10.0	-1.2	29	29
3	RUS	TROICKOE	49.45	136.57	5.4	14.2	-1.7	33	29
3	RUS	TROIZK	54.08	61.62	5.5	13.3	-1.9	29	12
3	RUS	TULUN	54.60	100.63	2.7	11.2	-1.4	30	30
3	RUS	TUNKA	51.73	102.53	2.8	12.4	-0.9	29	12
3	RUS	TURIJ-ROG	45.22	131.98	7.3	14.2	-1.8	29	31
3	RUS	TURINSK	58.05	63.68	4.2	12.1	-2.0	27	21
3	RUS	TUROCAK	52.27	87.17	4.5	12.6	-1.8	30	26
3	RUS	TURUHANSK	65.78	87.93	-1.5	11.2	-1.9	33	8
3	RUS	TYNDA	55.18	124.67	1.1	12.6	-1.2	26	14
3	RUS	UAKIT	55.47	113.62	-1.1	11.1	-1.2	27	-3
3	RUS	UEGA	60.72	142.78	-0.5	11.0	-1.7	29	11
3	RUS	UFA	54.72	55.83	5.9	12.8	-1.8	27	16
3	RUS	UHTA	63.55	53.82	1.7	9.6	-1.5	31	38
3	RUS	ULAN-UDE	51.83	107.60	3.4	13.4	-1.4	28	30
3	RUS	ULETY	51.35	112.47	3.5	11.7	-1.9	30	26
3	RUS	URMI	49.40	133.23	4.1	13.7	-1.6	30	36
3	RUS	UST-BARGUZIN	53.42	109.02	1.7	10.5	-0.9	37	34
3	RUS	UST-CILMA	65.43	52.27	0.7	8.8	-0.6	33	10
3	RUS	UST-ILIMSK	58.20	102.75	1.7	10.6	-1.9	32	27
3	RUS	UST-ISIM	57.68	71.18	3.5	12.0	-1.6	28	32
3	RUS	UST-JUDOMA	59.18	135.15	-0.7	14.9	-2.0	24	-21
3	RUS	UST-KAMCHATSK	56.22	162.47	1.4	7.4	1.2	50	-25
3	RUS	UST-KULOM	61.68	53.68	3.2	10.8	-1.5	26	22
3	RUS	UST-KUT	56.87	105.70	1.1	10.2	-1.2	31	23
3	RUS	UST-MAJA	60.38	134.45	-1.1	14.8	-1.8	26	-14
3	RUS	UST-NJUKZHA	56.58	121.48	1.5	13.6	-1.0	27	13
3	RUS	UST-UMALTA	51.63	133.32	2.5	13.3	-1.0	28	13
3	RUS	UST-USA	65.97	56.92	0.2	8.5	-1.3	33	10
3	RUS	USUGLI	52.65	115.17	1.9	12.2	-0.9	28	13
3	RUS	VANZIL-KYNAK	60.35	84.08	1.6	11.2	-1.8	30	16
3	RUS	VERESCAGINO	58.08	54.68	4.8	11.9	-1.9	24	16
3	RUS	VERHNEIMBATSK	63.15	87.95	0.6	10.7	-1.3	32	14

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	VERHNIJ-UFALEJ	56.08	60.30	4.4	11.5	-1.8	28	22
3	RUS	VERHNJAJA-GUTARA	54.22	96.97	0.9	10.3	-1.8	28	-1
3	RUS	VERHOJANSK	67.55	133.38	-5.1	16.6	-4.2	34	-17
3	RUS	VERHOTUR`E	58.87	60.78	4.0	11.5	-1.7	27	22
3	RUS	VESELAJA-GORKA	52.28	135.80	3.0	12.9	-1.5	32	45
3	RUS	VESLJANA	62.98	50.90	2.3	9.8	-2.1	32	24
3	RUS	VIKULOVO	56.82	70.62	4.6	12.4	-2.0	29	21
3	RUS	VILJUJSK	63.77	121.62	-1.4	13.8	-2.2	26	-8
3	RUS	VITIM	59.45	112.58	0.9	12.2	-1.6	28	7
3	RUS	VLADIVOSTOK	43.12	131.93	7.5	12.7	1.3	35	-42
3	RUS	VOLCIHA	52.02	80.37	5.2	13.2	-2.2	29	22
3	RUS	VORKUTA	67.48	64.02	-1.8	9.1	-1.9	38	4
3	RUS	VOROGOVO	61.03	89.63	1.8	11.0	-1.2	32	20
3	RUS	ZAMOKTA	52.77	109.97	0.4	9.4	-1.4	31	11
3	RUS	ZAVITAJA	50.12	129.47	4.2	14.4	-1.4	29	20
3	RUS	ZDVINSK	54.70	78.67	4.3	12.8	-1.9	30	20
3	RUS	ZEJA	53.70	127.30	3.1	13.9	-1.2	27	33
3	RUS	ZHIGALOVO	54.80	105.22	1.9	12.0	-1.5	30	17
3	RUS	ZHIGANSK	66.77	123.40	-3.9	14.6	-2.6	34	-10
3	RUS	ZIMA	53.93	102.05	3.0	12.5	-1.7	26	28
3	RUS	ZMEINOGORSK	51.15	82.20	5.4	12.3	-1.9	30	21
3	RUS	ZOLOTOJ	47.32	138.98	4.9	10.4	2.4	47	-37
3	RUS	ZURAVLEVKA	44.75	134.47	5.7	14.3	-1.8	32	35
3	RUS	ZVERINOGOLOVSKAJA	54.47	64.87	5.4	13.2	-2.2	28	12
3	RUS	ZYRJANKA	65.73	150.90	-3.8	14.5	-3.1	35	-7
3	SAU	ABHA	18.23	42.65	21.5	5.5	0.8	16	-12
3	SAU	AL-AHSA	25.30	49.48	28.5	11.2	1.0	19	18
3	SAU	AL-BAHA	20.30	41.65	24.5	6.7	0.6	17	-1
3	SAU	AL-JOUF	29.78	40.10	23.7	11.5	1.8	21	6
3	SAU	AL-MADINAH	24.55	39.70	29.4	9.3	1.1	22	5
3	SAU	AL-QAISUMAH	28.32	46.13	26.8	12.0	1.3	19	-3
3	SAU	AL-TAIF	21.48	40.55	24.8	7.0	0.9	19	9
3	SAU	AL-WEJH	26.20	36.48	26.6	5.1	1.2	28	23
3	SAU	ARAR	30.90	41.13	24.1	12.0	1.3	21	-9
3	SAU	BISHA	19.98	42.63	27.4	7.3	0.9	13	-10
3	SAU	DHAHRAN	26.27	50.17	28.1	10.0	1.0	21	13
3	SAU	GASSIM	26.30	43.77	26.3	11.0	1.1	21	10
3	SAU	GIZAN	16.88	42.58	32.0	4.2	0.7	25	29
3	SAU	GURIAT	31.40	37.28	21.6	10.2	0.9	22	3
3	SAU	HAIL	27.43	41.68	24.2	11.2	1.2	23	4

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	SAU	JEDDAH(KING-ABDUL)	21.70	39.18	29.8	5.0	0.5	26	8
3	SAU	KHAMIS-MUSHAIT	18.30	42.80	22.5	5.3	0.5	16	10
3	SAU	KING-KHALED-INTL-AP	24.93	46.72	27.1	10.7	1.2	18	4
3	SAU	MAKKAH	21.43	39.77	32.6	6.2	0.9	22	12
3	SAU	NAJRAN	17.62	44.42	27.3	7.2	0.7	10	-21
3	SAU	RAFHA	29.62	43.48	24.9	12.3	1.9	21	1
3	SAU	RIYADH-OBS(OAP)	24.70	46.73	27.9	10.6	1.0	19	2
3	SAU	SHARORAH	17.47	47.10	29.6	7.7	1.5	12	-2
3	SAU	TABUK	28.38	36.60	24.0	10.1	1.2	21	-4
3	SAU	TURAIF	31.68	38.73	20.9	11.0	1.0	24	-3
3	SAU	WADI-AL-DAWASSER-AP	20.50	45.25	29.5	9.1	1.0	14	4
3	SAU	YENBO	24.13	38.07	29.0	6.4	1.0	28	17
3	THA	ARANYAPRATHET	13.70	102.58	29.4	1.8	0.9	-17	-2
3	THA	BANGKOK	13.73	100.57	29.7	1.5	0.7	-21	8
3	THA	BHUMIBOL-DAM	17.25	99.02	29.4	2.9	1.8	-20	11
3	THA	CHAIYAPHUM	15.80	102.03	28.4	2.4	1.4	-22	-1
3	THA	CHANTHABURI	12.60	102.12	28.6	1.1	0.5	-27	18
3	THA	CHIANG-MAI	18.78	98.98	27.1	2.9	1.9	-14	8
3	THA	CHIANG-RAI	19.97	99.88	26.6	3.7	1.8	-6	6
3	THA	CHON-BURI	13.37	100.98	29.6	1.6	0.7	-22	3
3	THA	CHUMPHON	10.48	99.18	27.7	1.1	0.7	-39	13
3	THA	DON-MUANG	13.92	100.60	29.4	1.2	0.7	-27	11
3	THA	HAT-YAI	6.92	100.43	27.3	0.7	0.5	12	16
3	THA	HUA-HIN	12.58	99.95	28.8	1.6	0.7	-13	0
3	THA	KAM-PAENG-PHET	16.48	99.53	30.4	2.1	1.3	-11	9
3	THA	KANCHANABURI	14.02	99.53	29.5	2.2	1.6	-45	2
3	THA	KHLONG-YAI	11.77	102.88	28.5	0.0	0.5	9	30
3	THA	KHON-KAEN	16.43	102.83	28.3	2.5	1.3	-11	9
3	THA	KO-LANTA	7.53	99.05	29.0	0.8	0.1	-32	46
3	THA	KO-SAMUI	9.47	100.05	29.1	1.1	0.0	-46	44
3	THA	KO-SICHANG	13.17	100.80	29.4	1.7	0.7	-1	27
3	THA	LAMPANG	18.28	99.52	28.6	2.4	2.0	-11	11
3	THA	LAMPHUN	18.57	99.03	28.4	2.7	1.7	-11	11
3	THA	LOEI	17.45	101.73	27.2	2.7	1.2	-9	6
3	THA	LOP-BURI	14.80	100.62	30.0	1.7	1.5	-40	3
3	THA	MAE-HONG-SON	19.30	97.83	28.4	3.3	2.1	-4	15
3	THA	MAE-SARIANG	18.17	97.93	28.0	2.6	2.1	-6	14
3	THA	MAE-SOT	16.67	98.55	27.4	2.2	1.7	-24	8
3	THA	MUKDAHAN	16.53	104.72	27.9	3.0	1.4	-11	1
3	THA	NAKHON-PHANOM	17.42	104.78	28.1	3.5	1.8	-3	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	THA	NAKHON-RATCHASIMA	14.97	102.08	28.4	2.5	1.2	-23	-5
3	THA	NAKHON-SAWAN	15.80	100.17	29.7	2.2	1.2	-26	8
3	THA	NAKHON-SI-THAMMARAT	8.53	99.95	28.4	1.4	0.5	15	6
3	THA	NAN	18.77	100.77	29.4	3.5	1.8	-11	17
3	THA	NARATHIWAT	6.42	101.82	28.3	0.9	0.7	-16	28
3	THA	NONG-KHAI	17.87	102.72	28.5	3.3	1.5	-1	10
3	THA	PATTANI	6.78	101.15	27.5	0.7	0.1	2	22
3	THA	PHAYAO	19.13	99.90	28.1	3.8	2.0	-11	9
3	THA	PHETCHABUN	16.43	101.15	28.7	2.3	0.9	-15	2
3	THA	PHITSANULOK	16.78	100.27	29.2	2.3	1.5	-13	11
3	THA	PHRAE	18.17	100.17	28.5	2.7	1.5	-9	10
3	THA	PHUKET-AP	8.13	98.32	28.8	1.5	0.1	4	13
3	THA	PHUKET	7.88	98.40	28.9	0.6	0.7	-71	3
3	THA	PRACHIN-BURI	14.05	101.37	30.0	1.7	0.8	-15	-4
3	THA	PRACHUAP-KHIRIKHAN	11.82	99.82	28.3	1.6	0.8	-20	17
3	THA	RANONG	9.98	98.62	28.6	1.2	0.7	-56	20
3	THA	ROI-ET	16.05	103.68	28.2	2.7	1.2	-10	8
3	THA	SAKON-NAKHON	17.15	104.13	27.9	3.3	1.5	-2	11
3	THA	SATTAHIP	12.68	100.98	28.8	1.4	0.5	-16	12
3	THA	SONGKHLA	7.20	100.62	28.0	0.8	0.4	-13	33
3	THA	SUPHAN-BURI	14.47	100.13	29.7	1.9	1.2	-25	15
3	THA	SURAT-THANI	9.12	99.15	27.7	0.8	0.6	0	16
3	THA	SURIN	14.88	103.50	28.3	2.1	1.3	-24	3
3	THA	TAK	16.88	99.15	29.8	2.4	1.8	-32	8
3	THA	THA-TUM	15.32	103.68	29.2	3.0	1.1	-25	3
3	THA	THONG-PHA-PHUM	14.75	98.63	29.1	2.3	1.3	-38	2
3	THA	TRANG	7.52	99.62	28.0	0.9	0.5	-58	20
3	THA	UBON-RATCHATHANI	15.25	104.87	28.2	1.9	1.2	-28	7
3	THA	UDON-THANI	17.38	102.80	28.2	3.3	1.5	-12	-3
3	THA	UTTARADIT	17.62	100.10	29.7	2.6	1.9	-20	12
3	TJK	DUSHANBE	38.55	68.78	18.9	12.9	0.8	18	-16
3	TKM	ASHGABAT-KESHI	37.92	58.33	19.0	13.8	-0.1	17	10
3	TKM	BAJRAMALY	37.60	62.18	19.9	14.2	0.4	13	14
3	TKM	BAKHERDEN	38.43	57.42	19.9	14.8	0.2	17	5
3	TKM	BYRDALYK	38.47	64.37	19.5	13.5	0.0	12	11
3	TKM	CARSANGA	37.52	66.02	20.9	13.4	-0.2	16	3
3	TKM	CHARDZHEV	39.08	63.60	18.2	14.0	0.2	12	2
3	TKM	DASHKHOVUZ	41.75	59.82	15.8	15.9	-0.1	17	11
3	TKM	EKEZHE	41.03	57.77	17.0	16.9	0.3	15	6
3	TKM	ERBENT	39.32	58.60	20.1	15.7	0.6	11	-20

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	TKM	GAZANDZHYK	39.25	55.52	19.2	14.5	0.0	17	9
3	TKM	GYSHGY	35.28	62.35	18.5	12.7	-1.0	18	-21
3	TKM	GYZYLARBAT	38.98	56.28	18.9	14.9	-0.2	17	15
3	TKM	KERKI	37.83	65.20	20.3	13.1	-0.1	15	7
3	TKM	SARAGT	36.53	61.22	20.5	13.0	0.0	15	5
3	TKM	TEDZHEN	37.38	60.52	20.0	13.8	0.1	15	6
3	TKM	TURKMENBASHI	40.05	53.00	17.4	13.3	0.2	22	2
3	TKM	UCHADZHY	38.08	62.80	20.3	14.8	0.0	14	0
3	TWN	CHENG-KUNG	23.10	121.37	24.5	4.7	0.0	32	-14
3	TWN	CHIANG-KAI-SHEK	25.08	121.22	22.9	6.4	-0.1	31	-7
3	TWN	CHIAYI	23.50	120.45	23.6	5.9	0.8	28	28
3	TWN	CHILUNG	25.15	121.80	23.4	6.4	0.0	31	-4
3	TWN	CHINMEM-SHATOU(AFB)	24.43	118.37	21.8	7.5	-0.3	37	-45
3	TWN	DAWU	22.35	120.90	25.6	4.2	0.5	24	6
3	TWN	DONGSHA-DAO	20.67	116.72	26.2	4.0	0.5	24	21
3	TWN	HENGCHUN	22.00	120.75	25.8	3.6	0.6	25	18
3	TWN	HSINCHU-CITY	24.83	120.93	22.8	6.7	0.0	33	-20
3	TWN	HUA-LIEN-CITY	23.98	121.60	24.1	5.0	0.5	27	2
3	TWN	ILAN-CITY	24.75	121.78	23.0	5.8	0.2	26	5
3	TWN	JOYUTANG	23.88	120.85	21.9	4.5	0.8	21	24
3	TWN	KAOHSIUNG-INTL-AP	22.58	120.35	25.6	4.3	1.1	23	23
3	TWN	KAOHSIUNG	22.63	120.28	25.2	4.4	1.2	24	23
3	TWN	LAN-YU	22.03	121.55	23.3	3.7	0.5	31	16
3	TWN	MAZU	26.17	119.93	19.5	8.7	-0.3	39	-17
3	TWN	MOUNT-ALISAN	23.52	120.80	14.0	4.2	0.8	23	16
3	TWN	MOUNT-MORRISON	23.48	120.95	6.5	5.6	0.4	39	6
3	TWN	PENGHU-ISLANDS	23.50	119.50	23.6	6.0	0.5	33	13
3	TWN	PENGJIA-YU	25.63	122.07	22.5	6.4	0.4	32	-12
3	TWN	SUAO-MET-STATION	24.60	121.85	23.2	6.0	0.1	30	2
3	TWN	SUNGSHAN-TAIPEI	25.07	121.55	23.5	6.4	0.1	31	-6
3	TWN	TAIBEI	25.03	121.52	24.0	6.6	0.6	32	27
3	TWN	TAIDONG	22.75	121.15	25.1	4.6	0.5	27	10
3	TWN	TAINAN	23.00	120.22	24.9	5.3	0.9	29	26
3	TWN	TAIZHONG	24.15	120.68	24.5	5.4	1.1	29	24
3	TWN	WU-CHI-OBSERVATORY	24.25	120.52	23.3	6.3	0.8	30	27
3	UZB	AK-BAJTAL	43.15	64.33	15.2	17.6	-0.1	18	4
3	UZB	BUHARA	39.72	64.62	17.5	14.6	0.2	13	1
3	UZB	BUZAUBAJ	41.75	62.47	17.3	17.4	0.6	14	17
3	UZB	CHIMBAJ	42.95	59.82	14.7	17.2	-1.1	16	-19
3	UZB	DARGANATA	40.47	62.28	17.2	14.9	0.6	13	9

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	UZB	DZIZAK	40.12	67.83	17.8	13.9	0.3	15	1
3	UZB	FERGANA	40.37	71.75	17.4	14.2	0.6	16	-3
3	UZB	KARSHI	38.80	65.72	19.0	14.1	-0.4	14	12
3	UZB	KUNGRAD	43.08	58.93	14.5	16.5	-0.1	14	19
3	UZB	NAMANGAN	40.98	71.58	17.4	14.0	0.6	15	-14
3	UZB	NUKUS	42.45	59.62	15.1	16.9	0.2	16	11
3	UZB	NURATA	40.55	65.68	17.4	13.7	-0.3	14	0
3	UZB	PSKEM	41.90	70.37	12.9	14.6	1.0	18	25
3	UZB	SAMARKAND	39.57	66.95	16.6	12.8	0.0	15	14
3	UZB	SYR-DARJA	40.82	68.68	17.1	14.6	0.7	12	21
3	UZB	TAMDY	41.73	64.62	17.1	16.0	0.6	13	23
3	UZB	TASHKENT	41.27	69.27	17.4	13.6	-0.1	15	4
3	UZB	TERMEZ	37.23	67.27	20.0	13.5	0.5	14	-6
3	UZB	URGENCH	41.57	60.57	15.9	15.7	0.6	13	16
3	VNM	BACH-LONG-VI	20.13	107.72	24.5	5.3	0.0	30	-6
3	VNM	CA-MAU	9.18	105.15	27.8	0.8	0.8	-13	15
3	VNM	CAO-BANG	22.67	106.25	22.9	5.8	1.2	19	20
3	VNM	CON-SON	8.68	106.60	28.3	1.3	0.7	-11	19
3	VNM	DA-NANG	16.07	108.35	26.6	3.8	0.5	16	25
3	VNM	DONG-HOI	17.48	106.60	25.7	5.1	0.6	18	22
3	VNM	HA-NOI	21.03	105.80	24.8	6.2	1.0	27	29
3	VNM	HUE	16.43	107.58	26.0	4.6	0.7	12	23
3	VNM	LANG-SON	21.83	106.77	22.4	6.3	1.2	22	21
3	VNM	LAO-CAI	22.50	103.97	25.3	5.8	1.3	19	15
3	VNM	NAM-DINH	20.43	106.15	24.4	6.0	1.0	25	19
3	VNM	NHA-TRANG	12.22	109.22	27.7	2.8	0.2	13	6
3	VNM	PHAN-THIET	10.93	108.10	28.1	1.3	0.5	-8	6
3	VNM	PHU-LIEN	20.80	106.63	24.5	5.7	0.8	26	28
3	VNM	PHU-QUOC	10.22	103.97	28.3	0.9	0.7	-25	14
3	VNM	QUY-NHON	13.77	109.22	28.2	3.5	0.5	11	4
3	VNM	TAN-SON-HOA	10.82	106.67	28.5	1.2	0.6	-36	14
3	VNM	THANH-HOA	19.75	105.78	25.2	5.6	0.5	22	16
3	VNM	TRUONG-SA	8.65	111.92	28.1	1.1	0.2	14	16
3	VNM	VINH	18.67	105.68	25.1	5.8	0.6	21	20
4	ARM	YEREVAN-YEREVAN-ARA	40.13	44.47	14.2	14.4	1.2	26	14
4	AUT	AIGEN-IM-ENNSTAL	47.53	14.13	9.0	10.3	0.4	22	-14
4	AUT	BREGENZ	47.50	9.75	11.3	9.1	-0.5	18	41
4	AUT	EISENSTADT	47.85	16.53	11.5	9.9	-0.1	20	16
4	AUT	FEUERKOGEL	47.82	13.72	5.5	7.4	-1.5	31	20
4	AUT	GRAZ-THALERHOF-FLUG	47.00	15.43	11.1	11.5	0.7	19	8

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	AUT	INNSBRUCK-FLUGHAFEN	47.27	11.35	10.5	9.9	0.4	17	11
4	AUT	KLAGENFURT-FLUGHAFE	46.65	14.33	10.3	11.5	0.5	20	11
4	AUT	KUFSTEIN	47.58	12.17	9.7	9.8	0.0	18	13
4	AUT	LIENZ	46.83	12.82	9.0	11.2	0.3	22	8
4	AUT	LINZ-HOERSCHING-FLU	48.23	14.18	10.7	10.0	0.1	20	9
4	AUT	MARIAZELL	47.77	15.32	8.6	10.1	-0.1	23	5
4	AUT	PATSCHERKOFEL	47.22	11.47	1.3	5.6	-0.2	49	2
4	AUT	PREITENEGG	46.93	14.92	7.9	9.7	-0.3	25	8
4	AUT	SALZBURG-FLUGHAFEN	47.80	13.00	10.9	9.4	0.1	19	11
4	AUT	SONNBLICK	47.05	12.95	-3.2	6.2	-0.9	49	-38
4	AUT	ST-POELTEN	48.18	15.62	10.7	10.2	-0.1	20	11
4	AUT	TULLN	48.32	16.12	11.4	9.7	-0.4	18	17
4	AUT	VILLACHERALPE	46.60	13.67	2.0	5.9	-1.5	46	45
4	AUT	WIEN-HOHE-WARTE	48.25	16.37	12.1	9.7	-0.9	20	43
4	AUT	WIEN-SCHWECHAT-FLUG	48.12	16.57	11.8	9.9	-0.1	21	8
4	AUT	ZELTWEG	47.20	14.75	9.1	10.7	0.4	21	6
4	AZE	LANKARAN	38.73	48.83	17.2	11.8	0.2	24	-3
4	AZE	ZAKATALA	41.67	46.65	14.9	11.0	0.8	22	-32
4	BEL	ANTWERPEN-DEURNE	51.20	4.47	11.9	6.9	-0.6	20	28
4	BEL	BEAUVECHAIN	50.75	4.77	11.4	7.2	-0.2	22	8
4	BEL	BIERSET	50.65	5.45	11.3	7.2	0.1	20	6
4	BEL	BRASSCHAAT	51.33	4.50	11.4	7.4	-0.7	19	44
4	BEL	BRUXELLES-NATIONAL	50.90	4.53	11.6	6.9	-0.3	21	9
4	BEL	CHARLEROI-GOSSELIES	50.47	4.45	11.3	7.3	-0.7	20	46
4	BEL	CHIEVRES	50.57	3.83	11.3	7.1	0.5	23	-30
4	BEL	ELSENBORN	50.47	6.18	8.4	7.7	-0.6	22	26
4	BEL	FLORENNES	50.23	4.65	10.6	6.9	-0.2	23	13
4	BEL	GENK	50.93	5.50	12.2	7.5	-0.1	22	10
4	BEL	GENT-INDUSTRIE-ZONE	51.18	3.82	12.5	6.8	-0.3	22	11
4	BEL	GOETSENHOVEN	50.78	4.95	11.5	7.5	-0.2	26	5
4	BEL	KLEINE-BROGEL	51.17	5.47	11.3	7.2	-0.7	17	42
4	BEL	KOKSIJDE	51.08	2.65	11.3	6.0	0.6	29	-27
4	BEL	OOSTENDE(AP)	51.20	2.87	11.4	6.2	0.0	28	9
4	BEL	SCHAFFEN	51.00	5.07	11.5	7.8	0.6	23	0
4	BEL	SEMMERZAKE	50.93	3.67	11.7	7.3	0.0	25	7
4	BEL	SPA-LA-SAUVENIERE	50.48	5.92	9.7	7.6	-0.8	23	-3
4	BEL	ST-HUBERT	50.03	5.40	9.3	7.7	-0.2	23	6
4	BEL	ST-TRUIDEN(BAFB)	50.80	5.20	11.4	7.5	-0.2	25	4
4	BEL	UCCLE	50.80	4.35	11.5	7.3	-0.8	22	53
4	BGR	BOTEV-VRAH(TOP-SOM)	42.67	24.83	1.4	5.9	1.0	49	-30

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	BGR	BURGAS	42.48	27.48	13.7	10.1	-0.5	26	45
4	BGR	KURDJALI	41.65	25.37	14.2	10.6	1.0	23	-28
4	BGR	LOM	43.82	23.25	14.1	12.0	-0.1	19	12
4	BGR	MUSSALA(TOP-SOMMET)	42.18	23.58	-0.5	4.9	-0.8	41	7
4	BGR	PLEVEN	43.42	24.60	13.5	11.7	0.8	21	-14
4	BGR	PLOVDIV	42.13	24.75	14.4	11.2	0.7	22	-24
4	BGR	ROUSSE	43.85	25.95	13.9	11.9	0.5	21	-10
4	BGR	SANDANSKI	41.52	23.27	16.1	11.3	0.9	22	-17
4	BGR	SLIVEN	42.67	26.32	14.2	10.7	0.6	24	-22
4	BGR	SOFIA(OBSERV)	42.65	23.38	12.3	11.2	0.5	22	7
4	BGR	VARNA	43.20	27.92	13.2	10.4	-0.1	26	8
4	BIH	BANJA-LUKA	44.78	17.22	12.9	10.0	0.1	19	8
4	BIH	MOSTAR	43.33	17.78	15.8	10.3	0.7	24	-14
4	BIH	SARAJEVO-BUTMIR	43.82	18.33	11.8	10.1	0.6	20	-7
4	BLR	BARANOVICHI	53.12	26.00	8.1	10.7	-0.9	25	-2
4	BLR	BOBRUISK	53.22	29.18	7.8	11.3	-1.4	24	-10
4	BLR	BREST	52.12	23.68	9.2	11.0	-1.1	22	-26
4	BLR	GOMEL	52.40	30.95	8.4	11.8	-1.3	23	-4
4	BLR	GRODNO	53.60	24.05	8.1	10.7	-1.4	25	1
4	BLR	KOSTUCKOVICHI	53.35	32.07	7.3	11.4	-1.2	26	7
4	BLR	LEPEL	54.88	28.70	7.6	11.1	-1.4	23	0
4	BLR	LIDA	53.85	25.32	7.8	10.8	-1.1	25	-1
4	BLR	LYNTUPY	55.05	26.32	6.9	10.2	-1.3	27	13
4	BLR	MINSK	53.93	27.63	7.4	11.1	-1.2	26	9
4	BLR	MOGILEV	53.95	30.07	7.1	11.2	-1.6	25	10
4	BLR	MOZYR	51.95	29.17	8.0	11.7	-0.8	24	6
4	BLR	ORSHA	54.50	30.42	7.0	10.9	-1.6	23	8
4	BLR	PINSK	52.12	26.12	9.1	11.1	-0.8	19	-21
4	BLR	SLUTSK	53.03	27.55	8.2	11.4	-1.0	23	-2
4	BLR	VERHNEDVINSK	55.82	27.95	7.3	11.0	-1.4	25	2
4	BLR	VITEBSK	55.17	30.22	7.6	11.1	-1.7	23	1
4	BLR	ZHITCKOVICHI	52.22	27.87	8.8	11.2	-1.1	23	-16
4	CHE	AIGLE	46.33	6.92	11.4	9.0	0.0	19	11
4	CHE	ALTDORF	46.87	8.63	11.5	8.6	0.0	19	16
4	CHE	CHUR-EMS	46.87	9.53	10.7	9.7	1.0	19	17
4	CHE	FAHY	47.43	6.95	10.4	8.3	-0.1	22	10
4	CHE	GENEVE-COINTRIN	46.25	6.13	11.7	9.1	0.3	21	5
4	CHE	GUETSCH	46.65	8.62	1.5	5.2	-1.3	50	47
4	CHE	JUNGFRAUJOCH	46.55	7.98	-4.7	6.6	-0.1	36	8
4	CHE	LOCARNO-MAGADINO	46.17	8.88	13.5	10.0	0.5	15	-16

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	CHE	LOCARNO-MONTI	46.17	8.78	14.0	9.4	0.2	19	5
4	CHE	PAYERNE	46.82	6.95	11.3	8.7	-1.0	20	45
4	CHE	PIOTTA	46.52	8.68	8.9	9.7	0.1	25	7
4	CHE	ROBBIA	46.35	10.07	8.7	9.5	0.3	23	-12
4	CHE	SAENTIS	47.25	9.35	1.1	4.1	0.9	50	-38
4	CHE	SAN-BERNARDINO	46.47	9.18	5.3	8.3	-1.5	33	22
4	CHE	SION	46.22	7.33	11.8	10.0	0.6	16	-16
4	CHE	ST-GALLEN	47.43	9.40	9.8	8.5	0.1	23	11
4	CHE	WYNAU	47.25	7.78	10.6	8.9	0.0	19	16
4	CHE	ZUERICH-METEOSCHWEI	47.38	8.57	10.8	9.3	-1.0	19	52
4	CHE	ZURICH-KLOTEN	47.48	8.53	10.9	9.2	-0.3	17	10
4	CPV	SAL	16.73	-22.95	25.0	2.9	1.2	55	1
4	CYP	AKROTIRI	34.58	32.98	21.7	8.0	0.4	30	-4
4	CYP	LARNACA-AP	34.88	33.63	21.6	8.6	0.6	30	-4
4	CYP	PAPHOS-AP	34.72	32.48	21.3	7.8	0.1	32	0
4	CZE	BRNO-TURANY	49.15	16.70	10.4	9.8	0.2	19	12
4	CZE	CERVENA	49.77	17.55	7.6	10.3	-0.9	23	6
4	CZE	CESKE-BUDEJOVICE	48.95	14.43	9.9	9.2	0.0	19	11
4	CZE	CHEB	50.08	12.40	8.9	9.3	-0.6	21	12
4	CZE	CHURANOV	49.07	13.62	6.4	8.2	-1.0	23	16
4	CZE	DOKSANY	50.47	14.17	10.9	9.7	0.0	18	13
4	CZE	DUKOVANY	49.10	16.13	10.2	9.4	-0.6	19	43
4	CZE	HOLESOV	49.32	17.57	10.8	9.8	-0.5	22	14
4	CZE	KARLOVY-VARY	50.20	12.92	8.5	9.1	-0.7	17	22
4	CZE	KOCELOVICE	49.47	13.83	9.3	9.4	-0.6	18	31
4	CZE	KOSTELNI-MYSLOVA	49.18	15.47	8.8	9.6	-0.4	22	9
4	CZE	KRESIN-KRAMOLIN	49.58	15.08	9.4	9.2	-0.7	21	39
4	CZE	KUCHAROVICE	48.88	16.08	10.5	9.6	0.0	19	7
4	CZE	LIBEREC	50.77	15.02	9.3	9.0	-0.1	20	10
4	CZE	LUKA	49.65	16.95	9.0	10.2	0.2	22	9
4	CZE	LYSA-HORA	49.55	18.45	5.1	7.9	-1.6	30	14
4	CZE	MILESOVKA	50.55	13.93	7.7	8.6	-0.5	21	28
4	CZE	OSTRAVA-MOSNOV	49.68	18.12	10.4	8.8	-0.1	22	5
4	CZE	PEC-POD-SNEZKOU	50.67	15.75	6.5	9.3	-1.3	25	9
4	CZE	PLZEN-LINE	49.17	13.27	9.9	8.9	-0.6	21	-2
4	CZE	PRADED-MOUNTAIN	50.07	17.23	2.7	6.7	-1.5	40	33
4	CZE	PRAHA-LIBUS	50.02	14.45	10.5	9.6	-0.2	19	15
4	CZE	PRAHA-RUZYNE	50.10	14.25	10.0	9.1	-0.6	20	30
4	CZE	PRIBYSLAV	49.58	15.77	8.9	9.3	0.1	23	10
4	CZE	PRIMDA	49.67	12.67	8.1	9.2	-0.1	19	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	CZE	SVRATOUCH	49.73	16.03	7.7	10.0	-0.7	24	-1
4	CZE	TEMELIN	49.20	14.33	9.8	9.8	-0.8	19	23
4	CZE	TUSIMICE	50.38	13.33	10.4	9.6	-0.6	19	27
4	CZE	USTI-NAD-LABEM	50.68	14.03	10.0	9.7	-0.5	18	36
4	CZE	USTI-NAD-ORLICI	49.98	16.43	9.0	9.7	-0.1	23	9
4	DEU	ALTENSTADT	47.83	10.87	9.9	9.2	-0.5	21	28
4	DEU	ANGERMUENDE	53.02	14.00	9.9	8.7	-0.6	22	28
4	DEU	ARKONA(CAPE)	54.68	13.43	9.5	7.4	-0.7	30	19
4	DEU	ARTERN	51.38	11.30	10.1	8.9	-0.2	24	6
4	DEU	BERGEN	52.82	9.93	10.4	8.2	-1.0	22	36
4	DEU	BERLIN-SCHONEFELD	52.38	13.52	9.9	9.2	-0.2	22	8
4	DEU	BOIZENBURG(AUT)	53.38	10.72	9.7	8.7	-0.2	24	7
4	DEU	BOLTENHAGEN	54.00	11.20	9.8	7.7	-0.6	28	38
4	DEU	BREMEN	53.05	8.80	10.2	7.3	-0.1	22	8
4	DEU	BROCKEN(PEAK)	51.80	10.62	4.3	6.6	-1.1	33	27
4	DEU	BRUGGEN(RAF)	51.20	6.13	11.4	6.8	-0.6	22	33
4	DEU	BUECHEL	50.17	7.07	9.4	8.0	-1.0	21	35
4	DEU	BUECKEBURG	52.28	9.08	11.6	8.2	-0.2	21	10
4	DEU	CELLE	52.60	10.02	11.1	8.2	-1.0	20	40
4	DEU	COTTBUS	51.78	14.33	12.1	9.6	-1.0	23	14
4	DEU	DIEPHOLZ	52.58	8.35	10.9	7.9	-0.7	22	43
4	DEU	DOBERLUG-KIRCHHAIN	51.65	13.58	10.5	8.7	-0.3	24	6
4	DEU	DRESDEN-KLOTZSCHE	51.13	13.77	10.0	9.4	-0.4	22	33
4	DEU	ERFURT-BINDERSLEBN	50.98	10.97	9.4	8.9	0.0	24	10
4	DEU	FASSBERG	52.92	10.18	10.4	8.3	-0.5	21	28
4	DEU	FICHTELBERG-MTN	50.43	12.95	4.2	7.2	-1.3	34	30
4	DEU	FRANKFURT-MAIN-AP	50.05	8.60	11.3	8.4	-0.1	18	17
4	DEU	GARDELEGEN(AUT)	52.52	11.40	10.1	8.1	-0.6	22	8
4	DEU	GERA-LEUMNITZ	50.88	12.13	9.5	8.4	0.3	24	8
4	DEU	GLUECKSBURG-MEIERWI	54.83	9.50	10.1	7.3	-0.6	28	38
4	DEU	GOERLITZ	51.17	14.95	9.6	8.7	-0.5	23	43
4	DEU	GREIFSWALD	54.10	13.40	9.7	8.0	-0.6	25	19
4	DEU	GUETERSLOH	51.93	8.32	11.1	7.7	-0.6	17	34
4	DEU	HOHN	54.32	9.53	10.3	7.8	-0.2	25	9
4	DEU	HOLZDORF	51.77	13.17	10.6	9.0	-0.7	21	27
4	DEU	HOPSTEN	52.33	7.53	11.1	7.6	0.0	19	14
4	DEU	IDAR-OBERSTEIN	49.70	7.33	10.0	8.7	-0.1	19	13
4	DEU	INGOLSTADT	48.72	11.53	10.8	10.3	0.0	18	14
4	DEU	ITZEHOE	53.98	9.57	10.3	7.8	-0.5	26	18
4	DEU	JEVER	53.53	7.90	10.7	7.3	-0.9	26	37

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	DEU	KALKAR	51.73	6.27	11.7	7.8	-0.1	19	8
4	DEU	KARL-MARX-STADT	50.82	12.90	10.0	8.7	-0.4	26	9
4	DEU	KOLN-BONN(CIV-MIL)	50.87	7.17	11.0	7.6	-0.5	19	33
4	DEU	KUEMMERSBRUCK	49.43	11.90	10.0	9.5	0.0	18	13
4	DEU	LAAGE	53.92	12.28	10.4	8.2	-0.6	22	49
4	DEU	LAARBRUCH(RAF)	51.60	6.15	10.9	7.6	-0.7	26	18
4	DEU	LAHR	48.37	7.83	11.9	9.0	-0.1	15	13
4	DEU	LANDSBERG	48.07	10.90	10.0	8.8	-0.1	21	11
4	DEU	LAUPHEIM	48.22	9.92	10.2	8.8	0.0	19	14
4	DEU	LECHFELD	48.18	10.85	10.1	8.9	-0.3	21	15
4	DEU	LEINEFELDE(AUT)	51.38	10.32	8.9	8.5	0.1	26	8
4	DEU	LEIPZIG-SCHKEUDITZ	51.42	12.23	9.9	9.4	-0.1	24	10
4	DEU	LINDENBERG	52.22	14.12	10.1	9.2	-0.5	21	6
4	DEU	LUEDENSCHEID	51.25	7.65	9.7	7.9	0.0	20	11
4	DEU	MAGDEBURG	52.12	11.58	10.2	8.4	-0.6	23	-4
4	DEU	MARNITZ(AUT)	53.32	11.93	9.5	8.7	-0.2	26	8
4	DEU	MEININGEN	50.55	10.37	8.4	9.3	0.1	27	12
4	DEU	MENDIG	50.37	7.32	11.0	8.8	-1.0	17	43
4	DEU	MEPPEN	52.73	7.33	12.0	7.7	-0.4	20	21
4	DEU	MESSSTETTEN	48.18	9.00	8.2	8.5	-0.8	21	16
4	DEU	MUNICH-RIEM	48.13	11.70	10.1	8.9	0.0	18	10
4	DEU	NEUBRANDENBURG	53.60	13.32	9.3	8.5	-0.1	24	11
4	DEU	NEUBURG-DONAU	48.72	11.22	10.3	9.7	-0.2	18	13
4	DEU	NEURUPPIN	52.90	12.82	9.9	8.8	-0.3	25	11
4	DEU	NIEDERSTETTEN	49.38	9.97	10.2	8.6	-0.1	21	12
4	DEU	NOERVENICH	50.83	6.67	11.9	8.3	-0.2	18	16
4	DEU	NORDHOLZ	53.77	8.67	10.6	7.4	-1.0	27	43
4	DEU	NUERBURG-BARWEILER	50.37	6.87	9.6	8.1	0.5	21	-19
4	DEU	OLDENBURG	53.18	8.17	10.8	7.7	0.1	23	9
4	DEU	OSCHATZ	51.30	13.10	10.9	8.5	0.0	20	9
4	DEU	PLAUEN(AUT)	50.50	12.15	9.2	9.1	0.1	26	6
4	DEU	POTSDAM	52.38	13.07	10.2	9.2	-0.2	24	7
4	DEU	RHEINE-BENTLAGE	52.30	7.38	11.0	7.6	-0.5	20	46
4	DEU	ROTH	49.22	11.10	10.3	8.9	-0.2	19	10
4	DEU	SCHLESWIG-JAGEL	54.47	9.52	10.2	7.8	-0.2	25	9
4	DEU	SCHMUECKE(RIDGE)	50.65	10.77	6.0	8.4	-0.6	33	15
4	DEU	SCHWERIN	53.63	11.42	9.9	8.5	0.3	20	10
4	DEU	SEEHAUSEN-ALTMARK	52.90	11.73	9.7	8.9	-0.5	25	9
4	DEU	SONNEBERG-NEUFANG	50.38	11.18	7.5	9.4	-0.7	25	20
4	DEU	STRAUBING	48.83	12.57	9.7	9.8	-0.1	18	12

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	DEU	TETEROW	53.77	12.62	9.3	8.4	-0.2	23	7
4	DEU	TROLLENHAGEN	53.60	13.32	10.3	8.9	0.1	22	4
4	DEU	UECKERMUENDE(AUT)	53.75	14.07	10.4	8.1	-0.2	24	9
4	DEU	WARNEMUENDE	54.18	12.08	9.8	7.7	-0.6	28	22
4	DEU	WERNIGERODE(AUT)	51.85	10.77	10.2	8.4	-0.7	28	37
4	DEU	WIESENBURG	52.12	12.47	9.9	8.6	-0.6	18	10
4	DEU	WITTENBERG	51.88	12.65	10.2	9.2	-0.6	20	7
4	DEU	WITTMUNDHAVEN	53.55	7.67	10.9	7.2	0.1	25	-6
4	DEU	WUNSTORF	52.47	9.43	11.4	7.9	-0.6	23	33
4	DEU	ZINNWALD-GEORGENFE	50.73	13.75	6.2	8.1	-1.0	30	10
4	DNK	AALBORG	57.10	9.85	9.4	7.5	-0.7	28	21
4	DNK	BILLUND	55.73	9.17	9.3	7.5	-0.6	26	13
4	DNK	CHRISTIANSO(LGT-H)	55.32	15.18	9.5	7.8	-1.0	39	30
4	DNK	ESBJERG	55.53	8.57	10.1	7.0	-0.3	27	19
4	DNK	FORNAES(CAPE)	56.45	10.97	9.5	7.4	-0.5	34	22
4	DNK	HAMMER-ODDE	55.30	14.78	9.7	7.8	-1.0	34	30
4	DNK	HOLBAEK	55.73	11.60	9.9	8.2	-0.6	28	44
4	DNK	HVIDE-SANDE	56.00	8.13	10.8	7.6	-0.8	34	42
4	DNK	KARUP	56.30	9.12	9.5	7.6	-0.7	26	17
4	DNK	KEGNAES	54.85	9.98	10.2	7.5	-0.4	31	26
4	DNK	KOEBENHAVN-KASTRUP	55.62	12.65	9.9	7.7	-0.5	28	6
4	DNK	ODENSE-BELDRINGE	55.48	10.33	10.0	7.6	-0.8	25	24
4	DNK	ROENNE	55.07	14.75	10.3	7.8	-1.0	31	29
4	DNK	ROSKILDE-TUNE	55.58	12.13	9.4	7.9	-0.7	28	25
4	DNK	SKAGEN	57.73	10.63	9.8	7.0	-1.3	33	32
4	DNK	SKRYDSTRUP	55.23	9.27	9.4	7.3	-0.7	28	12
4	DNK	THYBOROEN	56.70	8.22	10.5	6.7	-0.8	38	30
4	DNK	TIRSTRUP	56.32	10.63	9.2	8.0	-0.3	27	3
4	DNK	VAERLOESE	55.77	12.33	9.4	7.9	-1.1	23	40
4	ESP	ALBACETE-LOS-LLANOS	38.95	-1.85	16.6	10.8	0.0	22	11
4	ESP	ALICANTE-EL-ALTET	38.28	-0.55	20.3	8.0	0.8	28	-34
4	ESP	ALMERIA-AP	36.85	-2.38	20.7	7.6	1.0	28	-32
4	ESP	ASTURIAS-AVILES	43.55	-6.03	14.6	4.7	0.5	35	-32
4	ESP	BADAJOZ-TALAVERA-LA	38.88	-6.83	19.0	9.8	1.4	19	-30
4	ESP	BARCELONA-AP	41.28	2.07	18.0	8.3	1.3	26	-31
4	ESP	BILBAO-SONDICA	43.30	-2.90	15.5	6.2	1.1	28	-15
4	ESP	CACERES	39.47	-6.33	18.5	9.6	1.5	21	-43
4	ESP	CIUDAD-REAL	38.98	-3.92	17.9	11.5	-1.9	20	47
4	ESP	CORDOBA-AP	37.85	-4.85	20.2	10.3	1.5	23	-35
4	ESP	GERONA-COSTA-BRAVA	41.90	2.77	15.7	8.2	1.1	28	-34

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	ESP	GRANADA-AP	37.18	-3.78	18.2	10.3	-0.1	21	10
4	ESP	IBIZA-ES-CODOLA	38.88	1.38	20.0	8.1	0.8	30	-31
4	ESP	JEREZ-DE-LA-FRONTER	36.75	-6.07	19.9	8.1	1.1	26	-38
4	ESP	LA-CORUNA	43.37	-8.42	16.2	5.3	0.7	27	-32
4	ESP	LEON-VIRGEN-DEL-CAM	42.58	-5.65	13.0	9.8	-0.1	20	9
4	ESP	LOGRONO-AGONCILLO	42.45	-2.33	14.9	8.2	1.0	26	-34
4	ESP	MADRID-BARAJAS-RS	40.45	-3.55	16.9	10.6	-1.5	22	48
4	ESP	MADRID-GETAFE	40.30	-3.72	16.9	10.2	-1.4	21	49
4	ESP	MALAGA-AP	36.67	-4.48	20.2	7.5	-1.0	26	53
4	ESP	MENORCA-MAHON	39.87	4.23	18.8	7.7	0.1	31	-12
4	ESP	MORON-DE-LA-FRONTER	37.15	-5.62	20.7	9.1	1.0	22	-30
4	ESP	MURCIA-ALCANTARILLA	37.95	-1.23	19.9	9.2	0.1	19	9
4	ESP	MURCIA-SAN-JAVIER	37.78	-0.80	20.1	8.0	1.0	27	-33
4	ESP	MURCIA	38.00	-1.17	20.9	9.0	0.9	24	-32
4	ESP	NAVACERRADA	40.78	-4.02	9.1	9.2	-2.1	28	30
4	ESP	OVIEDO	43.35	-5.87	14.7	6.5	0.6	27	-28
4	ESP	PALMA-DE-MALLORCA-S	39.55	2.73	18.8	8.9	-0.7	28	47
4	ESP	PAMPLONA-NOAIN	42.77	-1.63	13.6	7.9	1.4	26	-33
4	ESP	REUS-AP	41.15	1.17	17.8	8.9	0.1	26	1
4	ESP	ROTA-NAS	36.65	-6.35	19.7	7.3	0.0	22	15
4	ESP	SALAMANCA-MATACAN	40.95	-5.50	14.7	9.8	-0.1	22	3
4	ESP	SAN-SEBASTIAN-FUENT	43.35	-1.80	15.4	6.5	1.1	31	-16
4	ESP	SAN-SEBASTIAN-IGUEL	43.30	-2.03	14.2	5.4	0.5	34	-13
4	ESP	SANTANDER-PARAYAS	43.43	-3.82	14.6	5.1	0.1	31	4
4	ESP	SANTANDER	43.48	-3.80	15.6	4.5	-0.8	33	30
4	ESP	SANTIAGO-LABACOLLA	42.90	-8.43	14.6	6.8	-0.9	25	48
4	ESP	SEVILLA-SAN-PABLO	37.42	-5.90	20.9	9.2	0.9	21	-35
4	ESP	SORIA	41.77	-2.47	11.3	8.4	-1.5	27	50
4	ESP	TORTOSA	40.82	0.50	18.9	8.7	0.1	23	7
4	ESP	VALENCIA-AP	39.50	-0.47	19.8	8.6	-1.0	24	53
4	ESP	VALLADOLID-VILLANUB	41.72	-4.85	13.5	9.8	1.2	21	-33
4	ESP	VALLADOLID	41.65	-4.77	15.0	10.1	-1.5	21	49
4	ESP	VIGO-PEINADOR	42.23	-8.63	15.5	6.2	0.0	22	6
4	ESP	VITORIA	42.88	-2.72	12.6	7.0	0.7	27	-37
4	ESP	ZARAGOZA-AP	41.67	-1.00	16.9	10.2	0.1	20	7
4	EST	PJARNU	58.37	24.50	7.6	10.5	-0.9	26	10
4	EST	RISTNA	58.92	22.07	7.6	9.3	-0.9	33	8
4	EST	TALLINN	59.47	24.82	6.8	10.0	-1.2	29	11
4	EST	TARTU	58.30	26.73	7.0	10.5	-1.5	26	8
4	EST	VALKE-MAARJA	59.13	26.23	6.2	10.1	-1.8	29	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	FIN	AHTARI	62.53	24.02	4.7	9.9	-2.3	31	21
4	FIN	BAGASKAR	59.93	24.02	6.4	9.8	-1.9	38	19
4	FIN	HALLI	61.85	24.80	5.3	10.0	-2.4	34	16
4	FIN	HELSINKI-VANTAA	60.32	24.97	6.8	10.1	-1.5	30	12
4	FIN	ILOMANTSI	62.68	30.95	4.0	10.0	-2.2	32	23
4	FIN	ISOSAARI	60.10	25.07	6.8	10.1	-1.6	37	16
4	FIN	IVALO	68.62	27.42	1.6	8.5	-1.4	33	22
4	FIN	JOENSUU	62.67	29.63	4.7	10.1	-2.6	34	22
4	FIN	JOKIOINEN	60.82	23.50	5.6	9.8	-2.1	31	21
4	FIN	JYVASKYLA	62.40	25.68	4.9	9.7	-2.5	32	18
4	FIN	KAJAANI	64.28	27.68	3.9	9.5	-1.8	33	23
4	FIN	KAUHAVA	63.10	23.03	5.3	9.7	-2.3	31	15
4	FIN	KEMI	65.78	24.58	3.6	9.4	-2.1	37	24
4	FIN	KEVO	69.75	27.03	0.7	7.7	-1.3	36	24
4	FIN	KUOPIO	63.02	27.80	5.4	10.4	-2.8	30	16
4	FIN	KUUSAMO	65.97	29.18	1.9	8.5	-1.8	34	29
4	FIN	LAHTI	60.97	25.63	5.9	10.0	-2.5	29	16
4	FIN	LAPPEENRANTA	61.05	28.20	5.8	10.1	-2.5	28	14
4	FIN	MARIEHAMN-ALAND-ISL	60.12	19.90	7.2	8.9	-1.4	30	4
4	FIN	MIKKELI	61.73	27.30	5.7	10.5	-2.5	30	14
4	FIN	MUONIO	67.97	23.68	1.1	8.1	-1.5	35	21
4	FIN	NIINISALO	61.85	22.47	5.3	10.1	-2.1	33	15
4	FIN	NIVALA	63.92	24.97	4.3	9.9	-2.1	32	15
4	FIN	OULU	64.93	25.37	4.4	9.8	-2.5	33	24
4	FIN	PELLO	66.80	24.00	2.4	9.2	-2.1	31	25
4	FIN	PORI	61.47	21.80	6.2	9.9	-2.3	29	17
4	FIN	PUDASJARVI	65.37	27.02	3.3	9.7	-1.9	34	30
4	FIN	RANKKI	60.37	26.97	6.3	10.3	-1.9	40	22
4	FIN	ROVANIEMI	66.57	25.83	2.9	9.1	-1.8	34	32
4	FIN	RUSSARO	59.77	22.95	7.3	9.3	-1.1	34	20
4	FIN	SALLA	66.82	28.67	1.2	8.0	-1.1	32	30
4	FIN	SODANKYLA	67.37	26.65	1.5	8.9	-1.3	33	23
4	FIN	SUOMUSSALMI	64.90	29.02	2.5	9.1	-1.8	33	31
4	FIN	TAMPERE-PIRKKALA	61.42	23.58	5.5	9.9	-2.2	33	18
4	FIN	TURKU	60.52	22.27	6.5	10.2	-2.0	32	17
4	FIN	UTO	59.78	21.38	8.0	8.3	-1.6	40	16
4	FIN	UTTI	60.90	26.93	5.7	10.3	-2.4	31	16
4	FIN	VAASA-AP	63.05	21.77	5.7	9.8	-2.1	34	14
4	FIN	VALASSAARET	63.43	21.07	4.9	9.0	-2.3	42	27
4	FIN	VIITASAARI	63.08	25.87	5.5	10.1	-2.6	32	18

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	FRA	ABBEVILLE	50.13	1.83	11.3	6.5	-0.3	28	19
4	FRA	AGEN	44.18	0.60	14.6	7.6	-0.8	23	40
4	FRA	AJACCIO	41.92	8.80	17.5	8.1	0.1	28	3
4	FRA	ALENCON	48.43	0.10	11.8	6.9	-0.7	25	43
4	FRA	BALE-MULHOUSE	47.60	7.52	11.6	8.9	0.0	21	12
4	FRA	BASTIA	42.55	9.48	18.1	8.6	-0.8	26	39
4	FRA	BEAUVAIS	49.47	2.12	11.7	7.1	-0.1	24	10
4	FRA	BELLE-IIE-LE-TALUT	47.30	-3.17	13.7	5.0	-0.5	37	23
4	FRA	BIARRITZ	43.47	-1.53	14.7	6.4	0.6	32	-22
4	FRA	BORDEAUX-MERIGNAC	44.83	-0.68	14.4	7.1	-0.8	26	50
4	FRA	BOULOGNE	50.73	1.60	11.7	6.1	0.0	29	3
4	FRA	BOURG-ST-MAURICE	45.62	6.77	10.4	10.3	0.5	20	5
4	FRA	BOURGES	47.07	2.37	13.1	8.0	-0.6	22	22
4	FRA	BREST	48.45	-4.42	12.1	5.1	0.5	34	-32
4	FRA	CAEN-CARPIQUET	49.18	-0.45	12.1	6.3	0.0	28	10
4	FRA	CALVI	42.53	8.80	17.8	8.5	-0.6	27	41
4	FRA	CAMBRAI	50.22	3.15	11.4	7.6	0.0	24	4
4	FRA	CAP-BEAR	42.52	3.13	17.0	7.5	-1.1	26	37
4	FRA	CAP-CEPET	43.08	5.93	16.9	8.3	-1.0	26	40
4	FRA	CAP-CORSE	43.00	9.37	18.5	8.1	0.0	30	-5
4	FRA	CAP-DE-LA-HEVE	49.50	0.07	12.1	6.1	0.1	31	5
4	FRA	CAP-PERTUSATO	41.37	9.17	17.7	7.5	-0.6	32	34
4	FRA	CAZAUX	44.53	-1.13	14.2	7.0	-0.3	25	16
4	FRA	CHAMBERY-AIX-LES-BA	45.63	5.87	12.4	9.4	0.1	18	14
4	FRA	CHASSIRON	46.05	-1.42	14.4	6.0	0.0	32	10
4	FRA	CLERMONT-FERRAND	45.78	3.17	12.7	7.9	-0.9	25	40
4	FRA	COGNAC	45.67	-0.32	14.1	7.9	0.7	26	-16
4	FRA	DIEPPE	49.93	1.10	12.0	5.9	-0.5	34	37
4	FRA	DIJON	47.27	5.08	12.3	8.4	-0.6	24	25
4	FRA	DINARD	48.58	-2.07	12.8	6.3	-0.9	28	48
4	FRA	DUNKERQUE	51.05	2.33	11.9	6.3	0.1	31	0
4	FRA	GRENOBLE-ST-GEOIRS	45.37	5.33	12.4	9.0	0.1	24	10
4	FRA	GROUIN-DE-CANCALE	48.72	-1.85	12.4	5.8	0.1	37	20
4	FRA	HYERES	43.10	6.15	17.5	8.5	-0.6	25	40
4	FRA	ISTRES	43.52	4.92	16.4	9.6	0.3	22	3
4	FRA	L-IIE-D-YEU	46.70	-2.33	13.9	5.7	-0.2	36	5
4	FRA	LE-BOURGET	48.97	2.43	12.6	7.4	-0.6	25	27
4	FRA	LE-MANS	47.93	0.20	13.4	7.3	-0.4	25	37
4	FRA	LE-PUY	45.08	3.77	9.8	8.0	-1.1	22	45
4	FRA	LILLE-LESQUI	50.57	3.10	11.6	7.0	-0.6	22	39

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	FRA	LIMOGES	45.87	1.18	12.3	7.4	-0.9	26	42
4	FRA	LORIENT-LAN-BIHOUE	47.77	-3.45	12.6	5.9	-0.1	30	8
4	FRA	LUXEUIL	47.80	6.38	11.2	8.6	-0.8	19	56
4	FRA	LYON-BRON	45.72	4.93	13.5	8.9	0.1	25	2
4	FRA	LYON-SATOLAS	45.73	5.08	13.4	8.5	0.1	19	10
4	FRA	MACON	46.30	4.80	12.6	9.0	-0.1	21	2
4	FRA	MARIGNANE	43.45	5.23	17.0	9.2	0.0	20	0
4	FRA	MAUPERTUS	49.65	-1.48	11.7	5.3	-0.5	36	5
4	FRA	METZ-FRESCATY	49.08	6.13	11.4	8.0	-0.2	20	16
4	FRA	MEYENHEIM-COLMAR	47.92	7.40	11.9	8.9	-0.1	17	13
4	FRA	MONT-DE-MARSAN	43.92	-0.50	14.1	7.7	0.2	23	9
4	FRA	MONTELIMAR	44.58	4.73	14.8	8.9	1.0	24	-35
4	FRA	MONTPELLIER	43.58	3.97	16.7	9.2	0.0	22	4
4	FRA	NANCY-ESSEY	48.68	6.22	11.6	7.7	-0.7	20	13
4	FRA	NANTES	47.15	-1.60	13.4	6.7	-0.9	29	33
4	FRA	NICE	43.65	7.20	17.5	8.6	-1.0	24	46
4	FRA	NIMES-COURBESSAC	43.87	4.40	16.6	9.6	-0.8	19	44
4	FRA	NIMES-GARONS(NAVY)	43.75	4.42	16.5	9.4	-0.1	20	9
4	FRA	ORANGE	44.13	4.83	16.3	9.9	0.9	20	-37
4	FRA	ORLEANS	47.98	1.78	12.2	7.6	-0.3	25	10
4	FRA	OUESSANT	48.48	-5.05	13.2	3.9	-0.6	42	28
4	FRA	PARIS-ORLY	48.72	2.38	12.5	7.6	-0.5	25	23
4	FRA	PAU	43.38	-0.42	14.0	7.4	0.2	25	8
4	FRA	PERPIGNAN	42.73	2.87	16.4	7.6	-1.1	28	44
4	FRA	POITIERS	46.58	0.30	13.0	7.3	0.1	26	1
4	FRA	PTE-DE-LA-HAGUE	49.72	-1.93	12.6	4.8	-0.3	38	-20
4	FRA	PTE-DE-PENMARCH	47.80	-4.37	13.6	4.5	-0.4	41	-6
4	FRA	REIMS	49.30	4.03	11.7	7.3	-0.1	21	18
4	FRA	RENNES	48.07	-1.73	13.0	6.7	-0.8	28	36
4	FRA	ROUEN	49.38	1.18	11.3	6.7	-0.2	26	12
4	FRA	SAINT-DIZIER	48.63	4.90	12.6	7.8	-0.1	23	8
4	FRA	SAINT-GIRONS	43.00	1.10	13.2	7.8	0.8	23	-33
4	FRA	ST-ETIENNE-BOUTHEON	45.53	4.30	12.9	8.0	-0.1	23	13
4	FRA	STRASBOURG-ENTZHEIM	48.55	7.63	11.8	8.7	-0.8	17	43
4	FRA	TARBES-OSSUN	43.18	0.00	13.5	7.3	0.0	28	12
4	FRA	TOULOUSE-BLAGNAC	43.63	1.37	14.6	8.1	1.1	29	-33
4	FRA	TOURS	47.45	0.73	12.4	7.4	-0.6	24	18
4	FRA	VILLACOUBLAY	48.77	2.20	12.1	7.5	-0.7	23	26
4	FRO	TORSHAVN	62.02	-6.77	7.9	3.7	-0.6	43	29
4	GBR	ABERDEEN-DYCE-AP	57.20	-2.22	9.4	5.1	0.0	26	2

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	GBR	ABERPORTH	52.13	-4.57	10.7	4.6	-0.6	36	31
4	GBR	ASPATRIA	54.77	-3.32	9.9	5.6	-0.6	26	38
4	GBR	AUGHTON	53.55	-2.92	10.8	5.9	-0.7	32	40
4	GBR	AVIEMORE	57.20	-3.83	7.7	5.7	-0.1	22	12
4	GBR	BANGOR-HARBOUR	54.67	-5.67	11.7	4.6	-0.3	34	25
4	GBR	BELFAST-ALDERGROVE	54.65	-6.22	10.4	4.9	-0.5	26	14
4	GBR	BENBECULA-ISLAND	57.47	-7.37	10.3	4.3	-0.5	30	44
4	GBR	BENSON	51.62	-1.08	11.3	5.9	-0.7	29	25
4	GBR	BIRMINGHAM-AP	52.45	-1.73	11.0	6.0	-0.6	26	21
4	GBR	BLACKPOOL-AP	53.77	-3.03	11.2	5.6	-0.3	29	13
4	GBR	BOSCOMBE-DOWN	51.17	-1.75	11.0	5.7	-0.7	30	23
4	GBR	BOULMER	55.42	-1.60	9.5	5.0	-0.2	32	15
4	GBR	BOURNEMOUTH-HURN	50.78	-1.83	11.3	5.4	-0.7	33	21
4	GBR	BRACKNELL-BEAUFORT	51.38	-0.78	10.9	6.3	-0.6	23	20
4	GBR	BRIDLINGTON-MRSC	54.10	-0.17	10.6	5.4	-0.7	32	46
4	GBR	BRISTOL-WEA-CENTER	51.47	-2.60	12.1	5.7	-0.5	26	18
4	GBR	BRIZE-NORTON	51.75	-1.58	11.1	6.0	-0.1	26	8
4	GBR	BUTT-OF-LEWIS(LH)	58.52	-6.27	9.9	4.3	-0.5	37	30
4	GBR	CAMBORNE	50.22	-5.32	11.7	4.2	-0.8	37	33
4	GBR	CAPE-WRATH(LGT-H)	58.63	-5.00	9.0	3.8	-0.4	36	2
4	GBR	CARDIFF-WALES-AP	51.40	-3.35	11.4	5.2	-0.6	30	14
4	GBR	CARDIFF-WEATHER-CEN	51.48	-3.18	12.3	5.7	-0.2	27	16
4	GBR	CARMONEY	55.02	-7.23	10.2	5.0	-0.4	30	38
4	GBR	CARTERHOUSE	55.37	-2.52	9.0	5.7	-0.6	27	40
4	GBR	CHURCH-FENTON	53.83	-1.20	11.0	5.8	-0.7	29	31
4	GBR	CILFYNYDD	51.63	-3.30	10.7	6.0	-0.5	25	15
4	GBR	COLTISHALL	52.77	1.35	11.0	5.7	0.5	30	-20
4	GBR	CONINGSBY	53.08	-0.17	10.9	6.0	-0.5	26	40
4	GBR	CORGARY	54.43	-8.05	9.7	5.2	-0.6	29	32
4	GBR	COTTESMORE	52.73	-0.65	10.6	6.1	-0.1	30	16
4	GBR	CRANWELL	53.03	-0.50	10.8	6.2	-0.7	27	47
4	GBR	CULDROSE	50.08	-5.25	11.7	4.5	-0.5	40	27
4	GBR	DISFORTH-AIRFIELD	54.13	-1.42	10.6	5.9	-0.1	27	4
4	GBR	DUMFRIES-DRUNGANS	55.05	-3.65	10.3	5.5	-0.1	25	8
4	GBR	EDINBURGH-AP	55.95	-3.35	10.0	5.4	-0.1	28	-8
4	GBR	EMLEY-MOOR	53.62	-1.67	9.8	5.5	-0.7	27	15
4	GBR	ESKDALEMUIR	55.32	-3.20	8.3	5.4	0.0	29	14
4	GBR	EXETER-AP	50.73	-3.42	11.5	5.5	-0.4	30	30
4	GBR	FAIR-ISLE	59.53	-1.63	9.0	3.5	0.5	44	-41
4	GBR	FIFE-NESS	56.30	-2.58	10.3	4.7	-0.5	35	34

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	GBR	FOYERS	57.27	-4.48	9.2	5.2	0.0	26	-1
4	GBR	FYLINGDALES	54.37	-0.67	8.9	5.5	0.0	31	5
4	GBR	GLASGOW-AP	55.87	-4.43	10.0	5.4	-0.6	26	45
4	GBR	GLENLIVET	57.35	-3.35	9.0	6.1	-0.9	22	23
4	GBR	GREAT-MALVERN	52.12	-2.30	11.8	6.0	-0.6	23	33
4	GBR	GREENOCK-MRCC	55.97	-4.80	11.0	5.0	-0.5	31	19
4	GBR	HEMSBY	52.68	1.68	10.8	5.6	-0.8	31	46
4	GBR	HILLSBOROUGH	54.48	-6.10	10.3	4.8	-0.6	27	22
4	GBR	INVERGORDON-HARBOUR	57.68	-4.17	9.7	5.3	-0.6	30	39
4	GBR	INVERNESS-DALCROSS	57.53	-4.05	9.4	5.8	0.7	26	-30
4	GBR	KINLOSS	57.65	-3.57	9.8	4.9	-0.2	28	12
4	GBR	KIRKWALL-AP	58.95	-2.90	9.0	4.2	-0.3	36	30
4	GBR	LANGDON-BAY	51.13	1.35	11.0	5.7	0.0	36	6
4	GBR	LARKHILL	51.20	-1.80	11.1	5.9	-0.6	28	27
4	GBR	LARNE	54.85	-5.80	11.0	4.4	-0.3	36	38
4	GBR	LEEDS-WEATHER-CTR	53.80	-1.55	11.3	5.7	-0.9	23	37
4	GBR	LEEMING	54.30	-1.53	10.3	5.8	0.0	27	3
4	GBR	LERWICK	60.13	-1.18	8.3	4.0	-0.5	37	34
4	GBR	LEUCHARS	56.40	-2.87	9.8	5.3	0.1	29	7
4	GBR	LINTON-ON-OUSE	54.05	-1.25	10.6	6.2	-0.2	26	18
4	GBR	LOCHRANZA	55.70	-5.30	11.2	5.6	-0.5	25	15
4	GBR	LONDON-GATWICK-AP	51.15	-0.18	11.6	6.2	-0.6	24	16
4	GBR	LONDON-HEATHROW-AP	51.48	-0.45	12.3	6.4	-0.7	25	25
4	GBR	LONDON-WEATHER-CENT	51.52	-0.10	13.0	6.2	-0.1	27	7
4	GBR	LOSSIEMOUTH	57.72	-3.32	9.5	5.2	0.0	25	6
4	GBR	LYNEHAM	51.50	-1.98	10.9	5.8	-0.7	26	32
4	GBR	MACHRIHANISH	55.43	-5.70	10.4	4.9	-0.8	32	9
4	GBR	MADLEY	52.03	-2.85	11.0	5.7	-1.0	21	41
4	GBR	MANCHESTER-AP	53.35	-2.28	11.1	5.9	-0.5	27	28
4	GBR	MARHAM	52.65	0.57	11.1	6.4	-0.6	25	35
4	GBR	MIDDLE-WALLOP	51.15	-1.57	11.4	6.1	-0.6	29	37
4	GBR	MILFORD-HAVEN	51.70	-5.05	11.6	4.6	-0.6	34	33
4	GBR	MUMBLES	51.57	-3.98	11.7	5.2	-0.5	34	31
4	GBR	NEWHAVEN(LGT-H)	50.78	0.05	12.1	5.6	-0.5	34	29
4	GBR	NORTHOLT	51.55	-0.42	11.7	6.4	-0.8	25	31
4	GBR	NORWICH-WEA-CNTRE	52.63	1.32	11.4	6.2	-0.7	28	36
4	GBR	OBAN	56.42	-5.47	10.1	5.2	0.0	25	9
4	GBR	ODIHAM	51.23	-0.95	11.2	5.7	-0.6	27	38
4	GBR	ORSAY(LGT-H)	55.67	-6.50	10.8	4.3	0.1	37	0
4	GBR	PENDENNIS-POINT	50.15	-5.07	12.4	4.4	-0.5	36	44

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	GBR	PETERHEAD-HARBOUR	57.50	-1.77	10.0	4.4	-0.4	36	42
4	GBR	PORTLAND-HELIPORT	50.57	-2.45	12.6	5.2	-0.1	41	16
4	GBR	PRESTWICK(CIV-NAVY)	55.50	-4.58	10.4	5.1	-0.6	26	30
4	GBR	SALSBURGH	55.87	-3.87	8.9	5.9	-1.0	27	40
4	GBR	SHAWBURY	52.80	-2.67	10.3	5.9	-0.4	25	10
4	GBR	SHEERNESS	51.45	0.75	12.3	5.8	0.0	35	-1
4	GBR	SHOEBURYNESS	51.55	0.83	11.5	6.5	-0.6	32	29
4	GBR	SOLENT-MRSC	50.80	-1.22	12.4	5.9	-0.4	33	33
4	GBR	SOUTHAMPTON-WX-CNTR	50.90	-1.40	12.2	6.1	-0.5	26	41
4	GBR	ST-CATHERINES-POIN	50.58	-1.30	12.0	5.3	-0.6	36	34
4	GBR	ST-MAWGAN	50.43	-5.00	11.7	4.5	-0.7	37	27
4	GBR	STANSTED-AP	51.88	0.23	10.7	6.4	-0.1	27	7
4	GBR	STORNOWAY	58.22	-6.32	9.5	4.2	-0.5	34	42
4	GBR	SUMBURGH(CAPE)	59.88	-1.30	9.3	3.8	-0.4	43	41
4	GBR	TIREE	56.50	-6.88	10.2	3.9	-0.5	35	11
4	GBR	TYNEMOUTH	55.02	-1.42	10.3	4.8	0.1	36	7
4	GBR	VALLEY	53.25	-4.53	11.1	4.8	-0.4	36	31
4	GBR	WADDINGTON	53.17	-0.52	10.9	5.9	-0.7	27	32
4	GBR	WALTON-ON-NAZE	51.85	1.28	11.8	6.5	-0.5	32	32
4	GBR	WATTISHAM	52.12	0.97	10.8	5.9	-0.5	29	43
4	GBR	WICK	58.45	-3.08	8.7	4.6	0.4	34	-24
4	GBR	WITTERING	52.62	-0.47	10.8	6.0	0.0	26	5
4	GBR	WYTON(RAF)	52.35	-0.12	10.7	6.2	-0.5	29	12
4	GBR	YEOVILTON	51.00	-2.63	11.6	5.7	-0.5	30	15
4	GEO	TBILISI	41.68	44.95	14.2	11.3	0.0	25	5
4	GGY	GUERNSEY-AP	49.43	-2.60	12.1	4.5	-0.5	42	26
4	GIB	GIBRALTAR	36.15	-5.35	20.0	6.0	0.8	27	-35
4	GRC	AKTION(AP)	38.62	20.77	19.1	8.7	0.5	28	-39
4	GRC	ALEXANDROUPOLI(AP)	40.85	25.92	16.5	10.9	-0.4	22	29
4	GRC	ANDRAVIDA(AP)	37.92	21.28	19.1	9.0	-0.1	26	8
4	GRC	ATHINAI(AP)	37.90	23.73	20.0	9.5	-0.7	27	32
4	GRC	HERAKLION(AP)	35.33	25.18	20.4	7.8	-0.4	31	22
4	GRC	KASTORIA(AP)	40.45	21.28	15.1	11.9	0.7	23	-19
4	GRC	KERKYRA(AP)	39.62	19.92	19.7	9.2	-0.5	26	47
4	GRC	KYTHIRA	36.28	23.02	19.8	8.4	-0.6	30	20
4	GRC	LAMIA	38.90	22.40	18.2	10.3	-0.7	20	27
4	GRC	LARISSA(AP)	39.63	22.42	18.3	11.2	0.5	21	-4
4	GRC	LIMNOS(AP)	39.92	25.23	17.4	9.9	0.1	24	6
4	GRC	METHONI	36.83	21.70	20.0	7.9	0.4	31	-33
4	GRC	MILOS	36.72	24.45	19.4	8.5	-0.6	27	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	GRC	MYTILINI(AP)	39.07	26.60	19.6	9.5	-0.4	23	24
4	GRC	NAXOS	37.10	25.38	19.8	7.2	-0.4	29	19
4	GRC	RHODES(AP)	36.40	28.08	21.1	7.7	0.4	29	-18
4	GRC	SAMOS(AP)	37.70	26.92	20.3	9.3	-0.8	27	28
4	GRC	SKYROS(AP)	38.97	24.48	19.0	8.8	0.0	26	3
4	GRC	SOUDA(AP)	35.48	24.12	19.8	8.2	-0.2	27	3
4	GRC	SOUDA-BAY-CRETE	35.53	24.15	20.3	8.4	-0.4	26	8
4	GRC	THESSALONIKI(AP)	40.52	22.97	16.5	9.7	-0.4	28	10
4	GRC	TRIPOLIS(AP)	37.53	22.40	16.3	10.8	-0.9	25	40
4	GRL	DANMARKSHAVN	76.77	-18.67	-8.4	11.8	-1.6	36	22
4	GRL	KANGERLUSSUAQ(SDR)	67.02	-50.70	-2.1	9.3	-2.7	38	-13
4	GRL	NARSARSUAQ	61.13	-45.43	2.5	7.3	-1.2	37	25
4	GRL	NUUK(GODTHAAB)	64.17	-51.75	-0.4	4.2	-0.9	41	2
4	GRL	PITUFFIK(THULE-AB)	76.53	-68.75	-6.0	11.8	-2.9	48	-21
4	HUN	BAJA	46.18	19.02	11.8	10.9	0.1	20	9
4	HUN	BEKESCSABA	46.68	21.17	12.0	10.8	0.2	21	9
4	HUN	BUDAPEST-PESTSZENTL	47.43	19.18	12.2	11.0	0.7	20	-25
4	HUN	DEBRECEN	47.48	21.60	11.6	10.9	0.5	18	8
4	HUN	GYOR	47.72	17.68	12.0	10.2	-0.2	20	6
4	HUN	KECSKEMET	46.92	19.75	11.9	10.5	0.3	17	16
4	HUN	KEKESTETO	47.87	20.02	7.7	9.4	-0.8	23	19
4	HUN	KESZTHELY	46.73	17.23	12.1	10.3	-0.1	20	9
4	HUN	MISKOLC	48.10	20.77	11.5	10.9	0.5	17	-8
4	HUN	NAGYKANIZSA	46.45	16.97	11.1	10.8	0.3	20	4
4	HUN	NYIREGYHAZA-NAPKOR	47.97	21.88	11.4	10.6	-0.2	19	16
4	HUN	PAKS	46.58	18.85	12.2	11.2	0.2	20	9
4	HUN	PAPA	47.20	17.50	12.0	9.9	-0.1	20	14
4	HUN	PECS-POGANY	46.00	18.23	12.2	10.4	0.2	22	5
4	HUN	SIOFOK	46.92	18.05	12.6	10.7	-0.1	21	13
4	HUN	SOPRON	47.68	16.60	11.4	9.9	0.0	20	6
4	HUN	SZEGED	46.25	20.10	12.5	10.3	0.5	20	-5
4	HUN	SZENTGOTTHARD-FARKA	46.92	16.32	11.1	9.7	0.1	20	8
4	HUN	SZOLNOK	47.12	20.23	12.3	10.6	-0.7	20	46
4	HUN	SZOMBATHELY	47.27	16.63	11.4	10.1	0.3	20	6
4	HUN	VESZPREM-SZENTKIRAL	47.07	17.83	11.1	10.2	0.0	20	10
4	IMN	ISLE-OF-MAN-RONALDS	54.08	-4.63	11.0	4.4	-0.3	39	0
4	IRL	BELMULLET	54.23	-10.00	11.4	4.0	-0.3	34	33
4	IRL	BIRR	53.08	-7.88	10.9	5.0	-0.6	25	23
4	IRL	CASEMENT-AERODROME	53.30	-6.43	10.8	5.0	-0.5	27	23
4	IRL	CLONES	54.18	-7.23	10.2	5.3	-0.5	29	47

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	IRL	CORK-AP	51.85	-8.48	10.9	4.5	-0.3	32	47
4	IRL	DUBLIN-AP	53.43	-6.25	10.6	4.8	-0.4	29	33
4	IRL	KILKENNY	52.67	-7.27	10.7	5.3	-0.6	26	34
4	IRL	MALIN-HEAD	55.37	-7.33	10.6	4.1	0.6	37	-41
4	IRL	MULLINGAR	53.53	-7.37	10.2	5.2	-0.2	27	6
4	IRL	ROSSLARE	52.25	-6.33	11.5	4.2	-0.1	35	3
4	IRL	SHANNON-AP	52.70	-8.92	11.6	4.9	-0.4	27	29
4	IRL	VALENTIA-OBSERVATOR	51.93	-10.25	12.0	3.9	-0.1	36	3
4	ISL	AKUREYRI	65.68	-18.08	4.5	6.4	-1.9	29	11
4	ISL	AKURNES	64.30	-15.22	5.9	5.5	-0.8	27	23
4	ISL	BERGSTADIR	65.70	-19.62	3.9	6.2	-1.2	36	18
4	ISL	BOLUNGAVIK	66.15	-23.25	4.2	5.7	-1.7	36	18
4	ISL	DALATANGI	65.27	-13.58	5.1	4.2	-0.9	33	31
4	ISL	EGILSSTADIR	65.28	-14.40	4.4	6.4	-2.0	34	18
4	ISL	EYRARBAKKI	63.87	-21.15	5.9	5.9	-1.3	22	20
4	ISL	HVERAVELLIR	64.87	-19.57	0.4	3.9	-1.0	40	17
4	ISL	KEFLAVIK	63.97	-22.60	6.0	5.4	-0.8	31	22
4	ISL	KIRKJUBAEJARKLAUSTU	63.78	-18.07	5.6	5.9	-1.0	28	10
4	ISL	RAUFARHOFN	66.45	-15.95	3.6	5.4	-1.6	35	28
4	ISL	REYKJAVIK	64.13	-21.90	5.7	5.7	-0.6	28	10
4	ISL	STYKKISHOLMUR	65.08	-22.73	4.7	6.2	-1.3	36	16
4	ISL	VESTMANNAEYJAR	63.40	-20.28	6.3	4.3	-0.8	34	21
4	ISR	BEER-SHEVA	31.23	34.78	22.2	8.3	0.8	26	15
4	ISR	EILAT	29.55	34.95	26.5	9.1	0.8	23	0
4	ISR	HAIFA	32.80	35.03	22.4	7.6	0.8	32	7
4	ISR	JERUSALEM	31.87	35.22	18.6	8.4	0.6	28	8
4	ISR	OVDA	30.00	34.83	22.5	9.1	1.1	21	5
4	ISR	SDE-DOV(TEL-AVIV)	32.10	34.78	22.7	7.4	0.5	34	9
4	ITA	ALBENGA	44.05	8.12	16.2	10.0	0.6	23	-12
4	ITA	ALGHERO	40.63	8.28	18.4	8.5	-0.8	28	37
4	ITA	AMENDOLA	41.53	15.72	16.9	9.0	-0.6	30	38
4	ITA	BARI-PALESE-MACCHIE	41.13	16.78	17.1	8.5	-0.7	31	23
4	ITA	BERGAMO-ORIO-AL-SER	45.67	9.70	14.5	10.6	0.9	20	-23
4	ITA	BOLOGNA-BORGO-PANIG	44.53	11.30	15.5	10.8	0.6	23	-9
4	ITA	BOLZANO	46.47	11.33	13.7	11.1	1.4	17	-13
4	ITA	BRESCIA-GHEDI	45.42	10.28	14.5	11.5	0.9	20	-25
4	ITA	BRINDISI	40.65	17.95	19.3	9.0	-0.3	28	1
4	ITA	CAGLIARI-ELMAS	39.25	9.07	19.2	8.5	0.6	27	-47
4	ITA	CAMPOBASSO	41.57	14.65	14.0	9.0	-0.9	29	37
4	ITA	CAPO-BELLAVISTA	39.93	9.72	19.2	8.4	-0.9	30	35

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	ITA	CAPO-CACCIA	40.57	8.17	18.6	7.9	0.6	31	-34
4	ITA	CAPO-FRASCA	39.75	8.47	18.9	7.7	0.7	34	-49
4	ITA	CAPO-MELE	43.95	8.17	16.9	8.2	-0.8	27	37
4	ITA	CAPO-PALINURO	40.02	15.28	19.0	8.8	-1.0	31	31
4	ITA	CATANIA-FONTANAROSS	37.47	15.05	19.9	8.8	0.7	29	-35
4	ITA	CATANIA-SIGONELLA	37.40	14.92	19.5	8.9	-1.0	29	38
4	ITA	COZZO-SPADARO	36.68	15.13	20.9	8.2	-0.7	34	41
4	ITA	CROTONE	39.00	17.07	18.7	9.1	0.1	30	-15
4	ITA	DOBBIACO	46.73	12.22	8.9	12.2	-0.4	22	8
4	ITA	FALCONARA	43.62	13.37	15.5	9.1	0.0	29	-7
4	ITA	FIRENZE-PERETOLA	43.80	11.20	16.6	9.8	-1.0	25	40
4	ITA	FRONTONE	43.52	12.73	14.7	9.9	-0.5	25	35
4	ITA	GELA	37.08	14.22	20.4	7.6	0.5	33	-21
4	ITA	GENOVA-SESTRI	44.42	8.85	17.8	9.1	1.0	24	-45
4	ITA	GROSSETO	42.75	11.07	17.5	9.8	-0.1	25	2
4	ITA	LAMEZIA-TERME	38.90	16.25	19.0	8.3	-0.7	31	31
4	ITA	MARINA-DI-GINOSA	40.43	16.88	18.7	9.3	-0.5	28	25
4	ITA	MESSINA	38.20	15.55	21.0	8.2	-0.7	33	33
4	ITA	MILANO-LINATE	45.43	9.28	14.9	10.9	1.4	20	-18
4	ITA	MILANO-MALPENSA	45.62	8.73	13.6	10.9	0.1	19	12
4	ITA	MONDOVI	44.38	7.82	13.8	9.9	1.4	22	-33
4	ITA	MONTE-CIMONE	44.20	10.70	4.8	7.0	-2.0	35	22
4	ITA	MONTE-TERMINILLO	42.47	12.98	7.5	8.3	-1.1	36	21
4	ITA	NAPOLI-CAPODICHINO	40.85	14.30	18.8	9.3	0.4	25	-23
4	ITA	PAGANELLA	46.15	11.03	4.5	8.4	-2.0	38	25
4	ITA	PALERMO-BOCCADIFALC	38.10	13.30	20.5	8.7	-0.4	28	11
4	ITA	PALERMO-PUNTA-RAISI	38.18	13.10	20.7	8.0	0.8	32	-36
4	ITA	PANTELLERIA	36.82	11.97	19.8	7.8	0.5	34	-36
4	ITA	PASSO-DELLA-CISA	44.43	9.93	11.1	9.3	1.3	23	-31
4	ITA	PASSO-ROLLE	46.30	11.78	4.9	8.7	-1.6	39	27
4	ITA	PERUGIA	43.08	12.50	15.2	9.5	0.8	27	-34
4	ITA	PESCARA	42.43	14.20	16.0	9.0	0.0	27	-1
4	ITA	PIACENZA	44.92	9.73	14.4	10.8	1.0	22	-29
4	ITA	PISA-S-GIUSTO	43.68	10.38	17.1	9.4	-0.8	24	43
4	ITA	PONZA	40.92	12.95	18.9	8.2	0.0	30	-9
4	ITA	POTENZA	40.63	15.80	14.7	10.6	-1.2	27	40
4	ITA	PUNTA-MARINA	44.45	12.30	15.3	10.4	0.7	23	-13
4	ITA	RIMINI	44.03	12.62	15.0	10.0	0.4	25	-13
4	ITA	ROMA-FIUMICINO	41.80	12.23	18.0	8.6	-0.6	26	45
4	ITA	RONCHI-DEI-LEGIONAR	45.82	13.48	14.7	9.9	0.2	24	8

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	ITA	S-MARIA-DI-LEUCA	39.82	18.35	19.1	8.5	-1.1	30	34
4	ITA	S-VALENTINO-ALLA-M	46.75	10.53	7.2	9.5	-0.7	26	-6
4	ITA	SIGONELLA	37.40	14.92	20.0	9.1	0.6	30	-23
4	ITA	TARVISIO	46.50	13.58	9.6	11.6	0.6	26	24
4	ITA	TORINO-BRIC-DELLA-C	45.03	7.73	13.4	9.6	1.5	21	-34
4	ITA	TORINO-CASELLE	45.22	7.65	14.0	10.7	1.4	19	-29
4	ITA	TRAPANI-BIRGI	37.92	12.50	20.2	8.1	-0.7	31	35
4	ITA	TREVISO-ISTRANA	45.68	12.10	14.7	10.5	0.6	20	-8
4	ITA	TRIESTE	45.65	13.75	16.4	9.8	0.1	26	-2
4	ITA	UDINE-RIVOLTO	45.98	13.03	14.8	10.2	0.7	21	-21
4	ITA	USTICA	38.70	13.18	19.5	8.2	-1.1	34	30
4	ITA	VENEZIA-TESSERA	45.50	12.33	14.9	10.5	0.8	22	-15
4	ITA	VERONA-VILLAFRANCA	45.38	10.87	15.3	11.1	1.0	20	-26
4	ITA	VICENZA	45.57	11.52	15.0	11.5	0.7	17	-23
4	JEY	JERSEY-AP	49.22	-2.20	12.1	5.1	-0.5	36	39
4	JOR	AMMAN-AP	31.98	35.98	20.4	9.5	1.1	25	3
4	JOR	AMMAN-QUEEN-ALIA-AP	31.72	35.98	19.8	9.9	0.7	25	16
4	JOR	AQABA-AP	29.55	35.00	26.2	9.1	0.9	21	5
4	JOR	GHOR-SAFI	31.03	35.47	29.9	10.4	1.0	21	2
4	JOR	H-4-IRWAISHED	32.50	38.20	22.1	11.4	1.1	23	-6
4	JOR	H-5-SAFAWI	32.20	37.13	21.6	10.8	1.0	26	1
4	JOR	IRBED	32.55	35.85	20.3	8.8	1.0	27	3
4	JOR	MAAN	30.17	35.78	20.9	10.3	0.8	24	-12
4	JOR	MAFRAQ	32.37	36.25	19.9	9.8	0.9	24	5
4	KAZ	NOVYJ-USHTOGAN	47.90	48.80	11.2	16.4	-1.4	18	6
4	LBN	BEYROUTH-AP	33.82	35.48	22.8	6.9	0.9	33	6
4	LTU	BIRZAI	56.20	24.77	8.0	10.8	-0.9	25	-1
4	LTU	KAUNAS	54.88	23.83	8.1	10.8	-1.0	25	-3
4	LTU	KLAIPEDA	55.73	21.07	9.1	9.3	-0.1	28	6
4	LTU	SIAULIAI	55.93	23.32	7.9	10.4	-1.0	25	1
4	LTU	VILNIUS	54.63	25.28	7.6	10.8	-0.9	26	0
4	LUX	LUXEMBOURG-LUXEMBOU	49.62	6.22	10.6	8.1	0.8	19	-23
4	LVA	DAUGAVPILS	55.87	26.62	7.3	10.6	-0.9	26	10
4	LVA	GULBENE	57.13	26.72	6.9	10.5	-1.8	22	5
4	LVA	KOLKA	57.75	22.60	8.0	9.4	-0.9	33	5
4	LVA	LIEPAJA	56.48	21.02	8.5	9.7	-0.5	31	-4
4	LVA	RIGA	56.97	24.05	8.2	10.4	-1.0	25	6
4	LVA	VALGA	57.78	26.03	7.1	10.3	-1.4	24	6
4	MDA	KISINEV	47.02	28.98	11.4	11.9	0.2	19	10
4	MKD	BITOLA	41.05	21.37	13.3	10.9	0.6	23	2

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	MKD	KRIVA-PALANKA	42.20	22.33	12.4	9.8	-0.1	21	10
4	MKD	OHRID	41.12	20.80	14.3	11.2	-0.5	24	31
4	MKD	SKOPJE-AP	41.97	21.65	14.4	11.5	1.2	19	-2
4	MLT	LUQA	35.85	14.48	20.9	7.8	-0.7	34	38
4	MNE	PLEVLJA	43.35	19.35	11.1	10.8	0.8	23	27
4	MNE	PODGORICA-GOLUBOVCI	42.37	19.25	16.6	10.2	0.3	23	3
4	MNE	TIVAT	42.40	18.73	16.6	9.1	-0.9	25	25
4	NLD	AMSTERDAM-AP-SCHIPH	52.30	4.77	11.3	6.9	0.4	26	10
4	NLD	DE-BILT	52.10	5.18	11.3	7.0	0.1	23	14
4	NLD	DE-KOOY	52.92	4.78	11.1	6.6	0.0	29	10
4	NLD	DEELEN	52.07	5.88	10.7	7.6	-0.2	23	-19
4	NLD	EINDHOVEN	51.45	5.42	11.5	7.0	-0.7	20	42
4	NLD	GILZE-RIJEN	51.57	4.93	11.5	6.9	-0.2	25	12
4	NLD	GRONINGEN-AP-EELDE	53.13	6.58	10.5	7.0	-0.7	24	33
4	NLD	HOEK-VAN-HOLLAND	51.98	4.10	11.7	6.2	0.4	31	-26
4	NLD	LEEUWARDEN	53.22	5.77	10.7	6.6	0.1	28	9
4	NLD	MAASTRICHT-AP-ZUID	50.92	5.78	11.9	7.1	-0.2	18	6
4	NLD	ROTTERDAM-AP-ZESTIE	51.95	4.45	11.5	7.0	-0.2	26	7
4	NLD	SOESTERBERG	52.13	5.28	11.1	7.3	-0.2	23	12
4	NLD	TWENTHE	52.27	6.90	11.1	7.0	-0.5	23	30
4	NLD	VALKENBURG	52.18	4.42	11.4	6.6	-0.1	28	5
4	NLD	VLISSINGEN	51.45	3.60	12.0	6.8	-0.6	28	55
4	NLD	VOLKEL	51.65	5.70	11.3	7.0	-0.1	18	11
4	NLD	WOENSDRECHT	51.45	4.33	11.4	7.0	0.0	23	8
4	NOR	ALESUND-VIGRA	62.57	6.12	8.7	5.4	-0.8	32	34
4	NOR	ALTA-LUFTHAVN	69.98	23.37	3.0	8.2	-2.2	34	35
4	NOR	ANDOYA	69.30	16.13	4.6	6.7	-1.3	36	22
4	NOR	BANAK	70.07	24.98	2.1	7.5	-1.7	38	37
4	NOR	BARDUFOSS	69.07	18.53	2.9	8.2	-2.1	33	32
4	NOR	BERGEN-FLESLAND	60.28	5.23	8.3	6.1	-0.7	28	24
4	NOR	BERGEN-FLORIDA	60.38	5.33	8.9	6.6	-0.5	25	28
4	NOR	BODO-VI	67.27	14.37	6.4	7.0	-0.9	28	11
4	NOR	BYGLANDSFJORD-SOLBA	58.67	7.80	7.7	8.8	-1.0	25	18
4	NOR	FAGERNES	60.98	9.23	4.5	9.9	-1.7	30	22
4	NOR	FERDER-FYR	59.03	10.53	9.4	8.0	-0.9	29	24
4	NOR	FOKSTUA-II	62.12	9.28	1.9	6.3	-1.9	38	33
4	NOR	FRUHOLMEN-FYR	71.10	24.00	3.8	6.0	-1.6	44	32
4	NOR	JAN-MAYEN	70.93	-8.67	1.1	3.7	1.2	53	-39
4	NOR	KAUTOKEINO	69.00	23.03	0.8	8.1	-1.1	32	13
4	NOR	KIRKENES	69.73	29.90	1.3	7.0	-1.3	40	39

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	NOR	KONGSBERG-IV	59.67	9.65	6.6	10.5	-1.8	25	8
4	NOR	KRISTIANSAND-KJEVIK	58.20	8.08	8.7	8.3	-0.9	24	30
4	NOR	LISTA-FYR	58.12	6.57	9.1	6.1	-0.2	34	-5
4	NOR	MYKEN	66.77	12.48	7.6	5.9	-1.0	32	24
4	NOR	OKSOY-FYR	58.07	8.05	9.1	7.1	-0.5	33	30
4	NOR	ONA-II	62.87	6.53	8.7	4.9	-1.1	38	32
4	NOR	ORLAND-III	63.70	9.60	7.8	6.2	-0.8	30	23
4	NOR	OSLO-FORNEBU	60.12	10.83	7.7	10.6	-1.2	21	11
4	NOR	OSLO-GARDERMOEN	60.20	11.08	5.6	9.7	-1.6	30	15
4	NOR	ROEST-III	67.52	12.10	6.9	4.9	-0.9	34	35
4	NOR	RYGGE	59.38	10.78	8.0	9.1	-0.8	22	17
4	NOR	SKROVA-FYR	68.15	14.65	6.5	7.0	-1.3	34	14
4	NOR	SLATTEROY-FYR	59.92	5.07	9.1	5.6	-0.9	36	18
4	NOR	SLETTNES-FYR	71.10	28.22	2.5	5.5	-1.9	46	41
4	NOR	SORTLAND	68.70	15.42	5.3	6.7	-1.6	27	16
4	NOR	STAVANGER-SOLA	58.88	5.63	9.0	6.3	0.1	33	-3
4	NOR	SVINOY-FYR	62.33	5.27	8.7	4.7	-0.9	41	38
4	NOR	TORSVAG-FYR	70.25	19.50	5.8	6.0	-1.0	31	23
4	NOR	TORUNGEN-FYR	58.40	8.80	9.1	7.6	-1.1	32	22
4	NOR	TROMSO-LANGNES	69.68	18.92	4.1	6.8	-2.4	32	25
4	NOR	TRONDHEIM-VERNES	63.47	10.93	7.0	8.3	-1.5	25	7
4	NOR	UTSIRA-FYR	59.30	4.88	8.9	5.6	-0.8	39	30
4	NOR	VARDO	70.37	31.10	2.9	6.0	-1.9	41	33
4	POL	BIALYSTOK	53.10	23.17	8.2	10.4	-1.0	24	-11
4	POL	BIELSKO-BIALA	49.80	19.00	10.0	10.0	0.4	22	11
4	POL	CHOJNICE	53.72	17.55	9.1	8.9	-0.4	22	8
4	POL	CZESTOCHOWA	50.82	19.10	9.8	10.0	0.3	22	12
4	POL	ELBLAG	54.17	19.43	9.3	9.5	0.2	25	8
4	POL	GORZOW-WLKP	52.75	15.28	10.3	9.0	0.4	19	18
4	POL	HEL	54.60	18.82	9.7	8.6	-0.5	29	28
4	POL	JELENIA-GORA	50.90	15.80	9.5	9.0	-0.4	20	9
4	POL	KALISZ	51.78	18.08	10.3	9.8	-0.3	21	14
4	POL	KASPROWY-WIERCH	49.23	19.98	1.4	5.4	-0.1	47	-6
4	POL	KATOWICE	50.23	19.03	9.9	9.2	-0.3	21	6
4	POL	KETRZYN	54.07	21.37	8.7	10.6	0.0	24	10
4	POL	KIELCE	50.82	20.70	9.0	9.8	-0.1	22	8
4	POL	KLODZKO	50.43	16.62	9.2	9.8	-0.1	21	7
4	POL	KOLOBRZEG	54.18	15.58	10.0	8.7	-0.5	26	31
4	POL	KOLO	52.20	18.67	10.2	9.3	-0.6	21	10
4	POL	KOSZALIN	54.20	16.15	10.0	8.4	0.0	23	12

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	POL	KOZIENICE	51.57	21.55	9.9	10.3	-1.2	26	-22
4	POL	KRAKOW	50.08	19.80	9.9	9.7	0.3	18	10
4	POL	KROSNO	49.68	21.75	9.7	10.1	0.0	24	4
4	POL	LEBA	54.75	17.53	9.5	7.8	-0.7	29	34
4	POL	LEBORK	54.55	17.75	9.3	8.3	-0.9	22	26
4	POL	LEGNICA	51.20	16.20	10.8	8.9	-0.7	19	20
4	POL	LESKO	49.47	22.35	9.3	9.9	0.9	24	49
4	POL	LESZNO	51.83	16.53	10.3	9.1	0.3	20	9
4	POL	LODZ	51.73	19.40	9.8	9.8	-0.5	18	34
4	POL	LUBLIN-RADAWIEC	51.22	22.40	8.8	11.0	-0.4	22	-2
4	POL	MIKOLAJKI	53.78	21.58	9.1	10.7	-0.2	22	8
4	POL	MLAWA	53.10	20.35	9.0	9.4	-0.7	23	-2
4	POL	NOWY-SACZ	49.62	20.70	10.5	10.5	0.3	17	12
4	POL	OLSZTYN	53.77	20.42	9.3	9.3	-0.5	22	11
4	POL	OPOLE	50.80	17.97	10.7	9.4	-0.5	21	4
4	POL	PILA	53.13	16.75	9.9	9.5	-0.3	20	11
4	POL	PLOCK	52.58	19.73	9.7	9.7	-0.1	23	6
4	POL	POZNAN	52.42	16.85	10.3	9.2	-0.3	21	6
4	POL	PRZEMYSL	49.80	22.77	9.3	9.9	-0.4	22	10
4	POL	RACIBORZ	50.05	18.20	10.3	9.1	-0.5	22	4
4	POL	RZESZOW-JASIONKA	50.10	22.05	9.3	10.5	-0.8	22	1
4	POL	SANDOMIERZ	50.70	21.72	9.7	9.9	-0.5	20	10
4	POL	SIEDLCE	52.25	22.25	8.8	10.2	-0.5	23	-15
4	POL	SLUBICE	52.35	14.60	10.8	9.0	-0.1	21	9
4	POL	SNIEZKA	50.73	15.73	2.4	5.9	-1.2	44	31
4	POL	SULEJOW	51.35	19.87	10.1	9.2	-0.2	23	12
4	POL	SUWALKI	54.13	22.95	7.8	10.5	-1.1	25	-10
4	POL	SWINOUJSCIE	53.92	14.23	10.1	8.6	-0.5	26	15
4	POL	SZCZECINEK	53.72	16.68	9.3	8.8	-0.9	21	25
4	POL	SZCZECIN	53.40	14.62	10.5	8.4	-0.3	22	17
4	POL	TARNOW	50.03	20.98	10.7	10.2	-0.2	18	8
4	POL	TERESPOL	52.07	23.62	9.4	10.0	-0.7	19	3
4	POL	TORUN	53.05	18.58	10.0	9.7	0.0	21	6
4	POL	USTKA	54.58	16.87	9.4	8.6	-0.2	26	8
4	POL	WARSZAWA-OKECIE	52.17	20.97	9.8	9.5	-0.2	21	14
4	POL	WIELUN	51.22	18.57	10.2	9.8	-0.5	18	43
4	POL	WLODAWA	51.55	23.53	8.7	10.9	0.0	21	12
4	POL	WROCLAW-II	51.10	16.88	10.5	9.5	-0.2	20	12
4	POL	ZAKOPANE	49.30	19.97	7.8	9.9	-0.5	27	-12
4	POL	ZAMOSC	50.70	23.25	8.8	10.6	-0.6	22	-21

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	POL	ZIELONA-GORA	51.93	15.53	10.6	8.9	-0.4	20	9
4	PRT	BEJA	38.02	-7.87	18.2	8.3	1.5	27	-40
4	PRT	BRAGANCA	41.80	-6.73	15.0	9.1	1.1	24	-35
4	PRT	COIMBRA	40.20	-8.42	17.5	6.8	-0.1	24	6
4	PRT	FARO-AP	37.02	-7.97	19.8	6.7	0.7	26	-39
4	PRT	FLORES(ACORES)	39.45	-31.13	18.5	4.0	0.7	47	-44
4	PRT	FUNCHAL-S-CATARINA	32.68	-16.77	20.7	4.0	0.5	38	-34
4	PRT	HORTA-CASTELO-BRANC	38.52	-28.72	18.6	3.7	0.8	48	-42
4	PRT	LAJES(ACORES)	38.77	-27.10	19.0	4.8	1.0	37	-44
4	PRT	LISBOA-GAGO-COUTINH	38.77	-9.13	18.5	6.4	1.0	25	-32
4	PRT	LISBOA-PORTELA	38.77	-9.13	19.3	7.2	1.5	23	-31
4	PRT	PONTA-DELGADA-NORDE	37.73	-25.70	19.2	4.6	-0.6	36	43
4	PRT	PORTALEGRE	39.28	-7.42	17.2	8.3	1.5	26	-37
4	PRT	PORTO-PEDRAS-RUBRAS	41.23	-8.68	16.3	5.9	0.2	23	5
4	PRT	PORTO-SANTO	33.07	-16.35	20.8	4.4	0.9	45	-17
4	PRT	SAGRES	37.00	-8.95	19.5	5.5	0.9	27	-21
4	PRT	SANTA-MARIA(ACORES)	36.97	-25.17	19.6	4.5	0.7	39	-44
4	PRT	VIANA-DO-CASTELO	41.70	-8.80	17.0	6.8	0.1	22	8
4	ROU	ARAD	46.13	21.35	12.3	11.1	0.9	21	-18
4	ROU	BACAU	46.53	26.92	11.3	11.9	0.7	18	-4
4	ROU	BAIA-MARE	47.67	23.50	11.5	11.3	0.6	20	35
4	ROU	BARLAD	46.23	27.65	11.6	11.8	-0.7	19	47
4	ROU	BISTRITA	47.15	24.50	10.9	11.3	0.7	20	19
4	ROU	BLAJ	46.18	23.93	11.3	12.1	0.6	19	33
4	ROU	BOTOSANI	47.73	26.65	10.8	11.1	0.4	18	11
4	ROU	BUCURESTI-INMH-BANE	44.48	26.12	12.4	11.9	0.0	19	15
4	ROU	BUZAU	45.13	26.85	12.8	11.8	0.7	20	-22
4	ROU	CALAFAT	43.98	22.95	13.6	11.2	0.5	21	-15
4	ROU	CALARASI	44.20	27.33	13.1	11.4	0.5	20	-18
4	ROU	CARANSEBES	45.42	22.25	12.9	10.4	-0.1	20	5
4	ROU	CEAHLAU-TOACA	46.98	25.95	2.2	7.1	-1.3	39	35
4	ROU	CLUJ-NAPOCA	46.78	23.57	10.5	11.2	0.8	21	39
4	ROU	CONSTANTA	44.22	28.65	13.3	10.4	-1.0	26	52
4	ROU	CRAIOVA	44.32	23.87	13.3	11.4	0.0	21	14
4	ROU	DEVA	45.87	22.90	12.5	10.9	0.2	16	11
4	ROU	DROBETA-TURNU-SEVER	44.63	22.63	14.0	10.7	0.6	18	-22
4	ROU	FAGARAS	45.83	24.93	10.1	11.8	-0.8	23	-30
4	ROU	FETESTI	44.37	27.85	12.9	11.2	0.0	22	8
4	ROU	GALATI	45.48	28.03	12.5	11.3	-0.1	21	4
4	ROU	GIURGIU	43.88	25.95	13.8	12.5	1.5	20	-29

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	ROU	GRIVITA	44.75	27.30	12.8	11.5	-0.2	20	12
4	ROU	IASI	47.17	27.63	11.2	11.9	-0.8	24	-35
4	ROU	INTORSURA-BUZAULUI	45.68	26.02	8.5	11.2	-0.5	23	-5
4	ROU	JURILOVCA	44.77	28.88	12.3	11.3	0.4	24	-27
4	ROU	KOGALNICEANU	44.33	28.43	12.4	10.7	1.0	24	-34
4	ROU	MANGALIA	43.82	28.58	13.2	10.4	-0.2	31	7
4	ROU	MIERCUREA-CIUC	46.37	25.73	8.1	11.2	-0.2	22	9
4	ROU	ORADEA	47.03	21.90	12.0	10.9	0.5	19	-18
4	ROU	ORAVITA	45.03	21.68	12.7	10.1	0.4	23	8
4	ROU	PETROSANI	45.42	23.38	10.4	11.1	0.0	19	10
4	ROU	PLOIESTI	44.95	26.00	12.0	11.3	0.0	23	8
4	ROU	PREDEAL	45.50	25.58	6.4	9.9	-1.0	29	8
4	ROU	RARAU(MONASTERY)	47.45	25.57	4.4	9.1	-1.9	33	28
4	ROU	RIMNICU-VALCEA	45.10	24.37	12.8	11.5	0.8	17	-5
4	ROU	ROMAN	46.97	26.92	10.2	12.1	0.4	20	4
4	ROU	ROSIORI-DE-VEDE	44.10	24.98	13.2	12.2	0.6	20	-17
4	ROU	SATU-MARE	47.72	22.88	11.7	11.2	0.3	20	13
4	ROU	SIBIU	45.80	24.15	10.7	11.4	0.5	18	13
4	ROU	SIGHETUL-MARMATIEI	47.93	23.92	10.2	11.9	0.8	20	45
4	ROU	SUCEAVA	47.63	26.25	9.6	11.6	-0.6	23	-17
4	ROU	SULINA	45.17	29.73	13.0	10.7	-0.1	29	4
4	ROU	TARGOVISTE	44.93	25.43	11.9	11.4	0.3	22	7
4	ROU	TG-JIU	45.03	23.27	12.7	11.8	0.1	19	14
4	ROU	TG-MURES	46.53	24.53	10.8	11.8	1.0	18	19
4	ROU	TIMISOARA	45.77	21.25	13.0	11.0	0.8	20	-12
4	ROU	TR-MAGURELE	43.75	24.88	13.8	12.1	1.0	20	-32
4	ROU	TULCEA	45.18	28.82	12.6	11.2	-0.2	23	13
4	ROU	VARFU-OMU	45.45	25.45	-0.3	5.2	-0.1	40	25
4	ROU	ZALAU	47.18	23.08	11.6	11.0	0.2	20	4
4	RUS	ADLER	43.43	39.90	14.8	8.6	0.0	33	8
4	RUS	ALATYR`	54.82	46.58	6.5	12.5	-2.0	28	14
4	RUS	ALEKSANDROV-GAJ	50.15	48.55	8.8	14.8	-2.3	26	3
4	RUS	ARHANGELSK	64.55	40.58	2.9	9.6	-1.9	36	39
4	RUS	ARMAVIR	44.98	41.12	12.4	11.9	0.2	22	16
4	RUS	ASTRAHAN	46.28	48.05	12.9	15.8	-0.7	19	-3
4	RUS	BALASOV	51.55	43.15	8.2	13.1	-1.4	25	16
4	RUS	BARENCBURG	78.07	14.25	-3.0	6.6	-1.6	48	-3
4	RUS	BELYJ	55.85	32.95	6.7	11.0	-1.8	25	12
4	RUS	BOGUCAR	49.93	40.57	9.4	13.7	-1.0	21	-7
4	RUS	BOLOGOE	57.90	34.05	6.4	10.7	-1.9	26	10

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	RUS	BRJANSK	53.25	34.32	7.4	11.5	-1.7	24	4
4	RUS	BUDENNOVSK	44.78	44.13	11.6	14.2	0.0	25	4
4	RUS	BUJ	58.48	41.53	5.3	11.2	-2.1	26	16
4	RUS	CELINA	46.55	41.05	10.4	13.5	-0.6	21	8
4	RUS	CEREPOVEC	59.25	37.97	4.5	10.6	-1.8	30	23
4	RUS	DIVNOE	45.92	43.35	11.2	14.0	-0.1	23	2
4	RUS	ELAT`MA	54.95	41.77	6.5	11.8	-2.0	24	9
4	RUS	ELEC	52.63	38.52	7.6	12.1	-1.8	26	6
4	RUS	ERSOV	51.37	48.30	7.7	13.4	-2.2	29	8
4	RUS	GRIDINO	65.90	34.77	2.5	8.4	-1.9	42	38
4	RUS	JASKUL	46.18	45.35	13.3	15.2	-0.9	18	-1
4	RUS	JUR`EVEC	57.33	43.12	6.0	11.6	-2.4	24	9
4	RUS	KALAC	50.42	41.05	8.6	13.0	-0.8	21	4
4	RUS	KALEVALA	65.22	31.17	2.7	9.2	-1.9	34	25
4	RUS	KALININGRAD	54.72	20.55	8.9	10.0	0.0	24	8
4	RUS	KALUGA	54.57	36.40	6.6	11.1	-1.3	25	6
4	RUS	KAMYSIN	50.07	45.37	9.3	13.7	-1.1	23	3
4	RUS	KANDALAKSA	67.15	32.35	2.2	8.7	-1.7	37	32
4	RUS	KANIN-NOS	68.65	43.30	0.3	4.9	-0.1	51	4
4	RUS	KARGOPOL	61.50	38.93	4.0	10.2	-2.1	28	30
4	RUS	KAZAN`	55.60	49.28	6.0	12.1	-1.8	29	11
4	RUS	KEM	64.95	34.65	2.9	8.3	-1.8	39	37
4	RUS	KINGISEPP	59.37	28.60	6.6	10.6	-2.1	27	13
4	RUS	KIROV	58.60	49.63	5.4	11.8	-2.5	28	16
4	RUS	KOCUBEJ	44.40	46.55	13.4	13.1	-0.2	22	-8
4	RUS	KOJNAS	64.75	47.65	2.1	10.1	-1.7	32	27
4	RUS	KOTLAS	61.23	46.72	3.9	10.7	-1.8	27	25
4	RUS	KOZ`MODEM`JANSK	56.33	46.58	6.4	12.3	-2.1	27	8
4	RUS	KRASNODAR	45.03	39.15	12.7	11.3	-0.1	22	9
4	RUS	KRASNOSCELE	67.35	37.05	0.9	7.7	-1.1	37	26
4	RUS	KRASNYE-BAKI	57.13	45.17	6.2	11.7	-1.8	25	13
4	RUS	KURSK	51.77	36.17	7.9	12.3	-1.6	27	1
4	RUS	LOVOZERO	68.00	35.03	1.1	7.9	-0.6	35	9
4	RUS	LUKOJANOV	55.03	44.50	6.3	12.0	-2.2	26	11
4	RUS	MAHACKALA	42.83	47.55	13.3	12.0	-0.4	30	8
4	RUS	MEDVEZEGORSK	62.92	34.43	4.0	10.3	-2.0	34	24
4	RUS	MEZEN	65.87	44.22	1.6	8.1	-1.1	32	38
4	RUS	MINERALNYE-VODY	44.23	43.07	10.6	12.7	-0.6	24	-25
4	RUS	MOROZOVSK	48.35	41.87	9.7	13.3	-1.0	25	13
4	RUS	MOSKVA	55.83	37.62	7.4	11.5	-1.8	22	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	RUS	MOZDOK	43.73	44.67	12.3	12.8	0.1	23	0
4	RUS	MURMANSK	68.97	33.05	1.7	7.8	-1.3	35	42
4	RUS	NALCIK	43.53	43.63	11.3	12.1	-0.1	23	4
4	RUS	NIKOLAEVSKOE	58.57	29.80	6.1	10.6	-1.9	29	12
4	RUS	NIKOLO-POLOMA	58.35	43.38	4.9	11.0	-2.4	27	20
4	RUS	NIKOL`SK	59.53	45.47	4.7	11.3	-2.4	27	25
4	RUS	NIZNIJ-NOVGOROD	56.27	44.00	6.4	11.4	-2.0	28	13
4	RUS	NJANDOMA	61.67	40.18	3.7	10.2	-2.0	27	26
4	RUS	NOLINSK	57.55	49.95	5.2	11.6	-2.1	27	15
4	RUS	OBJACEVO	60.37	49.65	4.4	10.8	-2.3	29	21
4	RUS	ONEGA	63.90	38.12	4.3	10.1	-2.2	35	24
4	RUS	OPARINO	59.85	48.28	4.0	10.6	-2.0	24	23
4	RUS	OREL	52.93	36.00	7.5	11.8	-1.8	23	2
4	RUS	OSTASKOV	57.13	33.12	6.5	10.8	-1.6	29	14
4	RUS	PAVELEC	53.78	39.25	6.5	11.7	-1.9	27	14
4	RUS	PENZA	53.12	45.02	6.8	12.4	-2.1	28	13
4	RUS	PETROZAVODSK	61.82	34.27	4.9	10.1	-2.1	32	25
4	RUS	PINEGA	64.70	43.38	2.6	9.7	-1.8	32	28
4	RUS	PJALICA	66.18	39.53	1.1	6.1	-0.9	44	39
4	RUS	PRIMORSKO-AHTARSK	46.03	38.15	12.6	12.3	-0.2	22	13
4	RUS	PSKOV	57.82	28.42	7.3	11.2	-1.5	23	9
4	RUS	PUDOZ	61.80	36.52	4.7	10.6	-2.3	29	22
4	RUS	REBOLY	63.83	30.82	3.4	9.9	-2.1	35	24
4	RUS	REMONTNOE	46.57	43.67	10.1	13.6	-0.7	25	3
4	RUS	RJAZAN`	54.63	39.70	6.9	11.8	-1.9	26	11
4	RUS	ROSLAVL	53.93	32.83	6.8	11.0	-1.7	28	12
4	RUS	ROSTOV-NA-DONU	47.25	39.82	10.7	13.0	-0.7	23	-23
4	RUS	ROSTOV	57.20	39.42	5.8	11.3	-2.4	27	17
4	RUS	RYBINSK	58.10	38.68	5.9	11.2	-2.0	25	17
4	RUS	SAKUN`JA	57.67	46.63	5.1	11.5	-2.0	29	16
4	RUS	SARATOV	51.57	46.03	7.8	13.6	-2.1	26	12
4	RUS	SAR`JA	58.37	45.53	4.9	11.2	-2.0	27	14
4	RUS	SEGEZA	63.77	34.28	3.9	9.7	-2.3	34	27
4	RUS	SENKURSK	62.10	42.90	4.2	10.9	-2.4	29	24
4	RUS	SERAFIMOVIC	49.57	42.75	9.6	13.4	-0.9	21	-6
4	RUS	SMOLENSK	54.75	32.07	6.7	10.9	-1.6	24	5
4	RUS	SOJNA	67.88	44.13	-0.5	6.5	-0.6	44	12
4	RUS	SORTAVALA	61.72	30.72	5.2	10.1	-2.6	35	21
4	RUS	ST-PETERSBURG	59.97	30.30	6.6	11.0	-2.2	29	19
4	RUS	STAVROPOL	45.12	42.08	11.1	12.1	1.0	24	-22

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	RUS	SUHINICI	54.10	35.58	6.9	11.4	-1.6	25	9
4	RUS	SURA	63.58	45.63	2.4	9.7	-1.4	32	28
4	RUS	SVETLOGRAD	45.35	42.85	11.7	13.2	0.0	24	5
4	RUS	TAMBOV	52.80	41.33	7.1	12.4	-1.8	25	5
4	RUS	TIHORECK	45.85	40.08	12.1	12.3	0.4	23	13
4	RUS	TIHVIN	59.65	33.55	5.5	10.5	-2.4	28	22
4	RUS	TOT`MA	59.88	42.75	4.7	10.9	-2.0	28	16
4	RUS	TRUBCEVSK	52.58	33.77	7.8	11.8	-0.9	25	11
4	RUS	TUAPSE	44.10	39.07	14.8	9.5	0.0	29	4
4	RUS	TULA	54.23	37.62	7.0	11.7	-2.1	26	15
4	RUS	TVER	56.90	35.88	6.0	11.0	-2.1	27	14
4	RUS	ULYANOVSK	54.32	48.33	6.6	12.7	-2.0	30	17
4	RUS	UMBA	66.68	34.35	2.5	8.4	-1.5	37	34
4	RUS	URJUPINSK	50.80	42.00	8.5	12.6	-1.3	24	2
4	RUS	VELIKIE-LUKI	56.35	30.62	7.2	10.9	-1.4	22	9
4	RUS	VELSK	61.08	42.07	4.6	11.1	-2.5	26	21
4	RUS	VERHNIJ-BASKUNCAK	48.22	46.73	11.7	15.5	-1.0	17	7
4	RUS	VERHNJAJA-TOJMA	62.23	45.02	3.2	10.0	-1.9	29	27
4	RUS	VJAZMA	55.17	34.40	6.1	11.2	-2.0	26	14
4	RUS	VLADIMIR	56.12	40.35	6.1	11.5	-1.8	24	12
4	RUS	VOLGOGRAD	48.78	44.37	9.4	13.6	-1.1	22	13
4	RUS	VOLOGDA	59.32	39.92	4.8	10.6	-2.4	29	25
4	RUS	VORONEZ	51.65	39.25	7.4	12.2	-1.6	26	4
4	RUS	VORONEZ	51.70	39.22	8.6	12.5	-1.5	24	-5
4	RUS	VOZEGA	60.47	40.20	4.5	10.7	-1.9	26	23
4	RUS	VYBORG	60.72	28.73	5.8	10.5	-2.2	33	16
4	RUS	VYTEGRA	61.02	36.45	4.9	10.6	-2.2	29	23
4	RUS	WLADIKAVKAZ	43.05	44.65	10.5	12.1	-0.1	25	3
4	RUS	ZAMETCINO	53.48	42.63	6.8	12.3	-2.0	27	14
4	RUS	ZIZGIN	65.20	36.82	2.6	7.5	-1.5	43	38
4	SJM	BJORNOYA	74.52	19.02	-0.1	2.7	-0.5	55	-1
4	SJM	HOPEN	76.50	25.07	-2.4	5.5	-2.2	62	-16
4	SJM	SVALBARD-LUFTHAVN	78.25	15.47	-2.6	6.8	-2.4	51	-9
4	SRB	BANATSKI-KARLOVAC	45.05	21.03	13.1	10.8	0.5	21	1
4	SRB	BEOGRAD-SURCIN	44.82	20.28	13.3	10.9	0.8	21	7
4	SRB	BEOGRAD	44.80	20.47	14.3	10.8	0.7	20	-16
4	SRB	CUPRIJA	43.93	21.38	12.8	10.7	-0.2	19	10
4	SRB	DIMITROVGRAD	43.02	22.75	11.7	10.7	0.5	22	-1
4	SRB	KIKINDA	45.85	20.47	13.1	11.0	0.7	21	-5
4	SRB	KOPAONIK	43.28	20.80	5.9	8.5	-1.7	32	14

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	SRB	KRALJEVO	43.70	20.70	13.2	10.8	0.7	21	-10
4	SRB	KRUSEVAC	43.57	21.35	13.6	11.0	0.1	19	6
4	SRB	LESKOVAC	42.98	21.95	12.8	10.6	0.1	20	12
4	SRB	LOZNICA	44.55	19.23	13.6	10.9	0.5	22	-7
4	SRB	NEGOTIN	44.23	22.55	13.4	12.0	1.0	19	-3
4	SRB	NIS	43.33	21.90	13.3	11.5	0.5	20	1
4	SRB	NOVI-SAD-RIMSKI-SAN	45.33	19.85	13.3	10.5	0.2	19	11
4	SRB	PALIC	46.10	19.77	12.9	11.4	0.0	21	0
4	SRB	PEC	42.67	20.30	13.2	11.4	0.6	25	0
4	SRB	PRISTINA	42.65	21.15	12.2	11.0	0.1	23	2
4	SRB	SJENICA	43.28	20.00	9.2	9.6	-0.8	25	-10
4	SRB	SMEDEREVSKA-PALANKA	44.37	20.95	13.3	10.8	0.4	21	3
4	SRB	SOMBOR	45.77	19.15	13.0	10.4	0.0	21	9
4	SRB	SREMSKA-MITROVICA	45.10	19.55	13.2	10.6	0.7	18	8
4	SRB	VALJEVO	44.32	19.92	13.2	10.5	0.1	21	11
4	SRB	VELIKO-GRADISTE	44.75	21.52	12.9	10.5	0.2	20	12
4	SRB	VRANJE	42.55	21.92	12.4	11.1	0.6	21	-1
4	SRB	VRSAC	45.15	21.32	13.5	10.8	1.0	21	6
4	SRB	ZLATIBOR	43.73	19.72	9.9	10.0	0.0	23	5
4	SRB	ZRENJANIN	45.37	20.42	13.3	10.8	0.1	20	4
4	SVK	BRATISLAVA-LETISKO	48.20	17.20	11.9	10.3	0.7	14	-21
4	SVK	CHOPOK	48.98	19.60	0.6	5.0	-0.4	40	4
4	SVK	DUDINCE	48.17	18.87	11.6	11.4	0.7	17	-5
4	SVK	HURBANOVO	47.87	18.20	12.3	10.5	0.0	19	9
4	SVK	KAMENICA-NAD-CIROCH	48.93	22.00	9.9	11.7	0.0	18	10
4	SVK	KOSICE	48.67	21.22	10.0	11.4	-0.2	21	-2
4	SVK	LIESEK	49.37	19.68	7.8	9.9	-0.5	24	-25
4	SVK	LOMNICKY-STIT	49.20	20.22	-2.1	5.6	-0.3	43	17
4	SVK	LUCENEC	48.33	19.73	11.1	10.9	-0.3	18	8
4	SVK	MILHOSTOV	48.67	21.73	10.8	11.3	0.6	17	21
4	SVK	NITRA	48.28	18.13	11.8	10.6	1.2	18	-5
4	SVK	PIESTANY	48.62	17.83	11.2	10.2	-0.2	21	14
4	SVK	POPRAD-TATRY	49.07	20.25	7.9	10.3	-0.6	21	13
4	SVK	PRIEVIDZA	48.77	18.60	10.9	10.9	0.9	19	10
4	SVK	SLIAC	48.65	19.15	10.0	11.3	-0.1	20	8
4	SVK	STRBSKE-PLESO	49.12	20.08	6.1	9.2	-1.4	31	8
4	SVK	STROPKOV-TISINEC	49.22	21.65	9.6	11.3	0.1	22	19
4	SVK	TELGART	48.85	20.18	7.0	9.7	-0.4	26	0
4	SVK	ZILINA-HRICOV	49.23	18.62	9.4	10.9	0.0	22	8
4	SVN	LJUBLJANA-BEZIGRAD	46.07	14.52	12.6	10.2	0.7	14	-12

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	SVN	LJUBLJANA-BRNIK	46.22	14.48	11.0	10.5	0.5	21	-11
4	SVN	PORTOROZ	45.52	13.57	14.9	9.2	0.0	26	7
4	SWE	ANGELHOLM	56.30	12.85	9.3	7.9	-0.5	23	26
4	SWE	ARJEPLOG	66.05	17.87	1.4	7.8	-1.1	34	26
4	SWE	BJUROKLUBB(LGT-H)	64.48	21.58	4.1	9.1	-1.9	39	30
4	SWE	FALSTERBO	55.38	12.82	10.0	8.1	-0.5	31	23
4	SWE	FARO-ISLAND	57.90	19.17	8.6	7.7	-1.3	31	20
4	SWE	FRANSTA	62.50	16.18	4.0	9.5	-1.7	28	23
4	SWE	GADDEDE	64.50	14.17	3.5	8.1	-2.2	33	29
4	SWE	GOTEBORG-LANDVETTER	57.67	12.30	8.3	7.8	-0.5	29	13
4	SWE	GOTEBORG-SAVE	57.78	11.88	8.8	8.1	-0.9	27	17
4	SWE	GOTSKA-SANDON	58.40	19.20	8.4	8.5	-1.3	34	17
4	SWE	GUNNARN	65.02	17.68	2.9	9.0	-1.7	31	32
4	SWE	HAPARANDA	65.83	24.15	3.8	9.4	-2.5	35	26
4	SWE	HARSTENA	58.25	17.02	8.6	8.3	-1.2	29	32
4	SWE	HEMAVAN	65.80	15.10	2.3	8.0	-1.8	37	40
4	SWE	HOBURG	56.92	18.15	8.9	8.2	-1.3	33	30
4	SWE	HOLMOGADD	63.60	20.75	5.1	8.9	-1.9	40	30
4	SWE	JOKKMOKK(SWE-AFB)	66.63	19.65	1.6	8.7	-1.6	34	27
4	SWE	JONKOPING-AXAMO	57.75	14.08	7.0	8.9	-0.9	28	7
4	SWE	KARLSTAD-FLYGPLATS	59.45	13.47	7.2	9.7	-1.0	27	6
4	SWE	KATTERJAKK	68.42	18.17	0.8	6.0	-1.0	38	24
4	SWE	KIRUNA	67.82	20.33	0.7	7.3	-1.0	35	18
4	SWE	KRAMFORS(SWE-AFB)	63.05	17.77	4.9	9.9	-1.7	29	17
4	SWE	KVIKKJOKK-ARRENJARK	66.88	17.75	1.6	8.6	-0.8	32	21
4	SWE	LAINIO	67.77	22.35	1.0	7.7	-1.5	33	24
4	SWE	LANDSORT	58.75	17.87	8.2	8.2	-1.5	31	26
4	SWE	LINKOPING-MALMSLATT	58.40	15.53	7.5	9.7	-0.5	26	6
4	SWE	LJUNGBYHED(SWE-AFB)	56.08	13.23	8.9	7.6	-0.8	23	8
4	SWE	LULEA-KALLAX	65.55	22.13	4.0	9.6	-2.0	36	25
4	SWE	MALILLA	57.40	15.82	7.8	8.7	-1.4	24	8
4	SWE	MALMO-STURUP	55.55	13.37	9.2	7.8	-0.4	26	23
4	SWE	MALUNG	60.68	13.72	4.9	9.4	-2.0	30	25
4	SWE	OSBY	56.37	13.95	8.2	8.6	-0.7	22	19
4	SWE	OSTERSUND-FROSON	63.20	14.50	4.5	8.4	-2.3	30	20
4	SWE	OSTMARK	60.35	12.65	5.4	9.4	-2.1	27	19
4	SWE	PAJALA	67.22	23.40	1.8	9.2	-1.6	27	24
4	SWE	RITSEM	67.73	17.47	1.1	6.8	-1.4	39	30
4	SWE	RONNEBY-KALLINGE	56.27	15.27	8.7	8.1	-0.4	23	12
4	SWE	SARNA	61.70	13.18	3.4	9.0	-1.5	27	34

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	SWE	SATENAS	58.43	12.72	8.1	8.8	-0.5	24	35
4	SWE	SINGO-ISLAND	60.17	18.75	7.3	9.4	-0.8	27	21
4	SWE	SODERHAMN(SWE-AFB)	61.27	17.10	5.7	9.5	-1.6	28	16
4	SWE	STOCKHOLM-ARLANDA	59.65	17.95	7.5	9.6	-1.0	28	10
4	SWE	STOCKHOLM-BROMMA	59.37	17.90	8.1	9.7	-1.3	26	-7
4	SWE	STORLIEN	63.30	12.12	2.7	7.1	-2.0	37	31
4	SWE	SVEG	62.02	14.37	4.4	9.2	-2.3	27	21
4	SWE	SVENSKA-HOGARNA	59.45	19.50	7.7	8.7	-0.8	38	20
4	SWE	TIMRA-MIDLANDA	62.52	17.45	5.1	9.4	-2.2	31	19
4	SWE	UMEA	63.80	20.28	4.8	9.3	-2.7	32	22
4	SWE	UNGSKAR	56.03	15.80	8.5	6.5	-1.3	33	7
4	SWE	UPPSALA	59.90	17.60	6.8	9.5	-1.2	24	10
4	SWE	VASTERAS-HASSLO-AFB	59.58	16.63	7.6	9.6	-1.6	28	1
4	SWE	VISBY	57.67	18.35	8.8	8.4	-0.9	29	15
4	SYR	ABUKMAL	34.42	40.92	23.8	12.5	1.4	22	-7
4	SYR	ALEPPO-INTL-AP	36.18	37.20	20.1	11.9	1.3	23	-4
4	SYR	DAMASCUS-INTL-AP	33.42	36.52	20.0	11.1	1.0	22	-5
4	SYR	DARAA	32.60	36.10	21.0	9.4	0.9	24	7
4	SYR	DEIR-EZZOR	35.32	40.15	22.3	13.0	1.2	21	-5
4	SYR	HAMA	35.12	36.75	21.3	11.1	1.2	24	-9
4	SYR	KAMISHLI	37.05	41.22	21.6	13.0	1.1	23	-16
4	SYR	LATTAKIA	35.53	35.77	21.9	8.6	1.2	29	-10
4	SYR	NABK	34.03	36.72	16.5	10.7	0.7	24	-1
4	SYR	PALMYRA	34.55	38.30	22.4	12.2	1.3	20	5
4	SYR	SAFITA	34.82	36.13	20.6	9.2	1.5	27	1
4	TUR	ADANA-INCIRLIK-AB	37.00	35.43	20.5	9.9	0.0	28	16
4	TUR	AFYON	38.75	30.53	14.4	11.1	0.7	20	-20
4	TUR	AKHISAR	38.92	27.85	19.0	11.2	0.0	23	9
4	TUR	ANTALYA	36.87	30.73	20.7	9.9	0.0	27	7
4	TUR	AYDIN	37.85	27.85	20.5	10.9	0.1	23	-5
4	TUR	BALIKESIR	39.62	27.92	16.6	10.7	0.3	23	3
4	TUR	BANDIRMA	40.32	27.97	16.0	10.1	-0.8	24	23
4	TUR	BODRUM	37.03	27.43	21.0	9.4	-0.8	27	18
4	TUR	BOLU	40.73	31.60	12.5	10.0	0.6	24	-7
4	TUR	BURSA	40.18	29.07	17.2	10.8	0.0	24	5
4	TUR	CANAKKALE	40.13	26.40	17.2	10.6	-0.4	27	8
4	TUR	CORUM	40.55	34.95	13.5	12.3	0.9	22	6
4	TUR	DIKILI	39.07	26.88	18.6	10.1	0.2	25	-2
4	TUR	DIYARBAKIR	37.88	40.18	18.1	14.2	1.0	24	-23
4	TUR	EDIRNE	41.67	26.57	15.2	11.0	0.0	22	9

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	TUR	ELAZIG	38.60	39.28	16.0	13.6	1.4	24	-26
4	TUR	ERZINCAN	39.70	39.52	13.9	14.8	0.9	22	17
4	TUR	ERZURUM	39.95	41.17	7.0	12.5	-1.2	36	28
4	TUR	ESENBOGA	40.12	33.00	13.0	12.1	0.5	22	-28
4	TUR	ESKISEHIR	39.78	30.57	13.9	11.9	-0.1	20	9
4	TUR	ETIMESGUT	39.95	32.68	14.4	12.2	-1.0	21	49
4	TUR	GAZIANTEP	37.08	37.37	18.3	12.8	1.2	24	-22
4	TUR	GOKCEADA	40.18	25.90	17.2	9.6	-0.5	25	3
4	TUR	GOLCUK-DUMLUPINAR	40.67	29.83	17.3	10.4	0.1	24	6
4	TUR	INEBOLU	41.98	33.78	14.7	8.7	-0.6	33	8
4	TUR	ISKENDERUN	36.58	36.17	22.3	9.2	1.3	27	-12
4	TUR	ISPARTA	37.75	30.55	15.2	11.5	0.0	25	16
4	TUR	ISTANBUL-ATATURK	40.97	28.82	16.4	10.1	0.0	26	0
4	TUR	IZMIR-A-MENDERES	38.27	27.15	18.5	10.9	-0.1	24	8
4	TUR	KAYSERI-ERKILET	38.82	35.43	13.8	12.1	1.0	23	-8
4	TUR	KONYA	37.97	32.55	14.3	12.2	0.8	23	-6
4	TUR	MALATYA-ERHAC	38.43	38.08	16.2	13.7	0.9	23	-17
4	TUR	MERZIFON	40.85	35.58	14.1	11.2	0.6	21	10
4	TUR	MUGLA	37.22	28.37	17.7	11.3	-0.7	24	34
4	TUR	SAMSUN	41.28	36.30	15.6	8.0	-0.9	35	27
4	TUR	SILIFKE	36.38	33.93	21.8	10.1	1.2	24	-6
4	TUR	SINOP	42.03	35.17	15.2	8.5	-0.4	37	13
4	TUR	SIVAS	39.75	37.02	12.5	13.0	1.3	25	17
4	TUR	TEKIRDAG	40.98	27.55	16.4	10.7	-0.5	25	36
4	TUR	TRABZON	41.00	39.72	15.8	8.2	0.5	37	-37
4	TUR	USAK	38.68	29.40	15.8	11.8	-0.8	23	39
4	TUR	VAN	38.45	43.32	12.5	14.0	0.0	27	14
4	TUR	ZONGULDAK	41.45	31.80	14.9	8.5	-0.2	32	7
4	UKR	CHERNIHIV	51.47	31.25	8.8	12.0	-1.3	24	-13
4	UKR	CHERNIVTSI	48.37	25.90	10.1	11.2	0.6	19	-15
4	UKR	CHORNOMORSKE	45.52	32.70	12.4	10.7	-0.7	29	20
4	UKR	DNIPROPETROVSK	48.60	34.97	10.1	12.8	-0.4	24	0
4	UKR	DONETSK	48.07	37.77	9.3	12.6	-0.4	23	20
4	UKR	HENICHESK	46.17	34.82	12.0	12.3	-0.8	24	43
4	UKR	IVANO-FRANKIVSK	48.97	24.70	9.7	11.2	-0.4	17	41
4	UKR	IZIUM	49.18	37.30	9.4	12.7	-0.9	22	-2
4	UKR	IZMAIL	45.37	28.85	12.1	11.5	-0.1	21	10
4	UKR	KERCH	45.40	36.42	12.2	11.3	-0.8	26	30
4	UKR	KHARKIV	49.97	36.13	9.0	13.0	-0.3	22	20
4	UKR	KHERSON	46.63	32.57	11.7	11.8	-0.3	24	4

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	UKR	KHMELNYTSKYI	49.43	26.98	9.6	10.5	-0.1	22	9
4	UKR	KIROVOHRAD	48.52	32.20	9.3	12.4	-0.6	24	-15
4	UKR	KONOTOP	51.23	33.20	9.0	11.9	-0.4	21	10
4	UKR	KRYVYI-RIH	48.03	33.22	9.9	13.1	-0.3	22	4
4	UKR	KYIV	50.40	30.57	9.7	11.7	-0.4	20	29
4	UKR	LIUBASHIVKA	47.85	30.27	9.9	12.6	-0.8	24	-11
4	UKR	LUBNY	50.00	33.02	9.4	12.6	-0.5	23	-6
4	UKR	LUHANSK	48.57	39.25	10.1	13.4	-0.4	20	11
4	UKR	LVIV	49.82	23.95	8.9	10.6	-0.7	24	-22
4	UKR	MARIUPOL	47.03	37.50	10.8	13.1	0.0	25	9
4	UKR	MOHYLIV-PODILSKYI	48.45	27.78	11.0	11.4	-0.5	19	42
4	UKR	MYRONIVKA	49.67	31.00	9.3	12.1	-0.7	24	-2
4	UKR	NIZHYN	51.05	31.90	8.9	12.1	-0.9	19	-14
4	UKR	ODESA	46.43	30.77	12.0	11.6	-0.5	24	30
4	UKR	POLTAVA	49.60	34.55	9.2	12.7	-0.5	24	-13
4	UKR	RIVNE	50.58	26.13	8.7	11.2	-0.3	23	0
4	UKR	SARNY	51.28	26.62	8.9	11.7	-0.7	21	-21
4	UKR	SHEPETIVKA	50.17	27.03	9.0	11.4	-0.5	22	-1
4	UKR	SIMFEROPOL	44.68	34.13	12.1	10.6	-0.5	25	12
4	UKR	SUMY	50.85	34.67	8.5	12.5	-1.0	23	6
4	UKR	SVITLOVODSK	49.05	33.25	10.3	13.0	-0.2	25	10
4	UKR	TERNOPIL	49.53	25.67	8.5	10.8	-0.2	20	10
4	UKR	UMAN	48.77	30.23	9.7	12.5	-0.5	22	1
4	UKR	UZHHOROD	48.63	22.27	11.0	11.4	-0.1	21	3
4	UKR	VINNYTSIA	49.23	28.60	9.2	11.5	-0.7	23	-19
4	UKR	VOLODYMYR-VOLYNSKYI	50.83	24.32	9.1	11.1	-0.7	21	-18
4	UKR	YALTA	44.48	34.17	14.2	10.3	-0.9	30	24
4	UKR	ZAPORIZHZHIA	47.80	35.02	10.2	12.9	-0.7	24	-14
4	UKR	ZHYTOMYR	50.23	28.73	8.8	11.6	-0.3	22	4
5	ABW	QUEEN-BEATRIX-AP	12.50	-70.02	29.8	1.0	0.5	-10	12
5	ANT	HATO-AP(CIV-MIL)	12.20	-68.97	28.5	1.2	0.6	46	13
5	ATG	VC-BIRD-INTL-AP	17.12	-61.78	27.3	1.4	-0.4	40	12
5	BHS	NASSAU-AP-NEW	25.05	-77.47	26.0	3.6	0.4	36	12
5	BLZ	BELIZE-PHILLIP-GOLD	17.53	-88.30	26.9	2.2	0.4	5	5
5	BRB	GRANTLEY-ADAMS	13.07	-59.48	27.3	0.8	0.8	-9	37
5	CAN	Calgary	51.12	-114.02	5.6	10.9	-1.9	32	24
5	CAN	Edmonton	53.53	-114.10	4.6	10.6	-1.7	27	23
5	CAN	Fort McMurray	56.65	-111.22	3.9	11.7	-1.3	30	14
5	CAN	Grande Prairie	55.18	-118.88	4.3	11.0	-1.4	32	26
5	CAN	Lethbridge	49.63	-112.80	7.5	11.7	-0.7	29	10

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	CAN	Medicine Hat	50.02	-110.72	8.3	14.0	-0.6	25	3
5	CAN	Abbotsford	49.03	-122.37	10.9	7.2	0.1	23	8
5	CAN	Comox	49.72	-124.90	10.6	7.1	-1.1	23	48
5	CAN	Cranbrook	49.60	-115.78	7.7	11.7	-1.2	23	32
5	CAN	Fort St John	56.23	-120.73	4.3	10.7	-1.0	30	14
5	CAN	Kamloops	50.70	-120.45	10.1	12.4	0.0	20	12
5	CAN	Port Hardy	50.68	-127.37	8.9	5.4	0.1	26	1
5	CAN	Prince George	53.88	-122.68	5.7	10.1	-1.2	27	24
5	CAN	Prince Rupert	54.30	-130.43	7.9	6.2	0.6	27	-15
5	CAN	Sandspit	53.25	-131.82	9.1	5.8	0.0	32	16
5	CAN	Smithers	54.82	-127.18	5.4	10.2	-1.5	26	18
5	CAN	Summerland	49.57	-119.65	10.2	10.7	0.1	20	8
5	CAN	Vancouver	49.18	-123.17	10.9	7.1	-0.9	21	48
5	CAN	Victoria	48.65	-123.43	11.9	7.7	-0.6	18	39
5	CAN	Brandon	49.92	-99.95	4.9	12.7	-1.4	32	24
5	CAN	Churchill	58.75	-94.07	-2.8	10.6	-1.8	47	-7
5	CAN	The Pas	53.97	-101.10	3.6	12.1	-1.7	33	20
5	CAN	Winnipeg	49.90	-97.23	5.5	13.2	-1.3	33	22
5	CAN	Fredericton	45.87	-66.53	6.7	12.1	-1.6	35	21
5	CAN	Miramichi	47.02	-65.45	6.4	12.0	-1.9	36	24
5	CAN	Saint John	45.32	-65.88	6.2	10.5	-1.0	40	24
5	CAN	Battle Harbour	52.30	-55.83	1.6	6.3	1.2	52	-20
5	CAN	Gander	48.95	-54.57	5.2	9.7	-2.1	41	29
5	CAN	Goose	53.32	-60.37	2.5	10.0	-1.2	39	39
5	CAN	St Johns	47.62	-52.73	5.6	9.2	-1.8	43	29
5	CAN	Stephenville	48.53	-58.55	6.2	10.1	-1.3	40	31
5	CAN	Greenwood	44.98	-64.92	8.0	11.3	-1.4	34	7
5	CAN	Sable Island	43.93	-60.02	8.8	8.3	0.7	47	-28
5	CAN	Shearwater	44.63	-63.50	7.7	10.6	-0.6	39	11
5	CAN	Sydney	46.17	-60.05	6.4	10.6	-1.5	44	28
5	CAN	Truro	45.37	-63.27	6.8	10.9	-1.3	42	20
5	CAN	Inuvik	68.30	-133.48	-4.2	12.8	-3.3	41	-11
5	CAN	Yellowknife	62.47	-114.45	-0.4	11.3	-1.9	33	-6
5	CAN	Resolute	74.72	-94.98	-12.2	14.5	-2.7	39	18
5	CAN	Kingston	44.22	-76.60	8.0	12.5	-1.4	39	23
5	CAN	London	43.03	-81.15	8.7	12.5	-0.7	32	0
5	CAN	Mount Forest	43.98	-80.75	7.2	12.0	-1.2	36	18
5	CAN	Muskoka	44.97	-79.30	6.9	12.0	-1.6	32	6
5	CAN	North Bay	46.35	-79.43	5.8	11.9	-1.6	35	14
5	CAN	Ottawa	45.32	-75.67	7.3	13.0	-1.5	33	18

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	CAN	Sault Ste Marie	46.48	-84.52	6.0	11.7	-1.1	38	25
5	CAN	Simcoe	42.85	-80.27	8.7	12.2	-1.0	32	4
5	CAN	Thunder Bay	48.37	-89.32	5.0	11.4	-1.6	36	23
5	CAN	Timmins	48.57	-81.37	4.4	11.3	-1.7	36	25
5	CAN	Toronto	43.67	-79.63	8.5	12.4	-1.5	33	11
5	CAN	Trenton	44.12	-77.53	8.3	12.4	-1.0	32	7
5	CAN	Windsor	42.27	-82.97	10.3	12.9	-0.2	31	13
5	CAN	Charlottetown	46.28	-63.13	6.6	11.3	-1.7	41	25
5	CAN	Bagotville	48.33	-71.00	4.6	11.4	-1.5	35	21
5	CAN	Baie Comeau	49.13	-68.20	3.8	9.9	-1.6	39	35
5	CAN	Grindstone Island	47.38	-61.87	5.5	9.8	-2.0	46	35
5	CAN	Kuujjuarapik	55.28	-77.77	-0.9	8.7	-0.3	45	13
5	CAN	Kuujuaq	58.10	-68.42	-2.0	9.1	-1.9	45	-8
5	CAN	La Grande Riviere	53.63	-77.70	0.2	9.5	-1.0	38	-13
5	CAN	Lake Eon	51.87	-63.28	0.1	8.3	-0.7	36	9
5	CAN	Mont Joli	48.60	-68.22	5.0	11.0	-2.1	36	26
5	CAN	Montreal Intl AP	45.47	-73.75	7.9	13.0	-1.5	33	4
5	CAN	Montreal Jean Brebeuf	45.50	-73.62	7.5	13.3	-1.6	33	15
5	CAN	Montreal Mirabel	45.68	-74.03	6.9	12.7	-1.2	31	5
5	CAN	Nitchequon CAN270	53.20	-70.90	-0.4	9.1	-1.1	36	-10
5	CAN	Quebec	46.80	-71.38	6.5	12.0	-1.7	35	17
5	CAN	Riviere du Loup	47.80	-69.55	5.2	11.2	-1.9	38	24
5	CAN	Roberval	48.52	-72.27	5.1	11.8	-1.8	34	18
5	CAN	Schefferville	54.80	-66.82	-0.9	8.6	-1.2	36	-9
5	CAN	Sept-Iles	50.22	-66.27	3.2	9.8	-1.1	39	45
5	CAN	Sherbrooke	45.43	-71.68	6.1	11.7	-1.7	32	14
5	CAN	St Hubert	45.52	-73.42	7.7	13.2	-1.5	33	9
5	CAN	Ste Agathe des Monts	46.05	-74.28	5.4	11.6	-1.8	34	19
5	CAN	Val d Or	48.07	-77.78	4.0	11.3	-1.4	35	24
5	CAN	Estevan	49.22	-102.97	6.0	12.9	-1.7	32	18
5	CAN	North Battleford	52.77	-108.25	4.6	12.1	-1.3	33	24
5	CAN	Regina	50.43	-104.67	5.1	12.5	-1.7	31	22
5	CAN	Saskatoon	52.17	-106.68	4.8	12.2	-1.6	32	15
5	CAN	Swift Current	50.28	-107.68	6.0	12.0	-1.5	32	16
5	CAN	Whitehorse	60.72	-135.07	2.5	10.7	-1.2	24	30
5	CRI	JUAN-SANTAMARIA-INT	9.98	-84.22	23.5	0.8	-0.6	-60	84
5	CUB	GUANTANAMO-BAY-NAS	19.90	-75.15	27.6	1.9	0.2	35	-4
5	DOM	LAS-AMERICAS	18.43	-69.67	26.2	1.7	0.4	17	34
5	DOM	PUERTO-PLATA-INTL	19.75	-70.55	26.3	1.8	-0.1	15	15
5	DOM	SANTO-DOMINGO	18.43	-69.88	26.8	1.8	0.1	25	0

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	FRA	LE-RAIZET-GUADELOUP	16.27	-61.60	26.5	1.6	0.0	44	22
5	GRD	POINT-SALINES-AP	12.00	-61.78	28.0	1.0	0.5	36	20
5	HND	LA-CEIBA(AP)	15.73	-86.87	26.6	2.2	0.6	31	7
5	HND	SANTA-ROSA-DE-COPAN	14.78	-88.78	21.6	2.1	1.1	1	4
5	HND	TEGUCIGALPA	14.05	-87.22	22.7	1.7	1.0	-19	7
5	JAM	KINGSTON-NORMAN-MAN	17.93	-76.78	28.4	0.6	0.1	1	16
5	JAM	MONTEGO-BAY-SANGSTE	18.50	-77.92	27.5	1.4	0.6	23	18
5	MEX	ACAPULCO-G-ALVAREZ	16.75	-99.75	28.0	1.5	-0.2	33	-9
5	MEX	AGUASCALIENTES	21.87	-102.30	21.4	4.6	1.3	2	24
5	MEX	BAHIAS-DE-HUATULCO	15.77	-96.25	27.8	1.2	-0.3	-16	3
5	MEX	CAMPECHE-IGNACIO	19.85	-90.55	27.8	2.5	1.2	4	5
5	MEX	CHETUMAL	18.48	-88.30	27.0	2.6	0.4	7	-4
5	MEX	CIUDAD-DEL-CARMEN-I	18.65	-91.80	29.0	2.7	1.0	5	9
5	MEX	CIUDAD-VICTORIA	23.70	-98.95	24.9	5.8	0.9	17	4
5	MEX	COLIMA	19.27	-103.58	25.4	1.4	0.5	4	20
5	MEX	CUERNAVACA	18.88	-99.23	24.0	2.3	1.5	-21	23
5	MEX	CULIACAN(CITY)	24.80	-107.40	27.9	6.1	1.1	27	29
5	MEX	DE-GUANAJUATO-INTL	20.98	-101.48	20.9	3.8	1.2	-12	23
5	MEX	DURANGO-INTL	24.12	-104.52	20.7	5.3	1.0	8	21
5	MEX	GUAYMAS-G-YANEZ-AP	27.97	-110.92	25.6	8.9	1.1	28	-9
5	MEX	HERMOSILLO-INTL	29.08	-110.93	26.0	9.2	1.0	22	-2
5	MEX	IXTAPA-ZIHUATANEJO	17.60	-101.45	28.5	1.8	0.3	31	28
5	MEX	JUAREZ-G-GONZALEZ	31.63	-106.42	21.7	11.0	1.1	13	-7
5	MEX	LA-PAZ-G-MARQUEZ-AP	24.07	-110.35	26.6	6.3	0.9	33	0
5	MEX	MATAMOROS-G-CANALES	25.77	-97.52	25.5	6.6	1.5	18	7
5	MEX	MEXICALI-G-SANCHEZ	32.63	-115.23	25.3	10.7	1.5	20	-21
5	MEX	MONCLOVA	26.88	-101.43	25.9	8.7	1.3	10	15
5	MEX	MONTERREY-INTL-AP	25.87	-100.38	25.3	7.8	1.0	9	1
5	MEX	MORELIA-G-MUJICA-AP	19.85	-101.02	19.9	3.2	1.2	-2	30
5	MEX	PIEDRAS-NEGRAS	28.70	-100.53	25.3	9.3	1.0	13	-10
5	MEX	PLAYA-DE-ORO-INTL	19.13	-104.55	27.8	2.7	0.0	47	-13
5	MEX	PUEBLA	19.05	-98.17	17.6	2.6	0.7	1	19
5	MEX	PUERTO-ESCONDIDO	15.87	-97.08	27.4	1.4	-0.5	24	-7
5	MEX	QUETZALCOATL-INTL	27.43	-99.57	25.5	9.3	1.2	14	9
5	MEX	SALTILLO	25.37	-101.02	20.6	5.7	0.6	7	19
5	MEX	TAPACHULA-INTL	14.78	-92.37	27.6	1.5	0.8	-24	28
5	MEX	TEPIC	21.52	-104.88	24.5	4.0	0.8	12	25
5	MEX	TIJUANA-G-RODRIGUE	32.53	-116.97	19.8	5.1	0.5	28	4
5	MEX	TOLUCA-LA-LOPEZ-AP	19.33	-99.57	15.3	2.6	0.9	0	16

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	MEX	TORREON-AP	25.53	-103.43	24.6	7.8	1.5	7	8
5	MEX	TULANCINGO	20.08	-98.37	17.2	2.5	0.5	-13	16
5	MEX	TUXPAN-INTL-AP	20.98	-89.65	27.1	2.6	0.2	8	17
5	MEX	TUXTLA-GUTIERREZ-A	16.75	-93.13	23.5	2.5	0.8	-4	28
5	MEX	VALLE-DEL-FUERTE-IN	25.68	-109.08	26.8	6.3	1.4	29	4
5	MEX	XOXOCOTLAN-INTL	17.00	-96.72	21.9	2.1	0.9	-11	10
5	MTQ	LE-LAMENTIN	14.60	-61.00	27.0	1.1	0.4	36	18
5	PRI	AQUADILLA-BORINQUEN	18.50	-67.13	25.6	1.5	0.0	47	-11
5	PRI	EUGENIO-MARIA-DE-HO	18.25	-67.15	25.9	1.3	0.0	19	10
5	PRI	MERCEDITA	18.00	-66.55	27.0	2.5	-0.5	37	8
5	PRI	ROOSEVELT-ROADS	18.25	-65.63	27.4	1.9	0.0	42	-16
5	PRI	SAN-JUAN-INTL-AP	18.42	-66.00	26.8	1.9	-0.4	34	-16
5	SPM	SAINT-PIERRE	46.77	-56.17	6.8	9.2	-1.1	49	31
5	TTO	CROWN-POINT-AP	11.15	-60.83	27.4	0.4	0.5	24	19
5	TTO	PIARCO-INTL-AP	10.62	-61.35	26.7	1.0	0.9	30	14
5	USA	Adak NAS	51.88	-176.65	5.4	4.4	-1.1	41	61
5	USA	Ambler	67.10	-157.85	-0.5	8.5	-1.2	25	-4
5	USA	Anaktuvuk Pass	68.13	-151.73	-3.4	9.8	-2.5	36	-20
5	USA	Anchorage-Elmendorf AFB	61.25	-149.80	5.6	9.3	-2.9	19	18
5	USA	Anchorage-Lake Hood Seaplane Base	61.18	-149.97	5.7	9.3	-2.3	23	12
5	USA	Anchorage-Merrill Field	61.22	-149.85	5.4	9.7	-3.1	26	15
5	USA	Anchorage Intl AP	61.18	-150.00	4.7	10.8	-2.3	24	25
5	USA	Aniak AP	61.58	-159.53	2.3	7.3	-2.8	29	25
5	USA	Annette Island AP	55.05	-131.57	8.9	5.8	-0.7	27	44
5	USA	Anvik	62.65	-160.18	2.4	8.3	-1.7	31	36
5	USA	Barrow-W Post-W Rogers AP	71.32	-156.62	-8.0	12.3	-1.1	44	-16
5	USA	Bethel AP	60.78	-161.83	1.9	8.1	-1.3	36	26
5	USA	Bettles Field	66.92	-151.52	-0.5	11.1	-2.0	22	-5
5	USA	Big Delta-Allen AAF	64.00	-145.72	3.7	12.3	-3.1	23	10
5	USA	Big River Lake	60.82	-152.30	5.1	9.9	-3.4	25	18
5	USA	Birchwood	61.42	-149.52	5.5	9.7	-2.5	19	15
5	USA	Chulitna	62.88	-149.83	2.9	7.0	-2.5	29	18
5	USA	Cold Bay AP	55.20	-162.72	5.1	5.4	-1.0	38	37
5	USA	Cordova	60.50	-145.50	5.1	7.8	-1.1	18	34
5	USA	Deadhorse	70.20	-148.48	-5.1	12.2	-4.4	47	-20
5	USA	Dillingham AWOS	59.05	-158.52	3.5	7.0	-3.0	26	30
5	USA	Eielson AFB	64.65	-147.10	2.1	9.6	-2.3	28	18
5	USA	Emmonak	62.78	-164.50	1.7	7.3	-1.3	38	43
5	USA	Fairbanks Intl AP	64.82	-147.85	2.4	11.6	-1.8	26	19

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Fort Yukon	66.57	-145.27	-0.7	11.1	-2.4	23	-8
5	USA	Gambell	63.78	-171.75	-0.5	5.1	-0.7	48	5
5	USA	Gulkana	62.15	-145.45	1.5	9.3	-0.4	28	22
5	USA	Gustavus	58.42	-135.70	5.9	7.5	0.0	20	13
5	USA	Hayes River	61.98	-152.08	4.2	8.5	-3.2	28	24
5	USA	Healy River AP	63.88	-149.02	3.1	8.1	-2.4	28	18
5	USA	Homer AP	59.65	-151.48	4.7	8.3	-1.6	34	30
5	USA	Hoonah	58.08	-135.45	6.0	8.5	-0.9	21	13
5	USA	Hooper Bay	61.52	-166.15	1.1	5.9	0.1	46	7
5	USA	Huslia	65.70	-156.38	0.6	8.7	-0.6	24	11
5	USA	Hydaburg Seaplane Base	55.20	-132.83					
5	USA	Iliamna AP	59.75	-154.92	4.7	7.8	-2.4	24	27
5	USA	Juneau Intl AP	58.35	-134.58	6.3	8.8	-0.5	23	-4
5	USA	Kake Seaplane Base	56.97	-133.95	7.2	7.7	-0.9	22	32
5	USA	Kenai Muni AP	60.58	-151.23	5.3	8.7	-2.4	20	22
5	USA	Ketchikan Intl AP	55.37	-131.72	7.4	8.2	-0.5	29	10
5	USA	King Salmon AP	58.68	-156.65	3.0	8.1	-2.0	36	36
5	USA	Kodiak AP	57.75	-152.50	6.9	6.4	-1.5	24	48
5	USA	Kotzebue-Ralph Wein Mem AP	66.88	-162.60	-1.7	9.0	-2.0	44	8
5	USA	McGrath AP	62.95	-155.60	0.9	10.3	-1.3	28	18
5	USA	Mekoryuk 702185	60.37	-166.27	1.5	5.0	1.7	46	-35
5	USA	Middleton Island	59.47	-146.32	7.0	5.6	-1.8	37	48
5	USA	Minchumina 702460	63.88	-152.28	2.3	11.1	-1.3	20	29
5	USA	Nenana Muni AP	64.55	-149.10	1.9	8.5	-2.7	24	13
5	USA	Nome Muni AP	64.52	-165.45	0.2	7.1	-1.8	40	11
5	USA	Northway AP	62.97	-141.93	-0.9	11.0	-1.6	23	-2
5	USA	Palmer Muni AP	61.60	-149.08	6.2	8.6	-1.9	20	17
5	USA	Petersburg	56.80	-132.95	6.3	8.0	-0.5	21	14
5	USA	Point Hope AWOS	68.35	-166.80	-2.6	7.3	-2.6	56	-13
5	USA	Port Heiden	56.95	-158.62	3.9	6.2	-1.6	43	36
5	USA	Saint Marys AWOS	62.07	-163.30	1.9	6.1	-1.2	45	19
5	USA	Sand Point	55.32	-160.52	5.3	5.9	-1.8	30	44
5	USA	Savoonga	63.68	-170.50	-0.3	5.3	-1.0	46	-7
5	USA	Selawik	66.60	-160.00	-0.9	8.4	-1.5	33	-9
5	USA	Seward	60.12	-149.45	5.2	8.0	-1.6	24	27
5	USA	Shemya AFB	52.72	174.12	3.7	4.9	0.7	47	-37
5	USA	Shishmaref AWOS	66.27	-166.05	-1.5	7.3	-1.7	48	-13
5	USA	Sitka-Japonski Island AP	57.05	-135.37	7.3	7.6	-0.2	30	21
5	USA	Skagway AP	59.47	-135.30	7.1	9.8	-1.1	14	-1

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Sleetmute	61.72	-157.15	3.2	9.5	-0.8	17	17
5	USA	Soldotna	60.47	-151.03	4.3	8.6	-2.8	23	26
5	USA	St Paul Island AP	57.17	-170.22	2.9	5.4	-1.5	55	45
5	USA	Talkeetna State AP	62.32	-150.10	3.5	9.8	-1.8	28	32
5	USA	Tanana-Ralph Calhoun AP	65.17	-152.10	0.4	8.6	-1.2	28	11
5	USA	Togiak Village AWOS	59.05	-160.40	3.6	7.1	-2.8	35	32
5	USA	Unalakleet Field	63.88	-160.80	1.3	6.8	-0.2	34	8
5	USA	Unalaska-Dutch Harbor Field	53.90	-166.55	5.6	5.2	-1.3	44	25
5	USA	Valdez-Pioneer Field	61.13	-146.27	5.5	8.0	-1.7	21	22
5	USA	Valdez	61.13	-146.35	4.9	8.2	-1.4	26	20
5	USA	Whittier	60.77	-148.68	4.9	8.1	-1.8	24	23
5	USA	Wrangell	56.48	-132.37	7.1	8.1	-0.1	26	3
5	USA	Yakutat State AP	59.52	-139.63	5.2	7.9	-1.0	30	22
5	USA	Anniston Metro AP	33.58	-85.85	17.9	8.8	0.9	16	3
5	USA	Auburn-Opelika AP	32.62	-85.43	17.7	8.8	0.9	24	21
5	USA	Birmingham Muni AP	33.57	-86.75	18.1	9.8	0.9	19	-3
5	USA	Dothan Muni AP	31.23	-85.43	20.0	9.3	1.3	20	11
5	USA	Fort Rucker-Cairns Field	31.27	-85.72	18.8	9.1	0.7	19	5
5	USA	Gadsen Muni AWOS	33.97	-86.08	17.2	9.5	1.2	20	-11
5	USA	Huntsville Intl AP-Jones Field	34.65	-86.78	16.8	10.6	0.8	19	11
5	USA	Maxwell AFB	32.38	-86.35	19.0	10.2	0.7	19	9
5	USA	Mobile-Downtown AP	30.63	-88.07	20.4	8.2	0.7	22	-21
5	USA	Mobile-Rgnl AP	30.68	-88.25	20.2	8.3	0.7	21	2
5	USA	Montgomery-Dannelly Field	32.30	-86.40	19.1	9.3	1.0	17	-11
5	USA	Muscle Shoals Rgnl AP	34.75	-87.60	17.8	9.5	1.0	24	26
5	USA	Troy Air Field	31.87	-86.02	19.3	9.1	1.5	21	-8
5	USA	Tuscaloosa Muni AP	33.22	-87.62	18.4	9.8	1.4	21	1
5	USA	Batesville AWOS	35.73	-91.65	16.7	10.9	0.2	23	3
5	USA	Bentonville AWOS	36.35	-94.22	15.3	11.5	-1.8	22	53
5	USA	El Dorado-Goodwin Field	33.22	-92.82	19.0	11.0	1.5	19	-8
5	USA	Fayetteville-Drake Field	36.00	-94.17	16.7	11.1	1.8	24	-20
5	USA	Flippin AWOS	36.30	-92.47	16.6	11.1	0.9	25	3
5	USA	Fort Smith Rgnl AP	35.33	-94.37	16.9	12.1	1.1	23	9
5	USA	Harrison AP	36.27	-93.15	16.1	11.0	0.9	27	-6
5	USA	Hot Springs Mem AP	34.47	-93.10	17.7	11.0	0.3	25	8
5	USA	Jonesboro Muni AP	35.83	-90.65	16.1	12.7	2.1	22	7
5	USA	Little Rock-Adams Field	34.75	-92.23	17.7	11.2	1.1	22	0
5	USA	Little Rock AFB	34.92	-92.15	17.3	11.1	0.0	20	5
5	USA	Pine Bluff AP	34.17	-91.93	18.1	12.3	2.0	21	-14

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Rogers AWOS	36.37	-94.10	15.7	11.8	-0.7	27	38
5	USA	Siloam Spring AWOS	36.18	-94.48	16.2	11.0	-1.0	22	42
5	USA	Springdale Muni AP	36.18	-94.12	15.9	11.3	1.4	21	-13
5	USA	Stuttgart AWOS	34.60	-91.57	18.4	10.5	0.8	25	7
5	USA	Texarkana-Webb Field	33.45	-94.00	19.4	10.3	1.3	23	0
5	USA	Walnut Ridge AWOS	36.13	-90.92	16.5	11.4	0.9	21	-2
5	USA	Casa Grande AWOS	32.95	-111.77	24.4	11.6	1.3	16	-32
5	USA	Davis-Monthan AFB	32.17	-110.88	23.7	9.7	0.1	14	8
5	USA	Douglas-Bisbee Douglas Intl AP	31.47	-109.60	20.4	9.8	1.2	11	7
5	USA	Flagstaff-Pulliam AP	35.13	-111.67	11.0	11.2	-0.4	20	12
5	USA	Grand Canyon National Park AP	35.95	-112.15	11.9	11.4	-0.3	21	4
5	USA	Kingman AWOS	35.27	-113.95	19.9	12.6	1.0	15	-33
5	USA	Luke AFB	33.55	-112.37	25.0	11.4	-0.1	18	12
5	USA	Page Muni AWOS	36.93	-111.45	18.5	13.0	1.0	12	-21
5	USA	Phoenix-Deer Valley AP	33.68	-112.08	24.7	11.5	0.2	21	1
5	USA	Phoenix-Sky Harbor Intl AP	33.45	-111.98	25.6	11.4	0.9	18	-22
5	USA	Prescott-Love Field	34.65	-112.42	16.2	11.2	-0.1	21	9
5	USA	Safford AWOS	32.82	-109.68	22.1	10.8	1.7	11	-6
5	USA	Scottsdale Muni AP	33.62	-111.92	24.9	11.7	0.0	20	7
5	USA	Show Low Muni AP	34.27	-110.00	15.0	10.3	0.7	15	-16
5	USA	Tucson Intl AP	32.13	-110.95	22.7	10.3	-0.1	19	7
5	USA	Winslow Muni AP	35.03	-110.72	16.3	12.4	-0.6	16	50
5	USA	Yuma Intl AP	32.67	-114.60	25.9	10.0	1.5	24	-29
5	USA	Yuma MCAS	32.65	-114.62	25.6	10.0	1.5	24	-24
5	USA	Alturas	41.50	-120.53	12.8	11.6	-2.1	18	40
5	USA	Arcata AP	40.98	-124.10	13.1	4.1	0.3	23	-6
5	USA	Bakersfield-Meadows Field	35.43	-119.05	21.0	10.0	1.1	22	-16
5	USA	Barstow Daggett AP	34.85	-116.80	21.7	11.3	1.2	17	-30
5	USA	Beale AFB	39.13	-121.43	19.2	10.8	1.9	19	-33
5	USA	Bishop AP	37.37	-118.35	17.2	11.7	-1.1	17	46
5	USA	Blue Canyon AP	39.30	-120.72	14.2	10.5	-0.6	29	1
5	USA	Blythe-Riverside County AP	33.62	-114.72	26.1	11.2	1.3	15	-29
5	USA	Burbank-Glendale-Passadena Bob Hope AP	34.20	-118.35	20.8	7.0	0.9	24	-9
5	USA	Camarillo AWOS	34.22	-119.08	18.5	5.0	0.3	23	15
5	USA	Camp Pendleton MCAS	33.30	-117.35	18.8	5.5	0.8	24	-24
5	USA	Carlsbad	33.13	-117.28	18.7	4.2	1.0	25	-41
5	USA	China Lake NAF	35.68	-117.68	20.9	12.1	0.9	15	-22
5	USA	Chino AP	33.97	-117.63	20.3	6.9	0.7	22	-30

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Chula Vista-Brown Field Muni AP	32.58	-116.98	19.1	4.5	0.6	30	-36
5	USA	Concord-Buchanan Field	38.00	-122.05	17.5	7.6	1.0	24	13
5	USA	Crescent City-Jack McNamara Field	41.78	-124.23	13.3	4.1	0.2	23	7
5	USA	Edwards AFB	34.90	-117.87	18.4	10.7	-1.5	22	43
5	USA	Fairfield-Travis AFB	38.27	-121.93	17.7	8.6	1.4	16	-6
5	USA	Fresno Air Terminal	36.78	-119.72	20.5	10.8	1.1	19	-23
5	USA	Fullerton Muni AP	33.87	-117.98	20.8	6.4	-1.0	28	48
5	USA	Hawthorne-Jack Northrop Field	33.92	-118.33	19.6	4.5	0.1	30	0
5	USA	Hayward Air Terminal	37.67	-122.12	17.6	5.2	1.4	21	-7
5	USA	Imperial County AP	32.83	-115.58	25.7	10.5	1.1	18	-21
5	USA	Lancaster-Gen Wm Fox Field	34.73	-118.22	19.5	10.5	1.3	18	-19
5	USA	Lemoore NAS	36.33	-119.95	19.7	10.4	1.0	15	-23
5	USA	Livermore Muni AP	37.70	-121.82	17.0	7.5	1.2	18	-15
5	USA	Lompoc AWOS	34.67	-120.47	15.4	3.5	0.9	28	-8
5	USA	Long Beach-Daugherty Field	33.83	-118.17	20.0	5.4	0.8	26	-18
5	USA	Los Angeles Intl AP	33.93	-118.40	19.3	4.3	0.5	27	-20
5	USA	March AFB	33.90	-117.25	20.1	8.3	1.4	23	-33
5	USA	Merced-Macready Field	37.28	-120.52	19.7	9.2	0.9	13	-15
5	USA	Modesto Muni AP	37.63	-120.95	19.5	9.1	1.1	16	-11
5	USA	Montague-Siskiyou County AP	41.78	-122.47	14.8	10.9	-2.0	20	53
5	USA	Monterey NAF	36.60	-121.87	15.9	3.7	1.1	24	-5
5	USA	Mountain View-Moffett Field NAS	37.40	-122.05	17.5	5.7	1.7	27	-9
5	USA	Napa County AP	38.22	-122.28	16.2	6.3	0.6	15	-8
5	USA	Needles AP	34.77	-114.62	25.7	12.0	0.1	15	7
5	USA	Oakland Intl AP	37.72	-122.22	16.4	4.8	0.7	19	5
5	USA	Oxnard AP	34.20	-119.20	18.2	4.4	0.8	26	-4
5	USA	Palm Springs-Thermal AP	33.63	-116.17	25.3	11.0	0.9	17	-19
5	USA	Palm Springs Intl AP	33.83	-116.50	26.1	10.1	0.1	18	6
5	USA	Palmdale AP	34.63	-118.08	19.5	11.1	0.8	19	-27
5	USA	Paso Robles Muni AP	35.67	-120.63	18.1	7.5	0.9	17	-3
5	USA	Point Mugu NAS	34.12	-119.12	17.7	4.2	0.5	30	-10
5	USA	Porterville AWOS	36.03	-119.07	19.9	9.7	-0.7	20	43
5	USA	Red Bluff Muni AP	40.15	-122.25	19.2	11.3	-0.8	22	29
5	USA	Redding Muni AP	40.52	-122.32	19.3	10.6	-0.2	21	12
5	USA	Riverside Muni AP	33.95	-117.45	20.5	7.0	-0.9	24	49
5	USA	Sacramento Exec AP	38.50	-121.50	18.1	8.8	1.3	17	-19
5	USA	Sacramento Metro AP	38.70	-121.58	18.8	9.3	0.9	14	-4

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Salinas Muni AP	36.67	-121.60	16.2	4.8	0.1	27	9
5	USA	San Diego-Lindbergh Field	32.73	-117.17	20.1	4.7	1.0	28	-21
5	USA	San Diego-Miramar NAS	32.87	-117.13	19.3	5.8	1.0	32	-36
5	USA	San Diego-Montgomery Field	32.82	-117.13	19.5	5.0	1.5	29	-31
5	USA	San Diego-North Island NAS	32.70	-117.20	19.4	4.3	0.7	30	-21
5	USA	San Francisco Intl AP	37.62	-122.40	16.2	4.0	1.1	21	3
5	USA	San Jose Intl AP	37.37	-121.93	17.8	6.2	1.1	22	-4
5	USA	San Luis Obispo AP	35.23	-120.63	17.0	4.9	0.8	21	2
5	USA	Sandberg	34.75	-118.72	16.4	9.0	0.0	25	2
5	USA	Santa Ana-John Wayne AP	33.68	-117.87	20.1	4.7	0.9	23	-21
5	USA	Santa Barbara Muni AP	34.43	-119.85	17.7	5.0	1.2	20	-18
5	USA	Santa Maria Public AP	34.92	-120.47	16.2	4.5	0.3	24	7
5	USA	Santa Monica Muni AP	34.02	-118.45	19.4	4.5	0.5	32	-40
5	USA	Santa Rosa AWOS	38.52	-122.82	16.9	6.8	0.7	16	-14
5	USA	South Lake Tahoe-Lake Tahoe AP	38.90	-120.00	10.2	10.7	-0.1	22	1
5	USA	Stockton Metro AP	37.90	-121.23	19.0	9.0	1.4	15	-13
5	USA	Truckee Tahoe AP	39.32	-120.13	10.4	10.4	-1.9	27	45
5	USA	Twentynine Palms	34.30	-116.17	23.1	11.6	1.3	18	-32
5	USA	Ukiah Muni AP	39.13	-123.20	17.7	8.6	1.3	19	-32
5	USA	Van Nuys AP	34.22	-118.48	21.1	6.7	0.0	22	16
5	USA	Visalia Muni AWOS	36.32	-119.40	19.3	11.5	1.8	13	-27
5	USA	Yuba County AP	39.10	-121.57	19.1	9.9	1.1	16	-22
5	USA	Akron-Washington County AP	40.17	-103.23	12.5	12.8	-0.2	18	9
5	USA	Alamosa Muni AP	37.43	-105.87	9.2	12.9	0.2	22	7
5	USA	Aspen-Pitkin County-Sardy Field	39.22	-106.87	7.4	11.0	-0.9	24	7
5	USA	Aurora-Buckley Field ANGB	39.72	-104.75	12.6	12.3	-1.8	20	40
5	USA	Boulder-Broomfield-Jefferson County AP	40.13	-105.24	12.9	12.3	1.1	19	-34
5	USA	Colorado Springs-Peterson Field	38.82	-104.72	12.2	12.1	0.2	19	9
5	USA	Cortez-Montezuma County AP	37.30	-108.63	13.4	12.6	0.1	14	9
5	USA	Craig Moffat AP	40.50	-107.53	7.3	12.5	-1.3	31	24
5	USA	Denver Intl AP	39.83	-104.65	13.5	12.5	-1.3	20	31
5	USA	Durango-La Plata County AP	37.15	-107.75	9.6	12.6	-0.5	27	48
5	USA	Eagle County Rgnl AP	39.65	-106.92	8.4	12.4	-0.2	25	12
5	USA	Fort Collins AWOS	40.45	-105.02	11.4	12.9	-0.2	17	7
5	USA	Golden-NREL	39.74	-105.18	11.3	10.9	-0.5	26	5

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Grand Junction-Walker Field	39.13	-108.53	14.7	13.7	1.1	17	-20
5	USA	Greeley-Weld County AWOS	40.43	-104.63	11.5	12.9	-1.4	20	44
5	USA	Gunnison County AWOS	38.53	-106.93	7.1	11.7	-0.8	25	27
5	USA	Hayden-Yampa AWOS	40.48	-107.22	7.7	12.3	-1.3	30	26
5	USA	La Junta Muni AP	38.05	-103.53	14.8	13.6	0.0	18	7
5	USA	Lamar Muni AP	38.07	-102.68	14.3	13.8	-1.7	20	40
5	USA	Leadville-Lake County AP	39.22	-106.32	4.3	9.1	-1.5	32	37
5	USA	Limon Muni AP	39.18	-103.72	11.4	12.3	-1.6	19	45
5	USA	Montrose County AP	38.50	-107.90	11.8	12.7	0.8	23	-14
5	USA	Pueblo Mem AP	38.28	-104.50	14.4	12.9	0.9	17	-13
5	USA	Rifle-Garfield County Rgnl AP	39.53	-107.72	11.8	12.7	1.6	19	-8
5	USA	Trinidad-Las Animas County AP	37.27	-104.33	14.2	11.8	0.9	21	-28
5	USA	Bridgeport-Sikorsky Mem AP	41.18	-73.15	12.3	11.5	0.4	31	39
5	USA	Danbury Muni AP	41.37	-73.48	11.4	11.1	-1.5	30	-26
5	USA	Groton-New London AP	41.33	-72.05	11.6	9.9	0.9	31	-10
5	USA	Hartford-Bradley Intl AP	41.93	-72.68	11.3	12.6	0.1	25	1
5	USA	Hartford-Brainard Field	41.73	-72.65	12.1	11.5	-0.1	27	-3
5	USA	New Haven-Tweed AP	41.27	-72.88	12.3	10.8	0.1	30	10
5	USA	Oxford AWOS	41.48	-73.13	11.0	11.9	-0.5	32	-3
5	USA	Dover AFB	39.13	-75.47	13.6	11.3	-0.3	27	7
5	USA	Wilmington-New Castle County AP	39.67	-75.60	13.5	12.0	0.6	22	2
5	USA	Crestview-Bob Sikes AP	30.78	-86.52	20.2	7.8	0.7	27	-1
5	USA	Daytona Beach Intl AP	29.18	-81.07	22.1	6.3	0.8	24	9
5	USA	Fort Lauderdale Executive AP	26.20	-80.17	24.7	4.2	0.6	24	13
5	USA	Fort Lauderdale Intl AP	26.07	-80.15	25.4	4.4	0.5	22	10
5	USA	Fort Myers-Page Field	26.58	-81.87	24.6	4.8	0.9	27	26
5	USA	Fort Pierce-St Lucie County AP	27.48	-80.37	22.5	5.4	0.7	24	1
5	USA	Fort Walton Beach-Hurlburt Field	30.42	-86.68	20.3	9.0	0.8	20	18
5	USA	Gainesville Rgnl AP	29.70	-82.28	21.0	7.3	1.3	19	-3
5	USA	Homestead AFB	25.48	-80.38	24.7	5.4	1.1	26	14
5	USA	Jacksonville-Craig Field	30.33	-81.52	21.3	6.7	0.1	21	6
5	USA	Jacksonville Intl AP	30.50	-81.70	20.7	7.5	0.6	22	5
5	USA	Jacksonville NAS	30.23	-81.67	22.1	7.2	1.2	15	0
5	USA	Key West Intl AP	24.55	-81.75	26.2	4.3	0.6	30	14
5	USA	Key West NAS	24.58	-81.68	26.2	4.5	0.7	28	11
5	USA	Lakeland Linder Rgnl AP	27.98	-82.02	22.6	7.1	1.2	22	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	MacDill AFB	27.85	-82.52	22.9	7.1	1.1	24	28
5	USA	Marathon AP	24.73	-81.05	26.9	4.5	0.9	25	8
5	USA	Mayport NS	30.40	-81.42	21.8	7.0	1.0	24	12
5	USA	Melbourne Rgnl AP	28.12	-80.65	23.4	4.9	0.9	23	-1
5	USA	Miami-Kendall-Tamiami Executive AP	25.65	-80.43	24.0	4.5	0.4	24	6
5	USA	Miami-Opa Locka AP	25.90	-80.28	24.8	4.8	0.5	34	3
5	USA	Miami Intl AP	25.82	-80.30	25.1	4.3	0.7	30	12
5	USA	Naples Muni AP	26.15	-81.77	23.8	5.0	0.6	24	7
5	USA	NASA Shuttle Landing Facility	28.62	-80.72	22.6	6.3	0.9	30	26
5	USA	Ocala Muni AWOS	29.17	-82.22	21.7	7.1	1.6	17	-8
5	USA	Orlando-Sanford AP	28.78	-81.25	22.6	6.4	-0.1	26	-1
5	USA	Orlando Executive AP	28.55	-81.33	23.2	6.4	1.8	22	6
5	USA	Orlando Intl AP	28.43	-81.33	22.7	5.7	0.8	25	8
5	USA	Panama City-Bay County AP	30.20	-85.68	21.5	7.8	0.3	25	-5
5	USA	Pensacola-Forest Sherman NAS	30.35	-87.32	20.9	8.3	0.9	19	13
5	USA	Pensacola Rgnl AP	30.48	-87.18	21.4	7.6	0.7	24	16
5	USA	Sarasota-Bradenton Intl AP	27.38	-82.55	23.1	5.9	1.4	30	17
5	USA	Southwest Florida Intl AP	26.53	-81.75	23.6	4.9	0.9	23	-9
5	USA	St Petersburg-Albert Whitted Station	27.77	-82.63	24.1	6.3	0.8	33	28
5	USA	St Petersburg-Clearwater Intl AP	27.90	-82.68	23.2	7.0	1.5	31	25
5	USA	Tallahassee Rgnl AP	30.38	-84.37	20.2	8.1	0.8	19	-8
5	USA	Tampa Intl AP	27.97	-82.53	23.1	6.2	1.1	23	9
5	USA	Tyndall AFB	30.07	-85.58	19.8	8.5	0.6	25	1
5	USA	Valparaiso-Elgin AFB	30.48	-86.52	19.8	9.1	0.5	23	17
5	USA	Vero Beach Muni AP	27.65	-80.42	23.7	4.6	0.7	23	12
5	USA	West Palm Beach Intl AP	26.68	-80.10	24.2	4.8	0.8	29	15
5	USA	Whiting Field NAS	30.72	-87.02	20.1	8.1	0.3	24	15
5	USA	Albany-Dougherty County AP	31.53	-84.18	20.1	8.2	0.6	24	7
5	USA	Alma-Bacon County AP	31.53	-82.50	19.7	9.3	1.3	18	-9
5	USA	Athens-Ben Epps AP	33.95	-83.33	17.8	9.4	0.8	18	0
5	USA	Atlanta-Hartsfield-Jackson Intl AP	33.63	-84.43	17.8	9.9	1.1	18	-7
5	USA	Augusta-Bush-Field	33.37	-81.97	18.4	9.7	0.7	18	-11
5	USA	Brunswick-Golden Isles AP	31.25	-81.47	19.9	9.2	0.5	19	24
5	USA	Brunswick-Malcolm McKinnon AP	31.15	-81.38	21.1	7.3	1.1	24	7
5	USA	Columbus Metro AP	32.52	-84.95	19.6	9.4	0.9	22	-8

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Dekalb Peachtree AP	33.87	-84.30	16.9	10.4	1.2	21	-14
5	USA	Fort Benning-Lawson Field	32.35	-85.00	17.6	10.4	0.6	16	-1
5	USA	Fulton County AP	33.77	-84.52	17.3	9.5	1.8	16	-18
5	USA	Macon-Middle Georgia Rgnl AP	32.68	-83.65	18.9	9.4	1.0	19	-2
5	USA	Marietta-Dobbins AFB	33.92	-84.52	15.9	10.6	0.2	21	12
5	USA	Rome-Richard B Russell AP	34.35	-85.17	17.3	10.7	1.6	23	-28
5	USA	Savannah-Hunter AAF	32.00	-81.15	19.3	9.4	1.0	20	-6
5	USA	Savannah Intl AP	32.12	-81.20	20.0	8.7	0.8	20	15
5	USA	Valdosta-Moody AFB	30.97	-83.20	19.6	8.8	0.5	18	-3
5	USA	Valdosta Rgnl AP	30.78	-83.28	21.0	8.4	0.8	18	4
5	USA	Warner Robins AFB	32.63	-83.60	17.9	10.5	0.9	15	-2
5	USA	Andersen-AFB	13.57	144.92	27.4	1.1	0.0	15	13
5	USA	GuamWfo	13.48	144.80	27.6	0.8	0.0	16	17
5	USA	Barbers Point NAS	21.32	-158.07	26.9	3.4	0.3	30	10
5	USA	Hilo Intl AP	19.72	-155.05	23.9	1.5	0.2	53	5
5	USA	Honolulu Intl AP	21.32	-157.93	27.2	2.6	0.1	37	-13
5	USA	Kahului AP	20.90	-156.43	24.7	1.9	0.3	44	3
5	USA	Kailua-Kaneohe Bay MCAS	21.45	-157.78	27.0	2.6	0.1	43	-12
5	USA	Kapalua-West Maui AP	20.95	-156.63	25.9	2.2	0.2	34	16
5	USA	Keahole-Kona Intl AP	19.73	-156.05	25.7	1.6	0.3	39	4
5	USA	Lanai AP	20.78	-156.95	23.9	2.2	0.3	27	22
5	USA	Lihue AP	21.98	-159.33	25.9	2.6	0.4	40	-9
5	USA	Molokai AWOS	21.15	-157.10	25.7	2.4	0.3	32	-5
5	USA	Algona Muni AP	43.08	-94.27	10.2	13.5	-0.1	25	1
5	USA	Atlantic Muni AP	41.40	-95.05	10.8	14.0	0.3	22	9
5	USA	Boone Muni AP	42.05	-93.85	10.6	13.8	-0.6	25	12
5	USA	Burlington Muni AP	40.78	-91.12	13.2	14.6	1.1	23	26
5	USA	Carroll Muni AP	42.05	-94.78	11.0	13.7	0.5	25	3
5	USA	Cedar Rapids Muni AP	41.88	-91.72	10.8	13.6	0.7	25	39
5	USA	Chariton Muni AP	41.03	-93.37	11.9	14.5	0.1	24	-4
5	USA	Charles City Muni AP	43.07	-92.62	10.2	13.6	0.3	29	16
5	USA	Clarinda Muni AP	40.72	-95.03	12.6	14.5	1.0	23	3
5	USA	Clinton Muni AWOS	41.83	-90.33	10.9	14.4	1.3	24	-29
5	USA	Council Bluffs Muni AP	41.27	-95.77	12.1	13.4	0.7	24	16
5	USA	Creston Muni AP	41.02	-94.37	11.6	13.7	1.0	19	4
5	USA	Decorah Muni AP	43.28	-91.73	11.8	14.1	1.0	23	-8
5	USA	Denison Muni AP	41.98	-95.38	11.1	14.4	0.7	27	-15
5	USA	Des Moines Intl AP	41.53	-93.67	11.4	14.6	0.0	24	6
5	USA	Dubuque Rgnl AP	42.40	-90.70	9.4	13.4	-0.7	28	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Estherville Muni AP	43.40	-94.75	8.5	14.0	-1.0	30	15
5	USA	Fairfield Muni AP	41.05	-91.98	11.8	14.0	0.6	23	14
5	USA	Fort Dodge AWOS	42.55	-94.18	10.4	14.4	0.0	25	5
5	USA	Fort Madison Muni AP	40.67	-91.33	13.3	13.0	1.3	26	-2
5	USA	Keokuk Muni AP	40.47	-91.43	13.2	13.6	1.7	28	31
5	USA	Knoxville Muni AP	41.30	-93.12	12.4	14.4	1.2	27	6
5	USA	Le Mars Muni AP	42.78	-96.20	11.8	13.3	2.2	26	36
5	USA	Mason City Muni AP	43.15	-93.33	9.0	14.3	-0.5	27	0
5	USA	Monticello Muni AP	42.23	-91.17	10.6	13.8	0.9	26	28
5	USA	Muscatine Muni AP	41.37	-91.15	11.6	14.0	0.9	28	36
5	USA	Newton Muni AP	41.68	-93.02	11.3	13.3	1.3	24	7
5	USA	Oelwein Muni AP	42.68	-91.97	10.8	12.9	0.9	25	5
5	USA	Orange City Muni AP	42.98	-96.07	10.6	13.7	-0.4	21	12
5	USA	Ottumwa Industrial AP	41.10	-92.45	11.2	13.7	-0.1	25	0
5	USA	Red Oak Muni AP	41.02	-95.27	12.0	14.4	0.4	25	5
5	USA	Sheldon Muni AP	43.22	-95.83	10.8	12.9	1.1	21	-32
5	USA	Shenandoah Muni AP	40.75	-95.42	11.8	14.7	0.5	23	12
5	USA	Sioux City-Sioux Gateway AP	42.38	-96.38	10.7	14.3	0.0	22	6
5	USA	Spencer Muni AP	43.17	-95.15	8.8	13.7	-0.7	28	-3
5	USA	Storm Lake Muni AP	42.60	-95.23	10.4	13.7	-0.1	27	1
5	USA	Washington Muni AP	41.28	-91.67	11.4	13.8	0.1	27	8
5	USA	Waterloo Muni AP	42.55	-92.40	10.0	14.3	-0.7	27	-11
5	USA	Webster City Muni AP	42.43	-93.87	11.4	14.1	0.7	25	-6
5	USA	Boise Air Terminal	43.62	-116.21	13.6	12.2	1.0	18	-26
5	USA	Burley Muni AP	42.53	-113.77	12.5	12.6	-1.2	20	46
5	USA	Caldwell AWOS	43.63	-116.63	13.4	12.8	-1.2	16	46
5	USA	Coeur dAlene AWOS	47.77	-116.82	11.0	12.0	-1.2	17	45
5	USA	Hailey-Sun Valley AP	43.50	-114.30	10.8	13.6	-2.3	22	34
5	USA	Idaho Falls-Fanning Field	43.52	-112.07	9.9	13.3	-0.5	22	1
5	USA	Lewiston-Nez Perce County AP	46.37	-117.02	13.8	12.8	-1.8	19	41
5	USA	Malad City AP	42.15	-112.28	10.7	12.0	-1.8	20	43
5	USA	Mountain Home AFB	43.05	-115.87	12.7	12.8	-2.3	19	43
5	USA	Pocatello Muni AP	42.92	-112.57	10.9	13.2	0.0	19	6
5	USA	Salmon-Lemhi AWOS	45.12	-113.88	9.5	12.5	-0.9	20	35
5	USA	Soda Springs-Tigert AP	42.65	-111.58	7.4	11.9	-2.7	28	22
5	USA	Twin Falls-Magic Valley Rgnl AP-Joslin Field	42.55	-114.35	12.5	12.5	-2.0	16	42
5	USA	Aurora Muni AP	41.77	-88.47	11.0	13.2	0.7	26	9
5	USA	Belleville-Scott AFB	38.55	-89.85	13.6	12.6	-0.5	22	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Bloomington Normal-Central Illinois Rgnl AP	40.47	-88.92	11.3	13.2	-1.0	24	-18
5	USA	Cahokia AP	38.57	-90.15	14.8	11.9	1.4	24	-12
5	USA	Carbondale-Southern Illinois AP	37.77	-89.25	15.6	12.4	0.8	23	13
5	USA	Chicago-Midway AP	41.78	-87.75	12.5	13.4	1.0	32	11
5	USA	Chicago-OHare Intl AP	41.98	-87.92	11.1	13.4	0.7	25	30
5	USA	Decatur AP	39.83	-88.87	12.7	13.0	1.3	22	-12
5	USA	Du Page AP	41.92	-88.25	11.7	12.6	0.6	22	-20
5	USA	Marion-Williamson County Rgnl AP	37.75	-89.02	14.6	11.6	-1.0	25	8
5	USA	Moline-Quad City Intl AP	41.47	-90.52	11.1	14.0	0.0	24	14
5	USA	Mount Vernon AWOS	38.32	-88.87	14.7	12.2	0.1	28	0
5	USA	Peoria-Greater Peoria AP	40.67	-89.68	11.3	13.7	0.9	22	40
5	USA	Quincy Muni AP	39.93	-91.20	13.0	12.7	1.7	24	12
5	USA	Rockford-Greater Rockford AP	42.20	-89.10	9.9	14.1	-0.2	26	5
5	USA	Springfield-Capital AP	39.85	-89.68	12.9	13.4	1.3	23	39
5	USA	Sterling-Rock Falls-Whiteside County AP	41.75	-89.67	11.7	13.1	1.1	26	26
5	USA	University of Illinois-Willard AP	40.06	-88.37	12.4	13.3	0.6	23	3
5	USA	Waukegan Rgnl AP	42.42	-87.87	9.9	12.8	-0.6	30	29
5	USA	Delaware County-Johnson Field	40.23	-85.40	12.4	12.8	-0.1	29	-7
5	USA	Evansville Rgnl AP	38.05	-87.53	14.9	11.9	0.7	21	13
5	USA	Fort Wayne Intl AP	41.00	-85.20	10.8	13.5	0.0	25	2
5	USA	Grissom AFB	40.65	-86.15	11.5	12.7	-1.2	27	-19
5	USA	Huntingburg Muni AP	38.25	-86.95	15.5	11.0	0.9	24	-32
5	USA	Indianapolis Intl AP	39.72	-86.27	12.5	13.3	0.7	20	24
5	USA	Lafayette-Purdue University AP	40.42	-86.93	12.1	13.0	1.3	26	23
5	USA	Monroe County AP	39.13	-86.62	13.2	12.2	0.9	23	-2
5	USA	South Bend-Michiana Rgnl AP	41.70	-86.33	11.6	13.0	0.2	23	3
5	USA	Terre Haute-Hulman Rgnl AP	39.45	-87.30	13.7	12.7	1.2	26	7
5	USA	Chanute-Martin Johnson AP	37.67	-95.48	15.6	12.9	2.7	19	-8
5	USA	Concordia-Blosser Muni AP	39.55	-97.65	14.2	13.6	0.5	22	7
5	USA	Dodge City Rgnl AP	37.77	-99.97	14.0	12.8	0.6	22	-8
5	USA	Emporia Muni AP	38.33	-96.18	13.2	14.2	0.9	20	2
5	USA	Fort Riley-Marshall AAF	39.05	-96.77	15.2	12.3	0.8	25	-10
5	USA	Garden City Muni AP	37.93	-100.72	14.4	13.2	-0.6	18	11
5	USA	Goodland-Renner Field	39.37	-101.70	12.9	13.7	1.2	17	-14
5	USA	Great Bend AWOS	38.35	-98.87	14.2	12.5	0.3	24	2

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Hays Muni AWOS	38.85	-99.27	14.2	12.9	1.5	25	-34
5	USA	Hill City Muni AP	39.38	-99.83	12.8	12.6	-1.1	25	-7
5	USA	Hutchinson Muni AP	38.07	-97.87	15.0	12.2	1.1	19	1
5	USA	Liberal Muni AP	37.03	-100.97	15.5	12.9	-1.0	20	42
5	USA	Manhattan Rgnl AP	39.13	-96.67	14.3	13.3	0.7	20	-7
5	USA	Newton AWOS	38.05	-97.28	14.1	12.5	0.7	29	-9
5	USA	Olathe-Johnson County Executive AP	38.85	-94.73	14.8	12.2	1.0	27	-4
5	USA	Olathe-Johnson County Industrial AP	38.83	-94.88	14.4	12.8	0.8	19	-13
5	USA	Russell Muni AP	38.88	-98.82	13.9	12.8	0.3	22	11
5	USA	Salina Muni AP	38.82	-97.67	15.1	13.2	0.7	28	11
5	USA	Topeka-Forbes AFB	38.95	-95.67	14.3	12.3	1.3	20	1
5	USA	Topeka-Phillip Billard Muni AP	39.07	-95.63	14.1	12.6	0.9	20	3
5	USA	Wichita-Col Jabara Field	37.75	-97.22	14.6	12.8	1.7	20	-19
5	USA	Wichita-McConnell AFB	37.62	-97.27	15.0	13.3	-0.1	24	-1
5	USA	Wichita-Mid Continent AP	37.65	-97.43	15.1	11.9	0.7	24	-13
5	USA	Bowling Green-Warren County AP	36.98	-86.43	15.3	11.9	1.3	28	3
5	USA	Cincinnati-Northern Kentucky AP	39.05	-84.67	13.2	12.0	0.8	20	28
5	USA	Fort Campbell AAF	36.67	-87.48	15.4	12.2	0.2	25	11
5	USA	Fort Knox-Godman AAF	37.90	-85.97	14.4	11.7	-0.1	24	2
5	USA	Henderson City County AP	37.82	-87.68	13.8	11.5	-0.2	23	5
5	USA	Jackson-Julian Carroll AP	37.58	-83.32	15.6	10.3	0.6	22	35
5	USA	Lexington-Bluegrass AP	38.03	-84.60	14.0	11.9	1.0	21	15
5	USA	London-Corbin-Magee Field	37.08	-84.08	14.4	11.0	1.7	23	7
5	USA	Louisville-Bowman Field	38.23	-85.67	15.6	11.2	0.8	19	13
5	USA	Louisville-Standiford Field	38.18	-85.73	14.9	12.0	0.6	22	23
5	USA	Paducah-Barkley Rgnl AP	37.05	-88.77	15.9	10.7	0.1	21	2
5	USA	Somerset-Pulaski County AWOS	38.00	-84.60	16.1	11.8	1.0	19	30
5	USA	Alexandria-England AFB	31.32	-92.55	20.6	8.7	1.1	21	4
5	USA	Alexandria-Esler Rgnl AP	31.40	-92.30	19.7	9.1	1.2	21	-27
5	USA	Barksdale AFB	32.50	-93.67	19.0	10.0	0.7	22	42
5	USA	Baton Rouge-Ryan AP	30.53	-91.15	20.4	8.6	0.9	17	1
5	USA	Fort Polk	31.05	-93.18	19.7	9.2	1.2	19	11
5	USA	Houma-Terrebonne AP	29.57	-90.67	21.0	8.2	1.1	22	17
5	USA	Lafayette RgnlAP	30.20	-91.98	20.7	8.2	0.2	28	8
5	USA	Lake Charles AP	30.22	-93.17	20.8	9.1	1.9	17	-6
5	USA	Lake Charles Rgnl AP	30.12	-93.23	20.5	8.6	0.9	20	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Monroe Rgnl AP	32.52	-92.03	19.4	9.6	0.8	22	-20
5	USA	New Iberia	30.03	-91.88	20.5	8.6	1.3	24	-17
5	USA	New Orleans-Alvin Callender Field	29.82	-90.02	21.3	7.4	0.2	22	1
5	USA	New Orleans-Lakefront AP	30.05	-90.03	21.7	8.0	0.0	23	8
5	USA	New Orleans Intl AP	30.00	-90.25	21.3	8.0	1.0	21	10
5	USA	Patterson Mem AP	29.72	-91.33	20.9	7.9	-0.8	21	43
5	USA	Shreveport Downtown	32.53	-93.75	19.4	11.2	1.6	23	-17
5	USA	Shreveport Rgnl AP	32.45	-93.82	19.3	10.0	1.6	19	-5
5	USA	Barnstable-Boardman Poland AP	41.67	-70.28	11.7	9.8	0.0	34	-7
5	USA	Beverly Muni AP	42.58	-70.92	10.2	11.7	-0.2	32	-1
5	USA	Boston-Logan Intl AP	42.37	-71.02	11.5	11.8	0.1	29	6
5	USA	Chicopee Falls-Westover AFB	42.20	-72.53	10.8	11.6	-0.6	29	-5
5	USA	Lawrence Muni AP	42.72	-71.12	11.2	11.3	0.3	28	-1
5	USA	Marthas Vineyard AP	41.40	-70.62	11.8	9.3	0.0	34	5
5	USA	Nantucket Mem AP	41.25	-70.07	12.0	8.9	0.5	41	-29
5	USA	New Bedford Rgnl AP	41.67	-70.95	12.0	10.6	-0.8	31	-23
5	USA	North Adams AP	42.70	-73.17	10.3	11.6	0.8	29	7
5	USA	Norwood Mem AP	42.18	-71.18	11.0	11.9	-0.2	31	6
5	USA	Otis ANGB	41.65	-70.52	11.3	10.3	-1.7	32	35
5	USA	Plymouth Muni AP	41.92	-70.73	11.5	10.2	0.7	31	8
5	USA	Provincetown AWOS	42.07	-70.22	11.9	10.1	-0.7	39	30
5	USA	Westfield-Barnes Muni AP	42.15	-72.72	10.6	12.5	0.4	30	-5
5	USA	Worcester Rgnl AP	42.27	-71.88	9.2	12.3	-1.0	29	-14
5	USA	Andrews AFB	38.82	-76.87	14.3	11.0	-0.5	25	5
5	USA	Baltimore-Washington Intl AP	39.17	-76.68	14.4	11.8	0.5	22	-2
5	USA	Hagerstown-Washington County Rgnl AP	39.70	-77.73	14.0	11.5	0.6	25	7
5	USA	Patuxent River NAS	38.30	-76.42	16.3	10.1	-0.1	24	1
5	USA	Salisbury-Wicomico County Rgnl AP	38.33	-75.52	15.5	10.2	0.5	23	-2
5	USA	Auburn-Lewiston Muni AP	44.05	-70.28	8.4	11.6	-0.9	29	8
5	USA	Augusta AP	44.32	-69.80	9.0	12.6	0.5	34	-5
5	USA	Bangor Intl AP	44.80	-68.82	8.7	12.7	-1.5	32	5
5	USA	Bar Harbor AWOS	44.45	-68.37	7.5	10.4	-1.2	37	15
5	USA	Brunswick NAS	43.90	-69.93	8.8	12.2	-0.6	32	36
5	USA	Caribou Muni AP	46.87	-68.03	5.6	12.0	-2.3	37	27
5	USA	Edmundston-Northern Aroostook Rgnl AP	47.28	-68.32	5.7	11.8	-2.2	33	36
5	USA	Houlton Intl AP	46.12	-67.80	7.0	12.6	-1.1	33	12

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Millinocket Muni AP	45.65	-68.68	8.5	12.5	-0.8	30	16
5	USA	Portland Intl Jetport	43.65	-70.30	8.5	12.0	-0.9	30	11
5	USA	Presque Isle Muni AP	46.68	-68.05	6.4	11.5	-1.6	34	20
5	USA	Rockland-Knox AWOS	44.07	-69.10	8.6	11.0	-0.6	37	-5
5	USA	Sanford Muni AWOS	43.40	-70.72	8.4	11.0	-1.6	28	-8
5	USA	Waterville AWOS	44.53	-69.68	8.2	12.7	-2.0	30	12
5	USA	Wiscasset AP	43.97	-69.72	9.6	11.4	-0.1	34	4
5	USA	Alpena County Rgnl AP	45.07	-83.58	7.7	12.1	-1.0	30	14
5	USA	Ann Arbor Muni AP	42.22	-83.75	10.7	11.7	-1.0	31	-33
5	USA	Battle Creek-Kellogg AP	42.30	-85.25	11.0	12.4	1.0	26	13
5	USA	Benton Harbor-Ross Field-Twin Cities AP	42.13	-86.43	11.2	12.6	0.9	24	-23
5	USA	Cadillac-Wexford County AP	44.28	-85.42	8.6	12.1	-2.0	31	3
5	USA	Chippewa County Intl AP	46.25	-84.47	6.0	11.2	-1.9	35	21
5	USA	Detroit-City AP	42.40	-83.00	11.1	13.3	-1.2	30	-13
5	USA	Detroit-Willow Run AP	42.23	-83.53	10.8	13.8	-0.1	28	17
5	USA	Detroit Metro AP	42.22	-83.35	10.3	13.2	-0.7	27	-10
5	USA	Escanaba AWOS	45.75	-87.03	6.5	11.3	-2.0	34	16
5	USA	Flint-Bishop Intl AP	42.97	-83.75	9.7	13.0	-0.6	26	-14
5	USA	Grand Rapids-Kent County Intl AP	42.88	-85.52	9.9	13.0	-1.0	26	-17
5	USA	Hancock-Houghton County AP	47.17	-88.50	6.6	12.0	-1.9	32	32
5	USA	Houghton-Lake Roscommon County AP	44.37	-84.68	8.1	12.7	-1.4	28	11
5	USA	Howell-Livingston County AP	42.63	-83.98	11.3	13.1	-0.2	26	13
5	USA	Iron Mountain-Ford Field	45.82	-88.12	8.5	13.2	-1.2	26	10
5	USA	Ironwood AWOS	46.53	-90.13	7.0	12.7	-2.0	32	24
5	USA	Jackson-Reynolds Field	42.27	-84.47	11.0	13.0	0.5	25	18
5	USA	Kalamazoo-Battle Creek Intl AP	42.23	-85.55	11.0	12.3	0.8	28	33
5	USA	Lansing-Capital City AP	42.78	-84.58	9.8	13.1	-0.9	25	-18
5	USA	Manistee AWOS	44.27	-86.25	9.4	12.9	-1.2	29	12
5	USA	Menominee AWOS	45.13	-87.63	8.6	12.8	-1.1	37	17
5	USA	Mount Clemens-Selfridge ANGB	42.62	-82.83	11.4	10.3	-1.5	28	21
5	USA	Muskegon County AP	43.17	-86.23	9.5	12.8	-1.3	30	-1
5	USA	Oakland County Intl AP	42.67	-83.42	11.2	12.7	0.0	30	7
5	USA	Oscoda-Wurtsmith AFB	44.45	-83.40	9.3	11.9	-0.9	29	1
5	USA	Pellston-Emmet County AP	45.57	-84.78	9.0	12.3	-0.6	25	14
5	USA	Rhinelander-Oneida County AP	45.63	-89.47	7.8	13.5	-1.1	28	7
5	USA	Saginaw-Tri City Intl AP	43.53	-84.08	9.8	12.3	0.1	29	6

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Sault Ste Marie-Sanderson Field	46.47	-84.35	6.2	11.5	-1.5	35	18
5	USA	St Clair County Intl AP	42.92	-82.53	10.9	12.9	-0.6	25	-14
5	USA	Traverse City-Cherry Capital AP	44.73	-85.58	8.4	12.5	-1.2	31	12
5	USA	Aitkin AWOS	46.55	-93.68	7.0	12.4	-1.2	35	17
5	USA	Albert Lea AWOS	43.68	-93.37	10.2	14.1	-1.3	31	8
5	USA	Alexandria Muni AP	45.88	-95.40	7.9	14.2	-0.4	30	4
5	USA	Austin Muni AP	43.67	-92.93	9.1	13.9	-0.6	27	47
5	USA	Baudette Intl AP	48.72	-94.60	6.9	12.5	-1.1	29	14
5	USA	Bemidji Muni AP	47.50	-94.93	6.9	13.4	-1.6	32	11
5	USA	Benson Muni AP	45.32	-95.65	8.3	14.0	-2.4	30	28
5	USA	Brainerd-Crow Wing County AP	46.40	-94.13	7.8	12.9	-0.6	26	4
5	USA	Cambridge Muni AP	45.57	-93.27	8.2	13.6	-1.0	25	24
5	USA	Cloquet AWOS	46.70	-92.50	6.8	12.3	-2.2	29	37
5	USA	Crane Lake AWOS	46.27	-92.57	6.1	12.6	-1.5	36	23
5	USA	Crookston Muni Field	47.85	-96.62	6.8	13.4	-2.2	26	25
5	USA	Detroit Lakes AWOS	46.83	-95.88	7.5	13.8	-1.5	30	19
5	USA	Duluth Intl AP	46.83	-92.22	6.1	12.0	-1.6	31	25
5	USA	Edin Prairie-Flying Cloud AP	44.82	-93.45	9.6	14.7	-1.3	28	16
5	USA	Ely Muni AP	47.82	-91.83	6.9	12.5	-1.0	28	16
5	USA	Eveleth Muni AWOS	47.40	-92.50	6.2	12.8	-2.1	30	24
5	USA	Fairmont Muni AWOS	43.65	-94.42	8.9	13.8	-1.6	29	15
5	USA	Faribault Muni AWOS	44.33	-93.32	9.6	13.1	-0.8	24	-13
5	USA	Fergus Falls AWOS	46.28	-96.15	8.7	14.0	-1.6	30	23
5	USA	Fosston AWOS	47.58	-95.77	6.6	13.2	-1.7	32	29
5	USA	Glenwood AWOS	45.65	-95.32	8.0	13.9	-1.8	26	27
5	USA	Grand Rapids AWOS	47.22	-93.52	7.0	12.9	-2.2	30	7
5	USA	Hallock	48.78	-96.95	7.3	14.1	-1.7	27	12
5	USA	Hibbing-Chisholm Hibbing AP	47.38	-92.85	5.9	12.7	-1.4	37	35
5	USA	Hutchinson AWOS	44.87	-94.38	8.1	14.0	-2.8	31	23
5	USA	International Falls Intl AP	48.57	-93.40	5.8	12.9	-1.8	31	15
5	USA	Litchfield Muni AP	45.10	-94.50	9.8	13.7	1.3	21	42
5	USA	Little Falls AWOS	45.95	-94.35	7.1	13.5	-2.3	27	23
5	USA	Mankato AWOS	44.22	-93.92	9.2	13.7	-1.7	28	6
5	USA	Marshall Muni-Ryan Field AWOS	44.45	-95.82	9.0	13.8	-1.6	31	24
5	USA	Minneapolis-Crystal AP	45.07	-93.35	8.4	13.9	-0.7	27	14
5	USA	Minneapolis-St Paul Intl AP	44.88	-93.23	9.1	14.0	-1.3	24	1
5	USA	Mora Muni AWOS	45.88	-93.27	8.3	13.2	0.1	31	8

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Morris Muni AWOS	45.57	-95.97	7.2	13.2	-2.4	28	17
5	USA	New Ulm Muni AWOS	44.32	-94.50	9.2	13.9	-1.6	33	2
5	USA	Orr Rgnl AP	48.02	-92.87	5.1	12.4	-2.0	30	34
5	USA	Owatonna AWOS	44.12	-93.25	9.4	14.3	-1.3	25	14
5	USA	Park Rapids Muni AP	46.90	-95.07	6.8	13.0	-1.0	29	10
5	USA	Pipestone AWOS	43.98	-96.32	8.7	14.4	-1.4	26	28
5	USA	Red Wing Muni AP	44.58	-92.48	9.7	14.2	-1.3	30	15
5	USA	Redwood Falls Muni AP	44.55	-95.08	8.9	13.7	-1.2	26	-19
5	USA	Rochester Intl AP	43.90	-92.50	8.3	13.5	-1.0	27	8
5	USA	Roseau Muni AWOS	48.85	-95.70	6.1	12.5	-1.4	37	21
5	USA	Silver Bay Muni AP	47.20	-91.40	4.9	11.1	-2.2	31	39
5	USA	South St Paul Muni AP	44.85	-93.15	9.6	14.6	-1.1	27	18
5	USA	St Cloud Muni AP	45.55	-94.05	7.8	13.5	-1.5	28	11
5	USA	St Paul-Downtown AP	44.93	-93.05	9.1	13.9	-0.7	30	5
5	USA	Thief River AWOS	48.07	-96.18	6.8	12.8	-2.1	31	18
5	USA	Two Harbors Muni AP	47.05	-91.75	6.4	12.1	-1.7	25	24
5	USA	Wheaton AWOS	45.70	-96.50	8.0	14.0	-1.1	27	28
5	USA	Willmar Muni AP	45.12	-95.08	9.4	13.3	-0.8	24	21
5	USA	Winona Muni AWOS	44.08	-91.70	9.6	13.9	-0.2	27	9
5	USA	Worthington AWOS	43.65	-95.58	8.9	13.9	-1.8	30	21
5	USA	Cape Girardeau Muni AP	37.23	-89.57	14.9	11.3	0.5	24	12
5	USA	Columbia Rgnl AP	38.82	-92.22	13.5	12.7	1.3	20	1
5	USA	Farmington Rgnl AP	37.77	-90.40	14.7	11.0	0.1	19	17
5	USA	Fort Leonard Wood-Forney AAF	37.75	-92.15	15.0	12.0	-0.4	21	11
5	USA	Jefferson City Mem AP	38.58	-92.15	15.2	12.1	0.9	24	-14
5	USA	Joplin Muni AP	37.15	-94.50	16.9	11.9	1.3	27	-3
5	USA	Kaiser-Lee Fine Mem AWOS	38.10	-92.55	15.0	12.4	1.1	23	-20
5	USA	Kansas City Downtown AP	39.12	-94.60	16.0	12.6	1.6	21	-21
5	USA	Kansas City Intl AP	39.30	-94.72	13.5	13.3	0.8	20	5
5	USA	Kirksville Muni AP	40.10	-92.55	11.8	14.3	0.9	21	34
5	USA	Poplar Bluff AWOS	36.77	-90.47	15.9	12.0	1.0	20	-7
5	USA	Rolla National AP	38.13	-91.77	13.8	10.7	0.8	19	-3
5	USA	Springfield Rgnl AP	37.23	-93.38	14.5	11.5	0.6	22	5
5	USA	St Joseph-Rosecrans Mem AP	39.77	-94.90	13.2	13.5	-0.2	23	7
5	USA	St Louis-Lambert Intl AP	38.75	-90.37	14.6	12.7	1.2	19	-13
5	USA	St Louis-Spirit of St Louis AP	38.65	-90.65	15.0	11.5	1.1	20	18
5	USA	Whiteman AFB	38.72	-93.55	14.3	11.9	-0.6	21	-7
5	USA	Biloxi-Keesler AFB	30.42	-88.92	20.6	8.8	0.8	22	9

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Columbus AFB	33.65	-88.45	17.4	11.5	1.4	18	-23
5	USA	Golden Triangle Rgnl AWOS	33.45	-88.58	17.5	11.0	0.7	19	-9
5	USA	Greenville Muni AP	33.48	-90.98	19.5	10.0	1.2	16	-20
5	USA	Greenwood-Leflore AP	33.50	-90.08	18.8	9.7	0.9	22	-18
5	USA	Gulfport-Biloxi Intl AP	30.40	-89.07	20.6	8.3	0.6	22	-29
5	USA	Hattiesburg-Laurel AP	31.47	-89.33	19.3	9.6	0.9	14	4
5	USA	Jackson Intl AP	32.32	-90.08	18.8	9.7	1.1	19	-14
5	USA	McComb-Pike Co AP	31.23	-90.47	19.6	9.1	1.6	20	-15
5	USA	Meridian-Key Field	32.33	-88.75	18.5	9.6	1.4	16	-15
5	USA	Meridian NAS	32.55	-88.57	19.2	9.4	1.0	22	12
5	USA	Natchez-Hardy Anders Field	31.62	-91.30	19.7	8.2	1.3	19	-8
5	USA	Tupelo Muni-C D Lemons AP	34.27	-88.77	17.9	10.6	1.6	17	-24
5	USA	Billings-Logan Intl AP	45.80	-108.55	11.1	13.4	0.0	22	7
5	USA	Bozeman-Gallatin Field	45.80	-111.15	8.1	12.5	-1.8	26	26
5	USA	Butte-Bert Mooney AP	45.95	-112.50	8.1	12.1	-1.7	22	35
5	USA	Cut Bank Muni AP	48.60	-112.37	8.5	11.4	-1.0	22	13
5	USA	Glasgow Intl AP	48.22	-106.62	9.0	14.9	-1.0	22	9
5	USA	Glendive AWOS	47.13	-104.80	8.4	14.6	-3.0	24	23
5	USA	Great Falls Intl AP	47.47	-111.38	9.4	12.9	-0.5	26	5
5	USA	Havre City-County AP	48.55	-109.77	9.1	13.8	-1.9	25	9
5	USA	Helena Rgnl AP	46.60	-111.97	9.8	13.0	-0.9	21	24
5	USA	Kalispell-Glacier Park Intl AP	48.32	-114.25	7.7	11.4	-1.3	24	27
5	USA	Lewistown Muni AP	47.05	-109.45	7.6	11.0	-1.3	32	7
5	USA	Livingston-Mission Field	45.70	-110.45	9.3	11.2	-1.2	26	44
5	USA	Miles City Muni AP	46.43	-105.88	10.1	14.9	-1.0	21	0
5	USA	Missoula Intl AP	46.92	-114.10	9.0	11.6	0.1	23	3
5	USA	Sidney-Richland Muni AP	47.70	-104.20	7.2	15.3	-2.5	27	35
5	USA	Wolf Point Intl AP	48.31	-105.10	7.8	13.9	-0.9	26	-14
5	USA	Asheville Rgnl AP	35.43	-82.53	14.0	9.7	0.7	19	-11
5	USA	Cape Hatteras	35.27	-75.55	18.2	9.2	0.8	25	-7
5	USA	Charlotte-Douglas Intl AP	35.22	-80.95	17.1	10.1	0.7	21	-13
5	USA	Cherry Point MCAS	34.90	-76.88	16.8	10.4	0.0	24	9
5	USA	Elizabeth City CGAS	36.30	-76.25	17.9	9.2	0.1	26	2
5	USA	Fayetteville-Pope AFB	35.17	-79.02	17.0	10.7	0.3	21	10
5	USA	Fayetteville Muni AP	34.98	-78.88	16.5	10.5	1.0	19	-3
5	USA	Fort Bragg-Simmons AAF	35.13	-78.93	17.5	10.3	-0.2	22	9
5	USA	Goldsboro-Seymour Johnson AFB	35.35	-77.97	16.6	10.9	0.7	18	-3
5	USA	Greensboro-Piedmont Triad Intl AP	36.10	-79.95	15.8	10.8	1.1	19	-3

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Hickory Rgnl AP	35.73	-81.38	16.7	10.3	0.8	21	33
5	USA	Jacksonville AWOS	34.83	-77.62	16.2	10.2	0.3	19	27
5	USA	Kinston Stallings AFB	35.32	-77.63	16.9	10.4	0.4	22	7
5	USA	Manteo-Dare County Rgnl AP	35.92	-75.70	17.2	9.9	-1.2	38	-31
5	USA	New Bern-Craven County Rgnl AP	35.07	-77.05	18.5	8.4	1.0	24	-32
5	USA	New River MCAS	34.70	-77.38	17.8	9.9	1.2	29	14
5	USA	Pitt Greenville AP	35.63	-77.40	17.4	9.5	1.3	27	47
5	USA	Raleigh-Durham Intl AP	35.87	-78.78	16.4	10.4	0.6	21	6
5	USA	Rocky Mount-Wilson AP	35.85	-77.90	17.0	8.9	0.9	18	4
5	USA	Southern Pines-Moore County AP	35.23	-79.40	16.5	9.8	-0.2	26	2
5	USA	Wilmington Intl AP	34.27	-77.90	18.4	9.4	0.2	23	10
5	USA	Winston Salem-Smith Reynolds AP	36.13	-80.22	16.7	9.3	1.0	19	11
5	USA	Bismarck Muni AP	46.77	-100.77	8.2	13.4	-1.4	25	7
5	USA	Devils Lake AWOS	48.12	-98.92	6.8	13.2	-1.2	37	18
5	USA	Dickinson Muni AP	46.80	-102.80	7.5	13.2	-1.2	28	35
5	USA	Fargo-Hector Intl AP	46.93	-96.82	7.6	13.9	-1.0	27	1
5	USA	Grand Forks AFB	47.97	-97.40	6.5	12.6	-2.9	29	26
5	USA	Grand Forks Intl AP	47.95	-97.18	7.4	14.5	-1.4	27	9
5	USA	Jamestown Muni AP	46.92	-98.68	6.7	13.8	-2.4	27	31
5	USA	Minot AFB	48.42	-101.35	6.8	12.2	-2.4	36	19
5	USA	Minot Intl AP	48.27	-101.28	7.4	13.4	-1.6	29	6
5	USA	Williston-Sloulin Field Intl AP	48.20	-103.65	8.4	15.1	-1.4	26	32
5	USA	Ainsworth Muni AP	42.58	-100.00	11.0	12.5	1.0	25	-32
5	USA	Alliance Muni AP	42.05	-102.80	11.5	13.9	-1.8	20	46
5	USA	Beatrice Muni AP	40.30	-96.75	12.4	13.5	0.8	23	12
5	USA	Bellevue-Offutt AFB	41.12	-95.92	11.5	14.1	-0.7	20	39
5	USA	Broken Bow Muni AP	41.43	-99.65	9.8	13.4	-0.7	28	17
5	USA	Chadron Muni AP	42.83	-103.08	12.0	13.6	-0.8	21	37
5	USA	Columbus Muni AP	41.45	-97.33	10.9	14.2	0.2	27	13
5	USA	Falls City-Brenner Field	40.08	-95.60	12.3	13.4	1.2	24	17
5	USA	Fremont Muni AP	41.45	-96.52	11.2	14.1	0.9	26	-10
5	USA	Grand Island-Central Nebraska Rgnl AP	40.97	-98.32	10.8	14.5	0.0	23	-4
5	USA	Hastings Muni AP	40.60	-98.43	11.7	13.8	-0.4	24	-2
5	USA	Holdrege-Brewster Field	40.45	-99.33	10.6	13.4	1.0	21	-38
5	USA	Imperial Muni AP	40.52	-101.62	13.1	13.5	-1.4	21	25
5	USA	Kearney Muni AWOS	40.73	-99.00	10.8	13.0	-0.6	25	34
5	USA	Lincoln Muni AP	40.83	-96.77	12.2	14.0	0.9	18	1

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	McCook Muni AP	40.20	-100.58	12.4	14.0	1.2	20	-18
5	USA	Norfolk-Karl Stefan Mem AP	41.98	-97.43	10.3	14.6	-0.2	24	3
5	USA	North Platte Rgnl AP	41.12	-100.67	10.4	13.2	-0.7	25	5
5	USA	Omaha-Eppley Airfield	41.32	-95.90	12.2	14.4	0.8	25	29
5	USA	Omaha WSFO	41.37	-96.02	11.7	14.8	0.7	22	25
5	USA	ONeill-Baker Field	42.47	-98.68	9.8	13.9	-1.2	26	49
5	USA	Ord-Sharp Field	41.62	-98.95	10.8	13.8	-0.7	21	-19
5	USA	Scottsbluff-W B Heilig Field	41.87	-103.60	11.7	13.8	-0.7	19	34
5	USA	Sidney Muni AP	41.10	-102.98	11.1	13.2	-0.5	17	7
5	USA	Tekamah AWOS	41.77	-96.17	11.5	14.0	0.6	25	-5
5	USA	Valentine-Miller Field	42.87	-100.55	10.9	13.1	0.3	24	0
5	USA	Berlin Muni AP	44.58	-71.18	6.8	12.0	-1.5	38	25
5	USA	Concord Muni AP	43.20	-71.50	9.1	12.8	-0.7	27	-7
5	USA	Keene-Dillant Hopkins AP	42.90	-72.27	9.8	12.6	-1.0	30	-2
5	USA	Laconia Muni AWOS	43.57	-71.42	9.4	12.2	-1.4	29	-2
5	USA	Lebanon Muni AP	43.63	-72.30	9.3	12.8	-0.7	32	-2
5	USA	Manchester Muni AP	42.93	-71.43	11.0	12.2	0.0	32	12
5	USA	Mount Washington	44.27	-71.30	-0.4	5.4	0.0	44	7
5	USA	Pease Intl Tradeport	43.08	-70.82	10.0	12.0	-1.0	30	5
5	USA	Atlantic City Intl AP	39.45	-74.57	13.2	11.0	0.1	25	1
5	USA	Belmar-Monmouth County AP	40.18	-74.07	12.9	11.3	-0.9	29	-14
5	USA	Caldwell-Essex County AP	40.88	-74.28	13.2	10.5	-0.4	30	0
5	USA	Cape May County AP	39.00	-74.92	14.6	10.0	-1.1	33	9
5	USA	McGuire AFB	40.02	-74.60	13.6	11.3	0.5	28	8
5	USA	Millville Muni AP	39.37	-75.08	14.0	10.6	-0.8	26	-24
5	USA	Newark Intl AP	40.72	-74.18	13.7	12.1	0.6	24	3
5	USA	Teterboro AP	40.85	-74.07	13.3	10.1	0.4	25	13
5	USA	Trenton-Mercer County AP	40.28	-74.82	14.0	11.7	0.4	25	-1
5	USA	Albuquerque Intl AP	35.04	-106.62	16.4	12.0	1.1	18	-27
5	USA	Carlsbad Cavern City Air Terminal	32.33	-104.27	19.9	11.7	0.6	18	17
5	USA	Clayton Muni AP	36.45	-103.15	15.3	12.2	0.3	18	4
5	USA	Clovis-Cannon AFB	34.38	-103.32	16.0	13.0	-0.2	20	0
5	USA	Clovis Muni AWOS	34.43	-103.08	16.0	12.7	0.0	17	15
5	USA	Deming Muni AP	32.25	-107.72	19.5	11.1	1.1	13	-7
5	USA	Farmington-Four Corners Rgnl AP	36.75	-108.23	14.7	13.1	-0.9	14	44
5	USA	Gallup-Sen Clarke Field	35.52	-108.78	13.0	11.8	-1.3	16	48
5	USA	Holloman AFB	32.85	-106.10	18.7	11.6	1.5	14	-22
5	USA	Las Cruces Intl AP	32.28	-106.92	20.0	11.8	0.5	19	-33

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Las Vegas-Muni AP	35.65	-105.15	13.5	10.1	0.0	16	10
5	USA	Roswell Industrial Air Park	33.30	-104.53	19.4	11.1	0.7	16	-5
5	USA	Ruidoso-Sierra Blanca Rgnl AP	33.47	-105.53	15.8	9.6	1.1	11	-23
5	USA	Santa Fe County Muni AP	35.62	-106.08	12.4	10.9	1.2	15	-23
5	USA	Taos Muni AP	36.45	-105.67	9.9	11.7	0.0	16	15
5	USA	Truth or Consequences Muni AP	33.23	-107.27	18.9	11.1	0.7	14	-28
5	USA	Tucumcari AP	35.18	-103.60	16.3	12.2	0.2	19	9
5	USA	Elko Muni AP	40.83	-115.80	11.3	13.1	-1.0	17	38
5	USA	Ely-Yelland Field	39.30	-114.85	10.5	11.9	-1.0	19	42
5	USA	Fallon NAS	39.42	-118.72	15.4	12.9	1.0	18	-38
5	USA	Las Vegas-McCarran Intl AP	36.08	-115.15	21.6	12.5	0.0	19	11
5	USA	Lovelock-Derby Field	40.07	-118.55	14.7	12.9	-1.6	20	48
5	USA	Mercury-Desert Rock AP	36.63	-116.02	19.8	12.3	0.0	18	2
5	USA	Nellis AFB	36.25	-115.03	22.4	13.2	-1.1	16	34
5	USA	Reno-Tahoe Intl AP	39.48	-119.77	14.1	12.0	-1.3	18	41
5	USA	Tonopah AP	38.07	-117.08	13.9	12.2	-1.4	19	35
5	USA	Winnemucca Muni AP	40.90	-117.80	12.9	12.8	-1.2	18	42
5	USA	Albany County AP	42.75	-73.80	10.0	12.5	-1.0	26	-28
5	USA	Binghamton-Edwin A Link Field	42.20	-75.98	9.3	12.0	-1.2	28	-16
5	USA	Buffalo-Greater Buffalo Intl AP	42.93	-78.73	10.0	12.2	-0.6	30	-17
5	USA	Elmira Rgnl AP	42.17	-76.90	10.3	11.0	0.5	25	3
5	USA	Fort Drum-Wheeler Sack AAF	44.05	-75.72	8.6	11.9	-1.6	28	12
5	USA	Glens Falls-Bennett Mem AP	43.35	-73.62	9.6	12.6	-0.7	31	-18
5	USA	Islip-Long Island MacArthur AP	40.78	-73.10	13.4	11.2	-0.1	28	-10
5	USA	Jamestown AWOS	42.15	-79.27	9.0	11.0	-1.3	32	-5
5	USA	Massena AP	44.93	-74.85	8.3	13.0	-1.4	28	4
5	USA	Monticello AWOS	41.70	-74.80	9.4	12.5	-0.8	30	10
5	USA	New York-Central Park	40.78	-73.97	13.6	11.8	0.3	25	10
5	USA	New York-J F Kennedy Intl AP	40.65	-73.80	13.7	11.5	-0.6	29	42
5	USA	New York-LaGuardia AP	40.78	-73.88	14.7	11.4	0.1	30	10
5	USA	Newburgh-Stewart Intl AP	41.50	-74.10	11.4	12.3	-1.0	28	-13
5	USA	Niagara Falls Intl AP	43.10	-78.95	10.5	12.0	-1.7	34	-10
5	USA	Poughkeepsie-Dutchess County AP	41.63	-73.88	11.3	11.8	1.0	25	33
5	USA	Republic AP	40.72	-73.42	13.6	10.6	1.0	31	-31

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Rochester-Greater Rochester Intl AP	43.12	-77.68	10.4	12.5	-0.8	28	-34
5	USA	Saranac Lake-Adirondack Rgnl AP	44.38	-74.20	6.9	12.1	-2.2	27	19
5	USA	Syracuse-Hancock Intl AP	43.12	-76.10	10.2	12.4	-0.7	25	-24
5	USA	Utica-Oneida County AP	43.15	-75.38	9.8	12.5	-0.4	27	6
5	USA	Watertown AP	44.00	-76.02	8.8	12.6	-0.6	33	24
5	USA	Westhampton-Suffolk County AP	40.85	-72.63	12.0	10.2	1.0	30	-9
5	USA	White Plains-Westchester County AP	41.07	-73.72	11.7	11.3	1.0	26	8
5	USA	Akron Canton Rgnl AP	40.92	-81.43	10.8	12.4	-1.1	26	-28
5	USA	Cincinnati Muni AP-Lunken Field	39.10	-84.42	13.6	11.4	0.3	24	8
5	USA	Cleveland-Burke Lakefront AP	41.52	-81.68	11.6	12.5	-1.0	30	-46
5	USA	Cleveland-Hopkins Intl AP	41.40	-81.85	11.2	13.1	-0.3	27	6
5	USA	Columbus-Port Columbus Intl AP	39.98	-82.88	12.4	11.8	0.8	23	40
5	USA	Dayton-Wright Patterson AFB	39.83	-84.05	12.3	11.6	-1.1	27	9
5	USA	Dayton Intl AP	39.90	-84.22	12.1	12.6	0.5	21	28
5	USA	Findlay AP	41.02	-83.67	11.9	11.1	1.1	22	14
5	USA	Mansfield-Lahm Muni AP	40.82	-82.52	10.3	12.8	-1.1	28	-23
5	USA	Ohio State University AP	40.07	-83.07	13.2	12.3	1.5	28	-23
5	USA	Toledo Express AP	41.58	-83.80	10.5	13.0	0.6	23	43
5	USA	Youngstown Rgnl AP	41.25	-80.67	10.2	12.0	-0.1	27	10
5	USA	Zanesville Muni AP	39.95	-81.90	13.1	10.0	0.1	19	8
5	USA	Altus AFB	34.65	-99.27	18.3	12.3	0.1	21	2
5	USA	Bartlesville-Phillips Field	36.77	-96.02	15.5	11.7	0.6	15	12
5	USA	Clinton Sherman AP	35.33	-99.20	16.1	12.5	0.7	23	8
5	USA	Fort Sill-Henry Post AAF	34.65	-98.40	17.7	12.3	0.1	22	10
5	USA	Gage AP	36.30	-99.77	17.3	13.7	1.0	16	-11
5	USA	Hobart Muni AP	35.00	-99.05	17.4	12.6	1.3	24	-22
5	USA	Lawton Muni AP	34.57	-98.42	17.7	10.7	0.6	19	-33
5	USA	McAlester Rgnl AP	34.90	-95.78	17.9	10.8	0.7	21	8
5	USA	Oklahoma City-Tinker AFB	35.42	-97.38	16.5	12.4	-0.6	21	8
5	USA	Oklahoma City-Wiley Post Field	35.53	-97.65	16.5	12.3	0.2	23	4
5	USA	Oklahoma City-Will Rogers World AP	35.38	-97.60	16.9	11.7	1.3	22	-7
5	USA	Ponca City Muni AP	36.61	-97.49	17.3	12.6	1.5	24	-28
5	USA	Stillwater Rgnl AP	36.15	-97.08	17.0	12.4	1.3	19	-26
5	USA	Tulsa Intl AP	36.20	-95.88	16.8	12.4	0.5	19	11
5	USA	Vance AFB	36.33	-97.92	15.7	13.0	-1.0	24	51

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Astoria Rgnl AP	46.15	-123.88	12.6	6.0	-0.9	23	59
5	USA	Aurora State AP	45.25	-122.77	14.6	8.9	-1.2	20	43
5	USA	Baker Muni AP	44.83	-117.82	10.8	12.1	-1.6	21	35
5	USA	Burns Muni AP	43.52	-119.02	10.4	12.3	-1.5	19	36
5	USA	Corvallis Muni AP	44.48	-123.28	14.9	8.7	-1.3	18	53
5	USA	Eugene-Mahlon Sweet AP	44.05	-123.07	13.4	8.7	0.0	20	5
5	USA	Klamath Falls Intl AP	42.22	-121.74	11.8	11.3	-2.0	20	36
5	USA	La Grande Muni AP	45.28	-118.00	12.4	11.4	-1.7	19	54
5	USA	Lakeview AWOS	42.17	-120.40	11.1	11.5	-1.3	20	34
5	USA	Medford-Rogue Valley Intl AP	42.19	-122.70	14.9	10.6	1.6	20	-35
5	USA	North Bend Muni AP	43.42	-124.25	13.2	5.1	0.1	20	18
5	USA	Pendleton-Eastern Oregon Rgnl AP	45.70	-118.83	13.5	11.3	1.4	19	-31
5	USA	Portland-Hillsboro AP	45.53	-122.95	14.3	8.6	1.2	13	-26
5	USA	Portland-Troutdale AP	45.55	-122.40	14.5	9.1	-1.2	22	46
5	USA	Portland Intl AP	45.60	-122.62	14.2	8.8	1.4	20	-27
5	USA	Redmond-Roberts Field	44.25	-121.17	11.5	10.5	0.1	20	6
5	USA	Roseburg Rgnl AP	43.23	-123.35	15.5	8.3	1.1	16	-37
5	USA	Salem-McNary Field	44.90	-123.00	13.8	8.7	0.1	20	6
5	USA	Sexton Summit	42.60	-123.37	13.1	9.4	-1.0	29	29
5	USA	Allentown-Lehigh Valley Intl AP	40.65	-75.45	11.8	12.4	1.2	24	40
5	USA	Altoona-Blair County AP	40.30	-78.32	11.8	11.2	1.3	23	-17
5	USA	Bradford Rgnl AP	41.80	-78.63	7.6	11.6	-1.0	27	9
5	USA	Butler County AWOS	40.78	-79.95	10.4	12.4	-0.9	27	-6
5	USA	DuBois-Jefferson County AP	41.18	-78.90	9.4	12.0	-0.1	26	6
5	USA	Erie Intl AP	42.08	-80.18	10.4	12.3	-1.1	30	-23
5	USA	Franklin-Chess Lemberton AP	41.38	-79.87	9.8	11.3	-0.5	26	35
5	USA	Harrisburg-Capital City AP	40.22	-76.85	12.8	12.1	0.8	22	11
5	USA	Harrisburg Intl AP	40.20	-76.77	12.2	13.5	-0.6	26	-16
5	USA	Johnstown-Cambria County AP	40.32	-78.83	10.5	11.8	0.7	24	-8
5	USA	Lancaster AP	40.12	-76.30	13.5	10.8	0.0	19	10
5	USA	Philadelphia-NE Philadelphia AP	40.08	-75.02	14.2	11.9	0.4	27	7
5	USA	Philadelphia Intl AP	39.87	-75.23	13.9	11.9	0.5	23	3
5	USA	Pittsburgh-Allegheny County AP	40.35	-79.92	12.6	10.2	0.8	22	13
5	USA	Pittsburgh Intl AP	40.50	-80.23	11.9	11.5	0.1	23	4
5	USA	Reading Mem AP-Spaatz Field	40.37	-75.97	13.5	11.5	0.9	25	25

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	State College-Penn State University	40.72	-77.93	11.1	12.0	1.6	31	64
5	USA	Washington AWOS	40.13	-80.28	12.1	10.7	-0.7	24	16
5	USA	Wilkes-Barre-Scranton Intl AP	41.33	-75.73	10.8	12.6	0.1	25	11
5	USA	Williamsport Rgnl AP	41.25	-76.92	11.7	12.5	0.8	24	37
5	USA	Willow Grove NAS	40.20	-75.15	14.0	10.6	-0.2	27	13
5	USA	Aquadilla/Borinquen	18.50	-67.13	26.0	1.5	0.0	41	-6
5	USA	Eugenio Maria De Ho	18.25	-67.15	26.4	1.4	-0.2	20	7
5	USA	Mercedita	18.00	-66.55	26.6	1.6	0.1	24	-1
5	USA	Roosevelt-Roads	18.25	-65.63	27.6	1.7	-0.1	32	1
5	USA	SanJuanIntlArpt	18.42	-66.00	27.0	1.8	-0.1	39	-13
5	USA	SanJuanLMMarinIntlAP	18.43	-66.00	27.0	1.9	0.1	34	-7
5	USA	Block Island State AP	41.17	-71.58	12.2	9.3	-0.9	38	26
5	USA	Pawtucket AWOS	41.92	-71.50	10.9	11.5	-0.5	28	9
5	USA	Providence-T F Green State AP	41.72	-71.43	11.7	11.5	0.2	27	-4
5	USA	Anderson County AP	34.50	-82.72	16.5	10.3	0.4	26	-2
5	USA	Beaufort MCAS	32.48	-80.72	19.4	9.0	0.6	23	7
5	USA	Charleston Intl AP	32.90	-80.03	19.4	8.8	0.5	23	1
5	USA	Columbia Metro AP	33.95	-81.12	18.3	9.6	1.1	20	5
5	USA	Florence Rgnl AP	34.18	-79.73	19.0	9.3	1.0	22	-21
5	USA	Greenville-Downtown AP	34.85	-82.35	16.1	10.7	0.3	25	1
5	USA	Greer Greenville-Spartanburg AP	34.90	-82.22	16.7	10.2	0.7	20	-19
5	USA	Myrtle Beach AFB	33.68	-78.93	18.5	8.9	0.7	20	6
5	USA	North Myrtle Beach-Grand Strand Field	33.82	-78.72	18.3	9.0	0.7	21	4
5	USA	Shaw AFB	33.97	-80.47	17.3	9.9	0.2	20	3
5	USA	Aberdeen Rgnl AP	45.45	-98.42	9.2	14.0	-1.0	27	3
5	USA	Brookings AWOS	44.30	-96.82	8.9	13.1	-0.5	24	9
5	USA	Ellsworth AFB	44.15	-103.10	8.8	13.3	-3.1	27	16
5	USA	Huron Rgnl AP	44.40	-98.22	8.6	14.0	-1.5	28	7
5	USA	Mitchell AWOS	43.77	-98.03	9.0	14.7	-2.6	28	28
5	USA	Mobridge Muni AP	45.53	-100.43	8.1	14.4	-2.2	25	30
5	USA	Pierre Muni AP	44.38	-100.28	9.9	14.3	-0.5	25	16
5	USA	Rapid City Rgnl AP	44.05	-103.05	9.3	13.2	-0.8	25	23
5	USA	Sioux Falls-Foss Field	43.58	-96.75	9.6	14.1	-0.7	26	8
5	USA	Watertown Muni AP	44.93	-97.15	7.7	13.7	-1.0	31	17
5	USA	Yankton-Chan Gurney Muni AP	42.92	-97.38	10.2	14.6	-1.4	29	11
5	USA	Bristol-TriCities Rgnl AP	36.47	-82.40	14.3	10.7	0.7	22	17
5	USA	Chattanooga-Lovell Field AP	35.03	-85.20	16.9	10.3	0.5	20	-5

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Crossville Mem AP	35.95	-85.08	14.9	9.7	0.9	20	0
5	USA	Dyersburg Muni AP	36.02	-89.40	16.9	11.3	-0.1	28	-7
5	USA	Jackson-McKellar Sipes Rgnl AP	35.60	-88.92	16.8	9.8	1.3	18	2
5	USA	Knoxville-McGhee Tyson AP	35.82	-83.98	15.9	11.2	0.9	22	10
5	USA	Memphis Intl AP	35.07	-89.98	18.1	11.0	0.7	21	6
5	USA	Nashville Intl AP	36.12	-86.68	16.7	11.4	0.9	23	3
5	USA	Abilene-Dyess AFB	32.43	-99.85	20.3	10.9	0.4	21	5
5	USA	Abilene Rgnl AP	32.47	-99.71	18.1	11.1	1.5	21	6
5	USA	Alice Intl AP	27.73	-98.03	23.3	7.6	0.8	18	2
5	USA	Amarillo Intl AP	34.99	-101.90	16.0	12.0	0.8	18	-26
5	USA	Austin-Camp Mabry	30.32	-97.77	20.8	9.3	1.0	20	-7
5	USA	Austin-Mueller Muni AP	30.29	-97.74	21.4	8.2	0.5	21	11
5	USA	Brownsville-South Padre Island AP	25.90	-97.43	23.3	7.1	1.2	20	6
5	USA	Childress Muni AP	34.43	-100.28	18.5	12.0	-0.9	21	32
5	USA	College Station-Easterwood Field	30.58	-96.37	20.7	8.6	1.5	20	-34
5	USA	Corpus Christi Intl AP	27.88	-97.63	22.4	7.4	1.0	24	13
5	USA	Corpus Christi NAS	27.68	-97.28	23.6	6.7	0.8	27	0
5	USA	Cotulla AP	28.45	-99.22	24.7	8.6	2.0	8	-15
5	USA	Cox Field	33.63	-95.45	18.0	10.5	0.8	22	-24
5	USA	Dalhart Muni AP	36.02	-102.55	14.4	12.4	-1.4	21	41
5	USA	Dallas-Addison AP	32.97	-96.83	19.5	11.4	1.7	24	-34
5	USA	Dallas-Fort Worth Intl AP	32.90	-97.02	19.7	10.7	1.4	20	-13
5	USA	Dallas-Love Field	32.85	-96.85	20.8	11.6	0.9	26	-5
5	USA	Dallas-Redbird AP	32.68	-96.87	20.7	9.9	2.0	18	-25
5	USA	Del Rio-Laughlin AFB	29.37	-100.78	24.5	9.6	1.1	14	-5
5	USA	Del Rio	29.38	-100.91	23.0	9.5	0.6	23	-27
5	USA	Draughon-Miller Central Texas AP	31.15	-97.40	19.9	9.7	0.5	22	4
5	USA	El Paso Intl AP	31.77	-106.50	20.7	10.8	0.7	14	-6
5	USA	Fort Hood	31.13	-97.72	20.4	10.2	1.2	21	12
5	USA	Fort Worth-Alliance AP	32.98	-97.32	18.8	10.6	0.5	24	10
5	USA	Fort Worth-Meacham AP	32.82	-97.37	19.2	11.4	-1.0	22	38
5	USA	Fort Worth NAS	32.77	-97.45	20.0	9.8	1.3	18	-21
5	USA	Galveston	29.30	-94.80	22.1	8.0	0.9	24	-24
5	USA	Georgetown AWOS	30.68	-97.68	20.2	9.4	0.4	25	1
5	USA	Greenville Muni AP	33.07	-96.07	19.0	10.7	0.4	23	5
5	USA	Harlingen-Valley Intl AP	26.23	-97.65	23.6	6.2	-0.3	27	-9
5	USA	Hondo Muni AP	29.37	-99.17	21.0	9.0	1.2	21	-13

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Houston-Bush Intercontinental AP	30.00	-95.37	21.2	8.4	0.7	23	5
5	USA	Houston-D W Hooks AP	30.07	-95.55	21.5	8.2	1.3	21	-3
5	USA	Houston-Ellington AFB	29.57	-95.09	21.4	8.1	0.7	28	15
5	USA	Houston-William P Hobby AP	29.65	-95.28	21.9	7.2	0.0	22	10
5	USA	Killeen-Fort Hood Rgnl AP	31.07	-97.83	20.8	8.9	1.2	24	-3
5	USA	Killeen Muni AWOS	31.08	-97.68	20.1	9.6	1.2	25	3
5	USA	Kingsville	27.50	-97.82	22.8	7.2	0.3	26	-2
5	USA	Laredo Intl AP	27.57	-99.49	24.2	9.5	1.8	18	26
5	USA	Longview-Gregg County AP	32.29	-94.98	19.7	9.4	0.4	28	-4
5	USA	Lubbock Intl AP	33.67	-101.82	17.8	11.5	0.9	17	-4
5	USA	Lufkin-Angelina Co AP	31.23	-94.75	19.9	8.9	0.6	22	12
5	USA	Marfa AP	30.37	-104.02	18.0	9.6	1.1	16	-12
5	USA	McAllen-Miller Intl AP	26.31	-98.17	24.7	7.5	1.3	21	-24
5	USA	McGregor AWOS	31.48	-97.32	19.8	10.1	0.0	29	-3
5	USA	Midland Intl AP	31.95	-102.18	19.6	10.5	0.3	14	2
5	USA	Mineral Wells Muni AP	32.78	-98.07	19.3	10.0	0.8	24	-25
5	USA	Nacogdoches AWOS	31.58	-94.72	19.4	9.1	0.5	25	0
5	USA	Palacios Muni AP	28.72	-96.25	21.6	7.9	1.0	25	30
5	USA	Port Arthur-Jefferson Co AP	29.95	-94.02	21.2	8.2	0.8	21	15
5	USA	Randolph AFB	29.53	-98.28	21.1	8.8	1.2	21	3
5	USA	Rockport-Aransas Co AP	28.08	-97.05	23.4	7.0	0.4	25	25
5	USA	San Angelo-Mathis AP	31.35	-100.50	20.1	10.9	1.5	15	-3
5	USA	San Antonio-Kelly AFB	29.38	-98.58	22.1	8.8	1.1	23	31
5	USA	San Antonio-Stinson AP	29.33	-98.47	21.6	8.7	0.2	16	1
5	USA	San Antonio Intl AP	29.53	-98.47	21.3	9.0	0.9	23	5
5	USA	Tyler-Pounds Field	32.35	-95.40	19.3	9.6	0.6	23	-15
5	USA	Victoria Rgnl AP	28.87	-96.93	21.5	8.1	0.8	24	-5
5	USA	Waco Rgnl AP	31.62	-97.23	19.8	10.4	1.3	20	-16
5	USA	Wichita Falls Muni AP	33.98	-98.50	18.3	10.9	0.8	21	-12
5	USA	Wink-Winkler County AP	31.78	-103.20	21.4	11.8	0.7	13	14
5	USA	Blanding Muni AP	37.62	-109.48	13.9	12.9	-1.8	18	37
5	USA	Bryce Canyon AP	37.70	-112.15	7.0	11.0	-1.7	29	24
5	USA	Cedar City Muni AP	37.70	-113.10	13.7	12.4	-0.1	19	11
5	USA	Delta Muni AP	39.33	-112.58	13.5	12.5	-2.8	20	44
5	USA	Hanksville AP	38.37	-110.72	15.7	14.3	-2.0	16	40
5	USA	Moab-Canyonlands Field	38.58	-109.54	15.5	13.9	1.3	14	-31
5	USA	Ogden-Hill AFB	41.12	-111.97	12.2	12.4	-1.5	24	30
5	USA	Ogden-Hinkley AP	41.20	-112.02	14.2	14.0	0.9	18	-27

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Provo Muni AWOS	40.22	-111.72	12.5	12.0	-1.5	17	50
5	USA	Saint George AWOS	37.08	-113.60	21.1	12.9	0.0	13	12
5	USA	Salt Lake City Intl AP	40.77	-111.97	13.1	12.0	-1.9	22	52
5	USA	Vernal AP	40.43	-109.52	12.5	13.7	1.3	14	-25
5	USA	Wendover USAF Auxiliary Field	40.72	-114.03	13.8	14.4	-1.5	16	49
5	USA	Abingdon-Virgina Highlands AP	36.68	-82.03	13.8	10.4	-1.3	24	33
5	USA	Arlington-Ronald Reagan Washington Natl AP	38.87	-77.03	15.3	11.6	-0.6	26	-11
5	USA	Blacksburg-Virginia Tech AP	37.22	-80.42	13.2	11.1	0.4	27	10
5	USA	Charlottesville-Albemarle County AP	38.13	-78.45	15.8	10.0	1.2	22	32
5	USA	Danville Rgnl AP	36.57	-79.33	16.1	10.5	1.6	21	-16
5	USA	Davison AAF	38.72	-77.18	14.8	11.7	-0.7	25	-18
5	USA	Farmville Muni AP	37.35	-78.43	15.7	11.2	0.4	29	-2
5	USA	Franklin Muni AP	36.70	-76.90	17.3	9.6	1.1	24	-21
5	USA	Fredericksburg-Shannon AP	38.27	-77.45	15.0	11.5	-0.5	25	4
5	USA	Hillsville-Twin County AP	36.77	-80.82	12.6	10.6	-0.8	26	30
5	USA	Hot Springs-Ingalls Field	37.95	-79.83	10.3	9.9	0.1	28	2
5	USA	Langley AFB	37.08	-76.35	15.3	11.0	-0.1	25	5
5	USA	Leesburg Muni AP-Godfrey Field	39.08	-77.57	13.6	12.0	0.2	26	-6
5	USA	Lynchburg Rgnl AP-Preston Glen Field	37.33	-79.20	15.0	11.1	0.7	21	2
5	USA	Manassas Muni AWOS	38.72	-77.52	13.5	11.3	-0.9	24	8
5	USA	Marion-Wytheville-Mountain Empire AP	36.90	-81.35	13.5	10.7	1.1	20	-7
5	USA	Martinsville-Blue Ridge AP	36.63	-80.02	14.8	11.2	-0.8	25	18
5	USA	Melfa-Accomack County AP	37.65	-75.77	15.8	10.6	-1.0	33	-27
5	USA	Newport News	37.13	-76.50	16.7	10.3	0.1	22	3
5	USA	Norfolk Intl AP	36.90	-76.20	16.5	10.4	0.5	25	6
5	USA	Norfolk NAS	36.95	-76.28	17.1	9.4	0.5	23	2
5	USA	Oceana NAS	36.82	-76.03	16.8	9.9	0.7	24	-37
5	USA	Petersburg Muni AP	37.18	-77.52	16.4	10.3	-0.9	20	-29
5	USA	Pulaski-New River Valley AP	37.13	-80.68	13.3	10.8	0.1	27	7
5	USA	Quantico MCAS	38.50	-77.30	15.4	11.1	0.8	25	-22
5	USA	Richmond Intl AP	37.52	-77.32	15.9	10.9	0.5	23	12
5	USA	Roanoke Rgnl AP-Woodrum Field	37.32	-79.97	14.9	10.8	0.3	21	14
5	USA	Staunton-Shenandoah Valley Rgnl AP	38.27	-78.90	14.5	11.5	-0.8	27	27
5	USA	Sterling-Washington Dulles Intl AP	38.98	-77.47	13.9	11.5	0.4	22	8

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Winchester Rgnl AP	39.15	-78.15	13.7	11.9	-0.3	24	1
5	USA	Wise-Lonesome Pine AP	36.98	-82.53	13.6	10.5	0.6	31	6
5	USA	Charlotte-AmalieHarrySTrum	18.35	-64.97	27.6	2.0	0.5	49	-3
5	USA	Burlington Intl AP	44.47	-73.15	9.0	12.7	-1.2	28	-4
5	USA	Montpelier AP	44.20	-72.57	8.7	12.1	-0.4	32	9
5	USA	Rutland State AP	43.52	-72.95	9.2	13.7	-0.8	29	5
5	USA	Springfield-Hartnes State AP	43.35	-72.52	9.2	12.4	-0.5	30	-14
5	USA	Bellingham Intl AP	48.80	-122.53	11.6	8.2	-0.8	19	21
5	USA	Bremerton National AP	47.48	-122.75	12.4	8.0	-0.9	16	44
5	USA	Ephrata Muni AP	47.30	-119.52	13.6	13.4	1.5	17	-28
5	USA	Fairchild AFB	47.63	-117.65	9.9	12.4	-2.7	21	49
5	USA	Fort Lewis-Gray AAF	47.08	-122.58	12.0	8.9	-1.7	22	54
5	USA	Hanford	46.57	-119.60	13.4	13.6	2.0	19	-32
5	USA	Hoquiam AP	46.98	-123.93	12.4	6.3	0.1	21	12
5	USA	Kelso AP	46.13	-122.90	13.4	7.8	1.5	17	-27
5	USA	Moses Lake-Grant County AP	47.20	-119.32	13.7	12.5	1.6	14	-29
5	USA	Olympia AP	46.97	-122.90	12.2	8.3	-1.0	20	50
5	USA	Pasco-Tri Cities AP	46.27	-119.12	14.8	12.0	-0.1	13	6
5	USA	Port Angeles-William R Fairchild Intl AP	48.12	-123.50	11.6	7.4	0.6	21	-29
5	USA	Pullman-Moscow Rgnl AP	46.75	-117.12	11.6	11.5	-1.5	19	49
5	USA	Quillayute State AP	47.93	-124.57	10.6	5.2	-0.6	26	51
5	USA	Renton Muni AP	47.48	-122.22	13.9	8.1	-1.1	17	39
5	USA	Seattle-Boeing Field	47.68	-122.25	13.9	7.8	1.1	20	-33
5	USA	Seattle-Tacoma Intl AP	47.47	-122.32	13.1	7.8	1.1	19	-25
5	USA	Snohomish County AP	47.90	-122.28	12.7	7.1	-1.3	23	40
5	USA	Spokane-Felts Field	47.68	-117.32	12.1	12.1	-1.7	20	37
5	USA	Spokane Intl AP	47.49	-117.59	10.8	11.9	1.0	18	-29
5	USA	Stampede Pass	47.28	-121.33	7.5	10.0	-1.6	23	25
5	USA	Tacoma-McChord AFB	47.15	-122.48	11.9	9.0	-1.5	22	44
5	USA	Tacoma Narrows AP	47.27	-122.58	13.3	7.8	-0.6	19	34
5	USA	The Dalles Muni AP	45.62	-121.15	15.1	11.0	1.5	16	-32
5	USA	Toledo-Winlock-Ed Carlson Mem AP	46.48	-122.80	11.6	8.8	1.4	22	-30
5	USA	Walla Walla City-County AP	46.10	-118.28	14.3	11.5	-1.9	18	46
5	USA	Wenatchee-Pangborn Mem AP	47.40	-120.20	13.2	13.3	1.2	17	-25
5	USA	Whidbey Island NAS	48.35	-122.67	12.1	6.5	0.0	19	11
5	USA	Yakima Air Terminal-McAllister Field	46.57	-120.55	12.4	12.5	1.4	13	-26

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Appleton-Outagamie County AP	44.25	-88.52	9.6	12.3	-0.8	27	3
5	USA	Eau Claire County AP	44.87	-91.48	8.3	13.9	-1.1	27	10
5	USA	Ephraim AWOS	45.15	-87.15	8.0	13.7	-2.0	27	26
5	USA	Green Bay-Austin Straubel Intl AP	44.48	-88.13	8.7	13.4	-1.4	28	2
5	USA	Janesville-Rock County AP	42.62	-89.03	9.9	10.5	-0.4	26	2
5	USA	La Crosse Muni AP	43.87	-91.25	9.7	14.0	-0.9	26	5
5	USA	Lone Rock AP	43.20	-90.18	10.6	12.2	-1.5	29	-35
5	USA	Madison-Dane County Rgnl AP	43.13	-89.33	9.1	13.8	-0.5	24	-11
5	USA	Manitowac Muni AWOS	44.13	-87.68	9.2	11.8	-0.7	34	-21
5	USA	Marshfield Muni AP	44.63	-90.18	9.2	12.9	0.0	28	12
5	USA	Milwaukee-Mitchell Intl AP	42.95	-87.90	9.2	13.0	-0.6	31	14
5	USA	Minocqua-Woodruff-Lee Field	45.93	-89.73	7.6	13.4	-1.1	30	7
5	USA	Mosinee-Central Wisconsin AP	44.78	-89.67	8.0	13.3	-1.5	25	15
5	USA	Phillips-Price County AP	45.70	-90.40	7.8	13.5	-1.2	30	6
5	USA	Rice Lake Muni AP	45.48	-91.72	8.2	13.7	-1.1	30	7
5	USA	Sturgeon Bay-Door County AP	44.85	-87.42	9.0	12.7	-0.4	34	4
5	USA	Watertown Muni AP	43.17	-88.72	10.3	13.2	-1.2	30	-15
5	USA	Wausau Muni AP	44.92	-89.63	8.7	14.0	-1.8	33	14
5	USA	Wittman Rgnl AP	43.98	-88.55	8.8	12.6	-0.4	28	6
5	USA	Beckley-Raleigh County Mem AP	37.80	-81.12	12.5	10.6	1.0	20	-16
5	USA	Bluefield-Mercer County AP	37.27	-81.24	13.7	9.6	0.3	27	7
5	USA	Charleston-Yeager AP	38.38	-81.58	14.1	11.2	0.5	21	4
5	USA	Clarksburg-Harrison Marion Rgnl AP	39.28	-80.23	13.3	11.2	1.8	19	-21
5	USA	Elkins-Randolph County AP	38.88	-79.85	11.0	10.8	0.5	21	11
5	USA	Huntington-Tri State Walker Long Field	38.38	-82.55	14.2	11.1	0.8	21	27
5	USA	Lewisburg-Greenbrier Valley AP	37.87	-80.40	11.1	10.6	-0.9	23	29
5	USA	Martinsburg-Eastern WV Rgnl AP	39.40	-77.98	14.2	10.1	0.7	22	13
5	USA	Morgantown Muni-Hart Field	39.65	-79.92	13.2	10.7	1.1	20	19
5	USA	Parkersburg-Wood County-Gill Robb Wilson AP	39.35	-81.43	13.8	11.8	1.1	26	15
5	USA	Wheeling-Ohio County AP	40.18	-80.65	12.1	11.1	0.1	24	1
5	USA	Casper-Natrona County Intl AP	42.90	-106.47	10.1	13.2	-1.2	25	28

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Cheyenne Muni AP	41.15	-104.80	9.8	11.9	-1.2	24	36
5	USA	Cody Muni AWOS	44.52	-109.02	9.4	11.7	1.2	23	-41
5	USA	Evanston-Uinta County AP-Burns Field	41.28	-111.03	7.4	12.0	-1.8	29	27
5	USA	Gillette-Gillette County AP	44.35	-105.53	11.5	13.6	-1.4	22	43
5	USA	Green River-Greater Green River Intergalactic Spaceport	41.46	-109.44	9.2	13.0	-1.2	22	26
5	USA	Jackson Hole AP	43.60	-110.73	5.8	10.8	-2.0	28	30
5	USA	Lander-Hunt Field	42.82	-108.73	10.6	13.7	-0.8	20	30
5	USA	Laramie-General Brees Field	41.32	-105.68	7.8	11.1	-1.1	26	36
5	USA	Rawlins Muni AP	41.80	-107.20	8.6	11.7	-1.7	22	29
5	USA	Riverton Rgnl AP	43.05	-108.45	10.9	14.6	-1.2	23	22
5	USA	Sheridan County AP	44.77	-106.97	10.6	13.4	-0.2	21	-3
5	USA	Worland Muni AP	43.97	-107.95	11.2	14.7	0.0	22	13
6	ARG	AEROPARQUE-BS-AS	-34.57	-58.42	18.7	-6.4	0.4	25	-29
6	ARG	BAHIA-BLANCA-AERO	-38.73	-62.17	16.4	-7.2	0.0	21	17
6	ARG	BARILOCHE-AERO	-41.15	-71.17	10.4	-7.1	-0.7	18	57
6	ARG	CATAMARCA-AERO	-28.60	-65.77	22.6	-7.5	1.1	6	0
6	ARG	CERES-AERO	-29.88	-61.95	19.7	-6.3	0.6	15	18
6	ARG	COMODORO-RIVADAVIA	-45.78	-67.50	14.3	-6.6	0.7	17	-18
6	ARG	CONCORDIA-AERO	-31.30	-58.02	19.6	-6.3	0.5	14	-13
6	ARG	CORDOBA-AERO	-31.32	-64.22	18.0	-5.9	0.4	14	-2
6	ARG	CORRIENTES-AERO	-27.45	-58.77	22.1	-5.4	0.1	16	12
6	ARG	DOLORES-AERO	-36.35	-57.73	16.4	-7.0	0.5	19	-14
6	ARG	ESQUEL-AERO	-42.93	-71.15	10.2	-7.4	1.1	18	-19
6	ARG	EZEIZA-AERO	-34.82	-58.53	17.5	-6.5	-0.1	21	11
6	ARG	FORMOSA-AERO	-26.20	-58.23	23.1	-5.4	0.9	15	-9
6	ARG	GUALEGUAYCHU-AERO	-33.00	-58.62	18.8	-6.9	-0.1	18	15
6	ARG	IGUAZU-AERO	-25.73	-54.47	22.1	-4.8	-0.7	13	73
6	ARG	JUJUY-AERO	-24.38	-65.08	20.7	-5.1	1.1	6	-7
6	ARG	JUNIN-AERO	-34.55	-60.92	16.7	-6.7	0.5	19	-16
6	ARG	LA-RIOJA-AERO	-29.38	-66.82	23.0	-8.4	1.6	9	11
6	ARG	LABOULAYE-AERO	-34.13	-63.37	17.3	-7.2	0.3	16	12
6	ARG	LAS-LOMITAS	-24.70	-60.58	23.3	-5.3	1.1	2	-14
6	ARG	MALARGUE-AERO	-35.50	-69.58	15.2	-8.9	-0.1	16	19
6	ARG	MAR-DEL-PLATA-AERO	-37.93	-57.58	14.6	-5.6	0.3	25	-10
6	ARG	MARCOS-JUAREZ-AERO	-32.70	-62.15	18.1	-6.9	0.5	14	-3
6	ARG	MENDOZA-AERO	-32.83	-68.78	19.4	-9.0	0.5	10	2
6	ARG	MONTE-CASEROS-AERO	-30.27	-57.65	20.7	-6.5	0.0	15	15
6	ARG	NEUQUEN-AERO	-38.95	-68.13	16.9	-9.4	0.0	13	13

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
6	ARG	PARANA-AERO	-31.78	-60.48	19.0	-6.4	0.5	18	-19
6	ARG	PASO-DE-LOS-LIBRES	-29.68	-57.15	20.5	-6.3	-0.1	16	15
6	ARG	POSADAS-AERO	-27.37	-55.97	23.0	-4.9	0.5	16	14
6	ARG	PRESIDENCIA-ROQUE-S	-26.82	-60.45	22.1	-5.4	0.5	13	-5
6	ARG	RECONQUISTA-AERO	-29.18	-59.70	20.9	-5.8	-0.1	21	10
6	ARG	RESISTENCIA-AERO	-27.45	-59.05	22.0	-5.6	0.8	17	-15
6	ARG	RIO-CUARTO-AERO	-33.12	-64.23	17.1	-6.7	0.6	16	-12
6	ARG	RIO-GALLEGOS-AERO	-51.62	-69.28	9.2	-7.0	0.5	13	8
6	ARG	RIO-GRANDE-BA	-53.80	-67.75	6.9	-5.0	0.6	17	-12
6	ARG	ROSARIO-AERO	-32.92	-60.78	18.4	-6.6	0.1	16	16
6	ARG	SALTA-AERO	-24.85	-65.48	18.1	-5.0	0.9	9	4
6	ARG	SAN-ANTONIO-OESTE-A	-40.78	-65.10	16.7	-8.3	0.3	13	14
6	ARG	SAN-JUAN-AERO	-31.40	-68.42	20.7	-10.1	1.2	10	-5
6	ARG	SAN-JULIAN-AERO	-49.32	-67.75	10.9	-7.2	0.5	11	0
6	ARG	SAN-LUIS-AERO	-33.27	-66.35	19.3	-8.0	0.1	9	18
6	ARG	SAN-RAFAEL-AERO	-34.58	-68.40	18.2	-8.5	0.1	12	17
6	ARG	SANTA-ROSA-AERO	-36.57	-64.27	16.5	-7.8	-0.1	17	15
6	ARG	SANTIAGO-DEL-ESTERO	-27.77	-64.30	22.4	-7.2	0.7	7	2
6	ARG	SAUCE-VIEJO-AERO	-31.70	-60.82	19.9	-6.8	0.0	12	14
6	ARG	TANDIL-AERO	-37.23	-59.25	14.6	-6.7	-0.1	22	13
6	ARG	TARTAGAL-AERO	-22.65	-63.82	22.8	-5.1	1.2	-1	-10
6	ARG	TRELEW-AERO	-43.20	-65.27	15.1	-8.0	0.2	15	12
6	ARG	TRES-ARROYOS	-38.33	-60.25	15.4	-7.1	-0.2	20	27
6	ARG	TUCUMAN-AERO	-26.85	-65.10	20.7	-6.0	0.9	12	2
6	ARG	USHUAIA-AERO	-54.80	-68.32	7.3	-4.1	0.5	17	-10
6	ARG	VIEDMA-AERO	-40.85	-63.02	16.0	-8.0	0.5	18	-10
6	ARG	VILLA-DOLORES-AERO	-31.95	-65.13	21.2	-8.5	0.4	9	34
6	ARG	VILLA-REYNOLDS-AERO	-33.73	-65.38	17.2	-7.3	0.7	11	0
6	BOL	COCHABAMBA	-17.42	-66.18	21.0	-2.3	1.2	1	1
6	BOL	LA-PAZ-ALTO	-16.52	-68.18	9.3	-2.2	0.0	21	51
6	BOL	SANTA-CRUZ-EL-TROMP	-17.80	-63.18	24.2	-3.1	1.1	1	-9
6	BOL	VIRU-VIRU	-17.63	-63.13	24.0	-3.1	1.0	0	-5
6	BRA	ARACAJU(AP)	-10.98	-37.07	29.3	-2.6	0.5	58	-4
6	BRA	BELEM(AP)	-1.38	-48.48	28.5	0.9	0.6	98	-74
6	BRA	BOA-VISTA(AP)	2.83	-60.70	28.7	-0.5	1.1	-27	4
6	BRA	BRASILIA(AP)	-15.87	-47.93	22.6	-1.7	1.1	-7	4
6	BRA	CAMPINAS(AP)	-23.00	-47.13	22.2	-2.8	0.8	17	-18
6	BRA	CAMPO-GRANDE(AP)	-20.47	-54.67	25.2	-2.6	1.2	-4	6
6	BRA	CARAVELAS(AP)	-17.63	-39.25	25.4	-3.3	0.3	37	1
6	BRA	CUIABA(AP)	-15.65	-56.10	28.1	-2.1	1.0	7	3

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
6	BRA	CURITIBA(AP)	-25.52	-49.17	18.6	-3.9	0.8	30	-27
6	BRA	EDUARDO-GOMES-INTL	-3.03	-60.05	28.3	1.0	0.9	86	-15
6	BRA	FERNANDO-DE-NORONHA	-3.85	-32.42	28.8	-0.2	0.2	0	15
6	BRA	FLORIANOPOLIS(AP)	-27.67	-48.55	22.1	-4.1	0.3	30	-7
6	BRA	FORTALEZA(AP)	-3.78	-38.53	29.1	-0.6	0.3	-21	30
6	BRA	FOZ-DO-IGUACU(AP)	-25.52	-54.58	22.7	-4.3	0.5	13	-2
6	BRA	GOIANIA(AP)	-16.63	-49.22	25.2	-1.6	1.4	-12	-5
6	BRA	ILHEUS(AP)	-14.82	-39.03	26.0	-1.4	0.6	44	20
6	BRA	LONDRINA(AP)	-23.33	-51.13	23.0	-3.7	0.9	15	4
6	BRA	MACEIO(AP)	-9.52	-35.78	26.0	-1.3	0.4	32	-1
6	BRA	MANAUS(AP)	-3.15	-59.98	28.5	0.8	0.4	90	29
6	BRA	NATAL-AP	-5.92	-35.25	28.6	-1.6	0.5	32	25
6	BRA	PORTO-ALEGRE(AP)	-30.00	-51.18	20.9	-5.2	0.7	22	-10
6	BRA	PORTO-VELHO(AP)	-8.77	-63.92	27.3	-0.7	0.2	-49	44
6	BRA	PORTO-VELHO	-8.77	-63.92	27.8	-0.2	1.1	23	-1
6	BRA	RECIFE(AP)	-8.07	-34.85	28.0	-1.5	0.5	35	14
6	BRA	RIO-BRANCO	-10.00	-67.80	26.7	-1.4	-0.5	-35	60
6	BRA	RIO-DE-JANEIRO(AP)	-22.90	-43.17	25.1	-2.8	0.5	37	-25
6	BRA	SALVADOR(AP)	-12.90	-38.33	26.6	-1.7	-0.2	30	17
6	BRA	SANTAREM-AP	-2.43	-54.72	28.0	0.0	0.6	17	19
6	BRA	SAO-LUIZ(AP)	-2.60	-44.23	27.9	0.2	0.0	1	17
6	BRA	SAO-PAULO(AP)	-23.62	-46.65	21.1	-3.3	0.8	19	-8
6	BRA	TERESINA(AP)	-5.05	-42.82	29.9	0.0	0.3	16	1
6	BRA	VITORIA(AP)	-20.27	-40.28	25.7	-2.5	0.3	37	-12
6	CHL	ANTOFAGASTA	-23.43	-70.45	18.9	-3.5	0.1	28	6
6	CHL	ARICA	-18.47	-70.17	21.0	-4.0	0.4	33	-26
6	CHL	BALMACEDA	-45.92	-71.70	8.0	-5.9	0.1	17	15
6	CHL	CONCEPCION	-36.77	-73.07	15.0	-4.8	-0.3	17	39
6	CHL	COPIAPO	-27.30	-70.42	18.4	-4.6	-0.8	15	57
6	CHL	CURICO	-34.97	-71.23	16.3	-8.2	-0.4	11	35
6	CHL	IQUIQUE	-20.53	-70.18	20.9	-3.9	0.0	28	20
6	CHL	ISLA-DE-PASCUA	-27.17	-109.43	21.3	-2.9	0.4	44	-21
6	CHL	JUAN-FERNANDEZ	-33.62	-78.82	17.2	-3.9	0.0	33	11
6	CHL	LA-SERENA	-29.92	-71.20	16.6	-4.0	0.4	15	-21
6	CHL	PUDAHUEL	-33.38	-70.78	17.5	-7.4	-0.1	16	17
6	CHL	PUERTO-MONTT	-41.43	-73.10	11.2	-3.9	-0.4	20	28
6	CHL	PUNTA-ARENAS	-53.00	-70.97	7.3	-4.4	0.3	23	3
6	CHL	TEMUCO	-38.75	-72.63	12.7	-4.7	0.7	23	-41
6	COL	BARRANQUILLA-ERNEST	10.88	-74.78	28.5	0.9	-0.6	18	-9
6	COL	BOGOTA-ELDORADO	4.70	-74.13	14.8	-0.5	0.4	61	2

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
6	COL	CALI-ALFONSO-BONILL	3.55	-76.38	26.0	0.3	-0.3	-53	47
6	COL	CARTAGENA-RAFAEL-NU	10.45	-75.52	28.4	1.1	0.0	7	17
6	COL	RIONEGRO-JM-CORDOVA	6.13	-75.43	18.6	0.3	0.9	-9	18
6	FLK	MOUNT-PLEASANT-AP	-51.82	-58.45	7.4	-4.2	-0.1	22	17
6	GUF	ROCHAMBEAU	4.83	-52.37	26.7	0.2	-0.2	20	14
6	PER	AREQUIPA	-16.33	-71.57	17.7	-1.3	0.8	-1	16
6	PER	CHICLAYO	-6.78	-79.82	26.0	-2.3	2.4	69	-19
6	PER	CUZCO	-13.53	-71.93	15.0	-0.9	0.7	-27	32
6	PER	IQUITOS	-3.78	-73.30	27.8	0.0	0.8	-1	33
6	PER	LIMA-CALLAO-AP	-12.00	-77.12	22.2	-3.5	1.1	32	-44
6	PER	PISCO	-13.73	-76.22	22.7	-2.1	1.7	28	-30
6	PER	PIURA	-5.20	-80.60	27.2	-1.8	0.2	60	-4
6	PER	PUCALLPA	-8.37	-74.57	27.7	-0.3	0.4	2	16
6	PER	TACNA	-18.05	-70.27	21.6	-3.8	0.6	19	-12
6	PER	TALARA	-4.57	-81.23	26.7	-1.2	0.8	53	37
6	PER	TRUJILLO	-8.08	-79.10	24.1	0.3	0.6	4	55
6	PRY	ASUNCION-AP	-25.25	-57.52	23.8	-4.5	0.6	6	-22
6	PRY	CONCEPCION	-23.42	-57.30	24.6	-4.9	1.0	10	-9
6	PRY	ENCARNACION	-27.32	-55.83	22.1	-4.9	0.7	14	-11
6	PRY	VILLARRICA	-25.75	-56.43	23.3	-5.0	-0.1	11	8
6	URY	ARTIGAS	-30.38	-56.50	20.1	-6.0	-0.1	18	10
6	URY	BELLA-UNION	-30.27	-57.58	20.5	-6.2	0.5	19	6
6	URY	CARRASCO	-34.83	-56.00	16.9	-5.7	0.0	29	7
6	URY	COLONIA	-34.45	-57.83	18.2	-6.6	0.1	22	15
6	URY	DURAZNO	-33.35	-56.50	17.6	-6.5	0.1	21	9
6	URY	MELO	-32.37	-54.18	18.1	-6.0	1.0	21	-28
6	URY	MERCEDES	-33.25	-58.07	18.5	-6.6	0.1	18	12
6	URY	PASO-DE-LOS-TOROS	-32.80	-56.52	18.6	-6.4	0.1	22	14
6	URY	PAYSANDU	-32.33	-58.03	19.0	-6.7	-0.1	20	13
6	URY	RIVERA	-30.88	-55.53	18.9	-6.0	0.1	21	16
6	URY	ROCHA	-34.48	-54.30	16.9	-5.5	0.5	24	-6
6	URY	SALTO	-31.38	-57.95	19.8	-6.4	-0.2	18	11
6	URY	TACUAREMBO	-31.70	-55.98	18.4	-6.7	-0.1	18	15
6	URY	TREINTA-Y-TRES	-33.22	-54.38	17.9	-6.4	0.3	22	12
6	URY	YOUNG	-32.68	-57.63	18.4	-6.8	0.9	20	-9
6	URY	CARACAS-MAIQUETIA-A	10.60	-66.98	26.9	1.2	0.7	73	18
6	URY	GUANARE	9.02	-69.73	27.6	-1.0	0.2	81	-23
6	URY	MERIDA	8.60	-71.18	21.6	0.4	0.5	32	-18
7	ASM	PAGO-PAGO-WSO-AP	-14.33	-170.72	28.1	-0.7	0.2	32	8
7	AUS	ADELAIDE-AP	-34.95	138.53	18.2	-5.9	0.1	19	16

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	AUS	ADELAIDE-REGIONAL-O	-34.92	138.62	18.8	-6.5	-0.7	20	48
7	AUS	ALBANY-AP	-34.93	117.80	16.4	-4.3	0.3	29	-1
7	AUS	ALICE-SPRINGS-AP	-23.80	133.88	23.7	-8.2	1.6	9	-8
7	AUS	ARARAT-PRISON	-37.28	142.98	14.0	-5.6	-0.5	24	46
7	AUS	BALLARAT-AERODROME	-37.52	143.78	12.6	-5.5	-0.7	27	46
7	AUS	BENALLA	-36.55	145.97	15.9	-7.2	0.9	20	-55
7	AUS	BILOELA-THANGOOL-AP	-24.48	150.57	21.8	-5.6	1.1	13	8
7	AUS	BIRDSVILLE-POLICE-S	-25.90	139.35	25.1	-9.1	0.8	14	-4
7	AUS	BOULIA-AP	-22.92	139.90	27.5	-7.8	1.2	13	8
7	AUS	BOWEN-AP	-20.02	148.20	24.5	-4.0	0.8	22	12
7	AUS	BOWRAL(PARRY-DRIVE)	-34.48	150.40	14.4	-5.6	0.9	19	-6
7	AUS	BRISBANE-AERO	-27.38	153.13	20.8	-4.7	0.6	21	11
7	AUS	BROOME-AP	-17.95	122.23	28.4	-4.7	1.5	16	18
7	AUS	CAIRNS-AERO	-16.88	145.75	24.8	-3.0	0.4	17	11
7	AUS	CANBERRA-AP	-35.30	149.20	14.4	-7.3	0.2	20	7
7	AUS	CAPE-BORDA	-35.75	136.58	16.6	-4.3	-0.4	26	24
7	AUS	CAPE-BRUNY-LIGHTHOU	-43.50	147.15	12.6	-3.0	0.3	30	-4
7	AUS	CAPE-OTWAY-LIGHTHOU	-38.85	143.52	14.4	-3.0	0.4	35	-6
7	AUS	CARNARVON-AP	-24.88	113.67	23.3	-5.0	1.1	32	-16
7	AUS	CEDUNA-AMO	-32.13	133.70	18.7	-5.7	0.7	18	-19
7	AUS	CHARLEVILLE-AERO	-26.42	146.27	23.1	-8.3	0.9	11	5
7	AUS	COBAR-MO	-31.48	145.83	21.1	-8.9	0.8	17	-4
7	AUS	COFFS-HARBOUR-MO	-30.32	153.12	19.3	-4.8	0.5	22	10
7	AUS	COOKTOWN-MISSION	-15.43	145.18	27.1	-2.8	1.2	2	28
7	AUS	COONABARABRAN-NAMOI	-31.27	149.27	16.4	-7.6	0.4	17	-10
7	AUS	CORRIGIN	-32.33	117.87	19.9	-8.0	0.4	24	-13
7	AUS	COWRA-AP	-33.85	148.65	17.3	-8.1	0.1	22	15
7	AUS	CUNDERDIN	-31.65	117.25	20.4	-8.2	-0.1	20	14
7	AUS	CUNNAMULLA-POST-OFF	-28.07	145.68	23.9	-8.4	1.0	12	-1
7	AUS	DARWIN-AP	-12.42	130.88	27.6	-1.9	1.2	-5	23
7	AUS	DEVONPORT-AP	-41.17	146.42	13.2	-4.2	-0.5	29	45
7	AUS	EAST-SALE-AP	-38.10	147.13	14.6	-4.7	0.1	24	11
7	AUS	ELLISTON(PO)	-33.65	134.88	18.5	-4.8	0.6	19	-7
7	AUS	ESPERANCE	-33.83	121.88	17.9	-4.5	0.3	25	-1
7	AUS	GABO-ISLAND	-37.57	149.90	15.7	-3.6	0.3	36	-1
7	AUS	GAYNDAH-POST-OFFICE	-25.63	151.62	22.0	-5.9	0.8	14	12
7	AUS	GEORGETOWN-POST-OFF	-18.30	143.55	27.0	-4.5	1.2	1	22
7	AUS	GERALDTON-AP	-28.80	114.70	21.4	-5.9	0.2	31	-6
7	AUS	GILES-METEOROLOGICA	-25.03	128.30	23.9	-8.2	1.4	14	0
7	AUS	GOONDIWINDI-AP	-28.52	150.32	20.8	-7.2	0.8	16	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	AUS	GOVE-AP	-12.28	136.82	26.3	-2.3	0.9	26	60
7	AUS	HALLS-CREEK-AP	-18.23	127.67	29.0	-5.5	1.9	-1	16
7	AUS	HOBART-AP	-42.83	147.50	13.5	-4.1	0.1	27	17
7	AUS	HOBART-ELLERSLIE-RO	-42.88	147.33	13.2	-4.0	0.1	23	13
7	AUS	JURIEN	-30.30	115.03	21.1	-4.8	0.1	30	9
7	AUS	KALBARRI-PO	-27.72	114.17	22.8	-6.0	0.0	30	20
7	AUS	KALGOORLIE-BOULDER	-30.78	121.45	21.0	-8.1	0.7	17	-18
7	AUS	KATOOMBA	-33.72	150.28	13.5	-6.3	0.6	24	-15
7	AUS	KULGERA	-25.85	133.30	22.8	-8.6	1.2	14	-7
7	AUS	KYANCUTTA	-33.13	135.55	19.3	-7.4	0.2	18	16
7	AUS	LAKE-GRACE	-33.12	118.47	20.0	-7.7	0.2	22	11
7	AUS	LAMEROO	-35.33	140.52	17.8	-7.5	0.5	18	-21
7	AUS	LANCELIN	-31.02	115.32	20.6	-4.9	0.4	28	1
7	AUS	LAUNCESTON-AP	-41.53	147.20	12.7	-5.2	-0.1	25	0
7	AUS	LAVERTON-AERODROME	-37.87	144.75	15.0	-4.7	0.6	27	-4
7	AUS	LEARMONTH-AP	-22.23	114.08	25.4	-5.8	1.1	27	-11
7	AUS	LEONORA-POST-OFFICE	-28.88	121.33	22.8	-8.3	0.4	17	13
7	AUS	LORD-HOWE-ISLAND-AE	-31.53	159.07	21.1	-3.8	0.0	31	18
7	AUS	MAATSUYKER-ISLAND-L	-43.65	146.27	12.1	-2.3	0.4	51	-31
7	AUS	MACKAY-MO	-21.12	149.22	23.3	-4.3	0.6	18	14
7	AUS	MACQUARIE-ISLAND	-54.50	158.95	6.2	-2.0	-0.4	35	44
7	AUS	MAITLAND	-34.38	137.67	18.5	-6.5	0.0	20	14
7	AUS	MARBLE-BAR-COMPARIS	-21.18	119.75	29.2	-6.9	0.9	8	17
7	AUS	MARLA-POLICE-STATIO	-27.30	133.62	22.8	-8.4	1.0	13	-21
7	AUS	MARYBOROUGH-COMPOSI	-25.52	152.72	21.3	-4.8	0.4	18	23
7	AUS	MELBOURNE-AP	-37.67	144.85	15.0	-4.6	0.5	25	-19
7	AUS	MELBOURNE	-37.82	144.97	16.6	-5.4	0.0	22	8
7	AUS	MILDURA-AP	-34.23	142.08	19.0	-7.9	-0.5	14	43
7	AUS	MORUYA-HEADS-PILOT	-35.92	150.15	16.6	-4.1	0.6	30	-12
7	AUS	MOUNT-GAMBIER-AERO	-37.73	140.78	15.1	-5.1	0.6	22	-24
7	AUS	MOUNT-ISA-AERO	-20.68	139.48	26.7	-6.6	1.4	9	7
7	AUS	MURRURUNDI-POST-OFF	-31.77	150.83	16.2	-6.8	0.2	19	12
7	AUS	NEPTUNE-ISLAND	-35.33	136.12	16.9	-3.8	-0.2	30	11
7	AUS	NORMANTON	-17.67	141.08	29.5	-3.9	1.5	9	18
7	AUS	NORSEMAN	-32.20	121.78	20.3	-7.9	0.1	21	11
7	AUS	ONSLOW	-21.63	115.12	26.5	-5.2	0.9	31	6
7	AUS	PARKES(MACARTHUR-S)	-33.13	148.17	18.0	-8.0	-0.1	20	10
7	AUS	PAYNES-FIND	-29.27	117.68	23.1	-9.2	-0.1	20	12
7	AUS	PERTH-AP	-31.93	115.97	19.9	-6.0	0.6	27	-26
7	AUS	PORT-HEDLAND-AP	-20.37	118.63	27.7	-5.6	1.4	19	1

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	AUS	QUILPIE-AP	-26.62	144.25	25.0	-8.5	1.3	14	5
7	AUS	RICHMOND-POST-OFFIC	-20.73	143.13	28.0	-6.2	1.3	7	17
7	AUS	ROCKHAMPTON-AERO	-23.38	150.48	23.1	-5.0	0.8	17	16
7	AUS	ROEBOURNE-POST-OFFI	-20.78	117.15	29.8	-6.0	1.2	17	5
7	AUS	SHARK-BAY(DENHAM)	-25.92	113.52	23.1	-4.7	0.7	30	-14
7	AUS	SMOKY-CAPE-LIGHTHOU	-30.92	153.08	20.1	-4.0	0.6	28	-10
7	AUS	SOUTHERN-CROSS	-31.23	119.33	20.4	-8.1	0.5	15	9
7	AUS	ST-LAWRENCE-POST-OF	-22.35	149.53	23.3	-4.3	0.9	22	5
7	AUS	SYDNEY-AP-AMO	-33.93	151.18	18.9	-4.8	0.7	25	-8
7	AUS	TIBOOBURRA-POST-OFF	-29.43	142.00	22.1	-8.5	0.5	16	1
7	AUS	TOWNSVILLE-AERO	-19.25	146.77	24.9	-4.3	-0.9	20	-77
7	AUS	URANDANGIE	-21.60	138.30	27.5	-7.6	1.3	11	8
7	AUS	WAGGA-WAGGA-AMO	-35.17	147.45	16.3	-7.4	-0.6	25	44
7	AUS	WILLIAMTOWN-RAAF	-32.80	151.83	18.3	-5.6	0.6	20	2
7	AUS	WILLIS-ISLAND	-16.30	149.97	26.7	-2.2	-0.1	35	9
7	AUS	WINDORAH	-25.42	142.65	25.8	-8.3	1.2	13	-4
7	AUS	WINTON(POST-OFFICE)	-22.38	143.03	27.5	-6.9	1.2	7	13
7	AUS	WOLLOGORANG	-17.20	137.93	26.6	-4.1	1.4	10	24
7	AUS	WONTHAGGI-COMPOSITE	-38.60	145.58	14.8	-4.4	-0.5	26	42
7	AUS	WOOMERA-AERODROME	-31.15	136.82	20.5	-7.8	1.0	15	-13
7	AUS	WYNDHAM	-15.48	128.12	32.0	-4.4	1.6	-6	11
7	AUS	YAMBA-PILOT-STATION	-29.43	153.37	20.2	-4.0	0.0	23	10
7	BRN	BRUNEI-AP	4.93	114.93	27.8	1.0	0.1	-14	15
7	CCK	COCOS-ISLAND-AERO	-12.18	96.83	28.6	-0.2	0.3	17	15
7	COK	RAROTONGA	-21.20	-159.82	25.0	-2.1	0.3	45	-6
7	FJI	NADI-AP	-17.75	177.45	25.8	-1.9	0.3	24	10
7	FJI	NAUSORI	-18.05	178.57	25.1	-2.0	0.3	36	4
7	FSM	CHUUK-WSO-AP	7.45	151.83	28.2	0.4	0.0	2	16
7	FSM	KUSAIE-KOSRAE-EAST	5.33	163.03	28.3	0.3	0.3	61	39
7	FSM	POHNPEI-WSO	6.97	158.22	27.5	0.0	0.2	-5	21
7	FSM	YAP-ISLAND-WSO-AP	9.48	138.08	27.8	0.4	0.2	0	16
7	GUM	ANDERSEN-AFB	13.57	144.92	27.5	0.5	0.0	36	11
7	GUM	GUAM-WFO	13.48	144.80	27.8	0.6	0.0	13	17
7	IDN	BALIKPAPAN-SEPINGGA	-1.27	116.90	28.2	0.2	0.6	-4	33
7	IDN	BANDA-ACEH-BLANG-BI	5.52	95.42	28.2	1.6	0.3	2	-17
7	IDN	BANJARMASIN-SYAMSUD	-3.43	114.75	28.4	0.3	0.7	16	7
7	IDN	BANYUWANGI	-8.22	114.38	27.6	-0.3	0.9	9	27
7	IDN	CILACAP	-7.73	109.02	27.4	-1.7	0.9	53	37
7	IDN	DENPASAR-NGURAH-RAI	-8.75	115.17	28.3	-0.4	0.5	13	22

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	IDN	GORONTALO-JALALUDDI	0.52	123.07	28.1	-0.1	0.7	13	25
7	IDN	JAKARTA-SOEKARNO-HA	-6.12	106.65	28.1	0.1	0.7	-5	30
7	IDN	KALIANGET(MADURA-I)	-7.05	113.97	28.3	-0.8	0.6	-44	25
7	IDN	LHOKSEUMAWE-MALIKUS	5.23	97.20	28.1	1.3	0.4	6	23
7	IDN	MATARAM-SELAPARANG	-8.53	116.07	27.2	-0.9	0.7	18	15
7	IDN	MEDAN-POLONIA	3.57	98.68	28.7	1.1	0.6	-24	39
7	IDN	MENADO-SAM-RATULAN	1.53	124.92	27.8	0.5	0.1	25	4
7	IDN	PADANG-TABING	-0.88	100.35	27.8	-0.7	0.3	62	17
7	IDN	PALEMBANG-ST-M-BA	-2.90	104.70	28.6	1.0	0.9	-5	23
7	IDN	PALU-MUTIARA	-0.68	119.73	28.1	0.1	0.1	5	14
7	IDN	PEKAN-BARU-SIMPANGT	0.47	101.45	28.7	0.0	0.9	14	16
7	IDN	RENGAT-JAPURA	-0.33	102.32	28.2	0.3	0.8	11	27
7	IDN	SANGKAPURA(BAWEAN)	-5.85	112.63	28.7	-0.2	0.2	0	17
7	IDN	SAUMLAKI-OLILIT	-7.98	131.30	27.9	-0.9	0.2	14	17
7	IDN	SEMARANG-AHMAD-YANI	-6.98	110.38	28.2	0.8	0.9	48	25
7	IDN	SIBOLGA-PINANGSORI	1.55	98.88	28.7	-0.9	0.0	99	-28
7	IDN	SINGKEP-DABO	-0.48	104.58	28.1	0.5	0.8	-8	17
7	IDN	SUMBAWA-BESAR-BRANG	-8.43	117.42	27.7	-0.2	0.8	12	21
7	IDN	SURABAYA-JUANDA	-7.37	112.77	28.9	-0.2	0.9	-5	29
7	IDN	TEGAL	-6.85	109.15	28.1	-0.4	0.7	-38	38
7	IDN	UJUNG-PANDANG-HASAN	-5.07	119.55	27.6	0.2	0.6	13	23
7	IDN	WAINGAPU-MAU-HAU	-9.67	120.33	27.4	-1.2	1.2	-7	19
7	KIR	TARAWA	1.35	172.92	28.3	0.1	0.0	1	17
7	MHL	MAJURO-WSO-AP	7.08	171.38	28.1	0.0	0.0	15	15
7	MNP	ROTA-INTL-ROTA-ISL	14.17	145.25	28.1	1.5	0.0	21	16
7	MNP	WEST-TINIAN	15.00	145.62	28.1	1.2	1.0	-4	23
7	MYS	BINTULU	3.20	113.03	28.1	0.6	0.1	14	4
7	MYS	KOTA-BHARU	6.17	102.28	27.8	0.8	-0.1	-33	41
7	MYS	KOTA-KINABALU	5.93	116.05	28.7	0.5	0.4	16	53
7	MYS	KUALA-LUMPUR-SUBANG	3.12	101.55	28.2	0.4	-0.1	17	12
7	MYS	KUANTAN	3.78	103.22	27.6	1.1	0.6	17	30
7	MYS	KUCHING	1.48	110.33	27.4	0.8	0.1	19	-2
7	MYS	LABUAN	5.30	115.25	28.2	0.2	0.0	14	17
7	MYS	MALACCA	2.27	102.25	28.0	0.2	0.4	13	2
7	MYS	MIRI	4.33	113.98	27.7	0.8	0.4	-30	16
7	MYS	PENANG-BAYAN-LEPAS	5.30	100.27	28.0	0.2	0.1	13	16
7	MYS	SANDAKAN	5.90	118.07	28.2	0.6	0.4	16	30
7	MYS	SIBU	2.33	111.83	27.7	0.9	0.8	-37	-10

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	MYS	SITIAWAN	4.22	100.70	28.0	1.2	0.8	-24	22
7	MYS	TAWAU	4.27	117.88	27.6	-0.1	0.1	16	17
7	NCL	KOUMAC(NLLE-CALEDO)	-20.57	164.28	26.1	-3.0	0.7	16	-3
7	NCL	LA-TONTOUTA(NLLE-C)	-22.02	166.22	23.2	-3.6	0.4	30	11
7	NCL	NOUMEA(NLLE-CALEDO)	-22.27	166.45	23.8	-2.5	-0.3	34	37
7	NFK	NORFOLK-ISLAND-AERO	-29.03	167.93	19.5	-3.1	0.4	42	-34
7	NZL	AUCKLAND-AP	-37.02	174.80	16.0	-4.0	0.0	32	10
7	NZL	CHRISTCHURCH	-43.48	172.55	12.2	-5.2	0.1	21	17
7	NZL	TAIAROA-HEAD	-45.77	170.73	11.4	-3.2	0.3	29	-27
7	NZL	WELLINGTON-AP	-41.33	174.80	14.4	-3.6	0.1	39	3
7	PHL	APARRI	18.37	121.63	27.4	2.2	0.0	20	0
7	PHL	BAGUIO	16.42	120.60	20.3	1.0	0.8	-16	26
7	PHL	BUTUAN	8.93	125.52	28.0	1.5	0.7	-11	14
7	PHL	CAGAYAN-DE-ORO	8.48	124.63	29.3	0.6	0.5	-2	16
7	PHL	CALAPAN	13.42	121.18	28.0	1.4	0.7	-3	28
7	PHL	CATARMAN	12.50	124.63	28.0	1.6	0.7	2	39
7	PHL	DAET	14.13	122.98	27.6	1.5	0.3	-2	19
7	PHL	DAGUPAN	16.05	120.33	28.4	1.1	0.4	-22	25
7	PHL	DAVAO-AP	7.12	125.65	28.3	0.7	0.3	13	16
7	PHL	DIPOLOG	8.60	123.35	28.5	1.0	0.3	-26	30
7	PHL	DUMAGUETE	9.30	123.30	28.3	0.8	0.5	-4	22
7	PHL	ILOILO	10.70	122.57	28.1	1.2	1.0	-32	22
7	PHL	LAOAG	18.18	120.53	28.0	1.8	0.9	-2	32
7	PHL	LEGASPI	13.13	123.73	28.0	1.5	0.7	26	22
7	PHL	LUMBIA-AP	8.43	124.28	27.4	1.4	0.4	10	11
7	PHL	MACTAN	10.30	123.97	28.3	1.2	0.7	-2	34
7	PHL	MALAYBALAY	8.15	125.08	25.5	0.9	1.1	-40	26
7	PHL	MANILA	14.58	120.98	28.5	1.2	1.2	-24	40
7	PHL	MASBATE	12.37	123.62	28.6	1.7	0.3	14	1
7	PHL	NINOY-AQUINO-INTERN	14.52	121.00	28.2	1.3	1.0	-21	27
7	PHL	PUERTO-PRINCESA	9.75	118.73	27.9	0.9	0.8	-37	25
7	PHL	ROXAS	11.58	122.75	27.9	0.7	0.3	-15	34
7	PHL	SCIENCE-GARDEN	14.63	121.02	28.8	1.7	1.0	-34	31
7	PHL	TACLOBAN	11.25	125.00	28.6	1.8	0.7	24	5
7	PHL	TAGBILARAN	9.60	123.85	28.6	1.5	0.6	4	41
7	PHL	TAYABAS	14.03	121.58	27.8	2.5	1.2	2	17
7	PHL	TUGUEGARAO	17.62	121.73	27.9	2.6	1.0	4	26
7	PHL	VIRAC	13.58	124.23	27.9	1.5	0.8	15	51
7	PHL	ZAMBOANGA	6.90	122.07	28.3	0.6	0.2	-9	19
7	PLW	KOROR-WSO	7.33	134.48	27.8	0.4	0.4	0	17

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	PYF	ATUONA	-9.80	-139.03	26.6	-0.5	0.4	50	-2
7	PYF	MURUROA	-21.82	-138.80	25.5	-2.4	0.5	36	24
7	PYF	RAPA	-27.62	-144.33	21.5	-2.8	-0.6	48	64
7	PYF	RIKITEA	-23.13	-134.97	24.0	-2.3	0.6	45	-33
7	PYF	TAHITI-FAAA	-17.55	-149.62	27.1	-1.4	0.3	38	17
7	PYF	TAKAROA	-14.48	-145.03	28.0	-0.7	0.4	52	51
7	PYF	TUBUAI	-23.35	-149.48	24.0	-2.3	0.4	45	-9
7	SGP	SINGAPORE-CHANGI-AP	1.37	103.98	28.3	0.8	0.5	-4	5
7	SLB	HONIARA-HENDERSON	-9.42	160.05	27.0	-1.0	-0.4	25	-4
7	TON	FUAAMOTU	-21.23	-175.15	24.1	-2.5	0.2	40	-11
7	TON	HAAPAI	-19.80	-174.35	25.7	-2.0	0.4	42	4
7	VUT	ANEITYUM	-20.23	169.77	24.6	-2.6	0.0	36	-1
7	VUT	BAUERFIELD(EFATE)	-17.70	168.30	24.7	-2.5	0.3	34	-1
7	VUT	LAMAP(MALEKULA)	-16.42	167.80	26.4	-1.5	-0.4	43	14
7	VUT	PEKOA-AP(SANT)	-15.52	167.22	26.1	-1.0	0.5	41	50
7	VUT	WHITE-GRASS-AP	-19.45	169.22	24.8	-2.1	0.9	35	-31
7	WLF	HIHIFO(ILE-WALLIS)	-13.23	-176.17	27.0	-0.6	0.0	28	10

Table A-4: Constant values for tall grass

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
1	BEN	COTONOU	6.35	2.38	27.5	-1.3	0.7	64	26
1	BEN	PARAKOU	9.35	2.62	25.8	-1.6	-1.1	87	-69
1	BFA	BOBO-DIOULASSO	11.17	-4.32	26.4	1.5	1.7	-64	28
1	BFA	DORI	14.03	-0.03	26.8	4.0	2.1	-6	18
1	BFA	OUAGADOUGOU	12.35	-1.52	27.3	2.5	2.3	-20	27
1	BWA	FRANCISTOWN	-21.22	27.50	21.4	-4.1	1.4	5	9
1	BWA	MAUN	-19.98	23.42	23.4	-4.0	1.9	0	8
1	BWA	SERETSE-KHAMA-INTER	-24.55	25.92	20.4	-5.2	1.3	7	1
1	CIV	ABIDJAN	5.25	-3.93	27.0	-1.6	0.7	70	27
1	DZA	ANNABA	36.83	7.82	18.1	6.3	0.7	39	-39
1	DZA	BATNA	35.75	6.32	15.5	9.0	0.0	29	3
1	DZA	BECHAR	31.50	-2.25	20.7	10.0	0.8	25	-25
1	DZA	BEJAIA-AP	36.72	5.07	18.0	6.8	0.8	40	-24
1	DZA	BISKRA	34.80	5.73	22.0	9.3	0.0	26	4
1	DZA	BORDJ-BOU-ARRERIDJ	36.07	4.77	15.6	9.0	1.5	30	-33
1	DZA	CHLEF	36.22	1.33	19.1	8.3	1.1	32	-45
1	DZA	CONSTANTINE	36.28	6.62	15.6	8.3	0.0	30	0
1	DZA	DAR-EL-BEIDA	36.68	3.22	17.8	6.6	0.8	37	-40
1	DZA	DJANET	24.27	9.47	22.0	8.6	1.6	18	18
1	DZA	EL-BAYADH	33.67	1.00	14.9	9.8	-1.0	28	43
1	DZA	EL-GOLEA	30.57	2.87	21.2	10.1	0.9	24	-5
1	DZA	EL-OUED	33.50	6.78	21.2	9.5	0.8	26	-12
1	DZA	GHARDAIA	32.40	3.80	21.3	9.8	0.7	25	-22
1	DZA	HASSI-MESSAOUD	31.67	6.15	22.2	10.2	0.9	24	-14
1	DZA	ILLIZI	26.50	8.42	23.6	9.1	1.4	23	6
1	DZA	IN-AMENAS	28.05	9.63	21.8	9.5	1.0	22	-1
1	DZA	IN-SALAH	27.23	2.50	25.2	9.8	1.3	21	-26
1	DZA	JIJEL-ACHOUAT	36.80	5.88	18.0	6.4	0.9	39	-26
1	DZA	MASCARA-MATEMORE	35.60	0.30	16.6	7.8	0.1	32	2
1	DZA	MECHERIA	33.58	-0.28	16.6	9.2	1.2	26	-34
1	DZA	ORAN-SENIA	35.63	-0.60	18.1	6.4	1.2	34	-35
1	DZA	SETIF	36.18	5.25	14.7	8.9	-1.3	29	33
1	DZA	SKIKDA	36.88	6.90	19.0	6.0	0.5	43	-32
1	DZA	TAMANRASSET	22.80	5.43	21.2	7.6	1.0	19	12
1	DZA	TEBESSA	35.42	8.12	16.3	8.9	0.6	28	-35
1	DZA	TIARET	35.35	1.47	15.1	8.8	-1.0	32	37
1	DZA	TLEMCEN-ZENATA	35.02	-1.47	17.7	6.6	1.0	32	-35
1	DZA	TOUGGOURT	33.12	6.13	21.1	9.6	0.8	24	-22

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
1	EGY	ALEXANDRIA-NOUZHA	31.20	29.95	20.5	5.9	0.4	39	3
1	EGY	ASSWAN	23.97	32.78	25.6	7.7	1.4	24	13
1	EGY	ASYUT	27.05	31.02	22.0	7.8	1.0	24	10
1	EGY	BAHARIA	28.33	28.90	21.6	7.1	0.8	20	5
1	EGY	BALTIM	31.55	31.10	20.6	5.8	0.6	40	6
1	EGY	CAIRO-AP	30.13	31.40	21.9	6.4	0.6	28	14
1	EGY	DAKHLA	25.48	29.00	22.8	8.3	1.1	21	13
1	EGY	EL-ARISH	31.08	33.82	19.8	5.5	0.6	35	8
1	EGY	EL-TOR	28.23	33.62	23.2	6.2	0.5	30	10
1	EGY	HURGUADA	27.15	33.72	24.6	7.0	0.5	32	12
1	EGY	ISMAILIA	30.60	32.25	21.4	6.7	0.7	32	4
1	EGY	KHARGA	25.45	30.53	24.3	8.2	1.2	23	19
1	EGY	KOSSEIR	26.13	34.15	24.1	5.4	0.4	35	17
1	EGY	LUXOR	25.67	32.70	23.7	8.1	1.1	23	14
1	EGY	MERSA-MATRUH	31.33	27.22	20.2	6.1	0.5	42	-18
1	EGY	MINYA	28.08	30.73	21.4	7.4	0.9	25	11
1	EGY	PORT-SAID-EL-GAMIL	31.28	32.23	21.5	5.9	0.5	43	7
1	EGY	SIWA	29.20	25.32	21.6	7.6	0.8	26	3
1	ESH	DAKHLA	23.72	-15.93	20.6	2.1	-0.1	51	-25
1	ESP	FUERTEVENTURA-AP	28.45	-13.87	21.5	3.5	1.0	50	-8
1	ESP	LA-PALMA-AP	28.62	-17.75	20.7	3.0	0.4	54	-35
1	ESP	LANZAROTE-AP	28.95	-13.60	20.7	3.0	0.9	55	-8
1	ESP	LAS-PALMAS-DE-GRAN	27.93	-15.38	21.0	3.0	0.5	52	-23
1	ESP	MELILLA	35.28	-2.95	19.2	5.7	1.0	37	-46
1	ESP	STA-CRUZ-DE-TENERI	28.45	-16.25	20.9	3.1	0.4	52	-9
1	ESP	TENERIFE-LOS-RODEOS	28.47	-16.32	16.4	3.1	0.4	47	-33
1	ESP	TENERIFE-SUR	28.05	-16.57	21.8	2.9	0.4	48	-9
1	FRA	SERGE-FROLOW(ILE-T)	-15.80	54.50	25.8	-2.2	0.3	54	-10
1	KEN	GARISSA	-0.47	39.63	27.7	-1.1	0.8	58	8
1	KEN	KISUMU	-0.10	34.75	23.0	-0.6	0.4	21	-9
1	KEN	KITALE	1.02	35.00	18.7	-0.8	0.5	50	0
1	KEN	LODWAR	3.12	35.62	28.7	0.0	0.8	13	11
1	KEN	MAKINDU	-2.28	37.83	22.2	-1.2	0.6	13	-1
1	KEN	MARSABIT	2.30	37.90	20.4	0.0	0.5	-7	22
1	KEN	MERU	0.08	37.65	19.0	-0.5	0.9	67	10
1	KEN	MOMBASA	-4.03	39.62	25.6	-1.1	0.7	40	26
1	KEN	MOYALE	3.53	39.03	22.1	-1.9	0.8	39	-38
1	KEN	NAIROBI-KENYATTA-AP	-1.32	36.92	19.2	-1.3	0.7	39	6
1	KEN	NAKURU	-0.27	36.10	18.2	-1.2	0.4	58	-24
1	KEN	NYERI	-0.50	36.97	17.6	-0.7	0.9	38	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
1	KEN	VOI	-3.40	38.57	24.4	-1.3	0.6	37	14
1	LBY	AGEDABIA	30.72	20.17	20.7	6.9	0.9	30	8
1	LBY	BENINA	32.10	20.27	20.3	6.6	0.1	36	4
1	LBY	GHADAMES	30.13	9.50	22.4	9.5	1.0	23	-3
1	LBY	KUFRA	24.22	23.30	23.4	7.9	1.0	20	10
1	LBY	MISURATA	32.42	15.05	20.8	6.2	0.7	40	-4
1	LBY	NALUT	31.87	10.98	19.6	8.2	0.7	31	-8
1	LBY	SEBHA	27.02	14.45	23.1	8.9	1.3	24	11
1	LBY	SIRTE	31.20	16.58	21.1	5.9	0.8	40	0
1	LBY	TRIPOLI-INTL-AP	32.70	13.08	20.5	7.3	1.2	31	8
1	LBY	ZUARA	32.88	12.08	20.9	6.6	0.9	41	-13
1	MAR	AGADIR-AL-MASSIRA	30.32	-9.40	19.6	4.4	0.5	33	-15
1	MAR	AL-HOCEIMA	35.18	-3.85	18.1	5.3	0.9	35	-32
1	MAR	BENI-MELLAL	32.37	-6.40	18.8	7.8	1.2	28	-36
1	MAR	CASABLANCA	33.57	-7.67	18.4	4.7	0.5	36	-13
1	MAR	ERRACHIDIA	31.93	-4.40	19.1	10.0	1.0	24	-19
1	MAR	ESSAOUIRA	31.52	-9.78	18.3	2.4	0.6	47	-3
1	MAR	FES-SAIS	33.93	-4.98	17.3	7.4	0.7	35	-29
1	MAR	MARRAKECH	31.62	-8.03	19.8	6.8	1.2	29	-29
1	MAR	MEKNES	33.88	-5.53	17.3	6.5	-0.1	30	1
1	MAR	MIDELT	32.68	-4.73	14.7	7.7	0.9	29	-24
1	MAR	NADOR-AROUI	34.98	-3.02	18.7	5.7	1.2	38	-23
1	MAR	NOUASSEUR	33.37	-7.58	17.9	5.2	0.6	37	-12
1	MAR	OUARZAZATE	30.93	-6.90	19.0	8.7	1.2	21	-31
1	MAR	OUJDA	34.78	-1.93	17.2	6.6	1.0	36	-35
1	MAR	RABAT-SALE	34.05	-6.77	17.7	4.9	0.5	36	-9
1	MAR	SAFI	32.28	-9.23	18.7	4.7	0.7	39	-26
1	MAR	SIDI-IFNI	29.37	-10.18	19.5	1.7	0.6	38	8
1	MAR	TAN-TAN	28.45	-11.15	19.3	3.0	0.4	54	-11
1	MAR	TANGER(AERODROME)	35.73	-5.90	18.2	5.4	0.3	36	-6
1	MAR	TAZA	34.22	-4.00	17.6	7.4	1.2	30	-31
1	MAR	TETUAN-SANIA-RAMEL	35.58	-5.33	18.9	5.4	0.8	35	-37
1	MDG	ANTANANARIVO-IVATO	-18.80	47.48	18.6	-2.9	0.7	23	14
1	MDG	MAHAJANGA	-15.67	46.35	26.1	-1.8	0.6	37	30
1	MDG	TAOLAGNARO	-25.03	46.95	23.5	-2.7	0.1	25	-19
1	MDG	TOAMASINA	-18.12	49.40	23.7	-2.6	0.2	38	-11
1	MLI	BAMAKO-SENOU	12.53	-7.95	27.0	2.5	1.6	-44	16
1	MLI	MOPTI	14.52	-4.10	28.1	3.4	1.7	-2	22
1	MOZ	MAPUTO-MAVALANE	-25.92	32.57	23.3	-3.3	0.6	26	-8
1	MRT	NOUADHIBOU	20.93	-17.03	22.2	1.8	0.4	67	-15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
1	MRT	NOUAKCHOTT	18.10	-15.95	25.3	3.0	1.2	51	-6
1	MUS	AGALEGA	-10.43	56.75	26.6	-1.4	0.2	37	23
1	MUS	PLAISANCE(MAURITIU)	-20.43	57.68	23.9	-2.6	-0.1	40	14
1	MUS	RODRIGUES	-19.68	63.42	24.3	-2.2	0.3	52	-12
1	MUS	ST-BRANDON(ST-RA)	-16.45	59.62	25.6	-1.6	0.2	48	6
1	MUS	VACOAS(MAURITIUS)	-20.30	57.50	21.6	-2.4	-0.1	41	-11
1	MYT	DZAOUDZI-PAMANZI(M)	-12.80	45.28	26.0	-1.5	-0.1	53	-3
1	NAM	GROOTFONTEIN	-19.60	18.12	20.7	-3.6	1.1	-2	14
1	NAM	LUDERITZ(DIAZ-POIN)	-26.63	15.10	16.5	-1.8	-0.2	45	-2
1	NAM	RUNDU	-17.92	19.77	22.0	-4.0	2.0	-5	10
1	NAM	WINDHOEK	-22.57	17.10	19.4	-4.3	1.0	5	11
1	NER	AGADEZ	16.97	7.98	27.2	5.6	1.9	9	18
1	NER	BIRNI-NKONNI	13.80	5.25	27.1	3.5	1.8	-13	19
1	NER	MAGARIA	12.98	8.93	24.8	4.6	2.0	-3	19
1	NER	MAINE-SOROA	13.23	11.98	25.8	4.5	1.8	-4	22
1	NER	MARADI	13.47	7.08	26.3	3.8	1.7	-6	15
1	NER	NIAMEY-AERO	13.48	2.17	28.3	2.9	2.1	-14	20
1	NER	TAHOUA	14.90	5.25	28.0	3.3	2.0	-7	21
1	NER	TILLABERY	14.20	1.45	28.4	3.1	2.0	-6	23
1	NER	ZINDER	13.78	8.98	26.8	4.0	2.2	-5	20
1	REU	SAINT-DENIS-GILLOT	-20.88	55.52	23.8	-3.1	0.2	39	-13
1	SEN	CAP-SKIRRING	12.40	-16.75	26.0	1.6	0.5	36	4
1	SEN	DAKAR-YOFF	14.73	-17.50	24.5	3.3	-0.5	66	-59
1	SEN	DIOURBEL	14.65	-16.23	27.0	2.3	0.8	23	13
1	SEN	KAOLACK	14.13	-16.07	27.5	2.1	1.1	11	16
1	SEN	LINGUERE	15.38	-15.12	27.8	2.7	1.0	2	24
1	SEN	MATAM	15.65	-13.25	28.0	3.9	1.4	1	22
1	SEN	PODOR	16.65	-14.97	27.1	3.5	1.3	14	18
1	SEN	SAINT-LOUIS	16.05	-16.45	24.9	3.1	0.7	56	-1
1	SEN	TAMBACOUNDA	13.77	-13.68	28.0	2.4	1.4	-40	27
1	SEN	ZIGUINCHOR	12.55	-16.27	26.0	1.7	0.7	21	24
1	SHN	WIDE-AWAKE-FIELD(A)	-7.97	-14.40	25.2	-1.8	-0.2	98	-72
1	SYC	SEYCHELLES-INTL-AP	-4.67	55.52	27.2	-0.7	0.5	14	3
1	TCD	NDJAMENA	12.13	15.03	27.7	2.9	2.4	-17	24
1	TGO	LOME	6.17	1.25	27.0	-1.4	0.7	58	20
1	TUN	BIZERTE	37.25	9.80	18.4	7.0	0.7	39	-35
1	TUN	DJERBA-MELLITA	33.87	10.77	20.8	6.7	0.9	41	-12
1	TUN	GABES	33.88	10.10	20.4	7.1	0.9	36	-18
1	TUN	GAFSA	34.42	8.82	19.5	8.7	0.7	27	-14
1	TUN	JENDOUBA	36.48	8.80	18.5	7.9	0.8	32	-45

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
1	TUN	KAIROUAN	35.67	10.10	19.7	7.4	0.8	34	-28
1	TUN	KELIBIA	36.85	11.08	18.5	6.4	0.7	42	-42
1	TUN	MEDENINE	33.35	10.48	20.5	8.0	1.2	30	-11
1	TUN	MONASTIR-SKANES	35.67	10.75	19.9	6.9	0.8	41	-26
1	TUN	REMADA	32.32	10.40	20.5	7.8	1.1	30	-7
1	TUN	SFAX-EL-MAOU	34.72	10.68	19.7	7.2	0.8	35	-19
1	TUN	SIDI-BOUZID	35.00	9.48	18.9	8.1	0.5	30	-31
1	TUN	TABARKA	36.95	8.75	18.4	6.4	0.8	35	-39
1	TUN	THALA	35.55	8.68	14.6	8.1	0.7	33	-45
1	TUN	TOZEUR	33.92	8.17	21.8	8.8	0.9	27	-25
1	TUN	TUNIS-CARTHAGE	36.83	10.23	19.2	7.0	0.7	37	-43
1	TZA	DAR-ES-SALAAM-AP	-6.87	39.20	25.1	-1.6	-0.2	43	0
1	ZAF	BETHLEHEM	-28.25	28.33	14.3	-5.5	1.2	14	2
1	ZAF	BLOEMFONTEIN-AP	-29.10	26.30	15.6	-6.8	0.9	12	-5
1	ZAF	CAPE-COLUMBINE	-32.83	17.85	15.7	-2.1	0.1	31	14
1	ZAF	CAPE-TOWN-INTL-AP	-33.97	18.60	17.1	-4.1	0.1	25	10
1	ZAF	DE-AAR	-30.65	24.00	17.6	-6.4	0.6	17	-15
1	ZAF	DURBAN-INTL-AP	-29.97	30.95	21.2	-3.4	0.7	28	-16
1	ZAF	EAST-LONDON	-33.03	27.83	18.9	-3.2	0.4	32	-22
1	ZAF	GEORGE-AP	-34.02	22.38	16.5	-3.5	-0.2	31	28
1	ZAF	GOUGH-ISLAND	-40.35	-9.88	12.7	-2.7	-0.1	43	2
1	ZAF	KIMBERLEY	-28.80	24.77	18.2	-6.7	1.1	11	-8
1	ZAF	MARION-ISLAND	-46.88	37.87	7.4	-2.0	-0.1	48	14
1	ZAF	MOSSEL-BAY(CAPE-ST)	-34.18	22.15	18.0	-3.0	-0.6	36	39
1	ZAF	PIETERSBURG	-23.83	29.42	18.4	-4.0	0.9	11	1
1	ZAF	PORT-ELIZABETH	-33.98	25.62	18.0	-3.3	0.0	31	12
1	ZAF	PRETORIA	-25.73	28.18	18.0	-4.9	1.3	8	-6
1	ZAF	SPRINGBOK	-29.67	17.90	17.3	-4.6	0.7	30	3
1	ZAF	UPINGTON	-28.40	21.27	20.3	-6.7	0.7	16	-6
1	ZWE	BEITBRIDGE	-22.22	30.00	22.5	-4.8	1.4	10	-2
1	ZWE	BULAWAYO-AP	-20.02	28.62	19.7	-3.4	1.2	2	4
1	ZWE	GWERU	-19.45	29.85	17.7	-3.3	1.2	-1	2
1	ZWE	HARARE(KUTSAGA)	-17.92	31.13	19.1	-2.9	1.3	0	13
1	ZWE	KAROI	-16.83	29.62	19.2	-2.8	1.7	-8	18
1	ZWE	MASVINGO	-20.07	30.87	19.3	-3.8	1.1	3	5
1	ZWE	RUSAPE	-18.53	32.13	17.8	-3.5	0.9	-3	10
2		BASE ARTURO PRAT	-62.50	-59.68	-1.1	-2.4	0.8	28	22
2		BERNARDO O`HIGGINS	-63.32	-57.90	-2.1	-3.6	1.1	24	13
2		CASEY	-66.28	110.52	-7.5	-6.4	-2.5	16	11
2		DAVIS	-68.58	77.95	-7.9	-7.8	-2.7	17	6

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
2		FREI CHI BASE	-62.18	-58.98	-1.3	-2.5	0.4	35	19
2		HALLEY	-75.50	-26.65	-16.1	-9.6	-2.3	15	7
2		NEUMAYER	-70.67	-8.25	-13.1	-8.3	-2.1	25	0
3	ARE	ABU-DHABI-BATEEN-AP	24.43	54.47	26.7	6.6	0.2	32	0
3	ARE	ABU-DHABI-INTL-AP	24.43	54.65	26.9	6.8	0.7	28	6
3	ARE	AL-AIN-INTL-AP	24.27	55.60	27.6	7.7	0.7	27	15
3	ARE	DUBAI-INTL-AP	25.25	55.33	27.1	6.7	0.4	31	-2
3	ARE	SHARJAH-INTL-AP	25.33	55.52	26.2	7.0	0.5	28	4
3	BHR	BAHRAIN-INTL-AP	26.27	50.65	26.4	7.5	0.7	33	32
3	CHN	ABAG-QI	44.02	114.95	3.7	13.2	0.0	30	16
3	CHN	AIHUI	50.25	127.45	3.9	12.8	-1.5	33	40
3	CHN	AKQI	40.93	78.45	7.8	10.9	0.2	25	9
3	CHN	ALAR	40.50	81.05	11.2	14.0	1.5	19	18
3	CHN	ALTAY	47.73	88.08	6.3	13.4	-1.4	31	13
3	CHN	ANDA	46.38	125.32	7.0	14.1	-1.5	28	21
3	CHN	ANDIR	37.93	83.65	11.1	13.6	0.5	17	14
3	CHN	ANKANG	32.72	109.03	16.3	9.9	0.5	22	-17
3	CHN	ANQING	30.53	117.05	18.0	10.4	0.6	25	7
3	CHN	ANYANG	36.05	114.40	14.9	11.9	1.0	20	1
3	CHN	ARXAN	47.17	119.93	1.1	10.7	0.2	30	3
3	CHN	BACHU	39.80	78.57	12.3	13.6	2.1	18	13
3	CHN	BAILING-MIAO	41.70	110.43	6.7	12.7	-1.4	29	23
3	CHN	BAINGOIN	31.37	90.02	1.1	5.4	0.8	40	-30
3	CHN	BAISE	23.90	106.60	22.1	6.6	0.9	19	19
3	CHN	BALGUNTAY	42.67	86.33	7.5	11.6	0.2	24	10
3	CHN	BAODING	38.85	115.57	13.9	13.4	1.2	21	8
3	CHN	BAOJI	34.35	107.13	13.8	11.1	0.9	20	1
3	CHN	BAOQING	46.32	132.18	6.5	13.5	-1.6	31	26
3	CHN	BAOSHAN	25.12	99.18	16.8	5.5	0.9	20	9
3	CHN	BARKAM	31.90	102.23	9.5	7.5	1.3	17	-7
3	CHN	BATANG	30.00	99.10	13.2	7.0	0.6	15	16
3	CHN	BAYAN-MOD	40.75	104.50	8.8	13.9	-0.5	24	11
3	CHN	BAYANBULAK	43.03	84.15	-0.7	8.7	1.4	29	40
3	CHN	BAYTIK-SHAN	45.37	90.53	4.5	10.5	-1.7	32	33
3	CHN	BEIHAI	21.48	109.10	23.2	6.1	0.9	26	26
3	CHN	BEIJING	39.93	116.28	13.0	13.6	1.3	21	8
3	CHN	BENGBU	32.95	117.37	16.7	10.9	0.9	25	15
3	CHN	BENXI	41.32	123.78	9.4	13.8	-0.6	27	5
3	CHN	BIJIE	27.30	105.23	13.6	8.1	0.6	25	18
3	CHN	BOXIAN	33.88	115.77	16.1	11.4	0.8	22	4

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	BUGT(BAOGUOTU)	42.33	120.70	8.3	13.2	-1.1	27	15
3	CHN	BUGT(BOKETU)	48.77	121.92	2.4	10.9	0.0	31	6
3	CHN	CANGZHOU	38.33	116.83	13.9	13.0	0.9	23	8
3	CHN	CHANG-DAO	37.93	120.72	13.0	12.2	1.2	34	24
3	CHN	CHANGBAI	41.35	128.17	4.8	11.8	-1.7	34	40
3	CHN	CHANGCHUN	43.90	125.22	8.0	13.7	-1.2	29	14
3	CHN	CHANGDE	29.05	111.68	18.0	9.9	0.3	25	12
3	CHN	CHANGLING	44.25	123.97	7.6	14.1	-1.3	30	14
3	CHN	CHANGSHA	28.23	112.87	18.0	10.1	0.6	28	8
3	CHN	CHANGTING	25.85	116.37	19.0	8.5	1.2	23	14
3	CHN	CHAOYANG	41.55	120.45	10.4	14.3	0.7	24	41
3	CHN	CHENGDE	40.98	117.95	10.2	13.4	0.1	20	5
3	CHN	CHENGDU	30.67	104.02	17.0	8.7	0.7	23	21
3	CHN	CHENGSHANTOU	37.40	122.68	12.6	10.4	0.8	39	-3
3	CHN	CHENZHOU	25.80	113.03	18.8	9.5	1.0	25	26
3	CHN	CHIFENG	42.27	118.97	8.5	13.4	-0.8	27	7
3	CHN	CHONGQING	29.58	106.47	18.9	9.0	0.9	22	-6
3	CHN	CHUXIONG	25.02	101.52	16.7	5.4	1.1	9	2
3	CHN	DA-QAIDAM	37.85	95.37	4.0	9.5	2.0	32	-49
3	CHN	DACHEN-DAO	28.45	121.88	17.8	8.7	0.1	40	-10
3	CHN	DALIAN	38.90	121.63	11.7	12.8	1.3	30	10
3	CHN	DALI	25.70	100.18	16.0	5.1	0.8	17	16
3	CHN	DANDONG	40.05	124.33	9.9	13.3	0.4	30	-7
3	CHN	DANXIAN	19.52	109.58	23.8	4.3	1.1	18	24
3	CHN	DAOCHENG	29.05	100.30	5.9	7.9	0.5	29	26
3	CHN	DARLAG	33.75	99.65	0.5	5.8	1.0	33	2
3	CHN	DATONG	40.10	113.33	8.8	13.0	-0.4	23	7
3	CHN	DAWU	30.98	101.12	9.4	7.7	1.0	17	-9
3	CHN	DAXIAN	31.20	107.50	17.7	8.9	0.8	24	5
3	CHN	DEGE	31.80	98.57	7.2	7.9	0.7	23	4
3	CHN	DELINGHA	37.37	97.37	6.0	9.8	-1.1	26	34
3	CHN	DENGQEN	31.42	95.60	5.0	7.7	-0.8	28	43
3	CHN	DEQEN	28.45	98.88	6.9	7.7	0.5	30	32
3	CHN	DINGHAI	30.03	122.12	17.5	9.5	0.2	36	1
3	CHN	DINGTAO	35.07	115.57	15.1	11.5	1.1	20	-1
3	CHN	DONGFANG	19.10	108.62	25.5	4.4	1.1	22	30
3	CHN	DONGSHENG	39.83	109.98	8.1	12.1	-0.8	26	11
3	CHN	DONGTAI	32.85	120.28	15.9	10.8	0.4	29	2
3	CHN	DULAN	36.30	98.10	5.0	8.6	-1.4	29	31
3	CHN	DUNHUANG	40.15	94.68	10.2	13.7	-0.6	22	-31

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	DUNHUA	43.37	128.20	5.7	12.6	-1.7	33	30
3	CHN	DUOLUN	42.18	116.47	4.9	11.7	-1.7	32	38
3	CHN	DUSHAN	25.83	107.55	16.1	7.8	1.0	25	26
3	CHN	EJIN-QI	41.95	101.07	9.7	15.3	-0.1	23	9
3	CHN	EMEI-SHAN	29.52	103.33	5.3	6.9	-0.9	32	10
3	CHN	ENSHI	30.28	109.47	16.7	9.0	0.6	26	9
3	CHN	ERENHOT	43.65	112.00	6.5	14.3	-1.4	30	32
3	CHN	FANGXIAN	32.03	110.77	15.1	10.1	0.6	22	8
3	CHN	FENGJIE	31.02	109.53	17.2	8.9	0.8	25	4
3	CHN	FENGNING	41.22	116.63	8.3	12.8	-0.9	26	8
3	CHN	FOGANG	23.87	113.53	21.5	7.0	1.0	28	23
3	CHN	FUDING	27.33	120.20	18.9	8.5	0.2	32	12
3	CHN	FUJIN	47.23	131.98	5.7	13.7	-1.7	34	33
3	CHN	FUYANG	32.87	115.73	16.1	11.2	0.5	24	3
3	CHN	FUYUN	46.98	89.52	5.0	14.5	-0.3	31	6
3	CHN	FUZHOU	26.08	119.28	20.5	7.9	-0.3	35	-42
3	CHN	GANGCA	37.33	100.13	1.7	6.9	1.4	36	-23
3	CHN	GANYU	34.83	119.13	14.8	11.3	0.6	29	2
3	CHN	GANZHOU	25.87	115.00	19.5	9.1	0.9	28	8
3	CHN	GAOYAO	23.05	112.47	22.4	7.0	1.1	27	17
3	CHN	GARZE	31.62	100.00	7.3	7.7	0.6	22	12
3	CHN	GENGMA	23.55	99.40	19.8	5.2	1.1	14	16
3	CHN	GOLMUD	36.42	94.90	7.0	10.3	-0.6	24	29
3	CHN	GUAIZIHU	41.37	102.37	10.5	15.6	-0.5	23	-3
3	CHN	GUANGCHANG	26.85	116.33	19.0	9.4	1.1	24	2
3	CHN	GUANGHUA	32.38	111.67	16.5	10.3	0.4	24	6
3	CHN	GUANGNAN	24.07	105.07	17.4	6.2	1.3	15	10
3	CHN	GUANGZHOU	23.17	113.33	22.7	6.5	1.1	28	22
3	CHN	GUILIN	25.33	110.30	19.4	8.8	1.1	28	20
3	CHN	GUIPING	23.40	110.08	22.3	6.7	0.9	29	25
3	CHN	GUIYANG	26.58	106.73	15.8	8.1	1.0	25	21
3	CHN	GUSHI	32.17	115.67	16.6	11.0	0.4	24	11
3	CHN	HAIKOU	20.03	110.35	24.3	4.4	0.9	23	26
3	CHN	HAILAR	49.22	119.75	3.0	12.6	-0.7	31	29
3	CHN	HAILS	41.45	106.38	7.2	12.9	-1.4	27	25
3	CHN	HAILUN	47.43	126.97	5.1	13.5	-1.6	32	35
3	CHN	HAIYANG-DAO	39.05	123.22	12.0	12.2	1.1	34	10
3	CHN	HAIYANG	36.77	121.17	13.4	11.4	0.6	31	6
3	CHN	HALIUT	41.57	108.52	7.3	13.3	-1.3	26	23
3	CHN	HAMI	42.82	93.52	10.3	14.8	0.8	19	40

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	HANGZHOU	30.23	120.17	17.4	10.4	0.7	28	-9
3	CHN	HANZHONG	33.07	107.03	15.2	9.9	0.4	22	8
3	CHN	HARBIN	45.75	126.77	7.0	13.9	-1.7	29	25
3	CHN	HECHI	24.70	108.05	20.9	7.3	0.5	27	18
3	CHN	HEFEI	31.87	117.23	16.8	11.0	0.5	24	4
3	CHN	HENAN	34.73	101.60	1.7	6.5	1.3	36	-23
3	CHN	HEQU	39.38	111.15	9.1	13.5	-0.6	23	1
3	CHN	HEYUAN	23.80	114.73	22.0	6.7	1.2	30	14
3	CHN	HEZUO	35.00	102.90	4.1	8.2	-1.4	32	41
3	CHN	HOBOKSAR	46.78	85.72	5.3	11.5	-1.3	32	31
3	CHN	HOHHOT	40.82	111.68	8.0	13.0	-1.0	26	18
3	CHN	HOTAN	37.13	79.93	13.5	12.5	1.6	15	2
3	CHN	HUA-SHAN	34.48	110.08	8.1	9.8	-0.7	26	-17
3	CHN	HUADE	41.90	114.00	5.0	11.8	-1.3	31	40
3	CHN	HUADIAN	42.98	126.75	7.2	13.8	-1.6	29	22
3	CHN	HUAILAI	40.40	115.50	11.0	13.4	0.5	22	40
3	CHN	HUAJIALING	35.38	105.00	5.0	9.1	-1.2	32	29
3	CHN	HUANG-SHAN	30.13	118.15	9.8	8.8	0.5	27	26
3	CHN	HUILI	26.65	102.25	15.9	5.9	0.9	15	11
3	CHN	HUIMIN	37.50	117.53	13.6	13.0	1.1	22	9
3	CHN	HUIZE	26.42	103.28	13.9	5.8	0.9	16	2
3	CHN	HULIN	45.77	132.97	5.9	13.2	-1.8	33	36
3	CHN	HUMA	51.72	126.65	3.1	13.2	-1.2	30	42
3	CHN	HUOSHAN	31.40	116.33	16.2	10.6	0.4	22	1
3	CHN	JARTAI	39.78	105.75	9.5	14.8	-0.7	26	-27
3	CHN	JARUD-QI	44.57	120.90	8.1	13.7	-1.4	27	14
3	CHN	JI'AN(JIANGXI)	27.12	114.97	19.1	9.7	0.9	24	5
3	CHN	JI'AN(JILIN)	41.10	126.15	8.6	13.7	-1.3	29	16
3	CHN	JIANGCHENG	22.62	101.82	19.2	4.4	0.9	16	9
3	CHN	JIANGLING	30.33	112.18	17.4	10.2	0.5	26	11
3	CHN	JIEXIU	37.03	111.92	12.2	11.7	0.7	18	12
3	CHN	JINAN	36.60	117.05	15.4	11.9	0.8	20	12
3	CHN	JINGDEZHEN	29.30	117.20	18.3	10.0	0.9	26	-4
3	CHN	JINGHE	44.62	82.90	9.6	15.0	-0.9	26	-12
3	CHN	JINGHONG	22.00	100.78	22.5	4.0	1.1	11	5
3	CHN	JINING	41.03	113.07	6.0	11.7	-1.6	29	20
3	CHN	JINZHOU	41.13	121.12	10.7	13.9	0.2	26	7
3	CHN	JIULONG	29.00	101.50	10.4	6.1	0.8	18	11
3	CHN	JIUQUAN	39.77	98.48	8.5	13.1	-0.3	26	10
3	CHN	JIUXIAN-SHAN	25.72	118.10	13.5	6.4	0.3	25	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	JIXI	45.28	130.95	6.2	13.1	-1.9	33	29
3	CHN	JURH	42.40	112.90	7.0	13.4	-1.7	29	26
3	CHN	KABA-HE	48.05	86.35	6.5	13.4	-1.4	32	18
3	CHN	KANGDING	30.05	101.97	8.2	8.1	1.0	25	14
3	CHN	KARAMAY	45.60	84.85	9.7	16.5	-0.6	26	-18
3	CHN	KASHI	39.47	75.98	12.7	12.6	1.2	18	14
3	CHN	KESHAN	48.05	125.88	5.1	13.7	-1.6	30	38
3	CHN	KORLA	41.75	86.13	12.4	13.5	0.9	16	7
3	CHN	KUANDIAN	40.72	124.78	8.5	13.1	-1.3	30	20
3	CHN	KUNMING	25.02	102.68	16.0	5.3	1.0	15	5
3	CHN	KUQA	41.72	82.95	11.9	13.3	1.2	18	12
3	CHN	LANCANG	22.57	99.93	19.8	4.6	1.2	16	12
3	CHN	LANGZHONG	31.58	105.97	17.4	8.9	0.4	23	2
3	CHN	LANZHOU	36.05	103.88	11.2	11.0	1.3	17	2
3	CHN	LENGHU	38.83	93.38	4.7	10.5	-1.6	29	38
3	CHN	LETING	39.43	118.90	11.9	13.1	0.9	24	10
3	CHN	LHASA	29.67	91.13	9.1	8.3	1.4	20	9
3	CHN	LHUNZE	28.42	92.47	6.8	8.1	0.7	28	32
3	CHN	LIANGPING	30.68	107.80	17.3	8.9	0.5	24	-7
3	CHN	LIANPING	24.37	114.48	20.6	7.2	0.9	27	21
3	CHN	LIANXIAN	24.78	112.38	20.1	8.6	1.0	27	19
3	CHN	LIJING	26.83	100.47	13.8	5.2	0.4	13	7
3	CHN	LINCANG	23.95	100.22	17.8	4.8	0.9	15	6
3	CHN	LINDONG	43.98	119.40	7.1	13.1	-1.4	26	13
3	CHN	LINGLING	26.23	111.62	18.6	9.6	1.0	29	18
3	CHN	LINGXIAN	37.33	116.57	14.4	12.2	0.8	20	10
3	CHN	LINHAI	28.85	121.13	18.8	9.5	0.5	31	-7
3	CHN	LINHE	40.77	107.40	9.8	13.6	-0.6	23	-17
3	CHN	LINJIANG	41.72	126.92	7.5	13.5	-1.5	30	28
3	CHN	LINXI	43.60	118.07	6.6	12.8	-1.5	31	23
3	CHN	LINYI	35.05	118.35	14.7	11.7	0.7	25	2
3	CHN	LISHI	37.50	111.10	10.6	13.3	1.0	22	34
3	CHN	LISHUI	28.45	119.92	18.6	9.6	0.8	27	3
3	CHN	LITANG	30.00	100.27	5.0	6.7	0.3	27	-28
3	CHN	LIUZHOU	24.35	109.40	21.0	7.7	0.4	30	7
3	CHN	LIYANG	31.43	119.48	16.8	10.7	0.6	27	8
3	CHN	LONGKOU	37.62	120.32	13.5	12.5	1.3	30	27
3	CHN	LONGZHOU	22.37	106.75	22.5	5.9	1.0	25	27
3	CHN	LU-SHAN	29.58	115.98	13.2	9.0	0.2	27	-3
3	CHN	LUODIAN	25.43	106.77	19.8	7.2	0.7	21	22

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	LUSHI	34.05	111.03	13.1	10.9	0.7	21	-5
3	CHN	LUSI	32.07	121.60	16.2	10.1	0.4	34	-9
3	CHN	LUXI	24.53	103.77	15.9	5.8	1.3	15	21
3	CHN	LUZHOU	28.88	105.43	18.3	8.4	0.6	24	4
3	CHN	MACHENG	31.18	114.97	17.6	10.5	0.3	26	-2
3	CHN	MADOI	34.92	98.22	-1.7	6.7	0.2	32	11
3	CHN	MANDAL	42.53	110.13	7.2	13.5	-1.6	28	22
3	CHN	MANGNAI	38.25	90.85	4.7	10.0	-1.7	30	41
3	CHN	MAZONG-SHAN	41.80	97.03	6.3	12.3	-1.6	29	28
3	CHN	MEIXIAN	24.30	116.12	21.4	7.3	1.2	26	14
3	CHN	MENGJIN	34.82	112.43	14.9	11.2	1.0	24	23
3	CHN	MENGLA	21.50	101.58	21.9	4.0	1.1	15	11
3	CHN	MENGSHAN	24.20	110.52	20.5	7.5	1.1	25	14
3	CHN	MENGZI	23.38	103.38	19.4	4.3	1.0	11	9
3	CHN	MIANYANG	31.45	104.73	17.1	8.7	0.5	22	7
3	CHN	MINQIN	38.63	103.08	9.3	13.3	-0.1	24	6
3	CHN	MOHE	52.13	122.52	0.7	11.4	-0.3	29	14
3	CHN	MUDANJIANG	44.57	129.60	6.6	13.4	-1.6	32	26
3	CHN	NAGQU	31.48	92.07	0.1	5.7	0.6	32	-7
3	CHN	NANCHANG	28.60	115.92	18.7	9.8	0.9	26	5
3	CHN	NANCHENG	27.58	116.65	18.7	9.8	0.9	24	0
3	CHN	NANCHONG	30.80	106.08	17.6	9.1	0.7	23	5
3	CHN	NANJING	32.00	118.80	16.3	10.9	0.5	27	-13
3	CHN	NANNING	22.63	108.22	21.8	6.8	1.1	24	20
3	CHN	NANPING	26.63	118.00	20.0	7.8	0.7	26	-4
3	CHN	NANYANG	33.03	112.58	15.8	11.0	0.6	21	13
3	CHN	NANYUE	27.30	112.70	13.2	8.6	0.7	26	29
3	CHN	NAPO	23.30	105.95	19.4	5.6	0.7	19	17
3	CHN	NARAN-BULAG	44.62	114.15	3.6	13.3	1.5	31	-26
3	CHN	NEIJIANG	29.58	105.05	18.2	8.3	0.5	23	2
3	CHN	NENJIANG	49.17	125.23	3.9	13.0	-1.4	31	35
3	CHN	NYINGCHI	29.57	94.47	10.2	6.5	0.7	25	3
3	CHN	OTOG-QI	39.10	107.98	8.1	13.1	-0.7	26	14
3	CHN	PAGRI	27.73	89.08	1.3	5.0	1.0	42	-18
3	CHN	PINGLIANG	35.55	106.67	10.0	11.7	0.7	23	37
3	CHN	PINGTAN	25.52	119.78	20.6	7.7	-0.5	42	-35
3	CHN	PINGWU	32.42	104.52	15.2	8.6	0.6	21	2
3	CHN	PISHAN	37.62	78.28	12.0	13.3	1.3	19	12
3	CHN	PUCHENG	27.92	118.53	18.1	8.8	0.9	25	4
3	CHN	QAMDO	31.15	97.17	8.3	8.2	0.8	22	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	QIAN-GORLOS	45.08	124.87	8.0	14.1	-1.5	28	20
3	CHN	QINGDAO	36.07	120.33	13.9	10.8	1.0	33	-10
3	CHN	QINGJIANG	33.60	119.03	15.4	11.0	0.6	27	4
3	CHN	QINGLONG	40.40	118.95	10.1	13.7	-0.5	24	-31
3	CHN	QINGYUAN	42.10	124.95	7.9	13.7	-1.4	28	22
3	CHN	QINZHOU	21.95	108.62	22.6	6.7	1.5	27	22
3	CHN	QIONGHAI	19.23	110.47	24.6	4.2	1.0	18	21
3	CHN	QIQIHAR	47.38	123.92	6.3	13.8	-1.6	30	33
3	CHN	QITAI	44.02	89.57	7.1	14.7	0.1	29	-2
3	CHN	QUMARLEB	34.13	95.78	-0.3	5.8	0.4	30	14
3	CHN	QUXIAN	28.97	118.87	18.0	9.8	0.5	28	-11
3	CHN	RIZHAO	35.43	119.53	14.2	11.0	0.9	32	-1
3	CHN	RONGJIANG	25.97	108.53	18.9	8.3	0.8	24	20
3	CHN	RUILI	24.02	97.83	20.7	4.8	1.3	18	13
3	CHN	RUOERGAI	33.58	102.97	2.9	7.1	-1.3	38	52
3	CHN	RUOQIANG	39.03	88.17	12.7	14.1	1.3	18	24
3	CHN	SANGZHI	29.40	110.17	17.0	9.3	0.4	25	-5
3	CHN	SANHU-DAO	16.53	111.62	27.2	2.3	0.8	15	35
3	CHN	SANSUI	26.97	108.67	15.7	9.3	0.6	24	28
3	CHN	SERTAR	32.28	100.33	2.2	6.6	1.3	38	-28
3	CHN	SHACHE	38.43	77.27	11.7	13.2	1.3	17	18
3	CHN	SHANGCHUAN-DAO	21.73	112.77	23.1	5.9	1.2	31	40
3	CHN	SHANGHAI-HONGQIAO	31.17	121.43	17.6	10.3	0.5	31	1
3	CHN	SHANGHAI	31.40	121.47	17.9	10.2	0.8	31	6
3	CHN	SHANGZHI	45.22	127.97	5.6	13.5	-1.6	31	31
3	CHN	SHANTOU	23.40	116.68	22.2	6.4	0.7	33	27
3	CHN	SHANWEI	22.78	115.37	22.5	6.2	1.0	33	24
3	CHN	SHAOGUAN	24.80	113.58	20.5	8.3	1.0	25	11
3	CHN	SHAOWU	27.33	117.47	18.5	8.6	0.8	26	1
3	CHN	SHAOYANG	27.23	111.47	17.8	9.7	0.6	26	9
3	CHN	SHENGSI	30.73	122.45	17.3	9.1	0.2	39	0
3	CHN	SHENGXIAN	29.60	120.82	17.3	10.0	0.7	28	-5
3	CHN	SHENYANG	41.73	123.52	9.8	14.5	-0.6	28	-9
3	CHN	SHENZHEN	22.55	114.10	23.2	6.3	1.1	29	16
3	CHN	SHEYANG	33.77	120.25	15.1	10.7	0.3	30	2
3	CHN	SHIJIAZHUANG	38.03	114.42	14.2	12.9	1.2	21	12
3	CHN	SHIPU	29.20	121.95	17.5	9.2	0.4	37	3
3	CHN	SHIQUANHE	32.50	80.08	2.1	8.2	1.7	37	-38
3	CHN	SHISANJIANFANG	43.22	91.73	10.6	15.6	0.2	24	13
3	CHN	SIMAO	22.77	100.98	18.8	4.4	1.2	12	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	SINAN	27.95	108.25	17.8	8.8	0.7	26	13
3	CHN	SIPING	43.18	124.33	8.6	13.8	-1.0	28	13
3	CHN	SOGXIAN	31.88	93.78	3.4	7.7	-1.6	35	51
3	CHN	SONGPAN	32.65	103.57	8.0	7.4	0.6	22	-16
3	CHN	SUIFENHE	44.38	131.15	5.1	11.9	-1.8	34	36
3	CHN	SUNWU	49.43	127.35	3.2	12.8	-1.1	31	42
3	CHN	TACHENG	46.73	83.00	8.7	13.2	-0.6	25	-2
3	CHN	TAI-SHAN	36.25	117.10	7.6	10.4	-0.9	30	14
3	CHN	TAILAI	46.40	123.42	7.6	14.2	-1.3	28	18
3	CHN	TAIYUAN	37.78	112.55	11.2	12.6	0.6	19	21
3	CHN	TANGSHAN	39.67	118.15	12.5	13.4	1.2	23	17
3	CHN	TENGCHONG	25.12	98.48	16.2	5.1	1.2	24	13
3	CHN	TIANJIN	39.10	117.17	13.4	13.6	1.3	22	7
3	CHN	TIANMU-SHAN	30.35	119.42	10.6	9.0	0.0	29	7
3	CHN	TIANSHUI	34.58	105.75	11.8	11.4	1.1	20	8
3	CHN	TIKANLIK	40.63	87.70	11.7	14.4	0.9	17	24
3	CHN	TINGRI	28.63	87.08	4.7	8.0	-0.8	34	25
3	CHN	TONGDAO	26.17	109.78	17.5	9.0	1.1	24	5
3	CHN	TONGDE	35.27	100.65	2.3	7.4	-1.4	32	57
3	CHN	TONGHE	45.97	128.73	5.5	13.5	-1.7	31	37
3	CHN	TONGLIAO	43.60	122.27	8.9	13.9	-1.2	27	11
3	CHN	TULIHE	50.45	121.70	0.1	10.8	-0.8	30	-8
3	CHN	TUOTUOHE	34.22	92.43	-1.4	6.4	0.7	35	38
3	CHN	TURPAN	42.93	89.20	14.0	15.7	1.7	16	13
3	CHN	ULIASTAI	45.52	116.97	3.9	13.5	1.7	30	-30
3	CHN	URUMQI	43.80	87.65	8.2	14.1	-0.8	29	17
3	CHN	WANYUAN	32.07	108.03	15.2	9.2	0.2	22	5
3	CHN	WEICHANG	41.93	117.75	7.0	12.6	-1.4	29	20
3	CHN	WEIFANG	36.77	119.18	13.7	12.0	0.8	24	3
3	CHN	WEINING	26.87	104.28	12.2	6.3	0.8	21	16
3	CHN	WENZHOU	28.02	120.67	18.6	8.8	0.4	37	37
3	CHN	WUDAOLIANG	35.22	93.08	-3.3	7.6	1.3	34	36
3	CHN	WUDU	33.40	104.92	15.1	9.5	0.9	20	7
3	CHN	WUGANG	26.73	110.63	17.5	9.5	0.8	25	22
3	CHN	WUHAN	30.62	114.13	17.7	10.8	0.5	24	5
3	CHN	WUHU	31.33	118.35	16.9	10.8	0.7	25	6
3	CHN	WUSHAOLING	37.20	102.87	1.6	6.8	1.1	36	-28
3	CHN	WUTAI-SHAN	38.95	113.52	0.8	7.4	-0.3	32	13
3	CHN	WUYISHAN	27.77	118.03	18.8	8.6	1.0	28	10
3	CHN	WUZHOU	23.48	111.30	21.7	6.9	1.1	29	28

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	XAINZA	30.95	88.63	1.7	5.9	1.5	37	-29
3	CHN	XI-UJIMQIN-QI	44.58	117.60	4.5	12.3	-1.6	33	36
3	CHN	XIAMEN	24.48	118.08	21.6	7.0	-0.8	39	-45
3	CHN	XIAN	34.30	108.93	14.6	11.2	0.7	19	-8
3	CHN	XIAOERGOU	49.20	123.72	3.5	13.0	-1.1	30	40
3	CHN	XICHANG	27.90	102.27	17.6	5.7	0.8	12	1
3	CHN	XIFENGZHEN	35.73	107.63	10.0	11.5	0.7	22	30
3	CHN	XIGAZE	29.25	88.88	8.2	7.7	1.1	15	-16
3	CHN	XIHUA	33.78	114.52	15.3	11.3	0.5	22	4
3	CHN	XILIN-HOT	43.95	116.12	4.7	13.5	-1.3	32	47
3	CHN	XIN-BARAG-YOUQI	48.67	116.82	3.5	14.0	0.0	30	14
3	CHN	XINGREN	25.43	105.18	16.2	6.6	1.2	20	15
3	CHN	XINGTAI	37.07	114.50	15.1	12.4	1.0	21	9
3	CHN	XINING	36.62	101.77	7.3	10.1	0.1	22	-2
3	CHN	XINXIAN	36.23	115.67	14.3	12.2	1.0	22	12
3	CHN	XINYANG	32.13	114.05	16.3	10.8	0.2	22	9
3	CHN	XINYI	22.35	110.93	22.8	5.9	1.1	28	26
3	CHN	XISHA-DAO	16.83	112.33	27.1	2.4	0.6	18	26
3	CHN	XIUSHUI	29.03	114.58	17.3	9.8	0.6	25	3
3	CHN	XUNWU	24.95	115.65	19.3	7.8	1.2	25	9
3	CHN	XUZHOU	34.28	117.15	15.8	11.3	0.6	22	12
3	CHN	YA'AN	29.98	103.00	16.9	8.5	0.7	22	12
3	CHN	YAN'AN	36.60	109.50	11.1	12.1	0.7	19	2
3	CHN	YANCHI	37.80	107.38	9.0	12.9	0.0	25	-2
3	CHN	YANGCHENG	35.48	112.40	12.8	11.6	0.6	20	6
3	CHN	YANGJIANG	21.87	111.97	22.9	5.8	1.1	28	25
3	CHN	YANJI	42.87	129.50	7.3	13.1	-1.4	30	32
3	CHN	YANZHOU	35.57	116.85	14.8	11.7	1.0	21	-8
3	CHN	YAXIAN	18.23	109.52	26.1	3.1	1.0	17	28
3	CHN	YIBIN	28.80	104.60	18.5	8.2	0.8	22	6
3	CHN	YICHANG	30.70	111.30	17.5	9.9	0.4	26	6
3	CHN	YICHUN(HEILONGJ)	47.72	128.90	4.5	12.9	-1.3	31	39
3	CHN	YICHUN(JIANGXI)	27.80	114.38	17.9	9.8	0.6	25	3
3	CHN	YINCHUAN	38.47	106.20	10.4	13.3	0.2	22	8
3	CHN	YINGKOU	40.67	122.20	10.8	14.0	0.1	27	11
3	CHN	YINING	43.95	81.33	10.0	13.0	0.8	24	36
3	CHN	YIWU	43.27	94.70	5.0	11.6	-1.3	32	33
3	CHN	YIYUAN	36.18	118.15	13.2	12.6	1.4	22	16
3	CHN	YONGAN	25.97	117.35	19.9	7.9	1.0	25	14
3	CHN	YOUYANG	28.83	108.77	15.8	8.7	0.2	27	-1

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	CHN	YUANJIANG	23.60	101.98	23.8	5.0	1.1	10	10
3	CHN	YUANLING	28.47	110.40	17.5	9.3	0.5	25	9
3	CHN	YUANMOU	25.73	101.87	21.2	4.9	1.4	5	2
3	CHN	YUANPING	38.75	112.70	10.4	13.2	-0.8	23	-38
3	CHN	YUEYANG	29.38	113.08	18.1	10.2	0.4	27	30
3	CHN	YULIN	38.23	109.70	9.3	13.5	-0.2	25	9
3	CHN	YUMENZHEN	40.27	97.03	8.3	12.9	-0.9	27	-8
3	CHN	YUNCHENG	35.05	111.05	14.8	12.2	0.7	19	2
3	CHN	YUSHE	37.07	112.98	9.7	12.4	0.1	24	7
3	CHN	YUSHU	33.02	97.02	4.9	8.0	-1.1	27	34
3	CHN	YUXIAN	39.83	114.57	9.1	13.5	0.1	24	2
3	CHN	ZADOI	32.90	95.30	1.6	7.3	1.6	36	-20
3	CHN	ZAOYANG	32.15	112.67	16.8	10.5	0.6	26	14
3	CHN	ZHANG-PING	25.30	117.40	20.9	7.0	1.0	27	10
3	CHN	ZHANGJIAKOU	40.78	114.88	9.8	13.4	0.1	25	17
3	CHN	ZHANGWU	42.42	122.53	9.8	14.1	-0.5	27	2
3	CHN	ZHANGYE	38.93	100.43	9.0	12.5	0.0	22	8
3	CHN	ZHANJIANG	21.22	110.40	23.5	5.7	0.8	26	28
3	CHN	ZHANYI	25.58	103.83	15.4	5.5	1.2	11	11
3	CHN	ZHAOTONG	27.33	103.75	12.8	7.3	0.7	21	1
3	CHN	ZHENGZHOU	34.72	113.65	15.4	11.5	0.7	19	-1
3	CHN	ZHIJIANG	27.45	109.68	17.3	9.5	0.4	23	8
3	CHN	ZHONGNING	37.48	105.68	11.0	12.6	1.0	20	20
3	CHN	ZHONGXIANG	31.17	112.57	17.3	10.5	0.6	25	14
3	CHN	ZHUMADIAN	33.00	114.02	15.8	11.0	0.3	24	23
3	CHN	ZUNYI	27.70	106.88	16.2	8.6	0.5	26	20
3	IND	AGARTALA	23.88	91.25	24.6	5.1	1.9	13	15
3	IND	AHMADABAD	23.07	72.63	26.3	5.1	2.0	2	27
3	IND	AKOLA	20.70	77.07	26.0	4.5	2.1	-15	24
3	IND	AMRITSAR	31.63	74.87	22.1	9.0	1.6	14	16
3	IND	AURANGABAD-CHIKALTH	19.85	75.40	24.6	4.2	2.0	-17	20
3	IND	BALASORE	21.52	86.93	25.9	4.4	2.0	3	14
3	IND	BANGALORE	12.97	77.58	23.2	1.8	1.3	-29	12
3	IND	BELGAUM-SAMBRA	15.85	74.62	23.4	1.9	1.3	-34	14
3	IND	BHOPAL-BAIRAGARH	23.28	77.35	24.6	5.5	2.4	-7	26
3	IND	BHUBANESWAR	20.25	85.83	26.6	3.5	1.8	-6	14
3	IND	BHUJ-RUDRAMATA	23.25	69.67	25.4	5.8	2.5	8	20
3	IND	BIKANER	28.00	73.30	24.7	8.6	1.5	11	16
3	IND	BOMBAY-SANTACRUZ	19.12	72.85	26.7	2.3	1.3	8	31
3	IND	CALCUTTA-DUM-DUM	22.65	88.45	25.8	4.7	2.1	7	12

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	IND	CHITRADURGA	14.23	76.43	24.6	2.2	1.2	-40	16
3	IND	COCHIN-WILLINGDON	9.95	76.27	27.1	0.7	0.9	-48	18
3	IND	COIMBATORE-PEELAMED	11.03	77.05	25.9	1.5	1.1	-29	15
3	IND	CUDDALORE	11.77	79.77	28.0	2.1	0.6	2	33
3	IND	CWC-VISHAKHAPATNAM	17.70	83.30	27.4	2.3	1.1	3	19
3	IND	DEHRADUN	30.32	78.03	21.0	6.8	1.5	14	19
3	IND	GADAG	15.42	75.63	24.8	2.0	1.3	-35	13
3	IND	GAUHATI	26.10	91.58	23.7	5.2	1.4	22	12
3	IND	GOA-PANJIM	15.48	73.82	26.8	1.1	1.0	-25	25
3	IND	GWALIOR	26.23	78.25	23.9	7.9	1.6	7	18
3	IND	HISSAR	29.17	75.73	24.1	8.5	2.0	13	21
3	IND	HYDERABAD-AP	17.45	78.47	26.0	3.7	1.4	-23	20
3	IND	INDORE	22.72	75.80	24.2	5.2	2.4	-10	27
3	IND	JABALPUR	23.20	79.95	23.8	5.7	1.9	1	22
3	IND	JAGDALPUR	19.08	82.03	23.7	3.8	1.7	-6	14
3	IND	JAIPUR-SANGANER	26.82	75.80	24.6	7.4	2.1	6	26
3	IND	JODHPUR	26.30	73.02	25.3	7.0	1.8	8	28
3	IND	KAKINADA	16.95	82.23	27.6	3.0	0.9	-1	26
3	IND	KOTA-AERODROME	25.15	75.85	25.8	6.8	2.5	3	29
3	IND	KOZHIKODE	11.25	75.78	27.3	0.0	1.1	12	22
3	IND	KURNOOL	15.80	78.07	26.8	3.1	1.5	-20	16
3	IND	LUCKNOW-AMAUSI	26.75	80.88	24.5	7.4	2.0	7	22
3	IND	MACHILIPATNAM	16.20	81.15	27.8	2.8	1.0	-3	25
3	IND	MADRAS-MINAMBAKKAM	13.00	80.18	27.9	2.5	0.8	0	30
3	IND	MANGALORE-BAJPE	12.92	74.88	26.7	0.2	0.9	2	25
3	IND	MINICOY	8.30	73.15	27.7	0.8	0.6	-8	30
3	IND	NAGPUR-SONEGAON	21.10	79.05	25.8	5.2	2.4	-12	25
3	IND	NELLORE	14.45	79.98	28.3	3.0	1.0	-2	24
3	IND	NEW-DELHI-SAFDARJUN	28.58	77.20	23.9	8.3	1.7	10	20
3	IND	PATIALA	30.33	76.47	22.7	8.0	1.5	13	17
3	IND	PATNA	25.60	85.10	24.8	6.9	2.0	10	15
3	IND	PBO-ANANTAPUR	14.58	77.63	27.2	2.9	1.1	-22	17
3	IND	POONA	18.53	73.85	23.4	3.4	1.7	-2	17
3	IND	RAJKOT	22.30	70.78	26.5	4.2	2.0	3	29
3	IND	RATNAGIRI	16.98	73.33	26.4	1.5	1.0	-6	40
3	IND	SHOLAPUR	17.67	75.90	26.3	2.8	1.5	-25	21
3	IND	SRINAGAR	34.08	74.83	13.6	9.4	0.9	20	-11
3	IND	SURAT	21.20	72.83	26.5	3.6	1.6	6	29
3	IND	THIRUVANANTHAPURAM	8.48	76.95	26.9	0.0	0.3	14	18
3	IND	TIRUCHCHIRAPALLI	10.77	78.72	28.4	2.7	0.8	-4	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	IND	VERAVAL	20.90	70.37	26.7	3.2	1.2	18	32
3	IOT	DIEGO-GARCIA-NAF	-7.30	72.40	27.3	-0.5	0.2	14	5
3	IRN	ABADAN	30.37	48.25	24.3	10.5	1.0	22	4
3	IRN	AHWAZ	31.33	48.67	24.6	10.6	0.5	24	2
3	IRN	ANZALI	37.47	49.47	17.1	8.6	-0.3	35	-1
3	IRN	ARAK	34.10	49.77	13.9	10.9	0.4	24	8
3	IRN	BABULSAR	36.72	52.65	17.7	8.9	0.4	35	-26
3	IRN	BANDARABBASS	27.22	56.37	26.6	7.4	0.9	26	15
3	IRN	BIRJAND	32.87	59.20	16.1	10.3	0.3	16	28
3	IRN	KASHAN	33.98	51.45	17.7	10.4	0.7	22	-3
3	IRN	KERMANSHAH	34.27	47.12	15.2	10.7	0.0	27	21
3	IRN	KERMAN	30.25	56.97	16.6	9.7	0.5	18	7
3	IRN	KHOY	38.55	44.97	12.6	11.3	0.7	26	24
3	IRN	MASHHAD	36.27	59.63	15.1	10.7	-0.2	22	12
3	IRN	ORUMIEH	37.53	45.08	11.6	10.5	1.0	26	-4
3	IRN	RAMSAR	36.90	50.67	16.7	8.5	0.1	37	1
3	IRN	SABZEVAR	36.22	57.67	17.3	10.8	0.6	20	-29
3	IRN	SHAHRUD	36.42	54.95	13.9	10.4	1.0	22	8
3	IRN	SHIRAZ	29.53	52.53	18.1	9.7	0.5	24	3
3	IRN	TABRIZ	38.08	46.28	13.6	11.4	0.8	30	-20
3	IRN	TEHRAN-MEHRABAD	35.68	51.32	17.2	11.1	0.7	26	4
3	IRN	TORBAT-HEYDARIEH	35.27	59.22	14.2	10.9	0.6	22	6
3	IRN	ZAHEDAN	29.47	60.88	18.9	9.3	0.8	14	12
3	IRN	ZANJAN	36.68	48.48	11.1	11.5	0.7	29	33
3	JPN	ABASHIRI	44.02	144.28	7.5	11.0	0.7	43	-39
3	JPN	AIKAWA	38.03	138.23	14.3	9.6	0.3	41	-34
3	JPN	AKITA	39.72	140.10	12.6	10.5	0.6	36	-13
3	JPN	AOMORI	40.82	140.77	11.3	10.3	0.7	37	-14
3	JPN	ASAHIKAWA	43.77	142.37	7.9	12.4	-1.2	36	28
3	JPN	CHOSHI	35.73	140.85	16.3	7.8	0.7	41	-1
3	JPN	FUKUE	32.70	128.83	17.3	8.3	0.4	39	-20
3	JPN	FUKUOKA	33.58	130.38	17.4	9.3	0.6	35	-26
3	JPN	FUTENMA	26.27	127.75	22.7	5.3	0.4	42	-5
3	JPN	HACHIJOJIMA-AP	33.12	139.78	19.3	7.1	0.6	43	-4
3	JPN	HACHIJOJIMA	33.12	139.78	19.0	7.1	0.5	44	-4
3	JPN	HACHINOHE	40.53	141.52	11.2	9.8	0.8	39	-2
3	JPN	HAKODATE	41.82	140.75	9.8	11.5	0.8	37	-2
3	JPN	HAMADA	34.90	132.07	16.1	8.8	0.7	37	-37
3	JPN	HIROSHIMA	34.40	132.47	16.8	9.8	0.4	35	-15
3	JPN	ISHIGAKIJIMA	24.33	124.17	24.2	4.9	-0.4	35	-28

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	JPN	IWAKUNI	34.15	132.23	16.2	9.3	0.5	37	-30
3	JPN	IZUHARA	34.20	129.30	16.3	8.7	0.8	37	-15
3	JPN	KAGOSHIMA	31.55	130.55	18.9	8.5	0.6	37	-12
3	JPN	KANAZAWA	36.58	136.63	15.5	10.0	0.2	37	-5
3	JPN	KOFU	35.67	138.55	15.3	10.0	0.8	30	-12
3	JPN	KUMAMOTO	32.82	130.70	17.3	9.6	0.8	34	-14
3	JPN	KUSHIRO	42.98	144.38	6.9	10.0	-0.1	47	12
3	JPN	MAEBASHI	36.40	139.07	15.2	9.9	0.5	35	-3
3	JPN	MAIZURU	35.45	135.32	15.0	9.6	0.6	35	-22
3	JPN	MATSUE	35.45	133.07	15.7	9.5	0.6	35	-17
3	JPN	MATSUMOTO	36.25	137.97	12.1	11.5	0.7	31	17
3	JPN	MATSUYAMA	33.85	132.78	16.7	9.2	0.6	35	-24
3	JPN	MINAMIDAITOJIMA	25.83	131.23	23.5	4.9	0.0	40	-10
3	JPN	MIYAKOJIMA	24.80	125.28	23.6	4.9	0.0	37	-12
3	JPN	MIYAKO	39.65	141.97	11.5	9.4	0.8	38	-15
3	JPN	MIYAZAKI	31.93	131.42	18.1	8.8	0.9	34	-13
3	JPN	MORIOKA	39.70	141.17	11.0	11.5	0.4	33	16
3	JPN	MUROTOMISAKI	33.25	134.18	17.4	8.0	0.5	39	-3
3	JPN	NAGASAKI	32.73	129.87	17.5	9.1	0.6	35	-15
3	JPN	NAGOYA	35.17	136.97	16.4	10.0	0.8	34	-17
3	JPN	NAHA	26.20	127.68	23.3	5.3	0.4	41	23
3	JPN	NAZE	28.38	129.50	21.6	6.2	0.1	36	12
3	JPN	NEMURO	43.33	145.58	7.0	9.6	0.8	51	-12
3	JPN	NIIGATA	37.92	139.05	14.5	10.1	0.6	36	-27
3	JPN	OITA	33.23	131.62	16.8	9.0	0.5	37	-19
3	JPN	OMAEZAKI	34.60	138.22	17.1	8.3	0.9	40	-3
3	JPN	ONAHAMA	36.95	140.90	14.2	8.7	0.9	41	-5
3	JPN	OSAKA	34.68	135.52	17.3	9.9	0.6	36	-19
3	JPN	OSHIMA	34.75	139.38	16.9	7.9	0.6	40	-12
3	JPN	OWASE	34.07	136.20	16.6	8.8	0.7	36	-11
3	JPN	RUMOI	43.95	141.63	8.7	11.6	-0.2	40	-3
3	JPN	SAIGO	36.20	133.33	15.0	9.2	0.7	38	-32
3	JPN	SAKATA	38.92	139.85	13.4	10.1	0.6	37	-20
3	JPN	SAPPORO	43.07	141.33	9.3	11.8	-0.1	38	1
3	JPN	SENDAI	38.27	140.90	13.1	9.4	0.5	37	6
3	JPN	SHIMIZU	32.72	133.02	18.5	7.9	0.6	38	-9
3	JPN	SHIMONOSEKI	33.95	130.93	17.2	8.9	0.5	39	-33
3	JPN	SHIONOMISAKI	33.45	135.77	17.9	8.0	0.9	40	-7
3	JPN	SUTTSU	42.80	140.22	9.2	10.9	0.7	41	-1
3	JPN	TAKADA	37.10	138.25	14.4	10.3	0.5	37	-21

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	JPN	TAKAMATSU	34.32	134.05	16.8	9.7	0.3	35	-32
3	JPN	TANEGASHIMA	30.73	130.98	20.2	7.0	0.6	38	-14
3	JPN	TOKYO	35.68	139.77	16.8	8.9	0.6	36	-9
3	JPN	TOTTORI	35.48	134.20	15.7	9.7	0.5	36	-29
3	JPN	URAKAWA	42.17	142.78	8.9	10.4	0.2	44	19
3	JPN	WAJIMA	37.40	136.90	14.3	9.8	0.6	38	-21
3	JPN	WAKAMATSU	37.48	139.92	12.3	11.7	1.0	33	1
3	JPN	WAKKANAI	45.42	141.68	7.7	10.8	1.0	44	-30
3	JPN	YOKOSUKA	35.28	139.67	16.9	8.5	0.5	38	-26
3	KAZ	AKKOL	52.00	70.95	4.3	12.2	-1.1	32	24
3	KAZ	AKKUDUK	42.97	54.12	13.1	12.8	-0.2	20	9
3	KAZ	AKTOBE	50.28	57.15	6.2	13.0	-2.2	31	19
3	KAZ	ALMATY	43.23	76.93	9.8	12.7	-0.3	23	10
3	KAZ	ARALSKOE-MORE	46.78	61.65	9.9	15.4	-1.5	26	0
3	KAZ	ASTANA	51.13	71.37	5.0	12.4	-1.6	34	22
3	KAZ	ATBASAR	51.82	68.37	4.9	12.4	-1.8	33	16
3	KAZ	ATYRAU	47.12	51.92	10.4	13.4	-1.1	24	5
3	KAZ	BALHASH	46.80	75.08	7.7	14.6	-1.3	30	16
3	KAZ	BALKASINO	52.53	68.75	3.4	11.4	-1.6	33	16
3	KAZ	BERLIK	49.88	69.52	5.3	12.9	-1.9	32	20
3	KAZ	BLACOVESCHENKA	54.37	66.97	3.8	11.9	-1.5	34	21
3	KAZ	BOLSHE-NARYMSKOE	49.20	84.52	4.7	13.0	-1.3	34	19
3	KAZ	CARDARA	41.37	68.00	14.8	12.2	0.2	20	5
3	KAZ	DZHAMBEJTY	50.25	52.57	7.5	13.4	-2.1	29	12
3	KAZ	DZHUSALY	45.50	64.08	10.8	14.5	-1.8	24	-11
3	KAZ	ESIL	51.88	66.33	5.0	12.7	-1.5	32	19
3	KAZ	FORT-SHEVCHENKO	44.55	50.25	13.5	12.0	0.6	26	-25
3	KAZ	IRTYSHSK	53.35	75.45	4.7	12.6	-1.4	32	22
3	KAZ	KARAGANDA	49.80	73.15	5.0	11.9	-1.6	32	28
3	KAZ	KAZALINSK	45.77	62.12	10.2	14.1	-1.2	20	-9
3	KAZ	KOKPEKTY	48.75	82.37	4.0	12.7	-1.1	34	31
3	KAZ	KOKSHETAY	53.28	69.38	4.6	12.4	-1.8	33	34
3	KAZ	KUSTANAI	53.22	63.62	4.9	12.2	-1.8	34	21
3	KAZ	KYZYLORDA	44.85	65.50	10.9	14.3	-1.3	22	-18
3	KAZ	KZYLZAR	48.30	69.65	6.3	13.9	-1.8	30	14
3	KAZ	LENINOGORSK	50.33	83.55	4.3	10.4	-1.8	34	31
3	KAZ	MUGODZARSKAJA	48.63	58.50	7.7	13.3	-1.5	27	13
3	KAZ	PAVLODAR	52.30	76.93	5.0	12.9	-2.0	31	22
3	KAZ	PETROPAVLOVSK	54.83	69.15	3.9	11.9	-1.4	32	20
3	KAZ	RUZAEVKA	52.82	66.97	4.3	12.4	-1.7	33	24

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	KAZ	SAM	45.40	56.12	10.5	14.1	-0.9	23	-2
3	KAZ	SEMIJARKA	50.87	78.35	5.7	13.5	-1.9	30	16
3	KAZ	SEMIPALATINSK	50.42	80.30	6.5	12.9	-1.8	28	8
3	KAZ	SUCINSK	52.95	70.22	3.7	11.5	-1.5	33	22
3	KAZ	TAIPAK	49.05	51.87	9.1	13.5	-1.3	26	5
3	KAZ	TEMIR	49.15	57.12	6.2	13.1	-2.3	32	20
3	KAZ	TORGAI	49.63	63.50	7.0	14.6	-1.7	31	14
3	KAZ	TURKESTAN	43.27	68.22	13.7	13.6	0.9	17	18
3	KAZ	UIL	49.07	54.68	7.9	14.0	-2.1	30	13
3	KAZ	URALSK	51.25	51.28	6.7	13.1	-1.7	33	17
3	KAZ	URDZHAR	47.12	81.62	6.6	13.2	-1.4	31	20
3	KAZ	URICKY	53.32	65.55	4.3	12.0	-1.9	34	23
3	KAZ	ZHALTYR	51.62	69.80	4.7	12.5	-1.6	33	21
3	KAZ	ZHAMBYL	42.85	71.38	11.3	12.6	0.6	22	17
3	KAZ	ZHARKENT	44.17	80.07	10.5	13.3	0.9	23	38
3	KAZ	ZHARYK	48.85	72.87	5.7	12.3	-1.8	32	20
3	KAZ	ZHEZKAZGAN	47.80	67.72	7.5	14.1	-1.4	27	11
3	KAZ	ZLIKHA	45.25	67.07	10.5	14.3	-1.5	24	-5
3	KGZ	BISHKEK	42.85	74.53	11.6	12.5	1.0	23	43
3	KGZ	DZHALAL-ABAD	40.92	72.95	13.1	12.2	1.1	20	20
3	KGZ	NARYN	41.43	76.00	5.3	11.4	-0.1	34	8
3	KGZ	TALAS	42.52	72.22	9.3	11.2	0.1	24	4
3	KGZ	TIAN-SHAN	41.88	78.23	-4.7	9.4	2.1	37	41
3	KGZ	TOKMAK	42.83	75.28	11.4	11.0	1.1	21	36
3	KOR	ANDONG	36.57	128.72	12.2	12.4	0.9	28	16
3	KOR	BUSAN	35.10	129.03	15.3	9.4	1.0	36	1
3	KOR	CHEONGJU	36.63	127.45	13.1	12.4	1.0	27	9
3	KOR	CHEORWON	38.15	127.30	10.6	13.0	0.5	26	5
3	KOR	CHUNCHEON	37.90	127.73	11.5	13.1	0.6	27	19
3	KOR	CHUPUNGNYEONG	36.22	128.00	12.0	11.8	1.0	27	15
3	KOR	DAEGU	35.88	128.62	14.8	10.6	0.5	28	2
3	KOR	DAEGWALLYEONG	37.68	128.77	8.3	11.0	-0.2	32	13
3	KOR	DAEJEON	36.37	127.37	12.8	12.2	1.1	29	6
3	KOR	DONGHAE-RADAR	37.50	129.13	13.3	9.3	0.9	32	3
3	KOR	GANGNEUNG	37.75	128.90	13.4	10.9	1.5	30	14
3	KOR	GUNSAN	36.00	126.77	13.9	11.1	0.6	33	-7
3	KOR	GWANGJU	35.17	126.90	14.5	10.7	0.8	29	-3
3	KOR	INCHEON	37.47	126.63	13.2	11.5	0.7	32	-6
3	KOR	JEJU	33.52	126.53	16.3	9.0	0.6	37	-23
3	KOR	JEONJU	35.82	127.15	13.7	12.0	0.9	28	9

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	KOR	JINJU	35.20	128.12	13.6	11.1	1.0	28	-17
3	KOR	MASAN	35.18	128.57	15.4	9.8	1.1	33	-11
3	KOR	MOKPO	34.82	126.38	14.8	10.3	0.7	34	-5
3	KOR	POHANG	36.03	129.38	15.0	9.8	1.0	29	0
3	KOR	SEOGWIPO	33.25	126.57	17.3	8.5	0.7	38	-17
3	KOR	SEOSAN	36.77	126.50	12.7	11.3	0.7	30	-20
3	KOR	SEOUL	37.57	126.97	13.1	12.2	1.5	27	9
3	KOR	SOKCHO	38.25	128.57	12.8	10.6	1.4	31	7
3	KOR	SUWON	37.27	126.98	12.7	12.1	0.9	28	1
3	KOR	TONGYEONG	34.85	128.43	14.9	9.5	0.8	34	-7
3	KOR	ULJIN	36.98	129.42	13.5	9.5	1.1	31	-7
3	KOR	ULLEUNGDO	37.48	130.90	13.5	9.6	0.6	36	-8
3	KOR	ULSAN	35.55	129.32	14.7	10.1	0.9	30	-12
3	KOR	WANDO	34.40	126.70	15.0	9.4	1.1	34	-16
3	KOR	WONJU	37.33	127.95	11.9	12.7	0.8	24	4
3	KOR	YEONGWOL	37.18	128.47	11.2	12.7	1.0	28	15
3	KOR	YEOSU	34.73	127.75	15.0	9.4	1.1	34	-1
3	KWT	KUWAIT-INTL-AP	29.22	47.98	25.4	10.5	0.6	24	4
3	MAC	TAIPA-GRANDE	22.17	113.57	22.9	6.5	0.8	34	31
3	MMR	YANGON	16.77	96.17	26.7	1.2	1.4	-26	18
3	MNG	ALTAI	46.40	96.25	1.2	9.5	0.2	32	12
3	MNG	ARVAIHEER	46.27	102.78	3.1	10.1	-1.5	31	43
3	MNG	BAITAG	46.12	91.47	4.4	13.3	-0.2	28	17
3	MNG	BARUUN-URT	46.68	113.28	3.1	13.4	1.2	29	-20
3	MNG	BARUUNHARAA	48.92	106.07	2.8	12.2	-0.9	28	41
3	MNG	BARUUNTURUUN	49.65	94.40	-0.8	14.8	2.4	24	24
3	MNG	BAYAN-OVOO	47.78	112.12	3.0	12.2	-1.2	32	37
3	MNG	BAYANBULAG	46.83	98.08	-1.4	10.0	1.0	24	30
3	MNG	BAYANDELGER	45.73	112.37	3.8	13.0	0.4	30	4
3	MNG	BAYANHONGOR	46.13	100.68	2.4	10.7	1.3	30	-23
3	MNG	BULGAN	48.80	103.55	2.0	10.4	-0.2	30	15
3	MNG	CHOIBALSAN	48.08	114.55	3.2	13.6	0.2	29	7
3	MNG	CHOIR	46.45	108.22	2.9	12.2	0.2	31	14
3	MNG	DALANZADGAD	43.58	104.42	6.4	13.2	-1.8	27	28
3	MNG	DASHBALBAR	49.55	114.40	3.0	12.1	-1.1	33	32
3	MNG	ERDENEMANDAL	48.53	101.38	2.2	9.9	0.0	30	9
3	MNG	GALUUT	46.70	100.13	-0.6	9.8	-0.5	27	10
3	MNG	HATGAL	50.43	100.15	-1.2	9.0	-0.2	31	9
3	MNG	HOVD	48.02	91.57	2.7	12.0	1.4	28	-7
3	MNG	HUJIRT	46.90	102.77	2.2	9.6	-0.8	32	35

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	MNG	HUTAG	49.38	102.70	3.1	11.8	-0.1	26	-3
3	MNG	KHALKH-GOL	47.62	118.62	3.3	12.6	-1.0	32	21
3	MNG	MAANTI	47.30	107.48	0.5	12.0	0.9	26	3
3	MNG	MANDALGOBI	45.77	106.28	3.5	12.0	1.6	28	-37
3	MNG	MATAD	47.17	115.63	3.5	12.7	-1.1	32	48
3	MNG	MUREN	49.63	100.17	2.5	10.8	-0.1	28	8
3	MNG	OMNO-GOBI	49.02	91.72	1.3	11.1	1.0	28	5
3	MNG	RINCHINLHUMBE	51.12	99.67	-1.8	11.1	-1.3	29	-27
3	MNG	SAIKHAN-OVOO	45.45	103.90	4.2	13.2	1.4	30	-28
3	MNG	SAINSHAND	44.90	110.12	6.0	14.3	-1.3	29	39
3	MNG	TARIALAN	49.57	102.00	2.2	10.6	0.1	29	11
3	MNG	TOSONTSENGEL	48.73	98.20	-0.6	10.4	1.5	27	51
3	MNG	TSETSERLEG	47.45	101.47	2.7	9.2	-1.2	32	39
3	MNG	TSOGT-OVOO	44.42	105.32	5.9	13.5	-2.0	29	40
3	MNG	ULAANBAATAR	47.92	106.87	1.1	11.6	1.2	26	3
3	MNG	ULAANGOM	49.80	92.08	-0.2	15.1	2.6	28	33
3	MNG	ULGI	48.93	89.93	2.9	10.3	-1.0	30	41
3	MNG	ULIASTAI	47.75	96.85	1.1	10.2	0.1	30	16
3	MNG	UNDERKHAAN	47.32	110.63	2.5	12.2	-0.2	30	6
3	MNG	ZAMYN-UUD	43.73	111.90	5.8	14.6	-1.1	29	41
3	OMN	KHASAB	26.20	56.23	27.8	6.1	0.3	31	-8
3	OMN	MASIRAH	20.67	58.90	26.3	2.4	1.8	3	38
3	OMN	SALALAH	17.03	54.08	26.1	2.6	1.1	-4	45
3	OMN	SEEB-INTL-AP	23.58	58.28	27.4	5.6	0.9	16	40
3	OMN	SOHAR-MAJIS	24.47	56.63	26.7	6.0	0.5	22	40
3	OMN	SUR	22.53	59.47	28.3	5.5	1.1	12	32
3	OMN	THUMRAIT	17.67	54.02	25.7	4.8	1.2	12	25
3	PAK	ISLAMABAD-AP	33.62	73.10	21.1	9.4	1.3	15	20
3	PAK	KARACHI-AP	24.90	67.13	25.9	5.4	1.6	11	18
3	PRK	ANJU	39.62	125.65	10.2	13.4	0.0	29	-8
3	PRK	CHANGJIN	40.37	127.25	4.3	11.0	-1.9	37	40
3	PRK	CHANGJON	38.73	128.18	12.4	11.0	1.9	32	17
3	PRK	CHONGJIN	41.78	129.82	9.2	11.7	0.5	34	-15
3	PRK	CHUNGGANG	41.78	126.88	7.1	13.5	-1.3	29	23
3	PRK	HAEJU	38.03	125.70	11.8	12.5	1.1	30	10
3	PRK	HAMHEUNG	39.93	127.55	11.0	12.2	0.9	30	16
3	PRK	HUICHON	40.17	126.25	9.9	13.8	0.2	26	1
3	PRK	HYESAN	41.40	128.17	5.8	12.7	-1.8	32	35
3	PRK	KAESONG	37.97	126.57	11.2	13.0	0.7	29	21
3	PRK	KANGGYE	40.97	126.60	9.3	13.7	-0.5	25	13

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	PRK	KIMCHAEK	40.67	129.20	9.6	11.5	0.7	36	-4
3	PRK	KUSONG	39.98	125.25	9.5	13.5	-0.5	29	5
3	PRK	NAMPO	38.72	125.38	11.5	13.0	1.0	31	20
3	PRK	PUNGSAN	40.82	128.15	4.1	10.7	-1.7	36	40
3	PRK	PYONGGANG	38.42	127.28	9.5	12.7	-0.2	31	-12
3	PRK	PYONGYANG	39.03	125.78	11.0	13.4	0.4	28	18
3	PRK	RYONGYON	38.15	124.88	11.3	12.4	0.7	30	18
3	PRK	SAMJIYON	41.82	128.30	2.6	10.2	0.1	37	5
3	PRK	SARIWON	38.52	125.77	11.3	13.5	0.7	28	20
3	PRK	SENBONG	42.32	130.40	8.1	11.9	0.9	37	-41
3	PRK	SINGYE	38.50	126.53	10.5	13.0	0.6	29	15
3	PRK	SINPO	40.03	128.18	10.4	11.8	0.5	34	-2
3	PRK	SINUIJU	40.10	124.38	10.3	13.3	0.3	29	-6
3	PRK	SUPUNG	40.45	124.93	9.4	13.5	-0.2	29	-6
3	PRK	WONSAN	39.18	127.43	11.7	11.2	1.2	30	16
3	PRK	YANGDOK	39.22	126.65	9.3	13.0	-0.2	26	9
3	QAT	DOHA-INTL-AP	25.25	51.57	27.0	7.7	0.6	29	24
3	RUS	AGATA	66.88	93.47	-5.0	13.4	-2.6	43	-17
3	RUS	AGINSKOE	51.10	114.52	1.8	11.1	-0.7	30	38
3	RUS	AGZU	47.60	138.40	3.7	11.1	2.0	36	-37
3	RUS	AJAN	56.45	138.15	-0.2	7.9	0.8	38	-15
3	RUS	AKJAR	51.87	58.18	4.5	11.8	-1.7	34	24
3	RUS	AKSA	50.27	113.27	2.0	11.0	0.0	31	11
3	RUS	ALDAN	58.62	125.37	-1.4	10.9	-1.3	29	-4
3	RUS	ALEJSKAJA	52.52	82.77	4.4	12.0	-1.4	32	26
3	RUS	ALEKSANDROVSK-SAHAL	50.90	142.17	3.0	10.1	1.5	45	-24
3	RUS	ALEKSANDROVSKIJ-ZAV	50.92	117.93	0.7	10.2	-0.2	31	10
3	RUS	ALEKSANDROVSKOE	60.43	77.87	1.8	10.3	-1.2	33	23
3	RUS	AMDERMA	69.75	61.70	-4.2	9.0	-1.3	55	-28
3	RUS	AMGA	60.90	131.98	-2.4	14.4	-2.2	29	-23
3	RUS	ANADYR	64.78	177.57	-3.3	10.1	-2.7	49	-7
3	RUS	ANUCINO	43.97	133.07	5.9	13.3	-1.6	32	38
3	RUS	ARHARA	49.42	130.08	3.7	12.9	-1.0	32	35
3	RUS	ARKA	60.08	142.33	-1.4	10.4	-1.2	32	-8
3	RUS	ASTRAHANKA	44.72	132.07	6.6	13.3	1.7	36	-56
3	RUS	BAEVO	53.27	80.77	4.1	11.9	-1.7	33	26
3	RUS	BAGDARIN	54.47	113.58	-1.3	10.9	-1.1	27	-15
3	RUS	BAJANDAJ	53.10	105.53	1.2	10.1	0.1	29	2
3	RUS	BAKALY	55.18	53.80	4.9	11.3	-1.7	31	14
3	RUS	BAKCHAR	57.08	81.92	2.5	10.6	-0.2	30	9

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	BALAGANSK	54.00	103.07	2.0	11.4	-0.5	33	10
3	RUS	BARABINSK	55.33	78.37	3.4	11.7	-1.4	33	32
3	RUS	BARNAUL	53.43	83.52	5.0	12.2	-1.8	32	18
3	RUS	BATAMAJ	63.52	129.48	-3.5	14.6	-2.4	33	-17
3	RUS	BEREZOVO	63.93	65.05	-0.5	9.1	-0.9	31	11
3	RUS	BIJSK-ZONALNAJA	52.68	84.95	4.6	11.9	-1.7	34	31
3	RUS	BIKIN	46.80	134.27	5.9	13.3	-1.5	30	38
3	RUS	BIROBIDZHAN	48.73	132.95	4.5	12.9	-1.6	31	39
3	RUS	BIRSK	55.42	55.53	4.8	11.4	-2.0	32	25
3	RUS	BLAGOVESCENSK	50.25	127.57	4.3	13.4	-1.7	30	39
3	RUS	BODAJBO	57.85	114.23	-0.2	11.1	-0.3	25	15
3	RUS	BOGORODSKOE	52.38	140.47	2.2	11.4	0.8	39	-22
3	RUS	BOGUCANY	58.38	97.45	1.1	10.6	-0.4	32	4
3	RUS	BOLSHERECHE	56.10	74.63	3.4	11.4	-1.2	31	26
3	RUS	BOLSOJ-SANTAR	54.83	137.53	-0.7	8.4	0.2	39	-4
3	RUS	BOL`SIE-UKI	56.93	72.67	3.2	11.0	-1.3	32	30
3	RUS	BOMNAK	54.72	128.93	1.0	11.5	-0.3	30	0
3	RUS	BORZJA	50.40	116.52	2.3	11.7	-1.1	32	29
3	RUS	BOR	61.60	90.02	0.8	9.7	-0.4	33	17
3	RUS	BRATSK	56.28	101.75	1.9	10.3	-1.3	30	25
3	RUS	BUGARIHTA	54.05	115.02	-1.3	11.9	-1.2	25	-25
3	RUS	BUGULMA	54.58	52.80	4.7	11.1	-1.8	32	28
3	RUS	BURUKAN	53.05	136.03	0.0	10.5	0.0	31	10
3	RUS	BUZULUK	52.82	52.22	5.9	12.5	-1.8	29	17
3	RUS	CEMAL	51.43	86.00	5.1	11.1	-1.3	31	22
3	RUS	CENTRALNYJ-RUDNIK	55.22	87.65	2.2	9.7	-1.5	35	42
3	RUS	CERLAK	54.17	74.80	3.9	12.4	-1.4	33	35
3	RUS	CERNUSKA	56.50	56.13	4.5	11.2	-1.4	31	27
3	RUS	CHANY	55.28	76.60	3.8	11.8	-1.2	33	26
3	RUS	CHARA	56.90	118.27	-2.1	12.0	-1.8	31	-14
3	RUS	CHELJABINSK-BALANDI	55.30	61.53	4.5	11.3	-1.4	29	24
3	RUS	CHERDYN	60.40	56.52	2.9	9.7	-1.9	32	35
3	RUS	CHERNISHEVSKIJ	63.03	112.50	-1.9	11.6	-1.2	32	-5
3	RUS	CHERNJAEVO	52.78	126.00	1.9	12.4	-0.1	29	15
3	RUS	CHERSKIJ	68.75	161.28	-4.6	13.1	-2.7	39	-11
3	RUS	CHITA	52.08	113.48	2.2	11.6	-0.9	31	44
3	RUS	CHOKURDAH	70.62	147.88	-6.8	14.3	-2.5	43	-18
3	RUS	CJULBJU	57.77	130.90	-1.5	12.6	-1.5	28	-23
3	RUS	CULMAN	56.83	124.87	-2.1	11.6	-1.2	29	-10
3	RUS	CULYM	55.10	80.97	3.4	11.1	-1.3	32	23

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	CURAPCA	62.03	132.60	-2.8	14.7	-2.3	30	-17
3	RUS	DALNERECHENSK	45.87	133.73	5.3	13.2	-1.8	33	37
3	RUS	DEMJANSKOE	59.60	69.28	2.0	10.4	-1.2	30	33
3	RUS	DUDINKA	69.40	86.17	-5.0	12.5	-2.9	51	-4
3	RUS	DUVAN	55.70	57.90	3.7	10.5	-1.7	31	31
3	RUS	DZALINDA	53.47	123.90	1.9	11.3	-0.3	32	10
3	RUS	DZARDZAN	68.73	124.00	-5.1	14.3	-2.5	36	-21
3	RUS	EGVEKINOT	66.35	-179.12	-2.6	8.9	-2.7	47	-6
3	RUS	EKATERINBURG	56.83	60.63	4.3	11.1	-1.7	30	34
3	RUS	EKATERINO-NIKOLSKOE	47.73	130.97	4.9	12.8	-1.8	33	33
3	RUS	EKIMCHAN	53.07	132.98	-0.1	11.1	-0.3	27	7
3	RUS	ELABUGA	55.77	52.07	5.1	11.4	-1.7	31	21
3	RUS	ENISEJSK	58.45	92.15	1.5	10.3	0.2	32	6
3	RUS	ERBOGACEN	61.27	108.02	-1.8	11.2	-1.3	32	-13
3	RUS	EROFEJ-PAVLOVIC	53.97	121.93	1.0	11.2	-0.7	28	13
3	RUS	GAJNY	60.28	54.35	2.9	9.4	-1.6	31	41
3	RUS	GARI	59.43	62.33	3.2	10.6	-1.2	30	34
3	RUS	GLAZOV	58.13	52.58	3.9	10.4	1.6	31	-66
3	RUS	GMO-IM-EK-FEDOROV	77.72	104.30	-10.9	13.1	-2.0	38	19
3	RUS	GORIN	51.20	136.80	2.1	12.1	-0.1	34	4
3	RUS	GORJACINSK	52.98	108.28	1.6	8.7	1.1	42	-36
3	RUS	GVASJUGI	47.67	136.18	3.0	12.2	-1.2	33	48
3	RUS	HABAROVSK	48.52	135.17	4.6	13.0	-1.6	36	38
3	RUS	HADAMA	53.95	98.82	0.2	9.0	-0.7	31	7
3	RUS	HANTY-MANSIJSK	61.02	69.03	1.6	10.2	-1.2	30	46
3	RUS	HATANGA	71.98	102.47	-7.0	14.3	-1.9	43	-19
3	RUS	HILOK	51.35	110.47	0.9	10.0	-0.7	31	8
3	RUS	HOLMSK	47.05	142.05	5.7	10.7	-1.8	47	54
3	RUS	HORINSK	52.17	109.78	1.8	10.8	-0.7	31	27
3	RUS	HOSEDA-HARD	67.08	59.38	-2.0	9.0	-1.7	42	7
3	RUS	HULARIN	51.42	135.08	2.1	11.2	0.3	34	-4
3	RUS	IGNASINO	53.47	122.40	0.9	11.9	-0.7	28	0
3	RUS	ILYINSKIY	47.98	142.20	4.5	9.9	2.0	50	-33
3	RUS	IM-MV-POPOVA	73.33	70.05	-6.7	11.3	-1.1	51	-29
3	RUS	IM-POLINY-OSIPENKO	52.42	136.50	1.7	11.4	0.9	33	-19
3	RUS	IRKUTSK	52.27	104.32	2.1	10.3	-0.2	31	14
3	RUS	ISILKUL	54.90	71.25	3.5	11.3	-1.4	34	24
3	RUS	ISIM	56.10	69.43	3.5	11.6	-1.4	34	26
3	RUS	ISIT	60.82	125.32	-1.3	12.6	-1.5	31	-7
3	RUS	IVDEL	60.68	60.45	1.9	10.1	0.1	27	13

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	IZHEVSK	56.83	53.45	4.5	11.0	-1.6	30	23
3	RUS	JAKUTSK	62.02	129.72	-2.0	14.1	-1.9	28	-17
3	RUS	JANAUL	56.27	54.90	4.2	11.1	-1.6	33	32
3	RUS	JUZHNO-KURILSK	44.02	145.87	6.0	9.1	1.2	56	-24
3	RUS	JUZHNO-SAHALINSK	46.95	142.72	4.1	10.1	2.1	46	-38
3	RUS	KACUG	53.97	105.90	0.8	10.7	-0.1	29	15
3	RUS	KAJLASTUJ	49.83	118.38	2.9	12.5	-1.1	31	43
3	RUS	KALACINSK	55.03	74.58	3.7	11.8	-1.6	33	25
3	RUS	KALAKAN	55.12	116.77	-1.6	11.9	-1.5	31	-17
3	RUS	KAMEN-NA-OBI	53.82	81.27	3.6	12.0	-1.9	32	26
3	RUS	KAMENSKOE	62.43	166.08	-2.4	10.3	-1.9	42	-4
3	RUS	KAMYSLOV	56.85	62.72	4.0	11.2	-1.5	29	26
3	RUS	KARASUK	53.70	78.07	4.4	12.5	-1.7	30	24
3	RUS	KARGASOK	59.05	80.95	2.0	10.9	-0.9	32	33
3	RUS	KAZACHINSK	56.32	107.62	0.5	10.2	-0.8	30	-12
3	RUS	KEDON	64.00	158.92	-5.8	14.0	-2.5	37	-24
3	RUS	KEMEROVO	55.23	86.12	3.2	11.1	-1.7	35	33
3	RUS	KIRENSK	57.77	108.07	0.4	10.4	-0.5	30	10
3	RUS	KIROVSKIJ	45.08	133.53	5.9	13.2	-1.8	34	36
3	RUS	KIRS	59.37	52.22	3.4	9.8	-1.3	32	39
3	RUS	KJAHTA	50.37	106.45	2.9	10.8	-1.2	30	43
3	RUS	KJUSJUR	70.68	127.40	-5.8	14.3	-3.0	41	-22
3	RUS	KLJUCHI	56.32	160.83	1.7	9.1	1.0	42	-34
3	RUS	KLJUCI	52.25	79.13	5.5	12.8	-1.9	33	19
3	RUS	KOCHKI	54.30	80.50	3.6	11.8	-1.5	33	25
3	RUS	KOLBA	55.08	93.37	1.8	9.2	-0.3	33	2
3	RUS	KOLPASEVO	58.32	82.95	1.8	10.5	0.2	32	5
3	RUS	KOLYVAN	55.30	82.75	3.5	11.5	-1.6	32	25
3	RUS	KORF	60.35	166.00	-0.5	7.6	-0.3	39	-4
3	RUS	KRASNOOZERSK	53.97	79.23	4.0	11.9	-1.4	32	25
3	RUS	KRASNOUFIMSK	56.65	57.78	4.0	10.8	-1.6	31	29
3	RUS	KRASNYJ-CHIKOJ	50.37	108.75	1.2	11.1	0.1	30	4
3	RUS	KRASNYJ-JAR	46.53	135.32	4.5	12.8	-1.8	28	46
3	RUS	KRESCHENKA	55.85	80.03	3.0	10.9	-1.1	31	28
3	RUS	KUDYMKAR	58.98	54.65	3.4	9.9	-1.7	28	35
3	RUS	KUPINO	54.37	77.28	4.2	12.2	-1.6	32	23
3	RUS	KURGAN	55.47	65.40	4.2	11.7	-1.5	31	26
3	RUS	KUR	49.93	134.63	2.2	12.0	1.0	32	-32
3	RUS	KYRA	49.57	111.97	2.0	10.9	-0.1	30	3
3	RUS	KYSTOVKA	56.60	76.57	2.8	11.0	-1.0	33	24

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	KYZYL	51.72	94.50	2.4	12.5	0.3	29	-2
3	RUS	LENSK	60.72	114.88	-0.6	11.2	-0.6	27	4
3	RUS	LEUSI	59.62	65.72	2.9	11.0	-1.3	29	34
3	RUS	LOSINOBORSKOE	58.43	89.37	1.5	9.4	-1.1	34	23
3	RUS	MAGADAN	59.55	150.78	-1.0	8.1	-0.4	36	10
3	RUS	MAGDAGACI	53.47	125.82	2.4	11.6	-1.1	31	23
3	RUS	MAGNITOGORSK	53.35	59.08	4.5	11.6	-1.8	32	15
3	RUS	MAJSK	57.78	77.28	2.3	10.3	-0.3	33	6
3	RUS	MAKUSINO	55.25	67.30	4.5	12.2	-1.8	30	15
3	RUS	MALYE-KARMAKULY	72.37	52.70	-2.5	6.5	-1.3	55	-5
3	RUS	MAMA	58.32	112.87	0.1	10.8	-0.3	29	36
3	RUS	MARESALE	69.72	66.80	-4.8	10.1	-1.5	54	-16
3	RUS	MARIINSK	56.22	87.75	3.7	11.2	-1.3	30	33
3	RUS	MARKOVO	64.68	170.42	-3.5	12.1	-2.8	42	-7
3	RUS	MASLJANINO	54.33	84.22	3.2	10.9	-1.3	30	30
3	RUS	MELEUZ	52.95	55.97	5.2	11.8	-1.8	34	24
3	RUS	MOGOCA	53.75	119.73	0.2	10.7	-0.1	27	13
3	RUS	MONDY	51.68	100.98	0.2	8.4	-0.9	32	-16
3	RUS	MUZI	65.38	64.72	-0.9	9.3	-1.4	35	9
3	RUS	NAGORNYJ	55.97	124.88	-2.4	11.4	-1.6	31	-21
3	RUS	NAPAS	59.85	81.95	1.5	10.1	-1.1	32	24
3	RUS	NARJAN-MAR	67.63	53.03	-0.9	7.6	-1.4	41	9
3	RUS	NAZYVOEVSK	55.57	71.37	3.3	11.4	-1.4	32	30
3	RUS	NERCHINSKIJ-ZAVOD	51.32	119.62	1.5	10.7	-0.2	32	9
3	RUS	NIKOLAEVSK-NA-AMURE	53.15	140.70	1.4	10.4	0.6	37	-24
3	RUS	NIKOLSKOE	55.20	165.98	3.4	6.2	1.7	55	-33
3	RUS	NIZHNEANGARSK	55.78	109.55	1.2	9.6	-0.9	39	27
3	RUS	NIZHNEUDINSK	54.88	99.03	2.2	10.5	-0.3	30	13
3	RUS	NJAKSIMVOL	62.43	60.87	1.1	9.7	-0.7	29	36
3	RUS	NJURBA	63.28	118.33	-2.5	12.8	-1.4	31	-4
3	RUS	NOGLIKI	51.92	143.13	1.5	8.7	1.3	44	-9
3	RUS	NORSK	52.35	129.92	1.8	12.0	-0.3	32	1
3	RUS	NOVOKUZNETSK	53.82	86.88	4.1	11.2	-1.7	32	31
3	RUS	NOVOSELENGINSK	51.10	106.65	2.6	12.2	-0.2	30	3
3	RUS	NOVOSIBIRSK	55.08	82.90	3.4	11.2	-1.6	34	24
3	RUS	NOZOVKA	57.08	54.75	4.7	11.1	-1.5	29	26
3	RUS	OBLUCE	49.00	131.08	3.0	12.4	0.2	32	3
3	RUS	ODESSKOE	54.20	72.97	4.1	12.2	-1.6	31	27
3	RUS	OHANSK	57.72	55.38	4.3	10.8	-1.6	29	29
3	RUS	OHOTSK	59.37	143.20	-0.6	8.6	-0.2	39	-5

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	OJMJAKON	63.25	143.15	-7.0	17.0	-3.6	36	-29
3	RUS	OKTJABRSKOE	62.45	66.05	0.4	9.0	-1.0	32	14
3	RUS	OLEKMINSK	60.40	120.42	-0.8	12.1	-1.1	27	2
3	RUS	OLENEK	68.50	112.43	-5.8	14.6	-2.9	37	-23
3	RUS	OLOVJANNAJA	50.95	115.58	2.4	11.7	-1.0	32	40
3	RUS	OMSK	55.02	73.38	4.0	12.0	-1.4	33	18
3	RUS	ORDYNSKOE	54.37	81.95	3.8	11.5	-1.8	35	25
3	RUS	ORENBURG	51.68	55.10	6.2	12.8	-2.1	30	16
3	RUS	ORLINGA	56.05	105.83	0.3	10.4	-1.4	31	-8
3	RUS	OSTROV-DIKSON	73.50	80.40	-7.8	12.6	0.9	45	34
3	RUS	OSTROV-GOLOMJANNYJ	79.55	90.62	-11.6	12.4	-2.3	35	12
3	RUS	OSTROV-KOTELNYJ	76.00	137.87	-10.7	14.2	-0.7	41	17
3	RUS	OSTROV-VIZE	79.50	76.98	-10.3	11.2	-2.1	37	9
3	RUS	OSTROV-VRANGELJA	70.98	-178.48	-7.8	11.3	-1.0	41	-25
3	RUS	OZERNAJA	51.48	156.48	2.8	6.6	1.9	58	-22
3	RUS	PARTIZANSK	43.15	133.02	6.4	12.4	-1.8	38	41
3	RUS	PECHORA	65.12	57.10	0.2	8.5	-1.0	34	17
3	RUS	PERM	57.95	56.20	3.9	11.1	-1.7	30	37
3	RUS	PERVOMAJSKOE	57.07	86.22	2.8	10.9	-1.4	32	37
3	RUS	PETROPAVLOVSK-KAMCH	53.08	158.58	3.1	7.9	2.0	46	-37
3	RUS	PETROVSKIJ-ZAVOD	51.32	108.87	0.8	10.5	0.0	30	13
3	RUS	PILVO	50.05	142.17	3.1	9.7	1.6	46	-34
3	RUS	POGIBI	52.22	141.63	1.3	9.3	1.2	48	-12
3	RUS	POGRANICHNOE	50.40	143.77	0.9	7.3	1.4	48	4
3	RUS	POGRANICHNYJ	44.40	131.38	6.4	12.9	-1.5	34	34
3	RUS	POJARKOVO	49.62	128.65	3.7	12.9	-0.1	32	5
3	RUS	POKROVSKAJA	61.48	129.15	-2.4	14.1	-1.9	30	-20
3	RUS	POLARGMO-IM-ET-K	80.62	58.05	-9.2	10.3	-2.2	40	13
3	RUS	POLTAVKA	54.37	71.75	3.9	12.2	-1.4	33	29
3	RUS	POLTAVKA	44.03	131.32	7.0	12.7	-1.1	31	29
3	RUS	PORONAJSK	49.22	143.10	2.6	9.2	2.1	48	-19
3	RUS	POSET	42.65	130.80	8.0	12.3	0.9	36	-21
3	RUS	PREOBRAZHENIE	42.90	133.90	6.5	11.3	-1.5	43	54
3	RUS	PRIARGUNSK	50.40	119.07	2.0	12.3	0.0	30	8
3	RUS	PUDINO	57.53	79.37	2.1	10.8	-0.4	32	22
3	RUS	REBRIHA	53.07	82.30	4.1	12.0	-1.9	31	25
3	RUS	ROMANOVKA	53.20	112.78	0.0	10.2	-0.4	27	11
3	RUS	RUBCOVSK	51.50	81.22	5.0	12.4	-1.9	31	22
3	RUS	RUDNAJA-PRISTAN	44.37	135.85	5.7	10.8	2.1	41	-41
3	RUS	SADRINSK	56.07	63.65	4.4	11.2	-1.4	30	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	SAIM	60.32	64.22	3.1	10.6	-1.5	28	28
3	RUS	SALEHARD	66.53	66.67	-2.1	9.9	-1.7	40	1
3	RUS	SAMARA	53.25	50.45	5.7	11.6	-1.9	31	11
3	RUS	SAMARY	57.35	58.22	3.4	10.5	-1.4	30	39
3	RUS	SANGARY	63.97	127.47	-2.6	13.7	-2.0	33	-8
3	RUS	SARAN-PAUL	64.28	60.88	0.1	9.2	-0.1	29	6
3	RUS	SARGATSKOE	55.60	73.48	3.3	11.6	-1.2	33	23
3	RUS	SEJMCHAN	62.92	152.42	-4.1	14.0	-2.7	36	-15
3	RUS	SEKTAGLI	50.43	131.02	2.0	12.3	0.9	30	-34
3	RUS	SELAGONCY	66.25	114.28	-5.1	14.4	-2.6	37	-21
3	RUS	SEVERNOE	56.35	78.35	3.2	11.4	-1.2	32	26
3	RUS	SEVERO-KURILSK	50.68	156.13	3.3	6.7	1.8	59	-25
3	RUS	SHILKA	51.87	116.03	1.9	11.7	0.1	30	2
3	RUS	SIMUSIR	46.85	151.87	3.9	6.7	1.1	56	-24
3	RUS	SLAVGOROD	52.97	78.65	4.6	13.0	-1.8	32	23
3	RUS	SMIDOVICH	48.62	133.83	4.4	13.0	-1.4	33	41
3	RUS	SOFIJSKIJ-PRIISK	52.27	133.98	-0.9	11.4	0.1	27	21
3	RUS	SOLNETHNAYA	54.03	108.27	1.3	8.6	0.9	43	-30
3	RUS	SOLOVEVSK	49.90	115.75	2.4	12.0	-0.9	33	30
3	RUS	SOSNOVO-OZERSKOE	52.53	111.55	0.5	9.6	-0.4	32	1
3	RUS	SOSVA	63.65	62.10	0.7	9.6	-0.6	34	30
3	RUS	SRETENSK	52.23	117.70	1.8	11.1	-0.2	30	6
3	RUS	STERLITAMAK	53.58	56.00	5.5	12.1	-1.7	31	17
3	RUS	SUMIHA	55.23	63.32	4.5	11.6	-1.6	28	15
3	RUS	SUNTAR	62.15	117.65	-1.2	12.3	-1.1	28	-7
3	RUS	SURGUT	61.25	73.50	0.8	9.9	-1.2	34	20
3	RUS	SYKTYVKAR	61.72	50.83	2.8	9.5	-1.8	31	38
3	RUS	SYM	60.35	88.37	0.6	9.7	-0.9	32	11
3	RUS	TAJSHET	55.95	98.00	2.5	10.6	-0.1	31	3
3	RUS	TANGUJ	55.38	101.03	2.0	10.7	-0.8	33	30
3	RUS	TANHOJ	51.57	105.12	2.3	8.9	-0.8	40	43
3	RUS	TARA	56.90	74.38	3.0	11.1	-1.2	31	27
3	RUS	TARKO-SALE	64.92	77.82	-1.6	10.2	-1.9	39	6
3	RUS	TATARSK	55.20	75.97	3.5	11.8	-1.6	32	26
3	RUS	TAZOVSKOE	67.47	78.73	-3.9	11.5	-2.1	46	-1
3	RUS	TERNEJ	45.00	136.60	5.3	10.7	1.9	43	-40
3	RUS	TEVRIZ	57.52	72.40	3.4	10.8	-1.5	35	36
3	RUS	TIKSI	71.58	128.92	-7.3	13.9	-2.1	47	-22
3	RUS	TISUL	55.75	88.32	3.4	10.6	-1.0	34	26
3	RUS	TIVJAKU	48.60	137.05	1.5	11.3	0.3	32	5

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	TJUKALINSK	55.87	72.20	3.5	11.4	-1.2	33	29
3	RUS	TJUMEN	57.12	65.43	3.9	11.4	-1.4	29	32
3	RUS	TOBOLSK	58.15	68.25	2.9	11.0	-1.5	29	37
3	RUS	TOGUCHIN	55.23	84.40	3.3	10.8	-1.7	32	32
3	RUS	TOKO	56.28	131.13	-5.0	14.2	-2.7	36	-28
3	RUS	TOMPO	63.95	135.87	-5.9	16.3	-3.4	37	-23
3	RUS	TOMSK	56.50	84.92	3.2	10.7	-1.4	33	36
3	RUS	TROICKO-PECHERSKOE	62.70	56.20	1.3	9.0	-0.2	31	9
3	RUS	TROICKOE	49.45	136.57	4.4	12.9	-1.5	36	43
3	RUS	TROIZK	54.08	61.62	4.7	12.2	-1.4	32	17
3	RUS	TULUN	54.60	100.63	1.8	9.8	-0.8	33	45
3	RUS	TUNKA	51.73	102.53	1.4	10.5	0.0	30	9
3	RUS	TURIJ-ROG	45.22	131.98	6.4	13.1	-1.9	32	38
3	RUS	TURINSK	58.05	63.68	3.5	10.9	-1.5	30	31
3	RUS	TUROCAK	52.27	87.17	3.5	11.2	-1.4	33	40
3	RUS	TURUHANSK	65.78	87.93	-2.0	10.7	-1.6	36	6
3	RUS	TYNDA	55.18	124.67	-0.2	11.3	-0.8	25	-7
3	RUS	UAKIT	55.47	113.62	-2.1	10.6	-1.4	32	-15
3	RUS	UEGA	60.72	142.78	-1.5	10.1	-1.3	32	-3
3	RUS	UFA	54.72	55.83	5.2	11.9	-1.6	31	25
3	RUS	UHTA	63.55	53.82	1.2	8.6	-1.1	33	49
3	RUS	ULAN-UDE	51.83	107.60	2.2	11.8	-0.1	29	1
3	RUS	ULETY	51.35	112.47	2.6	10.3	-1.3	32	35
3	RUS	URMI	49.40	133.23	2.7	11.7	0.1	31	3
3	RUS	UST-BARGUZIN	53.42	109.02	1.1	9.5	0.1	38	-7
3	RUS	UST-CILMA	65.43	52.27	0.3	8.1	-0.2	34	22
3	RUS	UST-ILIMSK	58.20	102.75	1.0	9.6	-1.2	32	30
3	RUS	UST-ISIM	57.68	71.18	2.8	11.0	-1.3	30	45
3	RUS	UST-JUDOMA	59.18	135.15	-1.8	13.5	-2.0	27	-29
3	RUS	UST-KAMCHATSK	56.22	162.47	0.9	6.7	1.0	51	-10
3	RUS	UST-KULOM	61.68	53.68	2.5	9.7	-1.0	29	35
3	RUS	UST-KUT	56.87	105.70	0.4	9.2	-0.7	31	17
3	RUS	UST-MAJA	60.38	134.45	-1.9	14.0	-1.8	29	-21
3	RUS	UST-NJUKZHA	56.58	121.48	-0.6	11.6	0.0	24	16
3	RUS	UST-UMALTA	51.63	133.32	1.0	11.4	-0.1	29	11
3	RUS	UST-USA	65.97	56.92	-0.4	7.9	-1.0	33	11
3	RUS	USUGLI	52.65	115.17	0.8	10.7	-0.1	28	29
3	RUS	VANZIL-KYNAK	60.35	84.08	0.6	9.8	-1.0	31	19
3	RUS	VERESCAGINO	58.08	54.68	4.0	10.7	-1.5	28	26
3	RUS	VERHNEIMBATSK	63.15	87.95	-0.2	9.7	-0.7	31	10

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	RUS	VERHNIJ-UFALEJ	56.08	60.30	3.6	10.4	-1.4	31	33
3	RUS	VERHNJAJA-GUTARA	54.22	96.97	-0.5	8.6	-1.6	26	-17
3	RUS	VERHOJANSK	67.55	133.38	-5.4	16.0	-3.9	35	-22
3	RUS	VERHOTUR`E	58.87	60.78	3.3	10.4	-1.2	30	35
3	RUS	VESELAJA-GORKA	52.28	135.80	1.9	11.2	1.2	33	-26
3	RUS	VESLJANA	62.98	50.90	1.7	8.8	-1.5	34	30
3	RUS	VIKULOVO	56.82	70.62	4.0	11.4	-1.6	32	29
3	RUS	VILJUJSK	63.77	121.62	-2.1	13.0	-2.0	29	-11
3	RUS	VITIM	59.45	112.58	0.1	11.2	-1.1	28	-2
3	RUS	VLADIVOSTOK	43.12	131.93	7.0	12.1	1.3	38	-39
3	RUS	VOLCIHA	52.02	80.37	4.5	12.2	-1.9	32	25
3	RUS	VORKUTA	67.48	64.02	-2.2	8.9	-1.7	41	-3
3	RUS	VOROGOVO	61.03	89.63	1.1	10.0	-0.5	33	4
3	RUS	ZAMOKTA	52.77	109.97	-0.5	8.5	-1.0	30	8
3	RUS	ZAVITAJA	50.12	129.47	3.0	12.8	-0.8	31	35
3	RUS	ZDVINSK	54.70	78.67	3.7	11.8	-1.5	32	28
3	RUS	ZEJA	53.70	127.30	2.0	12.4	0.3	28	-1
3	RUS	ZHIGALOVO	54.80	105.22	0.8	10.5	-0.6	31	1
3	RUS	ZHIGANSK	66.77	123.40	-4.8	14.5	-2.5	36	-20
3	RUS	ZIMA	53.93	102.05	2.1	11.2	-1.1	28	39
3	RUS	ZMEINOGORSK	51.15	82.20	4.5	11.1	-1.6	33	28
3	RUS	ZOLOTOJ	47.32	138.98	4.5	9.8	2.5	50	-32
3	RUS	ZURAVLEVKA	44.75	134.47	4.5	12.8	1.7	35	-42
3	RUS	ZVERINOGOLOVSKAJA	54.47	64.87	4.6	12.1	-1.8	31	18
3	RUS	ZYRJANKA	65.73	150.90	-4.7	14.4	-2.9	37	-16
3	SAU	ABHA	18.23	42.65	18.4	4.2	0.5	16	-10
3	SAU	AL-AHSA	25.30	49.48	25.9	9.4	0.8	22	14
3	SAU	AL-BAHA	20.30	41.65	22.0	5.6	0.4	20	-21
3	SAU	AL-JOUF	29.78	40.10	21.4	9.7	1.4	24	10
3	SAU	AL-MADINAH	24.55	39.70	26.4	7.7	0.8	27	4
3	SAU	AL-QAISUMAH	28.32	46.13	24.1	10.2	0.9	22	2
3	SAU	AL-TAIF	21.48	40.55	22.3	6.1	0.6	24	3
3	SAU	AL-WEJH	26.20	36.48	24.9	4.4	1.0	35	25
3	SAU	ARAR	30.90	41.13	21.5	9.9	0.8	23	2
3	SAU	BISHA	19.98	42.63	23.7	6.0	0.8	15	-5
3	SAU	DHAHRAN	26.27	50.17	26.2	8.7	0.8	25	29
3	SAU	GASSIM	26.30	43.77	23.5	9.1	0.9	24	10
3	SAU	GIZAN	16.88	42.58	29.8	3.4	0.1	28	-1
3	SAU	GURIAT	31.40	37.28	19.4	8.8	0.6	27	-1
3	SAU	HAIL	27.43	41.68	21.6	9.4	1.0	27	10

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	SAU	JEDDAH(KING-ABDUL)	21.70	39.18	27.5	4.0	0.0	32	-15
3	SAU	KHAMIS-MUSHAIT	18.30	42.80	19.3	4.1	0.5	20	0
3	SAU	KING-KHALED-INTL-AP	24.93	46.72	23.9	8.9	0.7	19	2
3	SAU	MAKKAH	21.43	39.77	28.5	4.6	0.7	26	11
3	SAU	NAJRAN	17.62	44.42	23.6	6.3	0.7	11	-26
3	SAU	RAFHA	29.62	43.48	22.6	10.5	1.6	25	5
3	SAU	RIYADH-OBS(OAP)	24.70	46.73	25.0	8.9	0.7	20	7
3	SAU	SHARORAH	17.47	47.10	26.9	6.7	1.2	14	-2
3	SAU	TABUK	28.38	36.60	21.1	8.5	0.9	24	0
3	SAU	TURAIF	31.68	38.73	18.9	9.2	0.7	29	-1
3	SAU	WADI-AL-DAWASSER-AP	20.50	45.25	26.7	7.2	0.8	18	5
3	SAU	YENBO	24.13	38.07	26.7	5.5	0.7	34	23
3	THA	ARANYAPRATHET	13.70	102.58	27.0	1.6	0.8	-10	-1
3	THA	BANGKOK	13.73	100.57	27.9	1.6	0.7	-22	10
3	THA	BHUMIBOL-DAM	17.25	99.02	26.2	2.9	1.5	-10	9
3	THA	CHAIYAPHUM	15.80	102.03	26.1	2.1	1.1	-10	3
3	THA	CHANTHABURI	12.60	102.12	26.6	0.9	0.4	-8	24
3	THA	CHIANG-MAI	18.78	98.98	25.0	2.9	1.7	-2	11
3	THA	CHIANG-RAI	19.97	99.88	23.9	3.4	1.4	7	11
3	THA	CHON-BURI	13.37	100.98	27.8	1.4	0.4	-14	5
3	THA	CHUMPHON	10.48	99.18	26.2	0.9	0.6	-27	14
3	THA	DON-MUANG	13.92	100.60	28.2	1.3	0.7	-21	13
3	THA	HAT-YAI	6.92	100.43	26.3	0.6	0.1	-11	32
3	THA	HUA-HIN	12.58	99.95	27.1	1.5	0.7	-14	14
3	THA	KAM-PAENG-PHET	16.48	99.53	26.5	2.0	1.1	6	10
3	THA	KANCHANABURI	14.02	99.53	26.7	1.7	1.2	-17	1
3	THA	KHLONG-YAI	11.77	102.88	26.6	0.5	0.5	-18	7
3	THA	KHON-KAEN	16.43	102.83	26.0	2.5	1.0	-2	7
3	THA	KO-LANTA	7.53	99.05	27.7	0.8	0.3	-14	15
3	THA	KO-SAMUI	9.47	100.05	27.7	1.2	-0.1	-45	60
3	THA	KO-SICHANG	13.17	100.80	27.7	1.4	0.4	7	25
3	THA	LAMPANG	18.28	99.52	25.2	2.6	1.5	2	13
3	THA	LAMPHUN	18.57	99.03	25.2	3.1	1.3	0	13
3	THA	LOEI	17.45	101.73	24.9	2.6	1.0	-2	8
3	THA	LOP-BURI	14.80	100.62	27.2	1.6	0.9	-26	8
3	THA	MAE-HONG-SON	19.30	97.83	24.7	3.3	1.7	7	16
3	THA	MAE-SARIANG	18.17	97.93	24.4	2.8	1.6	9	17
3	THA	MAE-SOT	16.67	98.55	24.8	2.2	1.6	-5	15
3	THA	MUKDAHAN	16.53	104.72	25.6	2.6	1.2	-2	8
3	THA	NAKHON-PHANOM	17.42	104.78	25.3	2.9	1.4	-2	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	THA	NAKHON-RATCHASIMA	14.97	102.08	26.2	2.2	0.9	-10	3
3	THA	NAKHON-SAWAN	15.80	100.17	27.2	2.3	1.1	-23	6
3	THA	NAKHON-SI-THAMMARAT	8.53	99.95	26.1	1.0	0.3	7	17
3	THA	NAN	18.77	100.77	25.4	3.3	1.4	4	16
3	THA	NARATHIWAT	6.42	101.82	26.7	0.9	0.5	-30	24
3	THA	NONG-KHAI	17.87	102.72	25.7	3.0	1.2	5	11
3	THA	PATTANI	6.78	101.15	26.2	0.5	0.2	-6	32
3	THA	PHAYAO	19.13	99.90	24.4	3.4	1.3	3	11
3	THA	PHETCHABUN	16.43	101.15	26.3	2.3	0.8	-4	12
3	THA	PHITSANULOK	16.78	100.27	26.7	2.2	1.3	-5	11
3	THA	PHRAE	18.17	100.17	25.5	2.9	1.3	-1	10
3	THA	PHUKET-AP	8.13	98.32	27.9	1.6	0.4	13	-23
3	THA	PHUKET	7.88	98.40	27.2	0.6	0.4	-37	9
3	THA	PRACHIN-BURI	14.05	101.37	27.2	1.3	0.7	-8	4
3	THA	PRACHUAP-KHIRIKHAN	11.82	99.82	26.9	1.4	0.7	-14	19
3	THA	RANONG	9.98	98.62	26.4	0.9	0.5	-30	29
3	THA	ROI-ET	16.05	103.68	26.0	2.4	0.9	-1	12
3	THA	SAKON-NAKHON	17.15	104.13	25.6	3.0	1.1	2	8
3	THA	SATTAHIP	12.68	100.98	27.7	1.4	0.5	-15	12
3	THA	SONGKHLA	7.20	100.62	27.2	0.6	0.2	-21	40
3	THA	SUPHAN-BURI	14.47	100.13	27.5	1.8	1.1	-21	15
3	THA	SURAT-THANI	9.12	99.15	26.0	0.8	0.2	-7	40
3	THA	SURIN	14.88	103.50	26.2	1.9	1.0	-7	4
3	THA	TAK	16.88	99.15	26.4	2.6	1.3	-12	6
3	THA	THA-TUM	15.32	103.68	26.2	2.5	0.9	-9	10
3	THA	THONG-PHA-PHUM	14.75	98.63	25.6	1.9	1.0	-22	4
3	THA	TRANG	7.52	99.62	26.5	0.7	0.3	-49	52
3	THA	UBON-RATCHATHANI	15.25	104.87	26.5	2.0	1.0	-13	9
3	THA	UDON-THANI	17.38	102.80	25.9	2.9	1.3	-3	1
3	THA	UTTARADIT	17.62	100.10	26.3	2.4	1.4	-5	12
3	TJK	DUSHANBE	38.55	68.78	15.4	9.7	0.4	20	-19
3	TKM	ASHGABAT-KESHI	37.92	58.33	17.0	11.7	-0.1	20	11
3	TKM	BAJRAMALY	37.60	62.18	17.2	11.3	0.3	16	5
3	TKM	BAKHERDEN	38.43	57.42	16.4	11.6	0.0	20	10
3	TKM	BYRDALYK	38.47	64.37	16.6	10.8	-0.2	16	13
3	TKM	CARSANGA	37.52	66.02	18.3	10.9	-0.4	20	-14
3	TKM	CHARDZHEV	39.08	63.60	16.0	11.4	0.0	15	6
3	TKM	DASHKHOVUZ	41.75	59.82	14.0	13.2	-0.6	21	-26
3	TKM	EKEZHE	41.03	57.77	14.3	13.5	0.3	19	2
3	TKM	ERBENT	39.32	58.60	16.6	12.2	0.1	15	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	TKM	GAZANDZHYK	39.25	55.52	17.1	12.3	-0.2	20	10
3	TKM	GYSHGY	35.28	62.35	16.1	10.5	-1.0	22	-14
3	TKM	GYZYLARBAT	38.98	56.28	17.0	12.6	-0.2	20	4
3	TKM	KERKI	37.83	65.20	17.8	10.5	-0.3	18	5
3	TKM	SARAGT	36.53	61.22	17.8	10.5	-0.3	19	11
3	TKM	TEDZHEN	37.38	60.52	17.0	10.7	0.0	18	4
3	TKM	TURKMENBASHI	40.05	53.00	15.7	11.1	-0.4	27	48
3	TKM	UCHADZHY	38.08	62.80	17.9	12.1	-0.3	17	10
3	TWN	CHENG-KUNG	23.10	121.37	23.8	4.2	0.0	35	-14
3	TWN	CHIANG-KAI-SHEK	25.08	121.22	22.5	6.0	0.0	33	-5
3	TWN	CHIAYI	23.50	120.45	22.9	5.6	0.7	29	28
3	TWN	CHILUNG	25.15	121.80	22.8	5.9	0.0	34	-16
3	TWN	CHINMEM-SHATOU(AFB)	24.43	118.37	21.3	7.1	-0.1	40	-6
3	TWN	DAWU	22.35	120.90	24.7	3.7	0.3	27	-3
3	TWN	DONGSHA-DAO	20.67	116.72	25.9	3.6	0.5	28	24
3	TWN	HENGCHUN	22.00	120.75	25.0	3.2	0.5	28	17
3	TWN	HSINCHU-CITY	24.83	120.93	22.1	6.1	0.1	34	-7
3	TWN	HUA-LIEN-CITY	23.98	121.60	23.3	4.5	0.5	30	20
3	TWN	ILAN-CITY	24.75	121.78	22.2	5.4	0.2	28	3
3	TWN	JOYUTANG	23.88	120.85	19.9	4.2	0.7	25	27
3	TWN	KAOHSIUNG-INTL-AP	22.58	120.35	24.9	4.2	0.9	25	23
3	TWN	KAOHSIUNG	22.63	120.28	24.4	4.2	1.0	26	25
3	TWN	LAN-YU	22.03	121.55	23.2	3.4	0.4	32	3
3	TWN	MAZU	26.17	119.93	19.1	8.2	-0.4	41	-17
3	TWN	MOUNT-ALISAN	23.52	120.80	12.4	3.5	0.6	26	18
3	TWN	MOUNT-MORRISON	23.48	120.95	5.9	5.1	0.4	41	12
3	TWN	PENGHU-ISLANDS	23.50	119.50	23.2	5.6	0.5	35	16
3	TWN	PENGJIA-YU	25.63	122.07	22.3	6.0	0.4	34	2
3	TWN	SUAO-MET-STATION	24.60	121.85	22.6	5.5	0.1	32	0
3	TWN	SUNGSHAN-TAIPEI	25.07	121.55	22.8	5.8	0.1	34	-12
3	TWN	TAIBEI	25.03	121.52	23.2	6.0	0.6	35	30
3	TWN	TAIDONG	22.75	121.15	24.3	4.1	0.4	31	11
3	TWN	TAINAN	23.00	120.22	24.3	5.0	0.8	30	26
3	TWN	TAIZHONG	24.15	120.68	23.4	5.0	1.0	31	27
3	TWN	WU-CHI-OBSERVATORY	24.25	120.52	22.9	5.8	0.7	32	29
3	UZB	AK-BAJTAL	43.15	64.33	13.2	14.7	-0.5	22	-26
3	UZB	BUHARA	39.72	64.62	15.6	12.2	0.2	17	9
3	UZB	BUZAUBAJ	41.75	62.47	14.7	14.3	0.4	19	17
3	UZB	CHIMBAJ	42.95	59.82	12.2	13.6	-1.4	18	-20
3	UZB	DARGANATA	40.47	62.28	14.9	12.0	0.4	16	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
3	UZB	DZIZAK	40.12	67.83	15.1	10.9	0.2	18	7
3	UZB	FERGANA	40.37	71.75	14.5	11.3	0.6	19	2
3	UZB	KARSHI	38.80	65.72	16.7	11.6	-0.7	17	30
3	UZB	KUNGRAD	43.08	58.93	12.8	13.8	-0.6	17	-23
3	UZB	NAMANGAN	40.98	71.58	14.8	11.4	0.5	17	0
3	UZB	NUKUS	42.45	59.62	13.4	14.3	0.0	19	4
3	UZB	NURATA	40.55	65.68	14.4	10.9	-0.1	17	10
3	UZB	PSKEM	41.90	70.37	9.3	11.2	0.2	24	1
3	UZB	SAMARKAND	39.57	66.95	14.5	10.4	0.2	20	2
3	UZB	SYR-DARJA	40.82	68.68	14.4	11.7	0.7	15	19
3	UZB	TAMDY	41.73	64.62	15.0	13.2	0.3	17	8
3	UZB	TASHKENT	41.27	69.27	14.8	10.6	0.0	18	4
3	UZB	TERMEZ	37.23	67.27	17.5	10.8	0.4	16	-5
3	UZB	URGENCH	41.57	60.57	13.9	12.9	0.5	17	31
3	VNM	BACH-LONG-VI	20.13	107.72	24.2	5.0	-0.7	32	-47
3	VNM	CA-MAU	9.18	105.15	26.5	0.6	0.5	10	18
3	VNM	CAO-BANG	22.67	106.25	21.9	5.5	1.1	18	19
3	VNM	CON-SON	8.68	106.60	27.4	1.0	0.4	-8	18
3	VNM	DA-NANG	16.07	108.35	25.6	3.1	0.7	19	28
3	VNM	DONG-HOI	17.48	106.60	24.8	4.6	0.6	21	26
3	VNM	HA-NOI	21.03	105.80	23.9	5.7	1.0	26	29
3	VNM	HUE	16.43	107.58	24.8	3.9	0.6	14	30
3	VNM	LANG-SON	21.83	106.77	21.4	5.8	1.1	21	21
3	VNM	LAO-CAI	22.50	103.97	23.4	5.1	1.2	19	18
3	VNM	NAM-DINH	20.43	106.15	23.7	5.6	0.9	25	17
3	VNM	NHA-TRANG	12.22	109.22	26.5	2.0	0.1	17	17
3	VNM	PHAN-THIET	10.93	108.10	27.3	1.3	0.4	-5	18
3	VNM	PHU-LIEN	20.80	106.63	23.7	5.5	0.8	27	27
3	VNM	PHU-QUOC	10.22	103.97	27.4	1.0	0.6	-13	12
3	VNM	QUY-NHON	13.77	109.22	26.8	2.8	0.4	14	13
3	VNM	TAN-SON-HOA	10.82	106.67	27.4	1.2	0.6	-24	17
3	VNM	THANH-HOA	19.75	105.78	24.0	4.9	0.6	23	25
3	VNM	TRUONG-SA	8.65	111.92	27.5	0.8	-0.1	3	16
3	VNM	VINH	18.67	105.68	24.0	5.3	0.5	22	25
4	ARM	YEREVAN-YEREVAN-ARA	40.13	44.47	12.7	12.9	1.1	28	18
4	AUT	AIGEN-IM-ENNSTAL	47.53	14.13	8.3	9.3	0.4	24	5
4	AUT	BREGENZ	47.50	9.75	10.7	8.1	-0.4	21	36
4	AUT	EISENSTADT	47.85	16.53	11.2	9.0	0.0	23	11
4	AUT	FEUERKOGEL	47.82	13.72	5.2	6.7	-1.4	34	22
4	AUT	GRAZ-THALERHOF-FLUG	47.00	15.43	10.2	10.5	0.8	22	13

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	AUT	INNSBRUCK-FLUGHAFEN	47.27	11.35	9.7	8.8	0.5	19	-5
4	AUT	KLAGENFURT-FLUGHAFE	46.65	14.33	9.3	10.3	0.7	23	18
4	AUT	KUFSTEIN	47.58	12.17	9.3	8.8	-0.1	21	8
4	AUT	LIENZ	46.83	12.82	8.1	10.3	0.2	24	11
4	AUT	LINZ-HOERSCHING-FLU	48.23	14.18	10.3	9.0	0.2	22	7
4	AUT	MARIAZELL	47.77	15.32	7.4	8.8	0.2	28	15
4	AUT	PATSCHERKOFEL	47.22	11.47	0.7	4.8	0.0	50	5
4	AUT	PREITENEGG	46.93	14.92	7.0	8.7	-0.3	28	3
4	AUT	SALZBURG-FLUGHAFEN	47.80	13.00	10.4	8.4	0.1	22	15
4	AUT	SONNBLICK	47.05	12.95	-3.5	6.2	1.0	48	46
4	AUT	ST-POELTEN	48.18	15.62	10.1	9.0	-0.1	22	11
4	AUT	TULLN	48.32	16.12	11.1	8.7	-0.2	21	11
4	AUT	VILLACHERALPE	46.60	13.67	1.5	5.2	0.1	49	6
4	AUT	WIEN-HOHE-WARTE	48.25	16.37	11.7	8.7	-0.8	22	38
4	AUT	WIEN-SCHWECHAT-FLUG	48.12	16.57	11.6	9.0	-0.1	24	13
4	AUT	ZELTWEG	47.20	14.75	8.3	9.7	0.5	24	11
4	AZE	LANKARAN	38.73	48.83	15.2	9.5	0.2	31	-2
4	AZE	ZAKATALA	41.67	46.65	14.1	9.8	0.7	25	-31
4	BEL	ANTWERPEN-DEURNE	51.20	4.47	11.7	6.2	-0.6	23	26
4	BEL	BEAUVECHAIN	50.75	4.77	11.2	6.5	-0.2	25	10
4	BEL	BIERSET	50.65	5.45	11.1	6.5	0.1	22	9
4	BEL	BRASSCHAAT	51.33	4.50	11.1	6.5	-0.6	22	50
4	BEL	BRUXELLES-NATIONAL	50.90	4.53	11.4	6.2	-0.4	24	28
4	BEL	CHARLEROI-GOSSELIES	50.47	4.45	11.1	6.6	-0.6	22	47
4	BEL	CHIEVRES	50.57	3.83	11.0	6.3	0.5	26	-33
4	BEL	ELSENBORN	50.47	6.18	8.3	6.9	-0.5	25	23
4	BEL	FLORENNES	50.23	4.65	10.4	6.2	-0.1	26	12
4	BEL	GENK	50.93	5.50	11.9	6.7	-0.1	25	11
4	BEL	GENT-INDUSTRIE-ZONE	51.18	3.82	12.2	6.0	-0.2	25	5
4	BEL	GOETSENHOVEN	50.78	4.95	11.2	6.8	-0.2	30	7
4	BEL	KLEINE-BROGEL	51.17	5.47	11.1	6.4	-0.1	21	3
4	BEL	KOKSIJDE	51.08	2.65	11.2	5.5	0.5	32	-28
4	BEL	OOSTENDE(AP)	51.20	2.87	11.4	5.7	0.6	32	-27
4	BEL	SCHAFFEN	51.00	5.07	11.3	7.0	0.5	27	-3
4	BEL	SEMMERZAKE	50.93	3.67	11.4	6.5	0.0	28	13
4	BEL	SPA-LA-SAUVENIERE	50.48	5.92	9.5	6.9	-0.7	26	-6
4	BEL	ST-HUBERT	50.03	5.40	9.2	7.0	-0.1	26	5
4	BEL	ST-TRUIDEN(BAFB)	50.80	5.20	11.1	6.7	-0.2	28	32
4	BEL	UCCLE	50.80	4.35	11.3	6.5	0.2	26	0
4	BGR	BOTEV-VRAH(TOP-SOM)	42.67	24.83	0.8	4.8	0.5	52	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	BGR	BURGAS	42.48	27.48	13.3	9.3	0.0	28	4
4	BGR	KURDJALI	41.65	25.37	13.0	9.3	0.8	24	-31
4	BGR	LOM	43.82	23.25	12.9	10.4	0.0	21	13
4	BGR	MUSSALA(TOP-SOMMET)	42.18	23.58	-0.9	4.7	-0.7	44	-7
4	BGR	PLEVEN	43.42	24.60	12.5	10.2	0.7	22	-5
4	BGR	PLOVDIV	42.13	24.75	13.4	10.2	0.6	24	-24
4	BGR	ROUSSE	43.85	25.95	13.2	10.7	0.4	23	-6
4	BGR	SANDANSKI	41.52	23.27	14.6	9.8	0.9	24	-19
4	BGR	SLIVEN	42.67	26.32	12.8	9.4	0.4	27	-23
4	BGR	SOFIA(OBSERV)	42.65	23.38	11.2	9.9	0.3	24	4
4	BGR	VARNA	43.20	27.92	12.7	9.4	0.0	29	6
4	BIH	BANJA-LUKA	44.78	17.22	12.1	8.7	0.0	22	13
4	BIH	MOSTAR	43.33	17.78	14.8	9.1	0.5	26	-7
4	BIH	SARAJEVO-BUTMIR	43.82	18.33	10.6	8.8	0.4	22	-15
4	BLR	BARANOVICHI	53.12	26.00	7.6	10.1	-0.7	28	-1
4	BLR	BOBRUISK	53.22	29.18	7.3	10.6	-1.2	28	-9
4	BLR	BREST	52.12	23.68	8.6	10.2	-1.1	24	-29
4	BLR	GOMEL	52.40	30.95	7.8	11.0	-1.1	26	-5
4	BLR	GRODNO	53.60	24.05	7.5	10.0	-1.2	29	2
4	BLR	KOSTUCKOVICHI	53.35	32.07	6.9	10.8	-1.0	29	9
4	BLR	LEPEL	54.88	28.70	7.0	10.3	-1.2	27	2
4	BLR	LIDA	53.85	25.32	7.4	10.2	-0.8	29	2
4	BLR	LYNTUPY	55.05	26.32	6.4	9.5	-1.0	30	15
4	BLR	MINSK	53.93	27.63	6.9	10.3	-1.0	29	11
4	BLR	MOGILEV	53.95	30.07	6.6	10.6	-1.5	28	14
4	BLR	MOZYR	51.95	29.17	7.4	10.8	-0.6	27	10
4	BLR	ORSHA	54.50	30.42	6.4	10.2	-1.4	26	12
4	BLR	PINSK	52.12	26.12	8.5	10.2	-0.6	23	-23
4	BLR	SLUTSK	53.03	27.55	7.6	10.7	-0.8	26	1
4	BLR	VERHNEDVINSK	55.82	27.95	6.7	10.3	-1.2	28	8
4	BLR	VITEBSK	55.17	30.22	6.9	10.2	-1.4	26	4
4	BLR	ZHITCKOVICHI	52.22	27.87	8.2	10.4	-1.0	26	-20
4	CHE	AIGLE	46.33	6.92	11.0	8.0	0.1	22	5
4	CHE	ALTDORF	46.87	8.63	10.9	7.7	0.1	21	11
4	CHE	CHUR-EMS	46.87	9.53	10.1	8.9	1.1	22	20
4	CHE	FAHY	47.43	6.95	10.0	7.5	-0.1	25	8
4	CHE	GENEVE-COINTRIN	46.25	6.13	11.1	8.1	0.3	24	11
4	CHE	GUETSCH	46.65	8.62	1.1	4.5	0.9	54	-36
4	CHE	JUNGFRAUJOCH	46.55	7.98	-4.8	6.2	-0.2	38	7
4	CHE	LOCARNO-MAGADINO	46.17	8.88	12.6	8.8	0.5	18	-17

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	CHE	LOCARNO-MONTI	46.17	8.78	13.0	8.1	0.2	22	12
4	CHE	PAYERNE	46.82	6.95	10.6	7.6	-0.8	23	46
4	CHE	PIOTTA	46.52	8.68	8.2	8.9	0.1	28	9
4	CHE	ROBBIA	46.35	10.07	7.8	8.5	0.3	25	7
4	CHE	SAENTIS	47.25	9.35	0.8	3.2	0.5	55	-8
4	CHE	SAN-BERNARDINO	46.47	9.18	4.7	7.6	-1.5	36	28
4	CHE	SION	46.22	7.33	11.1	9.0	0.5	18	-21
4	CHE	ST-GALLEN	47.43	9.40	9.3	7.6	0.2	26	9
4	CHE	WYNAU	47.25	7.78	10.1	7.8	0.1	22	11
4	CHE	ZUERICH-METEOSCHWEI	47.38	8.57	10.3	8.1	-1.0	22	55
4	CHE	ZURICH-KLOTEN	47.48	8.53	10.4	8.1	-0.7	19	44
4	CPV	SAL	16.73	-22.95	23.6	2.5	1.0	67	3
4	CYP	AKROTIRI	34.58	32.98	19.9	6.6	0.2	37	-8
4	CYP	LARNACA-AP	34.88	33.63	19.7	7.2	0.4	37	-10
4	CYP	PAPHOS-AP	34.72	32.48	19.5	6.3	0.1	40	-5
4	CZE	BRNO-TURANY	49.15	16.70	10.2	8.9	0.2	21	5
4	CZE	CERVENA	49.77	17.55	7.1	9.6	-0.7	26	8
4	CZE	CESKE-BUDEJOVICE	48.95	14.43	9.5	8.2	0.1	22	9
4	CZE	CHEB	50.08	12.40	8.5	8.3	-0.5	24	10
4	CZE	CHURANOV	49.07	13.62	6.1	7.4	-0.9	26	19
4	CZE	DOKSANY	50.47	14.17	10.5	8.7	0.0	21	10
4	CZE	DUKOVANY	49.10	16.13	10.0	8.6	-0.5	22	40
4	CZE	HOLESOV	49.32	17.57	10.3	8.7	-0.4	25	8
4	CZE	KARLOVY-VARY	50.20	12.92	8.2	8.2	-0.6	20	22
4	CZE	KOCELOVICE	49.47	13.83	9.0	8.5	-0.5	21	18
4	CZE	KOSTELNI-MYSLOVA	49.18	15.47	8.5	8.7	-0.3	25	5
4	CZE	KRESIN-KRAMOLIN	49.58	15.08	9.1	8.3	-0.6	24	39
4	CZE	KUCHAROVICE	48.88	16.08	10.3	8.8	0.0	22	9
4	CZE	LIBEREC	50.77	15.02	9.0	8.1	-0.1	23	12
4	CZE	LUKA	49.65	16.95	8.6	9.6	0.4	24	10
4	CZE	LYSA-HORA	49.55	18.45	4.9	7.3	-1.4	32	16
4	CZE	MILESOVKA	50.55	13.93	7.5	7.9	-0.5	24	29
4	CZE	OSTRAVA-MOSNOV	49.68	18.12	10.1	8.0	-0.2	24	14
4	CZE	PEC-POD-SNEZKOU	50.67	15.75	5.9	8.5	-1.1	29	13
4	CZE	PLZEN-LINE	49.17	13.27	9.5	7.9	-0.5	24	7
4	CZE	PRADED-MOUNTAIN	50.07	17.23	2.3	6.1	-1.2	44	43
4	CZE	PRAHA-LIBUS	50.02	14.45	10.0	8.5	-0.1	22	12
4	CZE	PRAHA-RUZYNE	50.10	14.25	9.7	8.2	-0.5	22	27
4	CZE	PRIBYSLAV	49.58	15.77	8.7	8.5	0.2	26	6
4	CZE	PRIMDA	49.67	12.67	7.9	8.4	0.0	21	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	CZE	SVRATOUCH	49.73	16.03	7.3	9.6	-0.6	27	1
4	CZE	TEMELIN	49.20	14.33	9.5	8.9	-0.7	22	26
4	CZE	TUSIMICE	50.38	13.33	10.0	8.6	-0.5	21	12
4	CZE	USTI-NAD-LABEM	50.68	14.03	9.7	8.7	-0.2	20	12
4	CZE	USTI-NAD-ORLICI	49.98	16.43	8.6	9.1	-0.1	25	4
4	DEU	ALTENSTADT	47.83	10.87	9.6	8.3	-0.3	24	10
4	DEU	ANGERMUENDE	53.02	14.00	9.7	7.9	-0.6	25	35
4	DEU	ARKONA(CAPE)	54.68	13.43	9.5	6.9	-0.6	33	20
4	DEU	ARTERN	51.38	11.30	9.8	8.0	-0.3	28	0
4	DEU	BERGEN	52.82	9.93	10.1	7.1	-0.9	25	35
4	DEU	BERLIN-SCHONEFELD	52.38	13.52	9.6	8.4	-0.2	25	-1
4	DEU	BOIZENBURG(AUT)	53.38	10.72	9.5	7.9	-0.2	27	9
4	DEU	BOLTENHAGEN	54.00	11.20	9.7	7.1	-0.6	31	49
4	DEU	BREMEN	53.05	8.80	10.1	6.6	-0.1	25	16
4	DEU	BROCKEN(PEAK)	51.80	10.62	4.4	6.3	-1.0	34	29
4	DEU	BRUGGEN(RAF)	51.20	6.13	11.2	6.1	-0.5	25	37
4	DEU	BUECHEL	50.17	7.07	9.3	7.2	-0.9	24	41
4	DEU	BUECKEBURG	52.28	9.08	11.4	7.3	-0.2	24	13
4	DEU	CELLE	52.60	10.02	10.8	7.3	-0.9	22	43
4	DEU	COTTBUS	51.78	14.33	11.6	8.5	-0.8	26	13
4	DEU	DIEPHOLZ	52.58	8.35	10.7	7.1	-0.6	25	46
4	DEU	DOBERLUG-KIRCHHAIN	51.65	13.58	10.2	7.8	-0.4	27	16
4	DEU	DRESDEN-KLOTZSCHE	51.13	13.77	9.7	8.5	0.0	24	6
4	DEU	ERFURT-BINDERSLEBN	50.98	10.97	9.2	8.1	0.1	27	11
4	DEU	FASSBERG	52.92	10.18	10.2	7.4	-0.5	24	24
4	DEU	FICHTELBERG-MTN	50.43	12.95	4.2	6.8	-1.3	36	31
4	DEU	FRANKFURT-MAIN-AP	50.05	8.60	11.0	7.5	0.0	20	10
4	DEU	GARDELEGEN(AUT)	52.52	11.40	9.8	7.2	-0.5	26	9
4	DEU	GERA-LEUMNITZ	50.88	12.13	9.2	7.7	0.3	27	9
4	DEU	GLUECKSBURG-MEIERWI	54.83	9.50	10.1	6.7	-0.6	31	37
4	DEU	GOERLITZ	51.17	14.95	9.3	7.9	-0.1	26	10
4	DEU	GREIFSWALD	54.10	13.40	9.6	7.3	-0.5	28	26
4	DEU	GUETERSLOH	51.93	8.32	10.8	6.8	-0.6	21	39
4	DEU	HOHN	54.32	9.53	10.2	7.1	-0.2	28	9
4	DEU	HOLZDORF	51.77	13.17	10.4	8.0	-0.6	23	26
4	DEU	HOPSTEN	52.33	7.53	10.9	6.8	0.2	22	6
4	DEU	IDAR-OBERSTEIN	49.70	7.33	9.8	7.8	0.0	21	11
4	DEU	INGOLSTADT	48.72	11.53	10.3	9.2	0.1	21	11
4	DEU	ITZEHOE	53.98	9.57	10.1	7.0	-0.6	30	34
4	DEU	JEVER	53.53	7.90	10.6	6.6	-0.8	29	37

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	DEU	KALKAR	51.73	6.27	11.4	6.8	-0.9	22	52
4	DEU	KARL-MARX-STADT	50.82	12.90	9.7	7.9	-0.4	29	6
4	DEU	KOLN-BONN(CIV-MIL)	50.87	7.17	10.7	6.7	-0.5	22	34
4	DEU	KUEMMERSBRUCK	49.43	11.90	9.6	8.4	0.0	21	9
4	DEU	LAAGE	53.92	12.28	10.3	7.5	-0.6	25	44
4	DEU	LAARBRUCH(RAF)	51.60	6.15	10.7	6.9	-0.6	30	20
4	DEU	LAHR	48.37	7.83	11.4	8.0	0.1	17	5
4	DEU	LANDSBERG	48.07	10.90	9.7	8.0	0.0	24	10
4	DEU	LAUPHEIM	48.22	9.92	9.8	7.9	0.1	22	12
4	DEU	LECHFELD	48.18	10.85	9.7	8.0	-0.2	24	13
4	DEU	LEINEFELDE(AUT)	51.38	10.32	8.7	7.7	0.2	29	0
4	DEU	LEIPZIG-SCHKEUDITZ	51.42	12.23	9.7	8.6	0.0	27	6
4	DEU	LINDENBERG	52.22	14.12	9.7	8.2	-0.4	24	8
4	DEU	LUEDENSCHEID	51.25	7.65	9.6	7.1	0.1	23	11
4	DEU	MAGDEBURG	52.12	11.58	9.9	7.5	-0.5	26	4
4	DEU	MARNITZ(AUT)	53.32	11.93	9.2	7.8	-0.2	29	8
4	DEU	MEININGEN	50.55	10.37	8.0	8.3	0.3	30	13
4	DEU	MENDIG	50.37	7.32	10.7	7.9	-0.9	20	41
4	DEU	MEPPEN	52.73	7.33	11.7	6.8	-0.4	23	35
4	DEU	MESSSTETTEN	48.18	9.00	8.0	7.7	-0.7	24	20
4	DEU	MUNICH-RIEM	48.13	11.70	9.8	8.0	-0.1	21	11
4	DEU	NEUBRANDENBURG	53.60	13.32	9.2	7.8	-0.1	26	17
4	DEU	NEUBURG-DONAU	48.72	11.22	9.9	8.6	-0.1	21	12
4	DEU	NEURUPPIN	52.90	12.82	9.7	8.0	-0.3	28	6
4	DEU	NIEDERSTETTEN	49.38	9.97	10.0	7.8	0.0	24	12
4	DEU	NOERVENICH	50.83	6.67	11.6	7.4	-0.1	20	10
4	DEU	NORDHOLZ	53.77	8.67	10.5	6.8	-0.9	30	44
4	DEU	NUERBURG-BARWEILER	50.37	6.87	9.5	7.3	0.5	23	-18
4	DEU	OLDENBURG	53.18	8.17	10.7	7.0	0.0	26	11
4	DEU	OSCHATZ	51.30	13.10	10.5	7.5	0.1	23	10
4	DEU	PLAUEN(AUT)	50.50	12.15	8.9	8.2	0.3	28	21
4	DEU	POTSDAM	52.38	13.07	10.0	8.3	-0.2	28	5
4	DEU	RHEINE-BENTLAGE	52.30	7.38	10.8	6.8	-0.1	23	15
4	DEU	ROTH	49.22	11.10	9.9	7.8	-0.2	22	12
4	DEU	SCHLESWIG-JAGEL	54.47	9.52	10.1	7.1	-0.1	28	3
4	DEU	SCHMUECKE(RIDGE)	50.65	10.77	5.9	7.8	-0.5	36	9
4	DEU	SCHWERIN	53.63	11.42	9.7	7.7	0.3	23	12
4	DEU	SEEHAUSEN-ALTMARK	52.90	11.73	9.5	8.1	-0.4	28	10
4	DEU	SONNEBERG-NEUFANG	50.38	11.18	7.2	8.6	-0.5	28	27
4	DEU	STRAUBING	48.83	12.57	9.4	8.9	0.0	20	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	DEU	TETEROW	53.77	12.62	9.3	7.6	-0.2	26	16
4	DEU	TROLLENHAGEN	53.60	13.32	10.2	8.1	0.1	25	5
4	DEU	UECKERMUENDE(AUT)	53.75	14.07	10.2	7.3	-0.1	27	18
4	DEU	WARNEMUENDE	54.18	12.08	9.7	7.1	-0.6	31	27
4	DEU	WERNIGERODE(AUT)	51.85	10.77	9.8	7.5	-0.6	31	42
4	DEU	WIESENBURG	52.12	12.47	9.7	7.8	-0.5	21	11
4	DEU	WITTENBERG	51.88	12.65	9.8	8.3	-0.5	23	8
4	DEU	WITTMUNDHAVEN	53.55	7.67	10.8	6.6	-0.9	28	45
4	DEU	WUNSTORF	52.47	9.43	11.2	7.2	-0.6	26	33
4	DEU	ZINNWALD-GEORGENFE	50.73	13.75	6.0	7.5	-0.8	32	12
4	DNK	AALBORG	57.10	9.85	9.3	6.8	-0.6	31	14
4	DNK	BILLUND	55.73	9.17	9.2	6.9	-0.6	29	21
4	DNK	CHRISTIANSO(LGT-H)	55.32	15.18	9.6	7.3	-0.9	42	34
4	DNK	ESBJERG	55.53	8.57	10.1	6.4	-0.2	31	0
4	DNK	FORNAES(CAPE)	56.45	10.97	9.6	6.9	-0.4	37	21
4	DNK	HAMMER-ODDE	55.30	14.78	9.7	7.3	-1.0	37	33
4	DNK	HOLBAEK	55.73	11.60	9.8	7.5	-0.2	30	10
4	DNK	HVIDE-SANDE	56.00	8.13	10.8	7.1	-0.7	37	43
4	DNK	KARUP	56.30	9.12	9.5	6.9	-0.6	29	10
4	DNK	KEGNAES	54.85	9.98	10.2	7.0	-0.2	34	6
4	DNK	KOEBENHAVN-KASTRUP	55.62	12.65	9.8	7.1	-0.4	31	4
4	DNK	ODENSE-BELDRINGE	55.48	10.33	10.0	7.0	-0.7	28	25
4	DNK	ROENNE	55.07	14.75	10.3	7.3	-1.0	34	31
4	DNK	ROSKILDE-TUNE	55.58	12.13	9.4	7.3	-0.7	31	27
4	DNK	SKAGEN	57.73	10.63	9.9	6.5	-1.2	35	34
4	DNK	SKRYDSTRUP	55.23	9.27	9.4	6.7	-0.6	30	5
4	DNK	THYBOROEN	56.70	8.22	10.5	6.2	-0.8	41	31
4	DNK	TIRSTRUP	56.32	10.63	9.2	7.3	-0.2	30	11
4	DNK	VAERLOESE	55.77	12.33	9.3	7.2	-1.0	26	42
4	ESP	ALBACETE-LOS-LLANOS	38.95	-1.85	14.6	8.8	1.1	28	-32
4	ESP	ALICANTE-EL-ALTET	38.28	-0.55	18.4	6.4	0.6	36	-32
4	ESP	ALMERIA-AP	36.85	-2.38	18.9	6.1	0.9	36	-31
4	ESP	ASTURIAS-AVILES	43.55	-6.03	14.3	4.3	0.0	38	10
4	ESP	BADAJOZ-TALAVERA-LA	38.88	-6.83	16.8	7.7	1.2	25	-30
4	ESP	BARCELONA-AP	41.28	2.07	16.6	6.6	1.1	34	-31
4	ESP	BILBAO-SONDICA	43.30	-2.90	15.1	5.5	0.9	31	-13
4	ESP	CACERES	39.47	-6.33	16.4	7.4	1.3	27	-40
4	ESP	CIUDAD-REAL	38.98	-3.92	15.4	9.0	1.4	25	-41
4	ESP	CORDOBA-AP	37.85	-4.85	17.7	8.1	1.2	29	-36
4	ESP	GERONA-COSTA-BRAVA	41.90	2.77	14.9	7.3	0.8	30	-33

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	ESP	GRANADA-AP	37.18	-3.78	15.2	8.1	1.2	28	-35
4	ESP	IBIZA-ES-CODOLA	38.88	1.38	18.4	6.5	0.6	39	-32
4	ESP	JEREZ-DE-LA-FRONTER	36.75	-6.07	17.7	6.4	-0.9	34	50
4	ESP	LA-CORUNA	43.37	-8.42	15.0	4.0	0.6	39	-27
4	ESP	LEON-VIRGEN-DEL-CAM	42.58	-5.65	11.3	7.6	0.9	26	-36
4	ESP	LOGRONO-AGONCILLO	42.45	-2.33	14.2	7.2	0.9	28	-34
4	ESP	MADRID-BARAJAS-RS	40.45	-3.55	14.5	8.4	1.2	28	-40
4	ESP	MADRID-GETAFE	40.30	-3.72	14.8	8.2	-1.2	26	48
4	ESP	MALAGA-AP	36.67	-4.48	18.3	5.9	0.9	34	-40
4	ESP	MENORCA-MAHON	39.87	4.23	17.5	6.2	-0.5	40	33
4	ESP	MORON-DE-LA-FRONTER	37.15	-5.62	18.4	7.1	0.8	29	-31
4	ESP	MURCIA-ALCANTARILLA	37.95	-1.23	17.3	7.4	1.0	25	-36
4	ESP	MURCIA-SAN-JAVIER	37.78	-0.80	18.4	6.5	0.9	35	-34
4	ESP	MURCIA	38.00	-1.17	18.6	7.2	0.7	31	-30
4	ESP	NAVACERRADA	40.78	-4.02	7.5	7.2	-1.8	36	31
4	ESP	OVIEDO	43.35	-5.87	13.2	4.9	0.0	37	10
4	ESP	PALMA-DE-MALLORCA-S	39.55	2.73	17.0	7.2	0.0	35	0
4	ESP	PAMPLONA-NOAIN	42.77	-1.63	12.9	7.0	1.2	30	-30
4	ESP	REUS-AP	41.15	1.17	16.3	7.1	1.0	34	-42
4	ESP	ROTA-NAS	36.65	-6.35	18.0	5.8	0.7	29	-28
4	ESP	SALAMANCA-MATACAN	40.95	-5.50	12.7	7.4	-1.0	27	47
4	ESP	SAN-SEBASTIAN-FUENT	43.35	-1.80	15.0	5.9	0.9	34	-16
4	ESP	SAN-SEBASTIAN-IGUEL	43.30	-2.03	14.0	4.9	0.5	37	-7
4	ESP	SANTANDER-PARAYAS	43.43	-3.82	14.3	4.7	0.5	34	-40
4	ESP	SANTANDER	43.48	-3.80	15.2	4.1	-0.9	39	32
4	ESP	SANTIAGO-LABACOLLA	42.90	-8.43	13.2	5.0	0.7	35	-37
4	ESP	SEVILLA-SAN-PABLO	37.42	-5.90	18.6	7.2	0.7	28	-38
4	ESP	SORIA	41.77	-2.47	10.7	7.5	1.3	29	-41
4	ESP	TORTOSA	40.82	0.50	17.1	6.9	0.9	30	-38
4	ESP	VALENCIA-AP	39.50	-0.47	17.7	6.7	0.8	32	-38
4	ESP	VALLADOLID-VILLANUB	41.72	-4.85	11.8	7.6	0.9	27	-26
4	ESP	VALLADOLID	41.65	-4.77	12.9	7.7	-1.2	28	51
4	ESP	VIGO-PEINADOR	42.23	-8.63	14.0	4.6	0.0	30	8
4	ESP	VITORIA	42.88	-2.72	12.0	6.0	0.0	31	7
4	ESP	ZARAGOZA-AP	41.67	-1.00	15.3	8.2	0.7	26	-34
4	EST	PJARNU	58.37	24.50	7.2	9.9	-0.7	30	17
4	EST	RISTNA	58.92	22.07	7.3	8.8	-0.8	38	6
4	EST	TALLINN	59.47	24.82	6.4	9.5	-0.9	32	10
4	EST	TARTU	58.30	26.73	6.5	9.9	-1.4	30	13
4	EST	VALKE-MAARJA	59.13	26.23	5.8	9.6	-1.6	32	20

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	FIN	AHTARI	62.53	24.02	4.0	8.8	-1.9	35	28
4	FIN	BAGASKAR	59.93	24.02	6.2	9.4	-1.7	42	21
4	FIN	HALLI	61.85	24.80	4.8	9.3	-2.0	38	22
4	FIN	HELSINKI-VANTAA	60.32	24.97	6.4	9.6	-1.3	34	15
4	FIN	ILOMANTSI	62.68	30.95	3.4	9.1	-1.8	35	31
4	FIN	ISOSAARI	60.10	25.07	6.6	9.8	-1.4	41	19
4	FIN	IVALO	68.62	27.42	1.0	7.6	-0.8	34	16
4	FIN	JOENSUU	62.67	29.63	4.2	9.3	-2.2	38	29
4	FIN	JOKIOINEN	60.82	23.50	5.1	9.3	-2.0	35	27
4	FIN	JYVASKYLA	62.40	25.68	4.4	9.0	-2.1	36	22
4	FIN	KAJAANI	64.28	27.68	3.3	8.8	-1.4	37	33
4	FIN	KAUHAVA	63.10	23.03	4.8	9.1	-2.0	35	21
4	FIN	KEMI	65.78	24.58	3.1	8.8	-1.7	40	33
4	FIN	KEVO	69.75	27.03	0.1	6.8	-0.8	36	12
4	FIN	KUOPIO	63.02	27.80	4.9	9.6	-2.4	33	20
4	FIN	KUUSAMO	65.97	29.18	1.3	7.5	-1.1	37	26
4	FIN	LAHTI	60.97	25.63	5.2	9.1	-2.2	33	21
4	FIN	LAPPEENRANTA	61.05	28.20	5.3	9.4	-2.3	31	18
4	FIN	MARIEHAMN-ALAND-ISL	60.12	19.90	7.0	8.4	-1.2	34	2
4	FIN	MIKKELI	61.73	27.30	5.0	9.6	-2.0	34	19
4	FIN	MUONIO	67.97	23.68	0.6	7.2	-0.9	36	17
4	FIN	NIINISALO	61.85	22.47	4.8	9.3	-1.7	37	21
4	FIN	NIVALA	63.92	24.97	3.7	9.1	-1.6	37	23
4	FIN	OULU	64.93	25.37	3.9	9.1	-2.1	37	30
4	FIN	PELLO	66.80	24.00	1.8	8.2	-1.5	33	30
4	FIN	PORI	61.47	21.80	5.7	9.3	-2.1	33	21
4	FIN	PUDASJARVI	65.37	27.02	2.8	8.9	-1.5	38	41
4	FIN	RANKKI	60.37	26.97	5.9	9.9	-1.8	44	26
4	FIN	ROVANIEMI	66.57	25.83	2.5	8.4	-1.5	37	38
4	FIN	RUSSARO	59.77	22.95	7.1	8.9	-0.9	37	22
4	FIN	SALLA	66.82	28.67	0.7	7.1	-0.5	34	23
4	FIN	SODANKYLA	67.37	26.65	1.0	8.0	-0.6	35	18
4	FIN	SUOMUSSALMI	64.90	29.02	2.0	8.2	-1.3	36	43
4	FIN	TAMPERE-PIRKKALA	61.42	23.58	5.1	9.2	-1.9	38	22
4	FIN	TURKU	60.52	22.27	6.1	9.5	-1.8	36	20
4	FIN	UTO	59.78	21.38	7.9	7.8	-1.5	44	16
4	FIN	UTTI	60.90	26.93	5.3	9.7	-2.1	35	20
4	FIN	VAASA-AP	63.05	21.77	5.3	9.2	-1.8	38	19
4	FIN	VALASSAARET	63.43	21.07	4.6	8.6	2.0	46	-58
4	FIN	VIITASAARI	63.08	25.87	4.8	9.1	-2.2	36	24

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	FRA	ABBEVILLE	50.13	1.83	11.3	5.9	-0.2	31	1
4	FRA	AGEN	44.18	0.60	14.0	6.7	-0.5	26	17
4	FRA	AJACCIO	41.92	8.80	16.1	6.5	0.1	36	-4
4	FRA	ALENCON	48.43	0.10	11.7	6.2	0.1	28	-2
4	FRA	BALE-MULHOUSE	47.60	7.52	11.2	7.9	0.1	24	8
4	FRA	BASTIA	42.55	9.48	16.6	6.7	-0.7	35	39
4	FRA	BEAUVAIS	49.47	2.12	11.6	6.4	0.0	27	6
4	FRA	BELLE-IIE-LE-TALUT	47.30	-3.17	13.6	4.5	-0.4	40	28
4	FRA	BIARRITZ	43.47	-1.53	14.4	5.9	0.6	35	-24
4	FRA	BORDEAUX-MERIGNAC	44.83	-0.68	14.0	6.3	-0.7	28	53
4	FRA	BOULOGNE	50.73	1.60	11.6	5.6	0.0	32	5
4	FRA	BOURG-ST-MAURICE	45.62	6.77	9.3	9.1	0.5	23	10
4	FRA	BOURGES	47.07	2.37	12.7	7.1	-0.5	25	25
4	FRA	BREST	48.45	-4.42	12.1	4.6	0.4	38	-29
4	FRA	CAEN-CARPIQUET	49.18	-0.45	12.0	5.7	0.0	31	9
4	FRA	CALVI	42.53	8.80	16.4	6.7	-0.6	35	40
4	FRA	CAMBRAI	50.22	3.15	11.3	6.9	0.0	27	9
4	FRA	CAP-BEAR	42.52	3.13	16.3	6.1	-0.9	33	34
4	FRA	CAP-CEPET	43.08	5.93	15.9	6.7	0.1	33	-8
4	FRA	CAP-CORSE	43.00	9.37	17.5	6.5	-0.7	38	39
4	FRA	CAP-DE-LA-HEVE	49.50	0.07	12.0	5.6	0.1	33	7
4	FRA	CAP-PERTUSATO	41.37	9.17	16.8	6.1	-0.6	41	32
4	FRA	CAZAUX	44.53	-1.13	13.9	6.3	0.0	28	4
4	FRA	CHAMBERY-AIX-LES-BA	45.63	5.87	11.8	8.3	0.7	20	-27
4	FRA	CHASSIRON	46.05	-1.42	14.2	5.5	0.2	36	-14
4	FRA	CLERMONT-FERRAND	45.78	3.17	12.2	6.9	-0.7	28	39
4	FRA	COGNAC	45.67	-0.32	13.7	7.0	0.5	29	-9
4	FRA	DIEPPE	49.93	1.10	11.9	5.4	0.5	38	-52
4	FRA	DIJON	47.27	5.08	11.9	7.6	-0.7	27	43
4	FRA	DINARD	48.58	-2.07	12.6	5.6	-0.3	31	16
4	FRA	DUNKERQUE	51.05	2.33	11.9	5.8	0.0	34	12
4	FRA	GRENOBLE-ST-GEOIRS	45.37	5.33	12.0	8.1	0.5	26	-21
4	FRA	GROUIN-DE-CANCALE	48.72	-1.85	12.3	5.3	0.2	40	1
4	FRA	HYERES	43.10	6.15	16.2	6.8	-0.5	32	30
4	FRA	ISTRES	43.52	4.92	15.3	7.8	0.1	28	6
4	FRA	L-IIE-D-YEU	46.70	-2.33	13.7	5.2	-0.2	39	18
4	FRA	LE-BOURGET	48.97	2.43	12.3	6.7	-0.5	28	14
4	FRA	LE-MANS	47.93	0.20	13.0	6.5	-0.1	27	2
4	FRA	LE-PUY	45.08	3.77	9.4	7.1	-0.9	25	45
4	FRA	LILLE-LESQUI	50.57	3.10	11.5	6.4	-0.5	25	33

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	FRA	LIMOGES	45.87	1.18	11.9	6.6	0.8	28	-48
4	FRA	LORIENT-LAN-BIHOUE	47.77	-3.45	12.5	5.3	0.0	34	1
4	FRA	LUXEUIL	47.80	6.38	10.8	7.6	0.0	21	11
4	FRA	LYON-BRON	45.72	4.93	13.0	8.0	0.1	28	4
4	FRA	LYON-SATOLAS	45.73	5.08	13.0	7.6	0.0	21	13
4	FRA	MACON	46.30	4.80	12.1	8.0	-0.1	24	2
4	FRA	MARIGNANE	43.45	5.23	15.8	7.5	-0.1	26	4
4	FRA	MAUPERTUS	49.65	-1.48	11.6	4.8	-0.4	40	-11
4	FRA	METZ-FRESCATY	49.08	6.13	11.1	7.2	0.0	23	14
4	FRA	MEYENHEIM-COLMAR	47.92	7.40	11.5	8.0	0.0	19	8
4	FRA	MONT-DE-MARSAN	43.92	-0.50	13.6	6.9	0.6	26	-28
4	FRA	MONTELIMAR	44.58	4.73	14.3	8.0	0.9	27	-34
4	FRA	MONTPELLIER	43.58	3.97	15.5	7.4	0.1	29	1
4	FRA	NANCY-ESSEY	48.68	6.22	11.3	6.9	-0.6	23	14
4	FRA	NANTES	47.15	-1.60	13.1	6.0	-0.8	32	36
4	FRA	NICE	43.65	7.20	16.3	6.9	-0.8	32	45
4	FRA	NIMES-COURBESSAC	43.87	4.40	15.1	7.6	-0.7	25	43
4	FRA	NIMES-GARONS(NAVY)	43.75	4.42	15.2	7.5	0.7	26	-31
4	FRA	ORANGE	44.13	4.83	14.8	7.8	0.0	26	5
4	FRA	ORLEANS	47.98	1.78	12.0	6.8	-0.2	27	7
4	FRA	OUESSANT	48.48	-5.05	13.2	3.6	-0.6	46	29
4	FRA	PARIS-ORLY	48.72	2.38	12.3	6.8	-0.4	27	11
4	FRA	PAU	43.38	-0.42	13.5	6.6	0.7	28	-28
4	FRA	PERPIGNAN	42.73	2.87	16.1	6.9	-1.0	31	44
4	FRA	POITIERS	46.58	0.30	12.7	6.5	0.1	28	8
4	FRA	PTE-DE-LA-HAGUE	49.72	-1.93	12.5	4.4	-0.3	42	-24
4	FRA	PTE-DE-PENMARCH	47.80	-4.37	13.6	4.1	-0.4	44	-2
4	FRA	REIMS	49.30	4.03	11.5	6.5	0.0	24	5
4	FRA	RENNES	48.07	-1.73	12.8	6.0	-0.7	31	32
4	FRA	ROUEN	49.38	1.18	11.1	6.1	-0.1	29	8
4	FRA	SAINT-DIZIER	48.63	4.90	12.3	6.9	-0.7	26	52
4	FRA	SAINT-GIRONS	43.00	1.10	12.5	6.9	-0.7	25	56
4	FRA	ST-ETIENNE-BOUTHEON	45.53	4.30	12.4	7.0	0.1	25	5
4	FRA	STRASBOURG-ENTZHEIM	48.55	7.63	11.4	7.8	-0.4	19	19
4	FRA	TARBES-OSSUN	43.18	0.00	13.0	6.5	0.6	30	-32
4	FRA	TOULOUSE-BLAGNAC	43.63	1.37	14.2	7.3	0.9	31	-33
4	FRA	TOURS	47.45	0.73	12.1	6.6	-0.4	27	18
4	FRA	VILLACOUBLAY	48.77	2.20	11.9	6.7	-0.6	26	27
4	FRO	TORSHAVN	62.02	-6.77	8.1	3.4	-0.6	48	24
4	GBR	ABERDEEN-DYCE-AP	57.20	-2.22	9.4	4.6	0.0	30	6

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	GBR	ABERPORTH	52.13	-4.57	10.8	4.2	-0.5	40	31
4	GBR	ASPATRIA	54.77	-3.32	9.9	5.1	-0.6	28	41
4	GBR	AUGHTON	53.55	-2.92	10.8	5.4	-0.7	36	39
4	GBR	AVIEMORE	57.20	-3.83	7.8	5.1	0.1	26	5
4	GBR	BANGOR-HARBOUR	54.67	-5.67	11.7	4.1	-0.1	38	-5
4	GBR	BELFAST-ALDERGROVE	54.65	-6.22	10.4	4.4	-0.5	30	23
4	GBR	BENBECULA-ISLAND	57.47	-7.37	10.4	3.9	-0.1	33	6
4	GBR	BENSON	51.62	-1.08	11.1	5.3	-0.6	31	20
4	GBR	BIRMINGHAM-AP	52.45	-1.73	10.9	5.4	-0.6	29	24
4	GBR	BLACKPOOL-AP	53.77	-3.03	11.1	5.1	-0.3	32	15
4	GBR	BOSCOMBE-DOWN	51.17	-1.75	10.8	5.1	-0.6	34	19
4	GBR	BOULMER	55.42	-1.60	9.6	4.6	-0.2	36	-2
4	GBR	BOURNEMOUTH-HURN	50.78	-1.83	11.3	4.8	-0.6	36	23
4	GBR	BRACKNELL-BEAUFORT	51.38	-0.78	10.7	5.5	-0.5	27	16
4	GBR	BRIDLINGTON-MRSC	54.10	-0.17	10.6	4.9	-0.7	36	47
4	GBR	BRISTOL-WEA-CENTER	51.47	-2.60	12.0	5.0	-0.5	30	21
4	GBR	BRIZE-NORTON	51.75	-1.58	11.0	5.3	-0.1	29	8
4	GBR	BUTT-OF-LEWIS(LH)	58.52	-6.27	9.9	3.9	0.0	41	-12
4	GBR	CAMBORNE	50.22	-5.32	11.8	3.8	-0.7	42	33
4	GBR	CAPE-WRATH(LGT-H)	58.63	-5.00	9.1	3.4	-0.4	40	8
4	GBR	CARDIFF-WALES-AP	51.40	-3.35	11.4	4.7	-0.6	34	21
4	GBR	CARDIFF-WEATHER-CEN	51.48	-3.18	12.1	5.1	-0.2	31	2
4	GBR	CARMONEY	55.02	-7.23	10.1	4.3	-0.4	34	39
4	GBR	CARTERHOUSE	55.37	-2.52	9.1	5.2	-0.6	31	44
4	GBR	CHURCH-FENTON	53.83	-1.20	10.9	5.2	-0.7	33	39
4	GBR	CILFYNYDD	51.63	-3.30	10.4	5.2	-0.4	30	15
4	GBR	COLTISHALL	52.77	1.35	10.9	5.2	0.2	33	4
4	GBR	CONINGSBY	53.08	-0.17	10.8	5.4	-0.5	29	47
4	GBR	CORGARY	54.43	-8.05	9.7	4.6	-0.5	33	36
4	GBR	COTTESMORE	52.73	-0.65	10.5	5.6	-0.5	33	55
4	GBR	CRANWELL	53.03	-0.50	10.7	5.6	-0.6	30	46
4	GBR	CULDROSE	50.08	-5.25	11.8	4.1	-0.5	44	33
4	GBR	DISFORTH-AIRFIELD	54.13	-1.42	10.5	5.3	0.0	30	-2
4	GBR	DUMFRIES-DRUNGANS	55.05	-3.65	10.1	4.8	-0.1	30	17
4	GBR	EDINBURGH-AP	55.95	-3.35	10.0	4.9	-0.3	32	19
4	GBR	EMLEY-MOOR	53.62	-1.67	9.7	4.9	-0.6	30	14
4	GBR	ESKDALEMUIR	55.32	-3.20	8.4	4.8	-0.1	33	19
4	GBR	EXETER-AP	50.73	-3.42	11.4	5.0	-0.4	33	29
4	GBR	FAIR-ISLE	59.53	-1.63	9.1	3.2	0.5	49	-39
4	GBR	FIFE-NESS	56.30	-2.58	10.3	4.2	-0.4	39	39

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	GBR	FOYERS	57.27	-4.48	9.2	4.6	0.0	31	-9
4	GBR	FYLINGDALES	54.37	-0.67	9.0	5.0	-0.8	35	49
4	GBR	GLASGOW-AP	55.87	-4.43	10.0	4.8	0.6	30	-43
4	GBR	GLENLIVET	57.35	-3.35	8.9	5.3	-0.9	25	24
4	GBR	GREAT-MALVERN	52.12	-2.30	11.6	5.3	-0.6	27	35
4	GBR	GREENOCK-MRCC	55.97	-4.80	10.9	4.5	-0.5	37	27
4	GBR	HEMSBY	52.68	1.68	10.8	5.1	-0.1	34	4
4	GBR	HILLSBOROUGH	54.48	-6.10	10.3	4.3	-0.5	31	28
4	GBR	INVERGORDON-HARBOUR	57.68	-4.17	9.7	4.7	-0.6	34	36
4	GBR	INVERNESS-DALCROSS	57.53	-4.05	9.4	5.1	0.7	30	-27
4	GBR	KINLOSS	57.65	-3.57	9.8	4.5	-0.2	31	9
4	GBR	KIRKWALL-AP	58.95	-2.90	9.2	3.8	-0.1	40	-3
4	GBR	LANGDON-BAY	51.13	1.35	11.0	5.3	0.0	38	6
4	GBR	LARKHILL	51.20	-1.80	10.9	5.2	-0.6	32	30
4	GBR	LARNE	54.85	-5.80	11.0	4.0	-0.3	38	23
4	GBR	LEEDS-WEATHER-CTR	53.80	-1.55	11.2	5.1	-0.8	26	41
4	GBR	LEEMING	54.30	-1.53	10.3	5.2	-0.6	30	44
4	GBR	LERWICK	60.13	-1.18	8.5	3.7	-0.4	41	33
4	GBR	LEUCHARS	56.40	-2.87	9.8	4.8	0.1	32	0
4	GBR	LINTON-ON-OUSE	54.05	-1.25	10.5	5.5	-0.4	30	41
4	GBR	LOCHRANZA	55.70	-5.30	10.9	4.6	-0.4	31	18
4	GBR	LONDON-GATWICK-AP	51.15	-0.18	11.4	5.5	-0.6	28	21
4	GBR	LONDON-HEATHROW-AP	51.48	-0.45	12.1	5.7	-0.7	29	27
4	GBR	LONDON-WEATHER-CENT	51.52	-0.10	12.8	5.6	0.0	30	3
4	GBR	LOSSIEMOUTH	57.72	-3.32	9.5	4.7	-0.1	28	8
4	GBR	LYNEHAM	51.50	-1.98	10.8	5.2	-0.6	30	34
4	GBR	MACHRIHANISH	55.43	-5.70	10.5	4.5	-0.8	36	13
4	GBR	MADLEY	52.03	-2.85	10.7	4.9	-0.9	24	44
4	GBR	MANCHESTER-AP	53.35	-2.28	11.0	5.2	-0.3	30	10
4	GBR	MARHAM	52.65	0.57	11.0	5.7	0.0	28	-6
4	GBR	MIDDLE-WALLOP	51.15	-1.57	11.2	5.4	-0.6	33	41
4	GBR	MILFORD-HAVEN	51.70	-5.05	11.6	4.2	-0.5	38	35
4	GBR	MUMBLES	51.57	-3.98	11.7	4.7	-0.5	38	29
4	GBR	NEWHAVEN(LGT-H)	50.78	0.05	12.0	5.2	-0.4	38	34
4	GBR	NORTHOLT	51.55	-0.42	11.5	5.8	-0.8	28	34
4	GBR	NORWICH-WEA-CNTRE	52.63	1.32	11.3	5.6	-0.6	30	40
4	GBR	OBAN	56.42	-5.47	9.9	4.3	-0.1	30	10
4	GBR	ODIHAM	51.23	-0.95	11.1	5.2	-0.6	30	36
4	GBR	ORSAY(LGT-H)	55.67	-6.50	10.9	3.9	0.1	40	1
4	GBR	PENDENNIS-POINT	50.15	-5.07	12.4	4.0	0.5	40	-43

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	GBR	PETERHEAD-HARBOUR	57.50	-1.77	10.1	4.0	-0.1	40	5
4	GBR	PORTLAND-HELIPORT	50.57	-2.45	12.5	4.7	0.5	45	-30
4	GBR	PRESTWICK(CIV-NAVY)	55.50	-4.58	10.4	4.5	-0.6	30	35
4	GBR	SALSBURGH	55.87	-3.87	8.9	5.4	-0.9	30	41
4	GBR	SHAWBURY	52.80	-2.67	10.3	5.3	-0.7	29	38
4	GBR	SHEERNESS	51.45	0.75	12.3	5.4	0.7	38	-47
4	GBR	SHOEBURYNESS	51.55	0.83	11.5	6.0	-0.6	35	29
4	GBR	SOLENT-MRSC	50.80	-1.22	12.3	5.4	-0.4	36	33
4	GBR	SOUTHAMPTON-WX-CNTR	50.90	-1.40	11.9	5.3	-0.5	31	44
4	GBR	ST-CATHERINES-POIN	50.58	-1.30	11.9	4.8	-0.7	40	33
4	GBR	ST-MAWGAN	50.43	-5.00	11.7	4.2	-0.6	41	32
4	GBR	STANSTED-AP	51.88	0.23	10.6	5.7	-0.3	30	34
4	GBR	STORNOWAY	58.22	-6.32	9.6	3.9	0.0	37	0
4	GBR	SUMBURGH(CAPE)	59.88	-1.30	9.4	3.5	0.0	47	-7
4	GBR	TIREE	56.50	-6.88	10.2	3.5	-0.4	39	10
4	GBR	TYNEMOUTH	55.02	-1.42	10.4	4.4	0.6	39	-35
4	GBR	VALLEY	53.25	-4.53	11.1	4.4	-0.4	40	21
4	GBR	WADDINGTON	53.17	-0.52	10.8	5.3	-0.6	31	30
4	GBR	WALTON-ON-NAZE	51.85	1.28	11.8	5.9	-0.5	35	28
4	GBR	WATTISHAM	52.12	0.97	10.8	5.4	-0.1	32	7
4	GBR	WICK	58.45	-3.08	8.8	4.2	0.4	38	-30
4	GBR	WITTERING	52.62	-0.47	10.7	5.4	-0.7	30	50
4	GBR	WYTON(RAF)	52.35	-0.12	10.6	5.6	-0.4	32	15
4	GBR	YEOVILTON	51.00	-2.63	11.4	5.0	-0.5	34	14
4	GEO	TBILISI	41.68	44.95	13.7	10.4	0.0	27	4
4	GGY	GUERNSEY-AP	49.43	-2.60	12.1	4.1	-0.5	46	25
4	GIB	GIBRALTAR	36.15	-5.35	18.6	4.7	0.7	37	-36
4	GRC	AKTION(AP)	38.62	20.77	17.4	7.1	-0.5	36	38
4	GRC	ALEXANDROUPOLI(AP)	40.85	25.92	14.5	8.6	-0.1	29	-9
4	GRC	ANDRAVIDA(AP)	37.92	21.28	16.8	7.2	-0.1	33	7
4	GRC	ATHINAI(AP)	37.90	23.73	18.1	7.8	-0.7	33	31
4	GRC	HERAKLION(AP)	35.33	25.18	18.6	6.2	-0.1	39	-17
4	GRC	KASTORIA(AP)	40.45	21.28	12.2	9.2	0.4	27	-18
4	GRC	KERKYRA(AP)	39.62	19.92	17.2	7.2	0.0	34	-7
4	GRC	KYTHIRA	36.28	23.02	18.1	6.5	-0.1	39	-21
4	GRC	LAMIA	38.90	22.40	16.2	8.3	-0.6	26	25
4	GRC	LARISSA(AP)	39.63	22.42	15.4	8.9	0.4	27	-12
4	GRC	LIMNOS(AP)	39.92	25.23	16.0	8.0	0.1	32	-2
4	GRC	METHONI	36.83	21.70	18.4	6.4	0.4	39	-36
4	GRC	MILOS	36.72	24.45	17.9	6.6	-0.6	36	28

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	GRC	MYTILINI(AP)	39.07	26.60	17.8	7.6	-0.3	29	7
4	GRC	NAXOS	37.10	25.38	18.5	5.9	-0.5	39	22
4	GRC	RHODES(AP)	36.40	28.08	19.5	6.6	0.4	37	-36
4	GRC	SAMOS(AP)	37.70	26.92	18.6	7.6	1.0	35	-60
4	GRC	SKYROS(AP)	38.97	24.48	17.3	7.0	-0.1	34	-1
4	GRC	SOUDA(AP)	35.48	24.12	18.0	6.6	-0.3	35	27
4	GRC	SOUDA-BAY-CRETE	35.53	24.15	18.4	6.6	-0.4	33	26
4	GRC	THESSALONIKI(AP)	40.52	22.97	15.6	8.9	-0.4	31	19
4	GRC	TRIPOLIS(AP)	37.53	22.40	13.5	8.2	-0.9	31	42
4	GRL	DANMARKSHAVN	76.77	-18.67	-8.9	11.4	-1.8	34	26
4	GRL	KANGERLUSSUAQ(SDR)	67.02	-50.70	-2.7	9.2	-2.7	40	-19
4	GRL	NARSARSUAQ	61.13	-45.43	2.1	6.6	-0.8	39	31
4	GRL	NUUK(GODTHAAB)	64.17	-51.75	-0.6	4.0	-0.8	46	-3
4	GRL	PITUFFIK(THULE-AB)	76.53	-68.75	-7.3	12.2	-1.9	45	-28
4	HUN	BAJA	46.18	19.02	11.2	9.7	0.2	22	6
4	HUN	BEKESCSABA	46.68	21.17	11.5	9.7	0.2	23	2
4	HUN	BUDAPEST-PESTSZENTL	47.43	19.18	11.7	9.8	0.6	22	-23
4	HUN	DEBRECEN	47.48	21.60	11.2	9.9	0.5	20	13
4	HUN	GYOR	47.72	17.68	11.5	9.1	-0.1	22	3
4	HUN	KECSKEMET	46.92	19.75	11.5	9.5	0.5	19	-7
4	HUN	KEKESTETO	47.87	20.02	7.4	8.5	-0.7	25	21
4	HUN	KESZTHELY	46.73	17.23	11.4	8.9	-0.1	23	20
4	HUN	MISKOLC	48.10	20.77	11.0	9.8	0.4	19	13
4	HUN	NAGYKANIZSA	46.45	16.97	10.5	9.5	0.4	22	19
4	HUN	NYIREGYHAZA-NAPKOR	47.97	21.88	10.9	9.5	-0.1	22	9
4	HUN	PAKS	46.58	18.85	11.5	9.8	0.2	22	8
4	HUN	PAPA	47.20	17.50	11.4	8.8	0.0	22	11
4	HUN	PECS-POGANY	46.00	18.23	11.7	9.4	0.3	25	7
4	HUN	SIOFOK	46.92	18.05	12.1	9.6	0.0	23	15
4	HUN	SOPRON	47.68	16.60	11.1	9.1	0.0	23	17
4	HUN	SZEGED	46.25	20.10	12.0	9.2	0.4	22	12
4	HUN	SZENTGOTTHARD-FARKA	46.92	16.32	10.5	8.6	0.2	22	2
4	HUN	SZOLNOK	47.12	20.23	11.8	9.6	0.0	22	5
4	HUN	SZOMBATHELY	47.27	16.63	11.0	9.1	0.4	22	-13
4	HUN	VESZPREM-SZENTKIRAL	47.07	17.83	10.7	9.2	0.1	22	5
4	IMN	ISLE-OF-MAN-RONALDS	54.08	-4.63	11.0	4.0	-0.2	43	14
4	IRL	BELMULLET	54.23	-10.00	11.4	3.6	0.1	38	-6
4	IRL	BIRR	53.08	-7.88	10.8	4.5	-0.5	30	26
4	IRL	CASEMENT-AERODROME	53.30	-6.43	10.8	4.5	-0.5	30	29
4	IRL	CLONES	54.18	-7.23	10.2	4.7	-0.4	32	47

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	IRL	CORK-AP	51.85	-8.48	11.0	4.1	-0.3	36	48
4	IRL	DUBLIN-AP	53.43	-6.25	10.7	4.4	-0.4	32	33
4	IRL	KILKENNY	52.67	-7.27	10.6	4.7	-0.6	29	36
4	IRL	MALIN-HEAD	55.37	-7.33	10.7	3.8	0.6	41	-40
4	IRL	MULLINGAR	53.53	-7.37	10.2	4.7	-0.4	31	39
4	IRL	ROSSLARE	52.25	-6.33	11.5	3.9	0.4	39	-44
4	IRL	SHANNON-AP	52.70	-8.92	11.6	4.4	-0.4	31	32
4	IRL	VALENTIA-OBSERVATOR	51.93	-10.25	12.0	3.6	-0.3	40	19
4	ISL	AKUREYRI	65.68	-18.08	4.3	6.0	-1.7	33	14
4	ISL	AKURNES	64.30	-15.22	6.0	5.0	-0.8	31	25
4	ISL	BERGSTADIR	65.70	-19.62	3.7	6.0	-1.1	41	23
4	ISL	BOLUNGAVIK	66.15	-23.25	4.1	5.3	-1.5	42	18
4	ISL	DALATANGI	65.27	-13.58	5.2	3.7	-0.9	38	35
4	ISL	EGILSSTADIR	65.28	-14.40	4.2	5.9	-1.7	39	18
4	ISL	EYRARBAKKI	63.87	-21.15	6.0	5.4	-1.2	25	23
4	ISL	HVERAVELLIR	64.87	-19.57	0.0	3.4	-0.8	40	10
4	ISL	KEFLAVIK	63.97	-22.60	6.2	4.9	-0.8	34	22
4	ISL	KIRKJUBAEJARKLAUSTU	63.78	-18.07	5.8	5.4	-1.0	31	11
4	ISL	RAUFARHOFN	66.45	-15.95	3.5	5.2	-1.4	40	32
4	ISL	REYKJAVIK	64.13	-21.90	5.9	5.2	-0.5	31	6
4	ISL	STYKKISHOLMUR	65.08	-22.73	4.6	5.9	-1.1	41	15
4	ISL	VESTMANNAEYJAR	63.40	-20.28	6.4	3.9	-0.7	37	23
4	ISR	BEER-SHEVA	31.23	34.78	19.5	6.6	0.6	34	20
4	ISR	EILAT	29.55	34.95	24.5	7.9	0.6	29	0
4	ISR	HAIFA	32.80	35.03	20.6	6.4	0.6	41	3
4	ISR	JERUSALEM	31.87	35.22	16.6	7.0	0.3	35	-3
4	ISR	OVDA	30.00	34.83	20.3	7.6	0.8	26	8
4	ISR	SDE-DOV(TEL-AVIV)	32.10	34.78	20.8	6.3	0.2	43	-15
4	ITA	ALBENGA	44.05	8.12	14.5	8.1	0.5	30	-12
4	ITA	ALGHERO	40.63	8.28	16.7	6.5	-0.7	36	34
4	ITA	AMENDOLA	41.53	15.72	16.1	7.9	-0.2	33	2
4	ITA	BARI-PALESE-MACCHIE	41.13	16.78	16.5	7.5	-0.5	33	19
4	ITA	BERGAMO-ORIO-AL-SER	45.67	9.70	13.4	9.3	0.7	22	-16
4	ITA	BOLOGNA-BORGO-PANIG	44.53	11.30	14.6	9.5	0.5	25	4
4	ITA	BOLZANO	46.47	11.33	12.5	9.9	1.0	18	-9
4	ITA	BRESCIA-GHEDI	45.42	10.28	13.4	9.8	0.8	22	-16
4	ITA	BRINDISI	40.65	17.95	17.7	7.2	-0.7	37	37
4	ITA	CAGLIARI-ELMAS	39.25	9.07	17.5	7.2	-0.5	34	35
4	ITA	CAMPOBASSO	41.57	14.65	12.8	7.6	-0.6	32	29
4	ITA	CAPO-BELLAVISTA	39.93	9.72	17.7	6.7	-0.8	39	37

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	ITA	CAPO-CACCIA	40.57	8.17	17.4	6.2	0.5	40	-33
4	ITA	CAPO-FRASCA	39.75	8.47	17.5	6.2	-0.7	41	30
4	ITA	CAPO-MELE	43.95	8.17	16.0	6.6	0.7	36	-50
4	ITA	CAPO-PALINURO	40.02	15.28	17.4	6.9	-0.9	39	29
4	ITA	CATANIA-FONTANAROSS	37.47	15.05	18.0	7.1	-0.6	36	46
4	ITA	CATANIA-SIGONELLA	37.40	14.92	18.0	7.4	-0.9	37	39
4	ITA	COZZO-SPADARO	36.68	15.13	19.1	6.6	0.6	43	-47
4	ITA	CROTONE	39.00	17.07	16.9	7.3	-0.6	38	35
4	ITA	DOBBIACO	46.73	12.22	6.4	9.5	-0.4	28	6
4	ITA	FALCONARA	43.62	13.37	14.8	8.1	-0.1	32	6
4	ITA	FIRENZE-PERETOLA	43.80	11.20	15.4	8.4	0.7	28	-42
4	ITA	FRONTONE	43.52	12.73	13.5	8.3	0.0	29	6
4	ITA	GELA	37.08	14.22	18.6	6.4	0.4	42	-21
4	ITA	GENOVA-SESTRI	44.42	8.85	16.6	7.0	-0.8	31	45
4	ITA	GROSSETO	42.75	11.07	15.8	7.7	0.0	32	-2
4	ITA	LAMEZIA-TERME	38.90	16.25	17.2	6.7	-0.7	39	24
4	ITA	MARINA-DI-GINOSA	40.43	16.88	17.1	7.7	-0.5	34	19
4	ITA	MESSINA	38.20	15.55	19.2	6.6	-0.5	41	24
4	ITA	MILANO-LINATE	45.43	9.28	13.9	9.5	1.2	23	-15
4	ITA	MILANO-MALPENSA	45.62	8.73	12.4	9.3	0.0	22	17
4	ITA	MONDOVI	44.38	7.82	12.5	8.7	1.1	25	-29
4	ITA	MONTE-CIMONE	44.20	10.70	4.3	6.1	-1.6	39	25
4	ITA	MONTE-TERMINILLO	42.47	12.98	6.9	7.3	-1.0	39	21
4	ITA	NAPOLI-CAPODICHINO	40.85	14.30	16.7	7.4	0.0	32	-1
4	ITA	PAGANELLA	46.15	11.03	3.4	6.9	-1.8	41	31
4	ITA	PALERMO-BOCCADIFALC	38.10	13.30	18.4	6.9	-0.4	36	12
4	ITA	PALERMO-PUNTA-RAISI	38.18	13.10	19.2	6.5	0.7	41	-34
4	ITA	PANTELLERIA	36.82	11.97	18.3	6.3	0.5	43	-29
4	ITA	PASSO-DELLA-CISA	44.43	9.93	9.7	7.4	0.1	31	12
4	ITA	PASSO-ROLLE	46.30	11.78	3.7	7.2	1.6	47	-51
4	ITA	PERUGIA	43.08	12.50	14.1	8.2	0.2	29	4
4	ITA	PESCARA	42.43	14.20	15.2	8.1	0.1	30	-4
4	ITA	PIACENZA	44.92	9.73	13.2	9.4	0.6	23	-25
4	ITA	PISA-S-GIUSTO	43.68	10.38	15.4	7.4	-0.6	31	40
4	ITA	PONZA	40.92	12.95	17.4	6.5	-0.6	39	35
4	ITA	POTENZA	40.63	15.80	12.6	8.2	0.0	34	-3
4	ITA	PUNTA-MARINA	44.45	12.30	14.7	9.6	0.6	26	-11
4	ITA	RIMINI	44.03	12.62	14.6	9.2	0.4	28	-14
4	ITA	ROMA-FIUMICINO	41.80	12.23	16.4	6.8	-0.6	35	42
4	ITA	RONCHI-DEI-LEGIONAR	45.82	13.48	13.8	8.6	0.2	26	2

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	ITA	S-MARIA-DI-LEUCA	39.82	18.35	17.7	6.9	-0.9	39	33
4	ITA	S-VALENTINO-ALLA-M	46.75	10.53	6.3	8.5	-0.6	31	-7
4	ITA	SIGONELLA	37.40	14.92	17.8	7.2	0.3	38	1
4	ITA	TARVISIO	46.50	13.58	8.3	10.1	0.7	28	37
4	ITA	TORINO-BRIC-DELLA-C	45.03	7.73	11.9	8.2	1.2	24	-36
4	ITA	TORINO-CASELLE	45.22	7.65	12.6	9.2	1.2	22	-23
4	ITA	TRAPANI-BIRGI	37.92	12.50	18.3	6.5	-0.7	40	31
4	ITA	TREVISO-ISTRANA	45.68	12.10	13.8	9.3	0.5	23	-8
4	ITA	TRIESTE	45.65	13.75	15.1	8.3	0.0	30	4
4	ITA	UDINE-RIVOLTO	45.98	13.03	13.9	8.9	0.6	24	-17
4	ITA	USTICA	38.70	13.18	17.9	6.4	-0.8	43	29
4	ITA	VENEZIA-TESSERA	45.50	12.33	14.2	9.5	0.6	25	-10
4	ITA	VERONA-VILLAFRANCA	45.38	10.87	14.3	9.7	0.8	22	-21
4	ITA	VICENZA	45.57	11.52	13.1	9.5	0.5	20	-16
4	JEY	JERSEY-AP	49.22	-2.20	12.1	4.6	-0.5	39	37
4	JOR	AMMAN-AP	31.98	35.98	17.4	7.7	0.6	31	3
4	JOR	AMMAN-QUEEN-ALIA-AP	31.72	35.98	16.8	7.7	0.5	30	28
4	JOR	AQABA-AP	29.55	35.00	24.1	8.2	0.8	27	9
4	JOR	GHOR-SAFI	31.03	35.47	23.7	7.4	1.0	28	0
4	JOR	H-4-IRWAISHED	32.50	38.20	18.8	8.5	0.9	25	6
4	JOR	H-5-SAFAWI	32.20	37.13	19.4	9.0	0.7	28	3
4	JOR	IRBED	32.55	35.85	17.9	7.3	0.5	35	1
4	JOR	MAAN	30.17	35.78	17.6	8.0	0.7	25	-8
4	JOR	MAFRAQ	32.37	36.25	17.0	7.7	0.7	30	1
4	KAZ	NOVYJ-USHTOGAN	47.90	48.80	9.8	13.5	-1.3	22	7
4	LBN	BEYROUTH-AP	33.82	35.48	20.9	5.7	0.7	42	8
4	LTU	BIRZAI	56.20	24.77	7.6	10.1	-0.8	28	-1
4	LTU	KAUNAS	54.88	23.83	7.7	10.2	-0.8	29	-4
4	LTU	KLAIPEDA	55.73	21.07	9.0	8.6	-0.1	31	9
4	LTU	SIAULIAI	55.93	23.32	7.4	9.6	-0.8	29	-2
4	LTU	VILNIUS	54.63	25.28	7.1	10.1	-0.7	29	0
4	LUX	LUXEMBOURG-LUXEMBOU	49.62	6.22	10.3	7.3	0.8	22	-19
4	LVA	DAUGAVPILS	55.87	26.62	6.7	9.9	-0.8	29	11
4	LVA	GULBENE	57.13	26.72	6.3	9.7	-1.5	26	8
4	LVA	KOLKA	57.75	22.60	7.6	8.8	-0.8	38	5
4	LVA	LIEPAJA	56.48	21.02	8.2	9.1	-0.5	35	-13
4	LVA	RIGA	56.97	24.05	7.8	9.8	-0.8	29	12
4	LVA	VALGA	57.78	26.03	6.5	9.5	-1.2	27	12
4	MDA	KISINEV	47.02	28.98	10.7	10.9	0.7	20	-16
4	MKD	BITOLA	41.05	21.37	12.0	9.3	0.7	24	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	MKD	KRIVA-PALANKA	42.20	22.33	11.6	8.7	0.0	24	10
4	MKD	OHRID	41.12	20.80	12.1	8.8	-0.4	30	24
4	MKD	SKOPJE-AP	41.97	21.65	12.9	10.0	1.1	22	-2
4	MLT	LUQA	35.85	14.48	19.3	6.3	-0.6	43	35
4	MNE	PLEVLJA	43.35	19.35	9.5	9.2	0.8	26	27
4	MNE	PODGORICA-GOLUBOVCI	42.37	19.25	15.4	9.0	0.1	25	5
4	MNE	TIVAT	42.40	18.73	15.6	7.9	-0.7	27	26
4	NLD	AMSTERDAM-AP-SCHIPH	52.30	4.77	11.2	6.4	0.4	29	-3
4	NLD	DE-BILT	52.10	5.18	11.1	6.3	0.2	27	-4
4	NLD	DE-KOOY	52.92	4.78	11.2	6.1	0.4	32	-34
4	NLD	DEELEN	52.07	5.88	10.6	6.9	-0.2	26	12
4	NLD	EINDHOVEN	51.45	5.42	11.4	6.3	-0.1	23	1
4	NLD	GILZE-RIJEN	51.57	4.93	11.3	6.3	-0.1	28	9
4	NLD	GRONINGEN-AP-EELDE	53.13	6.58	10.5	6.4	-0.6	27	34
4	NLD	HOEK-VAN-HOLLAND	51.98	4.10	11.7	5.8	0.4	33	-25
4	NLD	LEEUWARDEN	53.22	5.77	10.7	6.1	0.1	30	12
4	NLD	MAASTRICHT-AP-ZUID	50.92	5.78	11.7	6.4	-0.2	21	7
4	NLD	ROTTERDAM-AP-ZESTIE	51.95	4.45	11.4	6.4	-0.2	29	1
4	NLD	SOESTERBERG	52.13	5.28	11.0	6.5	-0.2	26	17
4	NLD	TWENTHE	52.27	6.90	11.0	6.3	-0.1	26	-5
4	NLD	VALKENBURG	52.18	4.42	11.4	6.1	-0.1	31	19
4	NLD	VLISSINGEN	51.45	3.60	12.0	6.3	0.1	31	9
4	NLD	VOLKEL	51.65	5.70	11.2	6.3	-0.1	21	10
4	NLD	WOENSDRECHT	51.45	4.33	11.2	6.3	0.0	26	8
4	NOR	ALESUND-VIGRA	62.57	6.12	8.7	4.9	-0.8	36	36
4	NOR	ALTA-LUFTHAVN	69.98	23.37	2.6	7.4	-1.9	38	43
4	NOR	ANDOYA	69.30	16.13	4.4	6.4	-1.1	41	26
4	NOR	BANAK	70.07	24.98	1.7	6.8	-1.3	41	48
4	NOR	BARDUFOSS	69.07	18.53	2.3	7.2	1.7	37	-49
4	NOR	BERGEN-FLESLAND	60.28	5.23	8.3	5.5	-0.6	32	26
4	NOR	BERGEN-FLORIDA	60.38	5.33	8.9	5.9	-0.5	29	25
4	NOR	BODO-VI	67.27	14.37	6.3	6.6	-0.7	32	13
4	NOR	BYGLANDSFJORD-SOLBA	58.67	7.80	7.5	8.1	-0.7	29	19
4	NOR	FAGERNES	60.98	9.23	3.6	8.5	-1.3	36	37
4	NOR	FERDER-FYR	59.03	10.53	9.4	7.4	-0.8	32	23
4	NOR	FOKSTUA-II	62.12	9.28	1.4	5.5	0.1	43	-6
4	NOR	FRUHOLMEN-FYR	71.10	24.00	3.6	5.8	-1.4	48	37
4	NOR	JAN-MAYEN	70.93	-8.67	0.8	3.2	0.9	56	-29
4	NOR	KAUTOKEINO	69.00	23.03	-0.3	6.9	-0.6	31	14
4	NOR	KIRKENES	69.73	29.90	0.9	6.3	-0.8	42	48

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	NOR	KONGSBERG-IV	59.67	9.65	5.8	9.3	-1.4	29	11
4	NOR	KRISTIANSAND-KJEVIK	58.20	8.08	8.6	7.5	-0.8	27	31
4	NOR	LISTA-FYR	58.12	6.57	9.2	5.6	-0.3	37	11
4	NOR	MYKEN	66.77	12.48	7.7	5.5	-1.0	36	26
4	NOR	OKSOY-FYR	58.07	8.05	9.2	6.6	-0.5	36	36
4	NOR	ONA-II	62.87	6.53	8.8	4.5	-1.0	42	35
4	NOR	ORLAND-III	63.70	9.60	7.8	5.6	-0.7	34	23
4	NOR	OSLO-FORNEBU	60.12	10.83	7.2	9.8	-1.0	25	11
4	NOR	OSLO-GARDERMOEN	60.20	11.08	5.2	9.0	-1.4	34	20
4	NOR	ROEST-III	67.52	12.10	7.0	4.5	-0.8	37	37
4	NOR	RYGGE	59.38	10.78	7.9	8.3	-0.7	25	18
4	NOR	SKROVA-FYR	68.15	14.65	6.5	6.5	-1.2	39	12
4	NOR	SLATTEROY-FYR	59.92	5.07	9.1	5.2	-0.9	40	21
4	NOR	SLETTNES-FYR	71.10	28.22	2.3	5.2	-1.8	50	46
4	NOR	SORTLAND	68.70	15.42	5.2	6.1	-1.5	32	16
4	NOR	STAVANGER-SOLA	58.88	5.63	9.1	5.7	0.5	36	-41
4	NOR	SVINOY-FYR	62.33	5.27	8.9	4.4	-0.9	45	39
4	NOR	TORSVAG-FYR	70.25	19.50	5.7	5.5	-0.8	36	27
4	NOR	TORUNGEN-FYR	58.40	8.80	9.1	7.1	-1.0	35	24
4	NOR	TROMSO-LANGNES	69.68	18.92	3.7	6.3	2.2	37	-62
4	NOR	TRONDHEIM-VERNES	63.47	10.93	6.8	7.7	-1.3	29	4
4	NOR	UTSIRA-FYR	59.30	4.88	9.0	5.2	-0.8	42	31
4	NOR	VARDO	70.37	31.10	2.6	5.6	0.0	45	-6
4	POL	BIALYSTOK	53.10	23.17	7.7	9.6	-0.9	27	-15
4	POL	BIELSKO-BIALA	49.80	19.00	9.5	9.1	0.6	25	9
4	POL	CHOJNICE	53.72	17.55	9.0	8.1	-0.4	25	12
4	POL	CZESTOCHOWA	50.82	19.10	9.5	9.0	0.3	24	6
4	POL	ELBLAG	54.17	19.43	9.1	8.7	0.3	28	-8
4	POL	GORZOW-WLKP	52.75	15.28	10.0	8.1	0.4	22	17
4	POL	HEL	54.60	18.82	9.6	7.9	-0.4	32	28
4	POL	JELENIA-GORA	50.90	15.80	8.9	7.9	-0.4	24	12
4	POL	KALISZ	51.78	18.08	10.1	8.9	-0.3	23	13
4	POL	KASPROWY-WIERCH	49.23	19.98	0.9	4.6	0.0	50	16
4	POL	KATOWICE	50.23	19.03	9.6	8.3	-0.2	24	11
4	POL	KETRZYN	54.07	21.37	8.2	9.9	0.1	27	2
4	POL	KIELCE	50.82	20.70	8.8	8.9	0.1	24	11
4	POL	KLODZKO	50.43	16.62	8.5	8.9	0.0	24	10
4	POL	KOLOBRZEG	54.18	15.58	9.8	7.9	-0.1	29	1
4	POL	KOLO	52.20	18.67	10.0	8.5	-0.5	23	4
4	POL	KOSZALIN	54.20	16.15	9.9	7.7	0.0	26	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	POL	KOZIENICE	51.57	21.55	9.4	9.5	-1.2	29	-27
4	POL	KRAKOW	50.08	19.80	9.6	8.7	0.3	20	9
4	POL	KROSNO	49.68	21.75	9.2	9.4	0.1	27	5
4	POL	LEBA	54.75	17.53	9.4	7.2	0.0	32	-10
4	POL	LEBORK	54.55	17.75	9.1	7.5	-0.9	25	27
4	POL	LEGNICA	51.20	16.20	10.5	8.0	-0.7	21	28
4	POL	LESKO	49.47	22.35	8.7	9.2	0.9	27	42
4	POL	LESZNO	51.83	16.53	10.0	8.2	0.4	23	18
4	POL	LODZ	51.73	19.40	9.5	8.9	-0.3	20	11
4	POL	LUBLIN-RADAWIEC	51.22	22.40	8.3	10.2	-0.2	24	6
4	POL	MIKOLAJKI	53.78	21.58	8.5	9.8	0.1	26	3
4	POL	MLAWA	53.10	20.35	8.9	8.6	-0.7	25	-3
4	POL	NOWY-SACZ	49.62	20.70	9.5	9.2	0.4	21	10
4	POL	OLSZTYN	53.77	20.42	9.0	8.2	-0.4	25	12
4	POL	OPOLE	50.80	17.97	10.4	8.4	-0.4	24	13
4	POL	PILA	53.13	16.75	9.7	8.6	-0.3	23	9
4	POL	PLOCK	52.58	19.73	9.4	8.8	0.0	26	9
4	POL	POZNAN	52.42	16.85	10.0	8.2	-0.2	23	9
4	POL	PRZEMYSL	49.80	22.77	9.1	9.1	-0.4	24	7
4	POL	RACIBORZ	50.05	18.20	10.0	8.3	-0.5	24	6
4	POL	RZESZOW-JASIONKA	50.10	22.05	8.8	9.7	-0.9	25	-11
4	POL	SANDOMIERZ	50.70	21.72	9.5	9.0	-0.4	23	11
4	POL	SIEDLCE	52.25	22.25	8.4	9.6	-0.5	26	-30
4	POL	SLUBICE	52.35	14.60	10.5	8.0	-0.1	24	5
4	POL	SNIEZKA	50.73	15.73	2.0	5.4	-1.0	47	41
4	POL	SULEJOW	51.35	19.87	9.9	8.4	-0.5	25	-24
4	POL	SUWALKI	54.13	22.95	7.3	9.8	-0.9	29	-12
4	POL	SWINOUJSCIE	53.92	14.23	10.0	7.8	-0.7	29	35
4	POL	SZCZECINEK	53.72	16.68	9.0	7.8	-0.8	24	28
4	POL	SZCZECIN	53.40	14.62	10.3	7.6	-0.2	25	14
4	POL	TARNOW	50.03	20.98	10.1	8.9	-0.1	21	9
4	POL	TERESPOL	52.07	23.62	8.9	9.3	-0.4	22	9
4	POL	TORUN	53.05	18.58	9.7	8.8	0.1	23	7
4	POL	USTKA	54.58	16.87	9.4	8.0	-0.8	29	49
4	POL	WARSZAWA-OKECIE	52.17	20.97	9.7	8.7	-0.2	24	9
4	POL	WIELUN	51.22	18.57	9.9	8.8	-0.2	20	10
4	POL	WLODAWA	51.55	23.53	8.2	10.2	0.1	24	9
4	POL	WROCLAW-II	51.10	16.88	10.2	8.6	-0.1	22	8
4	POL	ZAKOPANE	49.30	19.97	6.9	8.9	-0.3	31	2
4	POL	ZAMOSC	50.70	23.25	8.2	9.8	-0.2	26	12

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	POL	ZIELONA-GORA	51.93	15.53	10.3	8.0	-0.4	23	5
4	PRT	BEJA	38.02	-7.87	16.5	6.6	1.2	35	-37
4	PRT	BRAGANCA	41.80	-6.73	13.1	7.0	0.2	29	6
4	PRT	COIMBRA	40.20	-8.42	15.6	5.0	0.0	34	4
4	PRT	FARO-AP	37.02	-7.97	18.1	5.2	0.0	35	5
4	PRT	FLORES(ACORES)	39.45	-31.13	18.3	3.7	0.7	51	-43
4	PRT	FUNCHAL-S-CATARINA	32.68	-16.77	19.3	3.0	0.4	52	-33
4	PRT	HORTA-CASTELO-BRANC	38.52	-28.72	18.3	3.4	0.7	53	-42
4	PRT	LAJES(ACORES)	38.77	-27.10	17.9	3.5	-0.8	50	46
4	PRT	LISBOA-GAGO-COUTINH	38.77	-9.13	16.8	4.8	0.9	34	-29
4	PRT	LISBOA-PORTELA	38.77	-9.13	17.8	5.7	1.3	31	-30
4	PRT	PONTA-DELGADA-NORDE	37.73	-25.70	18.0	3.4	-0.2	49	6
4	PRT	PORTALEGRE	39.28	-7.42	15.5	6.4	1.2	34	-36
4	PRT	PORTO-PEDRAS-RUBRAS	41.23	-8.68	14.9	4.2	0.3	32	0
4	PRT	PORTO-SANTO	33.07	-16.35	19.4	3.5	0.7	59	-17
4	PRT	SAGRES	37.00	-8.95	17.2	3.9	0.5	38	-21
4	PRT	SANTA-MARIA(ACORES)	36.97	-25.17	18.4	3.4	0.6	55	-42
4	PRT	VIANA-DO-CASTELO	41.70	-8.80	15.2	5.0	0.1	31	7
4	ROU	ARAD	46.13	21.35	11.6	9.8	0.9	23	-7
4	ROU	BACAU	46.53	26.92	10.5	10.7	1.0	19	4
4	ROU	BAIA-MARE	47.67	23.50	10.7	10.2	0.7	22	30
4	ROU	BARLAD	46.23	27.65	10.9	10.3	0.0	21	13
4	ROU	BISTRITA	47.15	24.50	9.4	9.8	0.7	22	25
4	ROU	BLAJ	46.18	23.93	9.9	10.6	0.8	21	37
4	ROU	BOTOSANI	47.73	26.65	10.1	10.1	0.5	20	13
4	ROU	BUCURESTI-INMH-BANE	44.48	26.12	11.5	10.4	0.3	22	1
4	ROU	BUZAU	45.13	26.85	12.1	10.7	0.3	21	10
4	ROU	CALAFAT	43.98	22.95	12.9	9.9	0.5	22	-8
4	ROU	CALARASI	44.20	27.33	12.4	10.1	0.3	22	9
4	ROU	CARANSEBES	45.42	22.25	11.7	8.9	0.1	23	4
4	ROU	CEAHLAU-TOACA	46.98	25.95	1.5	6.1	0.0	43	4
4	ROU	CLUJ-NAPOCA	46.78	23.57	9.8	10.2	0.9	23	42
4	ROU	CONSTANTA	44.22	28.65	12.9	9.5	-0.8	29	51
4	ROU	CRAIOVA	44.32	23.87	12.4	10.1	0.8	22	-24
4	ROU	DEVA	45.87	22.90	11.1	9.3	0.2	20	12
4	ROU	DROBETA-TURNU-SEVER	44.63	22.63	12.8	9.3	0.3	21	9
4	ROU	FAGARAS	45.83	24.93	8.8	10.4	-0.2	25	7
4	ROU	FETESTI	44.37	27.85	12.3	10.0	-0.1	24	15
4	ROU	GALATI	45.48	28.03	12.0	10.2	0.0	23	12
4	ROU	GIURGIU	43.88	25.95	12.7	10.8	1.1	21	-26

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	ROU	GRIVITA	44.75	27.30	12.0	10.0	0.1	22	13
4	ROU	IASI	47.17	27.63	10.5	10.9	0.0	27	6
4	ROU	INTORSURA-BUZAULUI	45.68	26.02	7.3	10.0	-0.5	26	-6
4	ROU	JURILOVCA	44.77	28.88	11.9	10.2	0.3	26	-20
4	ROU	KOGALNICEANU	44.33	28.43	12.1	9.8	0.1	25	7
4	ROU	MANGALIA	43.82	28.58	12.8	9.5	-0.1	33	2
4	ROU	MIERCUREA-CIUC	46.37	25.73	6.8	9.9	-0.4	25	3
4	ROU	ORADEA	47.03	21.90	11.4	9.8	0.5	21	-3
4	ROU	ORAVITA	45.03	21.68	12.0	9.0	0.6	25	18
4	ROU	PETROSANI	45.42	23.38	8.9	9.4	0.1	21	11
4	ROU	PLOIESTI	44.95	26.00	11.3	10.2	0.0	25	6
4	ROU	PREDEAL	45.50	25.58	5.7	9.0	-0.9	32	12
4	ROU	RARAU(MONASTERY)	47.45	25.57	3.3	7.5	-1.6	37	38
4	ROU	RIMNICU-VALCEA	45.10	24.37	11.5	10.1	0.9	20	-5
4	ROU	ROMAN	46.97	26.92	9.1	10.8	0.6	21	26
4	ROU	ROSIORI-DE-VEDE	44.10	24.98	12.1	10.6	0.5	21	-6
4	ROU	SATU-MARE	47.72	22.88	11.0	10.0	0.4	22	5
4	ROU	SIBIU	45.80	24.15	9.6	10.3	0.6	21	19
4	ROU	SIGHETUL-MARMATIEI	47.93	23.92	8.9	10.5	0.9	23	43
4	ROU	SUCEAVA	47.63	26.25	8.9	10.7	-0.6	25	-30
4	ROU	SULINA	45.17	29.73	12.9	9.9	0.1	31	-7
4	ROU	TARGOVISTE	44.93	25.43	11.0	10.0	0.4	24	8
4	ROU	TG-JIU	45.03	23.27	11.1	10.1	0.1	21	6
4	ROU	TG-MURES	46.53	24.53	9.7	10.6	1.1	21	20
4	ROU	TIMISOARA	45.77	21.25	12.0	9.5	0.6	22	-12
4	ROU	TR-MAGURELE	43.75	24.88	12.4	10.4	0.7	22	-29
4	ROU	TULCEA	45.18	28.82	12.2	10.1	-0.1	24	8
4	ROU	VARFU-OMU	45.45	25.45	-0.6	4.7	0.0	42	7
4	ROU	ZALAU	47.18	23.08	10.4	9.6	0.6	22	30
4	RUS	ADLER	43.43	39.90	14.4	7.9	0.8	35	-38
4	RUS	ALATYR`	54.82	46.58	5.8	11.6	-1.8	31	20
4	RUS	ALEKSANDROV-GAJ	50.15	48.55	8.0	13.7	-2.1	29	6
4	RUS	ARHANGELSK	64.55	40.58	2.4	8.8	-1.6	39	49
4	RUS	ARMAVIR	44.98	41.12	11.7	10.7	0.2	23	0
4	RUS	ASTRAHAN	46.28	48.05	11.6	13.3	-0.7	22	-3
4	RUS	BALASOV	51.55	43.15	7.4	12.2	-1.2	28	15
4	RUS	BARENCBURG	78.07	14.25	-3.2	6.4	-1.1	46	-11
4	RUS	BELYJ	55.85	32.95	6.0	10.2	-1.6	28	16
4	RUS	BOGUCAR	49.93	40.57	8.6	12.5	-0.8	24	-8
4	RUS	BOLOGOE	57.90	34.05	5.8	9.9	-1.6	30	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	RUS	BRJANSK	53.25	34.32	6.8	10.7	-1.5	27	9
4	RUS	BUDENNOVSK	44.78	44.13	10.7	13.1	0.2	27	12
4	RUS	BUJ	58.48	41.53	4.7	10.2	-1.8	29	24
4	RUS	CELINA	46.55	41.05	9.5	12.2	-0.3	24	2
4	RUS	CEREPOVEC	59.25	37.97	3.9	9.8	-1.6	33	33
4	RUS	DIVNOE	45.92	43.35	10.3	12.8	0.2	25	6
4	RUS	ELAT`MA	54.95	41.77	5.8	10.9	-1.7	27	14
4	RUS	ELEC	52.63	38.52	6.9	11.2	-1.6	29	10
4	RUS	ERSOV	51.37	48.30	7.1	12.7	-1.9	32	12
4	RUS	GRIDINO	65.90	34.77	2.0	7.7	1.5	45	-44
4	RUS	JASKUL	46.18	45.35	11.7	12.5	-0.9	22	-1
4	RUS	JUR`EVEC	57.33	43.12	5.4	10.7	-2.0	27	14
4	RUS	KALAC	50.42	41.05	7.8	11.9	-0.5	25	10
4	RUS	KALEVALA	65.22	31.17	2.1	8.3	-1.3	37	33
4	RUS	KALININGRAD	54.72	20.55	8.4	9.4	0.2	27	15
4	RUS	KALUGA	54.57	36.40	6.1	10.4	-1.1	28	10
4	RUS	KAMYSIN	50.07	45.37	8.7	13.0	-1.0	26	6
4	RUS	KANDALAKSA	67.15	32.35	1.8	7.9	-1.2	40	41
4	RUS	KANIN-NOS	68.65	43.30	0.0	4.5	-0.1	51	-2
4	RUS	KARGOPOL	61.50	38.93	3.4	9.3	-1.9	32	40
4	RUS	KAZAN`	55.60	49.28	5.4	11.3	-1.4	33	19
4	RUS	KEM	64.95	34.65	2.5	7.8	-1.6	42	45
4	RUS	KINGISEPP	59.37	28.60	6.0	9.8	-1.8	31	18
4	RUS	KIROV	58.60	49.63	4.7	10.8	-2.1	31	22
4	RUS	KOCUBEJ	44.40	46.55	12.8	11.8	-0.3	24	6
4	RUS	KOJNAS	64.75	47.65	1.5	9.0	-1.0	35	29
4	RUS	KOTLAS	61.23	46.72	3.3	9.8	-1.5	30	37
4	RUS	KOZ`MODEM`JANSK	56.33	46.58	5.7	11.4	-1.8	30	15
4	RUS	KRASNODAR	45.03	39.15	12.2	10.3	0.0	24	8
4	RUS	KRASNOSCELE	67.35	37.05	0.4	6.9	-0.5	38	24
4	RUS	KRASNYE-BAKI	57.13	45.17	5.6	11.0	-1.6	28	18
4	RUS	KURSK	51.77	36.17	7.3	11.5	-1.3	30	7
4	RUS	LOVOZERO	68.00	35.03	0.7	7.1	-0.1	38	6
4	RUS	LUKOJANOV	55.03	44.50	5.6	11.1	-1.9	29	17
4	RUS	MAHACKALA	42.83	47.55	12.9	11.0	-0.5	32	33
4	RUS	MEDVEZEGORSK	62.92	34.43	3.3	9.2	-1.5	38	36
4	RUS	MEZEN	65.87	44.22	1.1	7.4	0.3	34	0
4	RUS	MINERALNYE-VODY	44.23	43.07	10.0	12.0	-0.6	27	-30
4	RUS	MOROZOVSK	48.35	41.87	9.1	12.4	-0.7	28	13
4	RUS	MOSKVA	55.83	37.62	6.5	10.4	-1.5	25	9

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	RUS	MOZDOK	43.73	44.67	11.6	11.4	0.0	25	6
4	RUS	MURMANSK	68.97	33.05	1.4	7.1	0.1	37	6
4	RUS	NALCIK	43.53	43.63	10.6	11.0	0.0	25	9
4	RUS	NIKOLAEVSKOE	58.57	29.80	5.5	9.9	-1.6	33	18
4	RUS	NIKOLO-POLOMA	58.35	43.38	4.3	10.1	-2.1	31	27
4	RUS	NIKOL`SK	59.53	45.47	4.0	10.3	-2.2	30	34
4	RUS	NIZNIJ-NOVGOROD	56.27	44.00	5.8	10.6	-1.7	31	19
4	RUS	NJANDOMA	61.67	40.18	3.1	9.3	-1.6	31	36
4	RUS	NOLINSK	57.55	49.95	4.5	10.7	-1.7	31	22
4	RUS	OBJACEVO	60.37	49.65	3.7	9.8	-1.8	33	25
4	RUS	ONEGA	63.90	38.12	3.7	9.2	-1.8	38	32
4	RUS	OPARINO	59.85	48.28	3.4	9.6	-1.6	27	33
4	RUS	OREL	52.93	36.00	7.0	11.1	-1.6	26	7
4	RUS	OSTASKOV	57.13	33.12	5.8	9.9	-1.4	33	20
4	RUS	PAVELEC	53.78	39.25	5.9	10.9	-1.8	31	20
4	RUS	PENZA	53.12	45.02	6.1	11.6	-1.8	31	17
4	RUS	PETROZAVODSK	61.82	34.27	4.3	9.3	-1.9	36	33
4	RUS	PINEGA	64.70	43.38	2.0	8.7	-1.3	34	40
4	RUS	PJALICA	66.18	39.53	0.8	5.6	-0.2	46	15
4	RUS	PRIMORSKO-AHTARSK	46.03	38.15	12.1	11.2	0.0	24	-3
4	RUS	PSKOV	57.82	28.42	6.6	10.3	-1.4	27	14
4	RUS	PUDOZ	61.80	36.52	4.0	9.6	-1.9	33	30
4	RUS	REBOLY	63.83	30.82	2.8	9.0	0.1	38	-16
4	RUS	REMONTNOE	46.57	43.67	9.5	12.7	-0.5	28	8
4	RUS	RJAZAN`	54.63	39.70	6.2	10.8	-1.7	29	12
4	RUS	ROSLAVL	53.93	32.83	6.2	10.3	-1.5	31	18
4	RUS	ROSTOV-NA-DONU	47.25	39.82	10.2	12.3	0.1	25	14
4	RUS	ROSTOV	57.20	39.42	5.1	10.4	-2.1	30	23
4	RUS	RYBINSK	58.10	38.68	5.4	10.4	-1.8	28	21
4	RUS	SAKUN`JA	57.67	46.63	4.5	10.7	-1.6	32	22
4	RUS	SARATOV	51.57	46.03	7.2	12.9	-2.0	28	17
4	RUS	SAR`JA	58.37	45.53	4.3	10.4	-1.7	30	22
4	RUS	SEGEZA	63.77	34.28	3.4	9.0	-1.9	37	35
4	RUS	SENKURSK	62.10	42.90	3.7	10.0	-2.0	32	32
4	RUS	SERAFIMOVIC	49.57	42.75	8.8	12.5	-0.7	23	-6
4	RUS	SMOLENSK	54.75	32.07	6.1	10.1	-1.3	26	10
4	RUS	SOJNA	67.88	44.13	-0.7	6.2	-0.3	47	16
4	RUS	SORTAVALA	61.72	30.72	4.7	9.4	-2.2	39	27
4	RUS	ST-PETERSBURG	59.97	30.30	6.0	10.3	-2.0	32	24
4	RUS	STAVROPOL	45.12	42.08	10.7	11.5	1.0	26	-17

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	RUS	SUHINICI	54.10	35.58	6.2	10.5	-1.4	28	13
4	RUS	SURA	63.58	45.63	1.9	8.9	-0.2	34	4
4	RUS	SVETLOGRAD	45.35	42.85	10.5	11.6	0.1	26	13
4	RUS	TAMBOV	52.80	41.33	6.6	11.6	-1.4	29	7
4	RUS	TIHORECK	45.85	40.08	11.5	11.1	0.6	25	14
4	RUS	TIHVIN	59.65	33.55	4.9	9.7	-2.2	32	28
4	RUS	TOT`MA	59.88	42.75	4.1	10.1	-1.7	31	24
4	RUS	TRUBCEVSK	52.58	33.77	7.0	10.9	-0.8	28	14
4	RUS	TUAPSE	44.10	39.07	14.3	8.7	0.1	32	1
4	RUS	TULA	54.23	37.62	6.3	10.8	-1.9	29	20
4	RUS	TVER	56.90	35.88	5.3	10.1	-1.8	30	19
4	RUS	ULYANOVSK	54.32	48.33	5.9	11.8	-1.7	33	21
4	RUS	UMBA	66.68	34.35	2.2	7.8	-1.2	40	46
4	RUS	URJUPINSK	50.80	42.00	7.9	11.9	-1.1	26	5
4	RUS	VELIKIE-LUKI	56.35	30.62	6.5	10.1	-1.3	25	11
4	RUS	VELSK	61.08	42.07	3.8	9.8	-2.0	30	31
4	RUS	VERHNIJ-BASKUNCAK	48.22	46.73	10.3	12.8	-0.8	21	14
4	RUS	VERHNJAJA-TOJMA	62.23	45.02	2.7	9.2	-1.6	32	37
4	RUS	VJAZMA	55.17	34.40	5.4	10.3	-1.8	30	20
4	RUS	VLADIMIR	56.12	40.35	5.6	10.8	-1.6	26	17
4	RUS	VOLGOGRAD	48.78	44.37	8.8	12.8	-0.9	25	12
4	RUS	VOLOGDA	59.32	39.92	4.3	9.8	-2.2	32	31
4	RUS	VORONEZ	51.65	39.25	6.9	11.4	-1.4	29	6
4	RUS	VORONEZ	51.70	39.22	8.0	11.6	-1.3	27	-5
4	RUS	VOZEGA	60.47	40.20	3.9	9.9	-1.7	30	30
4	RUS	VYBORG	60.72	28.73	5.3	9.8	-2.0	37	22
4	RUS	VYTEGRA	61.02	36.45	4.3	9.7	-2.0	33	30
4	RUS	WLADIKAVKAZ	43.05	44.65	9.5	11.1	0.5	27	49
4	RUS	ZAMETCINO	53.48	42.63	6.1	11.4	-1.8	30	20
4	RUS	ZIZGIN	65.20	36.82	2.3	6.9	-1.3	46	48
4	SJM	BJORNOYA	74.52	19.02	-0.2	2.5	-0.4	55	6
4	SJM	HOPEN	76.50	25.07	-2.6	5.6	-2.2	63	-19
4	SJM	SVALBARD-LUFTHAVN	78.25	15.47	-2.9	6.8	-2.3	52	-14
4	SRB	BANATSKI-KARLOVAC	45.05	21.03	12.6	9.7	0.5	23	7
4	SRB	BEOGRAD-SURCIN	44.82	20.28	12.6	9.8	0.8	23	5
4	SRB	BEOGRAD	44.80	20.47	13.5	9.5	0.7	22	-11
4	SRB	CUPRIJA	43.93	21.38	11.9	9.2	-0.1	22	10
4	SRB	DIMITROVGRAD	43.02	22.75	10.9	9.6	0.6	24	7
4	SRB	KIKINDA	45.85	20.47	12.5	9.8	0.7	23	-1
4	SRB	KOPAONIK	43.28	20.80	5.6	7.7	-1.5	34	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	SRB	KRALJEVO	43.70	20.70	12.1	9.5	0.6	23	-7
4	SRB	KRUSEVAC	43.57	21.35	12.1	9.3	0.1	21	5
4	SRB	LESKOVAC	42.98	21.95	11.7	9.2	0.1	23	2
4	SRB	LOZNICA	44.55	19.23	12.1	9.3	0.4	24	2
4	SRB	NEGOTIN	44.23	22.55	12.3	10.5	0.9	20	0
4	SRB	NIS	43.33	21.90	12.3	10.0	0.5	23	1
4	SRB	NOVI-SAD-RIMSKI-SAN	45.33	19.85	12.6	9.4	0.3	21	8
4	SRB	PALIC	46.10	19.77	12.2	10.1	0.1	24	4
4	SRB	PEC	42.67	20.30	11.6	9.7	0.7	27	14
4	SRB	PRISTINA	42.65	21.15	10.8	9.4	0.0	25	12
4	SRB	SJENICA	43.28	20.00	8.3	8.4	-0.7	28	-15
4	SRB	SMEDEREVSKA-PALANKA	44.37	20.95	12.5	9.5	0.4	23	10
4	SRB	SOMBOR	45.77	19.15	12.2	9.2	0.1	23	13
4	SRB	SREMSKA-MITROVICA	45.10	19.55	12.6	9.4	0.7	20	10
4	SRB	VALJEVO	44.32	19.92	12.2	9.2	0.2	23	12
4	SRB	VELIKO-GRADISTE	44.75	21.52	12.2	9.4	0.3	23	3
4	SRB	VRANJE	42.55	21.92	11.7	9.9	0.7	23	1
4	SRB	VRSAC	45.15	21.32	12.8	9.6	1.0	23	9
4	SRB	ZLATIBOR	43.73	19.72	9.1	8.9	0.0	26	8
4	SRB	ZRENJANIN	45.37	20.42	12.6	9.5	0.1	22	12
4	SVK	BRATISLAVA-LETISKO	48.20	17.20	11.4	9.1	0.7	17	-17
4	SVK	CHOPOK	48.98	19.60	-0.1	4.1	-0.4	39	20
4	SVK	DUDINCE	48.17	18.87	10.9	10.0	0.7	19	2
4	SVK	HURBANOVO	47.87	18.20	11.7	9.4	0.0	22	1
4	SVK	KAMENICA-NAD-CIROCH	48.93	22.00	9.0	10.6	0.1	20	8
4	SVK	KOSICE	48.67	21.22	9.3	10.6	0.4	23	39
4	SVK	LIESEK	49.37	19.68	7.2	9.2	-0.1	28	15
4	SVK	LOMNICKY-STIT	49.20	20.22	-2.4	5.6	1.2	43	58
4	SVK	LUCENEC	48.33	19.73	10.3	9.6	-0.3	20	15
4	SVK	MILHOSTOV	48.67	21.73	10.2	10.4	0.8	20	26
4	SVK	NITRA	48.28	18.13	11.4	9.6	1.2	20	-3
4	SVK	PIESTANY	48.62	17.83	10.8	9.2	-0.1	23	4
4	SVK	POPRAD-TATRY	49.07	20.25	7.2	9.5	-0.5	23	9
4	SVK	PRIEVIDZA	48.77	18.60	10.1	10.0	1.0	22	13
4	SVK	SLIAC	48.65	19.15	9.0	10.2	-0.1	23	8
4	SVK	STRBSKE-PLESO	49.12	20.08	5.5	8.5	-1.2	35	14
4	SVK	STROPKOV-TISINEC	49.22	21.65	8.8	10.3	0.5	24	44
4	SVK	TELGART	48.85	20.18	6.6	9.2	-0.3	29	11
4	SVK	ZILINA-HRICOV	49.23	18.62	8.6	10.0	0.0	25	1
4	SVN	LJUBLJANA-BEZIGRAD	46.07	14.52	11.8	8.9	0.6	17	-7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	SVN	LJUBLJANA-BRNIK	46.22	14.48	10.2	9.3	0.4	24	0
4	SVN	PORTOROZ	45.52	13.57	14.4	8.2	0.1	29	2
4	SWE	ANGELHOLM	56.30	12.85	9.3	7.3	-0.5	27	32
4	SWE	ARJEPLOG	66.05	17.87	0.9	7.0	-0.5	36	16
4	SWE	BJUROKLUBB(LGT-H)	64.48	21.58	3.8	8.5	1.7	43	-51
4	SWE	FALSTERBO	55.38	12.82	9.9	7.4	-0.4	34	24
4	SWE	FARO-ISLAND	57.90	19.17	8.6	7.0	-1.2	34	23
4	SWE	FRANSTA	62.50	16.18	3.3	8.5	-1.4	32	34
4	SWE	GADDEDE	64.50	14.17	2.9	7.2	-1.9	38	39
4	SWE	GOTEBORG-LANDVETTER	57.67	12.30	8.3	7.2	-0.5	32	11
4	SWE	GOTEBORG-SAVE	57.78	11.88	8.8	7.4	-0.8	30	18
4	SWE	GOTSKA-SANDON	58.40	19.20	8.2	8.0	-1.2	39	16
4	SWE	GUNNARN	65.02	17.68	2.4	8.1	-1.4	35	44
4	SWE	HAPARANDA	65.83	24.15	3.3	8.5	-2.1	39	33
4	SWE	HARSTENA	58.25	17.02	8.5	7.6	-1.1	33	34
4	SWE	HEMAVAN	65.80	15.10	1.8	7.1	1.4	40	-38
4	SWE	HOBURG	56.92	18.15	8.9	7.6	-1.3	36	32
4	SWE	HOLMOGADD	63.60	20.75	4.8	8.5	-1.8	44	35
4	SWE	JOKKMOKK(SWE-AFB)	66.63	19.65	1.0	7.7	-0.9	36	31
4	SWE	JONKOPING-AXAMO	57.75	14.08	6.7	8.4	-0.7	31	5
4	SWE	KARLSTAD-FLYGPLATS	59.45	13.47	6.8	9.2	-0.8	30	6
4	SWE	KATTERJAKK	68.42	18.17	0.3	5.2	-0.5	39	36
4	SWE	KIRUNA	67.82	20.33	0.2	6.5	-0.5	36	16
4	SWE	KRAMFORS(SWE-AFB)	63.05	17.77	4.4	9.2	-1.4	33	26
4	SWE	KVIKKJOKK-ARRENJARK	66.88	17.75	0.9	7.5	-0.1	34	23
4	SWE	LAINIO	67.77	22.35	0.4	6.9	-1.0	34	22
4	SWE	LANDSORT	58.75	17.87	8.2	7.6	-1.4	35	28
4	SWE	LINKOPING-MALMSLATT	58.40	15.53	7.1	9.1	-0.2	29	16
4	SWE	LJUNGBYHED(SWE-AFB)	56.08	13.23	8.9	6.9	-0.8	26	6
4	SWE	LULEA-KALLAX	65.55	22.13	3.5	8.9	-1.6	39	34
4	SWE	MALILLA	57.40	15.82	7.5	7.6	-1.3	28	12
4	SWE	MALMO-STURUP	55.55	13.37	9.2	7.2	-0.3	29	1
4	SWE	MALUNG	60.68	13.72	4.2	8.5	-1.8	35	33
4	SWE	OSBY	56.37	13.95	8.0	7.7	-0.6	25	24
4	SWE	OSTERSUND-FROSON	63.20	14.50	4.1	7.8	-2.1	33	26
4	SWE	OSTMARK	60.35	12.65	4.9	8.7	-1.9	31	24
4	SWE	PAJALA	67.22	23.40	1.1	8.0	-0.9	30	30
4	SWE	RITSEM	67.73	17.47	0.5	5.9	-0.8	42	32
4	SWE	RONNEBY-KALLINGE	56.27	15.27	8.7	7.4	-0.4	26	8
4	SWE	SARNA	61.70	13.18	2.7	7.8	-1.3	30	48

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	SWE	SATENAS	58.43	12.72	7.8	8.3	0.0	27	5
4	SWE	SINGO-ISLAND	60.17	18.75	6.9	8.8	-0.5	30	27
4	SWE	SODERHAMN(SWE-AFB)	61.27	17.10	5.2	8.9	-1.5	32	21
4	SWE	STOCKHOLM-ARLANDA	59.65	17.95	7.2	9.1	-0.9	32	6
4	SWE	STOCKHOLM-BROMMA	59.37	17.90	7.7	9.0	-1.2	31	-10
4	SWE	STORLIEN	63.30	12.12	2.3	6.4	-1.6	41	37
4	SWE	SVEG	62.02	14.37	3.8	8.3	-2.0	32	29
4	SWE	SVENSKA-HOGARNA	59.45	19.50	7.5	8.3	-0.7	41	19
4	SWE	TIMRA-MIDLANDA	62.52	17.45	4.7	8.8	-2.0	34	25
4	SWE	UMEA	63.80	20.28	4.4	8.7	-2.4	36	28
4	SWE	UNGSKAR	56.03	15.80	8.6	6.1	-1.2	35	9
4	SWE	UPPSALA	59.90	17.60	6.4	8.9	-0.9	27	14
4	SWE	VASTERAS-HASSLO-AFB	59.58	16.63	7.3	9.0	-1.5	32	0
4	SWE	VISBY	57.67	18.35	8.8	7.7	-0.8	32	18
4	SYR	ABUKMAL	34.42	40.92	20.0	10.0	0.5	24	-15
4	SYR	ALEPPO-INTL-AP	36.18	37.20	17.6	10.0	0.9	29	-14
4	SYR	DAMASCUS-INTL-AP	33.42	36.52	17.1	9.1	0.6	26	-7
4	SYR	DARAA	32.60	36.10	17.7	7.4	0.8	31	-3
4	SYR	DEIR-EZZOR	35.32	40.15	19.3	10.9	0.9	25	-8
4	SYR	HAMA	35.12	36.75	17.7	8.9	0.7	28	-17
4	SYR	KAMISHLI	37.05	41.22	18.2	10.3	0.5	26	-26
4	SYR	LATTAKIA	35.53	35.77	19.8	7.2	1.0	37	-15
4	SYR	NABK	34.03	36.72	13.8	8.4	0.5	30	8
4	SYR	PALMYRA	34.55	38.30	18.5	9.8	0.8	24	-7
4	SYR	SAFITA	34.82	36.13	18.2	7.0	1.2	35	1
4	TUR	ADANA-INCIRLIK-AB	37.00	35.43	18.6	8.2	0.6	35	-35
4	TUR	AFYON	38.75	30.53	12.1	8.8	0.4	25	-12
4	TUR	AKHISAR	38.92	27.85	16.5	9.2	-0.5	29	35
4	TUR	ANTALYA	36.87	30.73	18.6	8.0	0.5	34	-44
4	TUR	AYDIN	37.85	27.85	17.7	8.4	-0.5	29	47
4	TUR	BALIKESIR	39.62	27.92	14.6	8.7	0.0	30	2
4	TUR	BANDIRMA	40.32	27.97	14.7	8.4	-0.8	31	22
4	TUR	BODRUM	37.03	27.43	18.9	7.5	-1.0	35	19
4	TUR	BOLU	40.73	31.60	11.5	8.7	0.6	28	-2
4	TUR	BURSA	40.18	29.07	14.9	8.4	-0.4	31	28
4	TUR	CANAKKALE	40.13	26.40	15.7	8.6	-0.5	34	20
4	TUR	CORUM	40.55	34.95	11.1	9.6	0.6	27	3
4	TUR	DIKILI	39.07	26.88	16.6	8.3	0.0	32	-1
4	TUR	DIYARBAKIR	37.88	40.18	15.7	11.9	0.9	29	-23
4	TUR	EDIRNE	41.67	26.57	14.1	9.5	0.1	25	10

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	TUR	ELAZIG	38.60	39.28	13.5	11.1	1.0	28	-23
4	TUR	ERZINCAN	39.70	39.52	11.0	11.9	0.7	26	21
4	TUR	ERZURUM	39.95	41.17	5.9	11.2	-1.2	38	35
4	TUR	ESENBOGA	40.12	33.00	10.8	9.8	0.0	27	7
4	TUR	ESKISEHIR	39.78	30.57	12.0	9.5	-0.9	26	48
4	TUR	ETIMESGUT	39.95	32.68	12.0	9.7	-0.9	26	44
4	TUR	GAZIANTEP	37.08	37.37	16.0	10.7	0.9	28	-30
4	TUR	GOKCEADA	40.18	25.90	15.8	7.7	-0.5	32	5
4	TUR	GOLCUK-DUMLUPINAR	40.67	29.83	15.3	8.2	0.0	30	1
4	TUR	INEBOLU	41.98	33.78	14.0	7.7	-0.5	38	17
4	TUR	ISKENDERUN	36.58	36.17	20.2	7.6	1.0	34	-19
4	TUR	ISPARTA	37.75	30.55	12.7	9.0	0.8	30	-30
4	TUR	ISTANBUL-ATATURK	40.97	28.82	15.2	8.4	-0.1	33	-1
4	TUR	IZMIR-A-MENDERES	38.27	27.15	17.0	9.3	-0.5	30	28
4	TUR	KAYSERI-ERKILET	38.82	35.43	11.3	9.5	0.6	27	-2
4	TUR	KONYA	37.97	32.55	12.5	10.2	0.6	29	-5
4	TUR	MALATYA-ERHAC	38.43	38.08	13.8	11.2	0.6	28	-16
4	TUR	MERZIFON	40.85	35.58	12.1	9.2	0.4	27	-1
4	TUR	MUGLA	37.22	28.37	15.2	9.2	-0.7	30	37
4	TUR	SAMSUN	41.28	36.30	15.0	7.3	-0.9	39	32
4	TUR	SILIFKE	36.38	33.93	19.5	8.1	1.0	31	-7
4	TUR	SINOP	42.03	35.17	14.7	7.7	-0.5	40	15
4	TUR	SIVAS	39.75	37.02	9.7	10.2	1.0	30	22
4	TUR	TEKIRDAG	40.98	27.55	14.6	8.5	0.5	32	-50
4	TUR	TRABZON	41.00	39.72	15.2	7.6	0.5	40	-34
4	TUR	USAK	38.68	29.40	13.2	9.2	-0.8	29	36
4	TUR	VAN	38.45	43.32	9.6	11.4	-0.4	34	-13
4	TUR	ZONGULDAK	41.45	31.80	14.2	7.6	-0.2	35	5
4	UKR	CHERNIHIV	51.47	31.25	8.2	11.1	-1.0	27	-6
4	UKR	CHERNIVTSI	48.37	25.90	9.6	10.4	0.7	21	-6
4	UKR	CHORNOMORSKE	45.52	32.70	12.2	9.8	-0.6	31	19
4	UKR	DNIPROPETROVSK	48.60	34.97	9.6	12.0	-0.2	26	6
4	UKR	DONETSK	48.07	37.77	8.7	11.8	-0.3	26	9
4	UKR	HENICHESK	46.17	34.82	11.6	11.2	0.6	26	-38
4	UKR	IVANO-FRANKIVSK	48.97	24.70	8.9	10.3	0.1	20	10
4	UKR	IZIUM	49.18	37.30	8.7	11.7	-0.8	25	-6
4	UKR	IZMAIL	45.37	28.85	11.5	10.3	0.0	24	3
4	UKR	KERCH	45.40	36.42	12.0	10.4	-0.7	28	31
4	UKR	KHARKIV	49.97	36.13	8.5	12.2	-0.3	25	8
4	UKR	KHERSON	46.63	32.57	11.0	10.8	0.0	27	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
4	UKR	KHMELNYTSKYI	49.43	26.98	9.3	9.7	0.0	24	10
4	UKR	KIROVOHRAD	48.52	32.20	8.7	11.6	-0.5	26	-18
4	UKR	KONOTOP	51.23	33.20	8.1	10.9	-0.3	24	10
4	UKR	KRYVYI-RIH	48.03	33.22	9.2	12.3	-0.1	25	13
4	UKR	KYIV	50.40	30.57	9.1	10.8	-0.2	22	9
4	UKR	LIUBASHIVKA	47.85	30.27	9.2	11.7	-0.7	27	-19
4	UKR	LUBNY	50.00	33.02	8.6	11.5	-0.2	26	13
4	UKR	LUHANSK	48.57	39.25	9.3	12.3	-0.4	23	-14
4	UKR	LVIV	49.82	23.95	8.4	10.0	-0.6	27	-29
4	UKR	MARIUPOL	47.03	37.50	10.4	12.5	0.2	27	8
4	UKR	MOHYLIV-PODILSKYI	48.45	27.78	10.1	9.7	-0.1	21	12
4	UKR	MYRONIVKA	49.67	31.00	8.6	11.2	-0.6	27	-9
4	UKR	NIZHYN	51.05	31.90	8.0	11.0	-0.8	22	-15
4	UKR	ODESA	46.43	30.77	11.7	10.7	-0.2	26	3
4	UKR	POLTAVA	49.60	34.55	8.7	11.9	-0.2	26	10
4	UKR	RIVNE	50.58	26.13	8.2	10.6	-0.2	25	3
4	UKR	SARNY	51.28	26.62	8.1	10.6	-0.7	24	-23
4	UKR	SHEPETIVKA	50.17	27.03	8.2	10.6	-0.2	24	13
4	UKR	SIMFEROPOL	44.68	34.13	11.8	9.7	-0.4	28	9
4	UKR	SUMY	50.85	34.67	7.9	11.7	-0.8	25	8
4	UKR	SVITLOVODSK	49.05	33.25	9.6	12.2	-0.5	28	-33
4	UKR	TERNOPIL	49.53	25.67	8.1	10.2	-0.1	23	15
4	UKR	UMAN	48.77	30.23	8.6	11.2	-0.6	25	-27
4	UKR	UZHHOROD	48.63	22.27	10.3	10.4	1.2	24	51
4	UKR	VINNYTSIA	49.23	28.60	8.7	10.9	-0.7	26	-22
4	UKR	VOLODYMYR-VOLYNSKYI	50.83	24.32	8.4	10.2	-0.2	24	4
4	UKR	YALTA	44.48	34.17	13.5	9.1	-0.8	33	25
4	UKR	ZAPORIZHZHIA	47.80	35.02	9.6	12.0	-0.7	27	-23
4	UKR	ZHYTOMYR	50.23	28.73	8.2	10.9	-0.2	25	16
5	ABW	QUEEN-BEATRIX-AP	12.50	-70.02	28.4	0.8	0.4	-13	29
5	ANT	HATO-AP(CIV-MIL)	12.20	-68.97	28.1	1.1	0.2	42	-20
5	ATG	VC-BIRD-INTL-AP	17.12	-61.78	27.0	1.3	-0.5	47	14
5	BHS	NASSAU-AP-NEW	25.05	-77.47	25.3	3.2	0.4	41	6
5	BLZ	BELIZE-PHILLIP-GOLD	17.53	-88.30	26.4	2.0	0.3	5	18
5	BRB	GRANTLEY-ADAMS	13.07	-59.48	27.0	0.7	0.7	-14	42
5	CAN	Calgary	51.12	-114.02	4.9	9.9	-1.7	35	31
5	CAN	Edmonton	53.53	-114.10	4.0	9.7	-1.5	31	33
5	CAN	Fort McMurray	56.65	-111.22	3.1	10.5	-0.7	33	23
5	CAN	Grande Prairie	55.18	-118.88	3.4	9.9	-1.2	36	41
5	CAN	Lethbridge	49.63	-112.80	6.9	10.8	-0.6	33	15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	CAN	Medicine Hat	50.02	-110.72	7.0	11.4	-0.9	32	23
5	CAN	Abbotsford	49.03	-122.37	10.3	6.3	0.5	26	-33
5	CAN	Comox	49.72	-124.90	10.3	6.4	-1.0	26	49
5	CAN	Cranbrook	49.60	-115.78	6.5	10.4	-1.4	26	31
5	CAN	Fort St John	56.23	-120.73	3.6	9.8	-0.8	34	38
5	CAN	Kamloops	50.70	-120.45	9.1	11.2	0.1	23	16
5	CAN	Port Hardy	50.68	-127.37	8.7	4.8	-0.4	29	49
5	CAN	Prince George	53.88	-122.68	5.0	9.1	-1.2	31	34
5	CAN	Prince Rupert	54.30	-130.43	7.8	5.7	0.6	31	-12
5	CAN	Sandspit	53.25	-131.82	9.1	5.3	0.7	36	-27
5	CAN	Smithers	54.82	-127.18	4.5	8.9	-1.3	30	28
5	CAN	Summerland	49.57	-119.65	9.5	9.8	0.5	22	-14
5	CAN	Vancouver	49.18	-123.17	10.6	6.3	0.9	25	-38
5	CAN	Victoria	48.65	-123.43	10.5	5.5	-0.5	27	50
5	CAN	Brandon	49.92	-99.95	4.2	11.7	-1.2	35	38
5	CAN	Churchill	58.75	-94.07	-3.3	10.5	-1.9	49	-16
5	CAN	The Pas	53.97	-101.10	3.0	11.3	-1.1	35	23
5	CAN	Winnipeg	49.90	-97.23	4.8	12.3	-1.0	36	30
5	CAN	Fredericton	45.87	-66.53	6.2	11.4	-1.4	38	27
5	CAN	Miramichi	47.02	-65.45	5.8	11.2	-1.7	39	29
5	CAN	Saint John	45.32	-65.88	5.8	10.0	-1.0	43	33
5	CAN	Battle Harbour	52.30	-55.83	1.2	5.7	1.2	55	-8
5	CAN	Gander	48.95	-54.57	4.8	9.2	-1.9	45	35
5	CAN	Goose	53.32	-60.37	2.0	9.2	0.0	42	8
5	CAN	St Johns	47.62	-52.73	5.3	8.8	1.7	46	-57
5	CAN	Stephenville	48.53	-58.55	5.8	9.6	1.3	43	-55
5	CAN	Greenwood	44.98	-64.92	7.6	10.7	-1.3	36	8
5	CAN	Sable Island	43.93	-60.02	8.7	7.8	0.7	50	-27
5	CAN	Shearwater	44.63	-63.50	7.3	10.1	-0.4	42	4
5	CAN	Sydney	46.17	-60.05	6.0	10.1	-1.4	47	33
5	CAN	Truro	45.37	-63.27	6.3	10.4	-1.2	45	27
5	CAN	Inuvik	68.30	-133.48	-5.0	12.9	-3.0	43	-18
5	CAN	Yellowknife	62.47	-114.45	-0.9	10.7	-1.5	34	-12
5	CAN	Resolute	74.72	-94.98	-12.8	14.6	-2.8	38	17
5	CAN	Kingston	44.22	-76.60	7.5	11.9	-1.4	42	28
5	CAN	London	43.03	-81.15	8.1	11.8	-0.5	35	-4
5	CAN	Mount Forest	43.98	-80.75	6.6	11.3	-1.1	40	27
5	CAN	Muskoka	44.97	-79.30	6.3	11.2	-1.3	36	11
5	CAN	North Bay	46.35	-79.43	5.2	11.2	-1.3	38	22
5	CAN	Ottawa	45.32	-75.67	6.7	12.1	-1.2	36	22

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	CAN	Sault Ste Marie	46.48	-84.52	5.5	11.0	-1.0	41	32
5	CAN	Simcoe	42.85	-80.27	8.2	11.6	-0.9	34	-1
5	CAN	Thunder Bay	48.37	-89.32	4.3	10.5	-1.4	40	35
5	CAN	Timmins	48.57	-81.37	3.7	10.4	-1.4	39	35
5	CAN	Toronto	43.67	-79.63	7.9	11.6	-1.3	36	12
5	CAN	Trenton	44.12	-77.53	7.9	11.8	-0.8	34	2
5	CAN	Windsor	42.27	-82.97	9.7	12.3	-0.5	34	-25
5	CAN	Charlottetown	46.28	-63.13	6.2	10.8	-1.5	44	31
5	CAN	Bagotville	48.33	-71.00	4.0	10.5	-1.1	38	30
5	CAN	Baie Comeau	49.13	-68.20	3.3	9.2	-1.4	42	44
5	CAN	Grindstone Island	47.38	-61.87	5.3	9.4	-1.9	49	41
5	CAN	Kuujjuarapik	55.28	-77.77	-1.2	8.2	-1.0	46	-32
5	CAN	Kuujuaq	58.10	-68.42	-2.4	9.0	-2.0	47	-14
5	CAN	La Grande Riviere	53.63	-77.70	-0.4	8.9	-1.0	38	-21
5	CAN	Lake Eon	51.87	-63.28	-0.5	7.6	-0.4	36	7
5	CAN	Mont Joli	48.60	-68.22	4.4	10.2	-1.9	40	34
5	CAN	Montreal Intl AP	45.47	-73.75	7.3	12.3	-1.3	36	7
5	CAN	Montreal Jean Brebeuf	45.50	-73.62	6.8	12.5	-1.4	36	18
5	CAN	Montreal Mirabel	45.68	-74.03	6.3	11.8	-1.0	34	10
5	CAN	Nitchequon CAN270	53.20	-70.90	-0.7	8.7	-0.8	37	-13
5	CAN	Quebec	46.80	-71.38	5.8	11.3	-1.6	38	26
5	CAN	Riviere du Loup	47.80	-69.55	4.6	10.4	-1.6	42	32
5	CAN	Roberval	48.52	-72.27	4.4	10.9	-1.5	38	26
5	CAN	Schefferville	54.80	-66.82	-1.4	8.3	-1.3	39	-17
5	CAN	Sept-Iles	50.22	-66.27	2.7	9.0	1.1	42	-32
5	CAN	Sherbrooke	45.43	-71.68	5.5	10.9	-1.5	36	20
5	CAN	St Hubert	45.52	-73.42	7.1	12.5	-1.4	36	13
5	CAN	Ste Agathe des Monts	46.05	-74.28	4.7	10.7	-1.6	37	28
5	CAN	Val d Or	48.07	-77.78	3.4	10.4	-1.1	38	37
5	CAN	Estevan	49.22	-102.97	5.4	12.1	-1.5	35	25
5	CAN	North Battleford	52.77	-108.25	3.8	11.2	-1.2	36	39
5	CAN	Regina	50.43	-104.67	4.5	11.6	-1.4	34	30
5	CAN	Saskatoon	52.17	-106.68	4.1	11.3	-1.2	35	25
5	CAN	Swift Current	50.28	-107.68	5.3	11.2	-1.3	35	22
5	CAN	Whitehorse	60.72	-135.07	0.8	8.0	0.9	29	-16
5	CRI	JUAN-SANTAMARIA-INT	9.98	-84.22	22.9	0.6	0.4	-50	-4
5	CUB	GUANTANAMO-BAY-NAS	19.90	-75.15	26.9	1.8	0.1	39	3
5	DOM	LAS-AMERICAS	18.43	-69.67	25.3	1.4	0.4	22	51
5	DOM	PUERTO-PLATA-INTL	19.75	-70.55	25.5	1.6	-0.2	13	3
5	DOM	SANTO-DOMINGO	18.43	-69.88	25.7	1.5	0.3	33	34

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	FRA	LE-RAIZET-GUADELOUP	16.27	-61.60	25.9	1.4	-0.1	48	-21
5	GRD	POINT-SALINES-AP	12.00	-61.78	27.6	0.9	0.5	32	21
5	HND	LA-CEIBA(AP)	15.73	-86.87	25.4	1.9	0.5	32	14
5	HND	SANTA-ROSA-DE-COPAN	14.78	-88.78	20.5	1.7	0.9	7	10
5	HND	TEGUCIGALPA	14.05	-87.22	21.9	1.2	0.7	-7	8
5	JAM	KINGSTON-NORMAN-MAN	17.93	-76.78	27.8	0.7	-0.1	25	9
5	JAM	MONTEGO-BAY-SANGSTE	18.50	-77.92	27.0	1.3	0.4	25	21
5	MEX	ACAPULCO-G-ALVAREZ	16.75	-99.75	26.9	1.4	-0.1	37	-14
5	MEX	AGUASCALIENTES	21.87	-102.30	17.6	3.6	1.2	10	20
5	MEX	BAHIAS-DE-HUATULCO	15.77	-96.25	26.1	1.2	-0.3	-16	23
5	MEX	CAMPECHE-IGNACIO	19.85	-90.55	25.7	1.9	0.9	10	7
5	MEX	CHETUMAL	18.48	-88.30	26.5	2.5	0.4	6	-2
5	MEX	CIUDAD-DEL-CARMEN-I	18.65	-91.80	27.1	2.0	0.7	14	12
5	MEX	CIUDAD-VICTORIA	23.70	-98.95	23.7	5.5	0.7	20	12
5	MEX	COLIMA	19.27	-103.58	23.5	1.3	0.4	11	20
5	MEX	CUERNAVACA	18.88	-99.23	20.9	1.9	1.0	-19	17
5	MEX	CULIACAN(CITY)	24.80	-107.40	24.3	5.3	0.7	34	28
5	MEX	DE-GUANAJUATO-INTL	20.98	-101.48	19.1	3.3	1.0	-6	18
5	MEX	DURANGO-INTL	24.12	-104.52	17.5	4.5	0.7	9	19
5	MEX	GUAYMAS-G-YANEZ-AP	27.97	-110.92	23.1	7.9	0.9	33	-15
5	MEX	HERMOSILLO-INTL	29.08	-110.93	22.6	7.7	0.7	27	-7
5	MEX	IXTAPA-ZIHUATANEJO	17.60	-101.45	25.7	1.7	-0.3	45	-24
5	MEX	JUAREZ-G-GONZALEZ	31.63	-106.42	19.1	9.3	1.0	16	-4
5	MEX	LA-PAZ-G-MARQUEZ-AP	24.07	-110.35	24.2	5.5	0.7	39	-1
5	MEX	MATAMOROS-G-CANALES	25.77	-97.52	23.8	5.8	1.2	21	9
5	MEX	MEXICALI-G-SANCHEZ	32.63	-115.23	22.7	8.9	1.3	25	-23
5	MEX	MONCLOVA	26.88	-101.43	22.5	7.2	1.2	14	19
5	MEX	MONTERREY-INTL-AP	25.87	-100.38	23.2	6.7	0.8	11	13
5	MEX	MORELIA-G-MUJICA-AP	19.85	-101.02	17.6	3.0	1.1	4	30
5	MEX	PIEDRAS-NEGRAS	28.70	-100.53	22.7	7.9	0.7	16	-5
5	MEX	PLAYA-DE-ORO-INTL	19.13	-104.55	25.3	2.5	-0.2	61	-10
5	MEX	PUEBLA	19.05	-98.17	15.7	2.1	0.7	3	20
5	MEX	PUERTO-ESCONDIDO	15.87	-97.08	26.6	1.3	-0.4	28	-10
5	MEX	QUETZALCOATL-INTL	27.43	-99.57	23.1	8.1	1.0	18	20
5	MEX	SALTILLO	25.37	-101.02	18.1	4.6	0.5	11	24
5	MEX	TAPACHULA-INTL	14.78	-92.37	26.3	1.2	0.7	-23	24
5	MEX	TEPIC	21.52	-104.88	21.2	3.4	0.4	26	31
5	MEX	TIJUANA-G-RODRIGUE	32.53	-116.97	17.7	4.0	0.5	37	-10
5	MEX	TOLUCA-LA-LOPEZ-AP	19.33	-99.57	13.9	2.6	0.9	4	20

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	MEX	TORREON-AP	25.53	-103.43	21.3	6.5	1.2	10	6
5	MEX	TULANCINGO	20.08	-98.37	15.4	2.7	0.3	2	31
5	MEX	TUXPAN-INTL-AP	20.98	-89.65	26.3	2.4	0.2	9	16
5	MEX	TUXTLA-GUTIERREZ-A	16.75	-93.13	22.5	2.1	0.7	-2	26
5	MEX	VALLE-DEL-FUERTE-IN	25.68	-109.08	24.2	5.6	1.0	36	-3
5	MEX	XOXOCOTLAN-INTL	17.00	-96.72	19.9	2.0	0.9	-3	8
5	MTQ	LE-LAMENTIN	14.60	-61.00	26.5	1.0	0.0	36	-11
5	PRI	AQUADILLA-BORINQUEN	18.50	-67.13	25.1	1.3	0.1	53	-3
5	PRI	EUGENIO-MARIA-DE-HO	18.25	-67.15	25.1	1.1	-0.1	29	-7
5	PRI	MERCEDITA	18.00	-66.55	26.3	2.2	-0.5	40	9
5	PRI	ROOSEVELT-ROADS	18.25	-65.63	26.8	1.7	-0.1	42	-3
5	PRI	SAN-JUAN-INTL-AP	18.42	-66.00	26.2	1.7	-0.4	36	-15
5	SPM	SAINT-PIERRE	46.77	-56.17	6.4	8.8	-1.0	53	34
5	TTO	CROWN-POINT-AP	11.15	-60.83	26.8	0.4	0.5	30	22
5	TTO	PIARCO-INTL-AP	10.62	-61.35	26.2	0.9	0.8	19	22
5	USA	Adak NAS	51.88	-176.65	5.5	4.1	1.0	45	-29
5	USA	Ambler	67.10	-157.85	-1.1	8.0	-1.0	29	-10
5	USA	Anaktuvuk Pass	68.13	-151.73	-4.1	10.0	-2.3	38	-29
5	USA	Anchorage-Elmendorf AFB	61.25	-149.80	5.1	8.6	-2.8	22	20
5	USA	Anchorage-Lake Hood Seaplane Base	61.18	-149.97	5.1	8.3	-2.0	28	14
5	USA	Anchorage-Merrill Field	61.22	-149.85	4.9	8.7	-2.5	30	16
5	USA	Anchorage Intl AP	61.18	-150.00	3.6	9.1	-2.1	31	40
5	USA	Aniak AP	61.58	-159.53	1.7	6.3	-2.2	32	30
5	USA	Annette Island AP	55.05	-131.57	8.9	5.2	-0.7	31	45
5	USA	Anvik	62.65	-160.18	1.6	7.1	-1.2	33	49
5	USA	Barrow-W Post-W Rogers AP	71.32	-156.62	-8.5	12.3	-0.9	43	-5
5	USA	Bethel AP	60.78	-161.83	1.5	7.6	-1.0	38	31
5	USA	Bettles Field	66.92	-151.52	-1.0	10.4	-1.6	25	-8
5	USA	Big Delta-Allen AAF	64.00	-145.72	1.9	9.7	-1.6	28	13
5	USA	Big River Lake	60.82	-152.30	3.8	8.0	-2.7	32	27
5	USA	Birchwood	61.42	-149.52	4.5	8.1	-2.1	23	19
5	USA	Chulitna	62.88	-149.83	2.5	6.3	-2.1	32	21
5	USA	Cold Bay AP	55.20	-162.72	5.2	5.1	-0.9	40	38
5	USA	Cordova	60.50	-145.50	4.6	7.2	-1.1	20	38
5	USA	Deadhorse	70.20	-148.48	-6.0	12.4	-4.0	47	-28
5	USA	Dillingham AWOS	59.05	-158.52	3.0	6.4	-2.9	30	35
5	USA	Eielson AFB	64.65	-147.10	1.4	8.5	-1.6	30	23
5	USA	Emmonak	62.78	-164.50	1.3	6.7	-0.1	40	12
5	USA	Fairbanks Intl AP	64.82	-147.85	1.5	10.3	-1.2	28	21

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Fort Yukon	66.57	-145.27	-1.3	10.4	-2.1	26	-12
5	USA	Gambell	63.78	-171.75	-0.8	5.0	-0.7	52	1
5	USA	Gulkana	62.15	-145.45	0.6	8.1	0.0	28	12
5	USA	Gustavus	58.42	-135.70	5.3	6.9	0.1	22	9
5	USA	Hayes River	61.98	-152.08	3.4	7.4	-2.9	33	31
5	USA	Healy River AP	63.88	-149.02	2.5	7.2	-2.0	32	23
5	USA	Homer AP	59.65	-151.48	4.4	7.8	-1.6	37	35
5	USA	Hoonah	58.08	-135.45	5.5	7.9	-0.8	24	16
5	USA	Hooper Bay	61.52	-166.15	0.8	5.4	0.4	48	3
5	USA	Huslia	65.70	-156.38	-0.2	7.8	-0.2	24	14
5	USA	Hydaburg Seaplane Base	55.20	-132.83					
5	USA	Iliamna AP	59.75	-154.92	4.6	7.4	-2.4	25	29
5	USA	Juneau Intl AP	58.35	-134.58	6.0	8.3	-0.4	26	-16
5	USA	Kake Seaplane Base	56.97	-133.95	6.9	6.7	-0.8	25	25
5	USA	Kenai Muni AP	60.58	-151.23	4.0	7.1	-2.4	27	29
5	USA	Ketchikan Intl AP	55.37	-131.72	7.4	7.6	-0.6	33	22
5	USA	King Salmon AP	58.68	-156.65	2.7	7.6	-1.8	40	43
5	USA	Kodiak AP	57.75	-152.50	6.7	5.8	-1.4	27	50
5	USA	Kotzebue-Ralph Wein Mem AP	66.88	-162.60	-2.1	8.9	-2.0	47	3
5	USA	McGrath AP	62.95	-155.60	0.1	9.4	-0.9	27	10
5	USA	Mekoryuk 702185	60.37	-166.27	1.3	4.6	1.6	48	-29
5	USA	Middleton Island	59.47	-146.32	6.9	5.0	-1.7	42	49
5	USA	Minchumina 702460	63.88	-152.28	1.1	9.2	0.0	21	8
5	USA	Nenana Muni AP	64.55	-149.10	1.1	7.4	-1.9	25	13
5	USA	Nome Muni AP	64.52	-165.45	-0.2	6.6	-1.6	40	11
5	USA	Northway AP	62.97	-141.93	-1.4	10.2	-1.3	25	-7
5	USA	Palmer Muni AP	61.60	-149.08	5.8	8.0	-1.6	23	19
5	USA	Petersburg	56.80	-132.95	6.0	7.4	-0.4	24	22
5	USA	Point Hope AWOS	68.35	-166.80	-2.8	7.3	-2.6	56	-18
5	USA	Port Heiden	56.95	-158.62	3.6	6.0	-1.6	47	40
5	USA	Saint Marys AWOS	62.07	-163.30	1.7	5.7	-0.7	49	21
5	USA	Sand Point	55.32	-160.52	5.3	5.5	-1.7	31	48
5	USA	Savoonga	63.68	-170.50	-0.5	5.0	-0.8	49	-5
5	USA	Selawik	66.60	-160.00	-1.4	8.1	-1.6	36	-17
5	USA	Seward	60.12	-149.45	5.0	7.6	-1.5	26	29
5	USA	Shemya AFB	52.72	174.12	3.7	4.9	0.7	48	-31
5	USA	Shishmaref AWOS	66.27	-166.05	-1.9	7.2	-1.8	50	-18
5	USA	Sitka-Japonski Island AP	57.05	-135.37	6.9	7.0	0.0	34	6
5	USA	Skagway AP	59.47	-135.30	6.1	8.2	-0.7	22	2

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Sleetmute	61.72	-157.15	2.3	8.1	-0.2	21	16
5	USA	Soldotna	60.47	-151.03	3.5	7.4	-2.6	27	32
5	USA	St Paul Island AP	57.17	-170.22	2.7	5.2	-1.5	59	51
5	USA	Talkeetna State AP	62.32	-150.10	2.9	8.8	-1.6	31	43
5	USA	Tanana-Ralph Calhoun AP	65.17	-152.10	-0.2	7.8	-0.8	27	6
5	USA	Togiak Village AWOS	59.05	-160.40	3.3	6.7	-2.7	38	35
5	USA	Unalakleet Field	63.88	-160.80	0.9	6.1	0.5	36	-6
5	USA	Unalaska-Dutch Harbor Field	53.90	-166.55	5.5	4.8	-1.2	48	24
5	USA	Valdez-Pioneer Field	61.13	-146.27	4.8	7.1	-1.6	24	25
5	USA	Valdez	61.13	-146.35	4.5	7.7	-1.4	30	26
5	USA	Whittier	60.77	-148.68	4.5	7.5	-1.7	27	27
5	USA	Wrangell	56.48	-132.37	6.7	7.5	-0.7	29	45
5	USA	Yakutat State AP	59.52	-139.63	4.9	7.5	-0.9	35	26
5	USA	Anniston Metro AP	33.58	-85.85	17.0	8.0	0.7	17	0
5	USA	Auburn-Opelika AP	32.62	-85.43	16.7	7.9	0.8	26	23
5	USA	Birmingham Muni AP	33.57	-86.75	17.3	8.9	0.9	21	-4
5	USA	Dothan Muni AP	31.23	-85.43	19.0	8.4	1.4	22	11
5	USA	Fort Rucker-Cairns Field	31.27	-85.72	18.1	8.3	0.6	20	1
5	USA	Gadsen Muni AWOS	33.97	-86.08	16.0	8.6	1.2	22	-12
5	USA	Huntsville Intl AP-Jones Field	34.65	-86.78	16.1	9.7	0.7	21	10
5	USA	Maxwell AFB	32.38	-86.35	18.1	9.2	0.8	21	1
5	USA	Mobile-Downtown AP	30.63	-88.07	19.7	7.6	0.7	24	-25
5	USA	Mobile-Rgnl AP	30.68	-88.25	19.6	7.6	0.7	22	8
5	USA	Montgomery-Dannelly Field	32.30	-86.40	18.2	8.3	0.9	19	-6
5	USA	Muscle Shoals Rgnl AP	34.75	-87.60	17.1	8.5	1.0	26	30
5	USA	Troy Air Field	31.87	-86.02	18.3	8.1	1.3	23	-7
5	USA	Tuscaloosa Muni AP	33.22	-87.62	17.5	8.9	1.2	22	5
5	USA	Batesville AWOS	35.73	-91.65	15.6	9.6	0.4	25	4
5	USA	Bentonville AWOS	36.35	-94.22	14.5	10.5	1.4	23	-37
5	USA	El Dorado-Goodwin Field	33.22	-92.82	18.0	9.9	1.2	20	-3
5	USA	Fayetteville-Drake Field	36.00	-94.17	15.9	10.1	1.6	26	-19
5	USA	Flippin AWOS	36.30	-92.47	15.2	9.7	1.0	28	3
5	USA	Fort Smith Rgnl AP	35.33	-94.37	16.2	11.1	1.0	24	8
5	USA	Harrison AP	36.27	-93.15	15.4	10.0	0.7	28	-6
5	USA	Hot Springs Mem AP	34.47	-93.10	16.9	10.0	0.4	26	-19
5	USA	Jonesboro Muni AP	35.83	-90.65	15.4	11.6	2.1	24	9
5	USA	Little Rock-Adams Field	34.75	-92.23	17.0	10.2	1.0	23	4
5	USA	Little Rock AFB	34.92	-92.15	16.5	10.0	0.2	22	9

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Pine Bluff AP	34.17	-91.93	17.2	11.0	1.8	22	-6
5	USA	Rogers AWOS	36.37	-94.10	14.9	10.8	-0.1	29	6
5	USA	Siloam Spring AWOS	36.18	-94.48	15.4	9.9	-0.7	23	38
5	USA	Springdale Muni AP	36.18	-94.12	15.2	10.3	1.2	23	-11
5	USA	Stuttgart AWOS	34.60	-91.57	17.6	9.6	0.7	26	17
5	USA	Texarkana-Webb Field	33.45	-94.00	18.5	9.3	1.3	24	1
5	USA	Walnut Ridge AWOS	36.13	-90.92	15.8	10.4	0.8	23	4
5	USA	Casa Grande AWOS	32.95	-111.77	20.9	9.7	1.2	22	-32
5	USA	Davis-Monthan AFB	32.17	-110.88	21.1	8.1	0.1	20	8
5	USA	Douglas-Bisbee Douglas Intl AP	31.47	-109.60	17.6	8.4	0.9	16	6
5	USA	Flagstaff-Pulliam AP	35.13	-111.67	8.7	9.2	-0.6	27	28
5	USA	Grand Canyon National Park AP	35.95	-112.15	9.3	9.3	-0.3	26	11
5	USA	Kingman AWOS	35.27	-113.95	17.5	10.7	-0.9	19	52
5	USA	Luke AFB	33.55	-112.37	22.3	9.7	-0.8	23	47
5	USA	Page Muni AWOS	36.93	-111.45	15.5	10.9	0.8	17	-24
5	USA	Phoenix-Deer Valley AP	33.68	-112.08	21.7	9.7	0.1	26	3
5	USA	Phoenix-Sky Harbor Intl AP	33.45	-111.98	22.6	9.7	0.2	22	9
5	USA	Prescott-Love Field	34.65	-112.42	13.9	9.2	0.6	26	-41
5	USA	Safford AWOS	32.82	-109.68	19.4	9.1	1.4	16	-7
5	USA	Scottsdale Muni AP	33.62	-111.92	21.2	9.7	0.0	26	6
5	USA	Show Low Muni AP	34.27	-110.00	12.7	8.6	0.0	20	9
5	USA	Tucson Intl AP	32.13	-110.95	20.1	8.6	-0.1	24	6
5	USA	Winslow Muni AP	35.03	-110.72	13.7	10.5	-0.5	20	39
5	USA	Yuma Intl AP	32.67	-114.60	23.1	8.3	1.5	31	-36
5	USA	Yuma MCAS	32.65	-114.62	22.9	8.4	1.5	29	-28
5	USA	Alturas	41.50	-120.53	10.0	8.9	-1.7	23	42
5	USA	Arcata AP	40.98	-124.10	11.5	2.6	0.2	40	7
5	USA	Bakersfield-Meadows Field	35.43	-119.05	18.5	8.1	0.9	26	-20
5	USA	Barstow Daggett AP	34.85	-116.80	19.5	9.7	1.0	21	-29
5	USA	Beale AFB	39.13	-121.43	16.8	8.2	1.6	23	-29
5	USA	Bishop AP	37.37	-118.35	14.5	9.4	-1.0	22	47
5	USA	Blue Canyon AP	39.30	-120.72	11.5	7.9	-0.4	39	8
5	USA	Blythe-Riverside County AP	33.62	-114.72	23.1	9.7	1.3	20	-34
5	USA	Burbank-Glendale-Passadena Bob Hope AP	34.20	-118.35	17.8	5.4	0.9	31	-13
5	USA	Camarillo AWOS	34.22	-119.08	16.0	3.5	0.0	34	7
5	USA	Camp Pendleton MCAS	33.30	-117.35	16.0	4.2	0.7	31	-21
5	USA	Carlsbad	33.13	-117.28	16.1	3.1	0.9	38	-38
5	USA	China Lake NAF	35.68	-117.68	17.8	10.2	0.8	19	-25

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Chino AP	33.97	-117.63	17.3	5.4	0.8	30	-25
5	USA	Chula Vista-Brown Field Muni AP	32.58	-116.98	16.4	3.2	0.5	42	-27
5	USA	Concord-Buchanan Field	38.00	-122.05	15.3	5.8	0.7	30	6
5	USA	Crescent City-Jack McNamara Field	41.78	-124.23	11.8	2.5	0.5	37	-24
5	USA	Edwards AFB	34.90	-117.87	16.2	9.0	1.4	26	-50
5	USA	Fairfield-Travis AFB	38.27	-121.93	16.1	6.9	1.2	22	-1
5	USA	Fresno Air Terminal	36.78	-119.72	17.9	8.6	0.8	24	-29
5	USA	Fullerton Muni AP	33.87	-117.98	17.7	4.9	1.0	36	-40
5	USA	Hawthorne-Jack Northrop Field	33.92	-118.33	17.0	3.5	-0.1	40	19
5	USA	Hayward Air Terminal	37.67	-122.12	15.3	3.8	1.1	31	-5
5	USA	Imperial County AP	32.83	-115.58	22.5	8.8	1.1	23	-22
5	USA	Lancaster-Gen Wm Fox Field	34.73	-118.22	17.0	9.1	1.0	21	-19
5	USA	Lemoore NAS	36.33	-119.95	17.2	8.4	0.8	20	-27
5	USA	Livermore Muni AP	37.70	-121.82	14.6	5.8	0.9	26	-19
5	USA	Lompoc AWOS	34.67	-120.47	13.4	2.5	0.6	43	-14
5	USA	Long Beach-Daugherty Field	33.83	-118.17	17.7	4.0	0.6	36	-15
5	USA	Los Angeles Intl AP	33.93	-118.40	17.2	3.0	0.4	41	-16
5	USA	March AFB	33.90	-117.25	17.3	6.4	1.1	30	-32
5	USA	Merced-Macready Field	37.28	-120.52	17.0	7.3	0.7	18	-31
5	USA	Modesto Muni AP	37.63	-120.95	17.1	7.0	0.8	21	-16
5	USA	Montague-Siskiyou County AP	41.78	-122.47	11.9	8.3	1.4	25	-39
5	USA	Monterey NAF	36.60	-121.87	13.8	2.5	0.7	40	-5
5	USA	Mountain View-Moffett Field NAS	37.40	-122.05	15.1	4.3	1.4	37	-14
5	USA	Napa County AP	38.22	-122.28	14.1	4.5	0.4	23	-17
5	USA	Needles AP	34.77	-114.62	23.1	10.1	0.9	21	-32
5	USA	Oakland Intl AP	37.72	-122.22	14.6	3.2	0.5	29	6
5	USA	Oxnard AP	34.20	-119.20	15.9	3.0	0.8	39	-8
5	USA	Palm Springs-Thermal AP	33.63	-116.17	21.9	9.2	1.0	20	-21
5	USA	Palm Springs Intl AP	33.83	-116.50	22.9	8.4	-0.9	23	55
5	USA	Palmdale AP	34.63	-118.08	16.9	9.3	0.7	23	-29
5	USA	Paso Robles Muni AP	35.67	-120.63	15.2	5.8	0.6	24	-7
5	USA	Point Mugu NAS	34.12	-119.12	15.4	2.9	0.3	43	-16
5	USA	Porterville AWOS	36.03	-119.07	16.9	7.6	-0.7	26	34
5	USA	Red Bluff Muni AP	40.15	-122.25	16.9	8.9	-0.8	28	28
5	USA	Redding Muni AP	40.52	-122.32	16.7	8.3	0.0	27	3
5	USA	Riverside Muni AP	33.95	-117.45	17.5	5.5	-0.9	33	50
5	USA	Sacramento Exec AP	38.50	-121.50	15.8	6.7	1.0	23	-25

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Sacramento Metro AP	38.70	-121.58	16.3	7.1	0.7	20	-9
5	USA	Salinas Muni AP	36.67	-121.60	14.1	3.2	0.5	36	-24
5	USA	San Diego-Lindbergh Field	32.73	-117.17	18.0	3.6	0.9	38	-17
5	USA	San Diego-Miramar NAS	32.87	-117.13	16.6	4.5	0.0	43	13
5	USA	San Diego-Montgomery Field	32.82	-117.13	16.8	3.8	1.4	39	-29
5	USA	San Diego-North Island NAS	32.70	-117.20	17.0	3.3	-0.5	42	60
5	USA	San Francisco Intl AP	37.62	-122.40	14.4	2.9	0.9	31	2
5	USA	San Jose Intl AP	37.37	-121.93	15.3	4.4	0.8	30	-4
5	USA	San Luis Obispo AP	35.23	-120.63	14.6	3.3	0.7	30	-3
5	USA	Sandberg	34.75	-118.72	14.6	7.3	-1.4	33	45
5	USA	Santa Ana-John Wayne AP	33.68	-117.87	17.5	3.6	0.7	31	-19
5	USA	Santa Barbara Muni AP	34.43	-119.85	15.2	3.4	1.1	29	-18
5	USA	Santa Maria Public AP	34.92	-120.47	14.1	3.0	0.2	37	-11
5	USA	Santa Monica Muni AP	34.02	-118.45	17.0	3.3	-0.5	45	45
5	USA	Santa Rosa AWOS	38.52	-122.82	14.3	4.6	0.6	23	-17
5	USA	South Lake Tahoe-Lake Tahoe AP	38.90	-120.00	7.5	8.3	-0.7	28	44
5	USA	Stockton Metro AP	37.90	-121.23	16.5	7.1	1.1	21	-15
5	USA	Truckee Tahoe AP	39.32	-120.13	7.5	7.9	-1.5	31	41
5	USA	Twentynine Palms	34.30	-116.17	19.8	9.6	1.1	21	-32
5	USA	Ukiah Muni AP	39.13	-123.20	14.5	6.5	-1.1	26	53
5	USA	Van Nuys AP	34.22	-118.48	18.0	4.9	0.6	29	-33
5	USA	Visalia Muni AWOS	36.32	-119.40	16.1	8.7	1.3	17	-22
5	USA	Yuba County AP	39.10	-121.57	16.7	7.5	1.0	20	-24
5	USA	Akron-Washington County AP	40.17	-103.23	11.0	10.7	-0.4	24	16
5	USA	Alamosa Muni AP	37.43	-105.87	6.7	10.5	-0.5	28	3
5	USA	Aspen-Pitkin County-Sardy Field	39.22	-106.87	6.4	10.0	-1.1	28	16
5	USA	Aurora-Buckley Field ANGB	39.72	-104.75	10.9	10.4	-1.6	24	40
5	USA	Boulder-Broomfield-Jefferson County AP	40.13	-105.24	11.1	10.1	-1.0	24	55
5	USA	Colorado Springs-Peterson Field	38.82	-104.72	10.6	10.1	0.1	24	-5
5	USA	Cortez-Montezuma County AP	37.30	-108.63	10.9	10.5	0.0	19	6
5	USA	Craig Moffat AP	40.50	-107.53	6.1	11.2	-1.3	33	31
5	USA	Denver Intl AP	39.83	-104.65	11.6	10.3	-1.2	25	32
5	USA	Durango-La Plata County AP	37.15	-107.75	8.5	11.5	-0.5	30	40
5	USA	Eagle County Rgnl AP	39.65	-106.92	7.0	11.0	-0.4	28	5
5	USA	Fort Collins AWOS	40.45	-105.02	9.4	10.6	-1.0	22	42

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Golden-NREL	39.74	-105.18	10.4	10.0	-0.8	28	25
5	USA	Grand Junction-Walker Field	39.13	-108.53	12.6	11.7	1.0	22	-24
5	USA	Greeley-Weld County AWOS	40.43	-104.63	9.4	10.6	-1.1	24	44
5	USA	Gunnison County AWOS	38.53	-106.93	5.5	10.1	-1.2	30	30
5	USA	Hayden-Yampa AWOS	40.48	-107.22	6.7	11.1	-1.3	33	30
5	USA	La Junta Muni AP	38.05	-103.53	12.9	11.3	-1.1	23	51
5	USA	Lamar Muni AP	38.07	-102.68	12.3	11.7	-1.6	25	40
5	USA	Leadville-Lake County AP	39.22	-106.32	3.5	8.1	-1.6	35	46
5	USA	Limon Muni AP	39.18	-103.72	9.7	10.2	-1.4	24	47
5	USA	Montrose County AP	38.50	-107.90	10.6	11.7	0.7	25	-8
5	USA	Pueblo Mem AP	38.28	-104.50	12.5	10.9	0.7	22	-15
5	USA	Rifle-Garfield County Rgnl AP	39.53	-107.72	10.4	11.6	1.3	21	-5
5	USA	Trinidad-Las Animas County AP	37.27	-104.33	12.0	9.9	0.6	25	-25
5	USA	Bridgeport-Sikorsky Mem AP	41.18	-73.15	12.1	10.8	0.1	33	-3
5	USA	Danbury Muni AP	41.37	-73.48	10.9	10.2	-1.3	34	-23
5	USA	Groton-New London AP	41.33	-72.05	11.4	9.3	0.8	33	-10
5	USA	Hartford-Bradley Intl AP	41.93	-72.68	10.7	11.9	0.6	27	38
5	USA	Hartford-Brainard Field	41.73	-72.65	11.4	10.7	1.6	30	43
5	USA	New Haven-Tweed AP	41.27	-72.88	11.9	10.0	0.7	32	-29
5	USA	Oxford AWOS	41.48	-73.13	10.4	10.8	-0.4	35	6
5	USA	Dover AFB	39.13	-75.47	13.1	10.4	-0.3	29	5
5	USA	Wilmington-New Castle County AP	39.67	-75.60	13.1	11.1	0.6	24	5
5	USA	Crestview-Bob Sikes AP	30.78	-86.52	19.3	7.0	0.7	30	-4
5	USA	Daytona Beach Intl AP	29.18	-81.07	21.4	5.7	0.7	26	12
5	USA	Fort Lauderdale Executive AP	26.20	-80.17	24.0	3.9	0.7	26	13
5	USA	Fort Lauderdale Intl AP	26.07	-80.15	24.7	3.9	0.5	25	12
5	USA	Fort Myers-Page Field	26.58	-81.87	23.6	4.2	0.9	31	26
5	USA	Fort Pierce-St Lucie County AP	27.48	-80.37	21.8	5.0	0.7	26	12
5	USA	Fort Walton Beach-Hurlburt Field	30.42	-86.68	19.7	8.3	0.8	21	14
5	USA	Gainesville Rgnl AP	29.70	-82.28	20.2	6.7	1.2	21	-3
5	USA	Homestead AFB	25.48	-80.38	23.7	4.7	1.1	28	17
5	USA	Jacksonville-Craig Field	30.33	-81.52	20.7	6.1	0.1	23	-1
5	USA	Jacksonville Intl AP	30.50	-81.70	20.0	6.8	0.5	24	8
5	USA	Jacksonville NAS	30.23	-81.67	21.3	6.6	1.1	17	-2
5	USA	Key West Intl AP	24.55	-81.75	25.7	3.8	0.5	33	17
5	USA	Key West NAS	24.58	-81.68	25.4	3.9	0.7	31	21

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Lakeland Linder Rgnl AP	27.98	-82.02	21.4	6.2	1.3	25	15
5	USA	MacDill AFB	27.85	-82.52	22.0	6.5	1.0	27	27
5	USA	Marathon AP	24.73	-81.05	26.0	3.9	0.8	30	11
5	USA	Mayport NS	30.40	-81.42	21.1	6.5	0.9	26	10
5	USA	Melbourne Rgnl AP	28.12	-80.65	22.8	4.5	0.9	25	2
5	USA	Miami-Kendall-Tamiami Executive AP	25.65	-80.43	23.3	3.9	0.5	27	12
5	USA	Miami-Opa Locka AP	25.90	-80.28	24.0	4.5	0.4	37	-7
5	USA	Miami Intl AP	25.82	-80.30	24.4	3.9	0.7	32	23
5	USA	Naples Muni AP	26.15	-81.77	22.9	4.6	0.5	26	2
5	USA	NASA Shuttle Landing Facility	28.62	-80.72	21.9	5.7	0.9	33	29
5	USA	Ocala Muni AWOS	29.17	-82.22	20.4	6.3	1.6	18	-8
5	USA	Orlando-Sanford AP	28.78	-81.25	21.7	5.7	-0.1	29	3
5	USA	Orlando Executive AP	28.55	-81.33	22.2	5.8	1.7	23	8
5	USA	Orlando Intl AP	28.43	-81.33	22.0	5.2	0.7	27	4
5	USA	Panama City-Bay County AP	30.20	-85.68	20.8	7.2	0.2	27	-3
5	USA	Pensacola-Forest Sherman NAS	30.35	-87.32	20.1	7.7	0.8	21	17
5	USA	Pensacola Rgnl AP	30.48	-87.18	20.8	6.9	0.7	25	21
5	USA	Sarasota-Bradenton Intl AP	27.38	-82.55	22.4	5.4	1.2	33	19
5	USA	Southwest Florida Intl AP	26.53	-81.75	22.7	4.3	0.9	26	-11
5	USA	St Petersburg-Albert Whitted Station	27.77	-82.63	23.3	5.8	0.7	36	30
5	USA	St Petersburg-Clearwater Intl AP	27.90	-82.68	22.5	6.5	1.3	33	26
5	USA	Tallahassee Rgnl AP	30.38	-84.37	19.4	7.3	0.7	21	-5
5	USA	Tampa Intl AP	27.97	-82.53	22.4	5.6	1.1	25	10
5	USA	Tyndall AFB	30.07	-85.58	19.2	7.7	0.7	26	2
5	USA	Valparaiso-Elgin AFB	30.48	-86.52	19.1	8.3	0.7	25	16
5	USA	Vero Beach Muni AP	27.65	-80.42	23.1	4.1	0.7	26	16
5	USA	West Palm Beach Intl AP	26.68	-80.10	23.6	4.4	0.8	33	16
5	USA	Whiting Field NAS	30.72	-87.02	19.3	7.4	0.4	26	2
5	USA	Albany-Dougherty County AP	31.53	-84.18	19.3	7.5	0.6	26	1
5	USA	Alma-Bacon County AP	31.53	-82.50	18.4	8.5	1.0	20	-10
5	USA	Athens-Ben Epps AP	33.95	-83.33	17.0	8.5	0.8	20	3
5	USA	Atlanta-Hartsfield-Jackson Intl AP	33.63	-84.43	17.1	9.0	1.0	20	-7
5	USA	Augusta-Bush-Field	33.37	-81.97	17.6	8.7	0.7	20	-10
5	USA	Brunswick-Golden Isles AP	31.25	-81.47	19.0	8.5	0.3	21	7
5	USA	Brunswick-Malcolm McKinnon AP	31.15	-81.38	20.5	6.8	1.0	25	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Columbus Metro AP	32.52	-84.95	18.8	8.5	0.8	23	-5
5	USA	Dekalb Peachtree AP	33.87	-84.30	16.1	9.5	1.1	22	-8
5	USA	Fort Benning-Lawson Field	32.35	-85.00	16.5	9.1	0.9	18	2
5	USA	Fulton County AP	33.77	-84.52	16.5	8.6	1.6	17	-15
5	USA	Macon-Middle Georgia Rgnl AP	32.68	-83.65	18.1	8.6	0.9	21	2
5	USA	Marietta-Dobbins AFB	33.92	-84.52	15.2	9.6	0.6	23	-20
5	USA	Rome-Richard B Russell AP	34.35	-85.17	16.1	9.7	1.4	27	-26
5	USA	Savannah-Hunter AAF	32.00	-81.15	18.6	8.6	1.0	22	-4
5	USA	Savannah Intl AP	32.12	-81.20	19.3	8.0	0.7	23	14
5	USA	Valdosta-Moody AFB	30.97	-83.20	18.7	7.9	0.5	20	-1
5	USA	Valdosta Rgnl AP	30.78	-83.28	20.0	7.6	0.9	20	1
5	USA	Warner Robins AFB	32.63	-83.60	17.1	9.5	1.0	17	-6
5	USA	Andersen-AFB	13.57	144.92	26.8	0.8	0.0	9	4
5	USA	GuamWfo	13.48	144.80	27.2	0.6	0.0	13	20
5	USA	Barbers Point NAS	21.32	-158.07	24.6	2.7	0.3	44	27
5	USA	Hilo Intl AP	19.72	-155.05	23.2	1.3	0.1	52	28
5	USA	Honolulu Intl AP	21.32	-157.93	24.9	2.1	0.1	49	6
5	USA	Kahului AP	20.90	-156.43	24.2	1.9	0.3	47	13
5	USA	Kailua-Kaneohe Bay MCAS	21.45	-157.78	24.9	2.0	0.3	58	21
5	USA	Kapalua-West Maui AP	20.95	-156.63	24.1	1.7	0.4	51	-17
5	USA	Keahole-Kona Intl AP	19.73	-156.05	25.0	1.5	0.3	45	5
5	USA	Lanai AP	20.78	-156.95	22.0	1.6	0.1	41	1
5	USA	Lihue AP	21.98	-159.33	24.3	2.1	0.2	51	-12
5	USA	Molokai AWOS	21.15	-157.10	23.8	2.1	0.2	42	8
5	USA	Algona Muni AP	43.08	-94.27	9.6	12.8	-0.1	28	8
5	USA	Atlantic Muni AP	41.40	-95.05	10.1	13.2	0.2	24	-4
5	USA	Boone Muni AP	42.05	-93.85	10.0	13.1	-0.4	26	8
5	USA	Burlington Muni AP	40.78	-91.12	12.4	13.8	1.2	25	28
5	USA	Carroll Muni AP	42.05	-94.78	10.3	13.0	0.4	27	6
5	USA	Cedar Rapids Muni AP	41.88	-91.72	10.2	13.0	0.8	27	40
5	USA	Chariton Muni AP	41.03	-93.37	11.3	13.8	0.1	26	15
5	USA	Charles City Muni AP	43.07	-92.62	9.6	12.9	0.4	31	1
5	USA	Clarinda Muni AP	40.72	-95.03	11.8	13.7	1.1	25	9
5	USA	Clinton Muni AWOS	41.83	-90.33	10.2	13.5	1.2	26	-26
5	USA	Council Bluffs Muni AP	41.27	-95.77	11.3	12.5	0.8	26	25
5	USA	Creston Muni AP	41.02	-94.37	11.0	13.0	1.0	20	12
5	USA	Decorah Muni AP	43.28	-91.73	10.9	13.0	1.0	25	1
5	USA	Denison Muni AP	41.98	-95.38	10.4	13.6	0.6	29	-4
5	USA	Des Moines Intl AP	41.53	-93.67	10.8	13.9	0.1	26	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Dubuque Rgnl AP	42.40	-90.70	8.8	12.7	-0.7	30	16
5	USA	Estherville Muni AP	43.40	-94.75	7.9	13.3	-0.9	32	14
5	USA	Fairfield Muni AP	41.05	-91.98	11.2	13.4	0.7	25	13
5	USA	Fort Dodge AWOS	42.55	-94.18	9.7	13.5	0.0	26	2
5	USA	Fort Madison Muni AP	40.67	-91.33	12.6	12.0	1.3	27	2
5	USA	Keokuk Muni AP	40.47	-91.43	12.4	12.7	1.8	30	35
5	USA	Knoxville Muni AP	41.30	-93.12	11.7	13.7	1.1	30	14
5	USA	Le Mars Muni AP	42.78	-96.20	11.1	12.6	2.2	29	38
5	USA	Mason City Muni AP	43.15	-93.33	8.4	13.6	-0.4	30	13
5	USA	Monticello Muni AP	42.23	-91.17	9.9	13.0	0.9	28	33
5	USA	Muscatine Muni AP	41.37	-91.15	10.9	13.2	1.0	30	40
5	USA	Newton Muni AP	41.68	-93.02	10.8	12.7	1.3	25	11
5	USA	Oelwein Muni AP	42.68	-91.97	10.2	12.2	1.0	27	11
5	USA	Orange City Muni AP	42.98	-96.07	10.0	13.0	-0.4	23	14
5	USA	Ottumwa Industrial AP	41.10	-92.45	10.6	13.0	1.0	27	49
5	USA	Red Oak Muni AP	41.02	-95.27	11.3	13.6	0.4	27	8
5	USA	Sheldon Muni AP	43.22	-95.83	10.2	12.3	0.4	22	8
5	USA	Shenandoah Muni AP	40.75	-95.42	11.1	13.9	0.4	24	-2
5	USA	Sioux City-Sioux Gateway AP	42.38	-96.38	10.2	13.7	0.1	25	0
5	USA	Spencer Muni AP	43.17	-95.15	8.3	13.0	-0.5	30	3
5	USA	Storm Lake Muni AP	42.60	-95.23	9.8	13.0	-0.3	29	19
5	USA	Washington Muni AP	41.28	-91.67	10.8	13.0	0.1	29	3
5	USA	Waterloo Muni AP	42.55	-92.40	9.4	13.5	-0.6	30	-13
5	USA	Webster City Muni AP	42.43	-93.87	10.8	13.4	0.7	28	2
5	USA	Boise Air Terminal	43.62	-116.21	11.8	9.7	0.9	23	-27
5	USA	Burley Muni AP	42.53	-113.77	10.5	10.0	-1.2	25	44
5	USA	Caldwell AWOS	43.63	-116.63	11.0	9.7	-0.9	20	47
5	USA	Coeur dAlene AWOS	47.77	-116.82	9.3	9.4	-1.1	22	45
5	USA	Hailey-Sun Valley AP	43.50	-114.30	8.7	11.3	-2.1	27	38
5	USA	Idaho Falls-Fanning Field	43.52	-112.07	8.1	10.8	-0.8	28	12
5	USA	Lewiston-Nez Perce County AP	46.37	-117.02	11.8	9.9	-1.5	23	42
5	USA	Malad City AP	42.15	-112.28	9.7	10.7	-1.5	21	46
5	USA	Mountain Home AFB	43.05	-115.87	11.0	10.4	-2.1	23	44
5	USA	Pocatello Muni AP	42.92	-112.57	9.3	10.8	0.0	23	10
5	USA	Salmon-Lemhi AWOS	45.12	-113.88	7.8	10.8	-1.1	23	30
5	USA	Soda Springs-Tigert AP	42.65	-111.58	6.6	10.8	-2.4	30	24
5	USA	Twin Falls-Magic Valley Rgnl AP-Joslin Field	42.55	-114.35	10.8	10.1	-1.7	21	41
5	USA	Aurora Muni AP	41.77	-88.47	10.3	12.4	0.9	28	22
5	USA	Belleville-Scott AFB	38.55	-89.85	13.0	11.3	0.0	24	3

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Bloomington Normal-Central Illinois Rgnl AP	40.47	-88.92	10.7	12.5	-0.9	27	-21
5	USA	Cahokia AP	38.57	-90.15	14.1	10.9	1.2	25	-12
5	USA	Carbondale-Southern Illinois AP	37.77	-89.25	14.8	11.2	0.9	24	18
5	USA	Chicago-Midway AP	41.78	-87.75	11.9	12.8	1.1	33	13
5	USA	Chicago-OHare Intl AP	41.98	-87.92	10.6	12.8	0.8	28	32
5	USA	Decatur AP	39.83	-88.87	12.1	12.3	1.3	23	-4
5	USA	Du Page AP	41.92	-88.25	11.2	11.9	0.6	23	-14
5	USA	Marion-Williamson County Rgnl AP	37.75	-89.02	13.9	10.5	-0.8	27	3
5	USA	Moline-Quad City Intl AP	41.47	-90.52	10.6	13.3	0.0	26	10
5	USA	Mount Vernon AWOS	38.32	-88.87	13.9	11.0	0.2	30	-2
5	USA	Peoria-Greater Peoria AP	40.67	-89.68	10.7	13.0	0.9	25	34
5	USA	Quincy Muni AP	39.93	-91.20	12.5	11.9	1.8	26	14
5	USA	Rockford-Greater Rockford AP	42.20	-89.10	9.4	13.4	-0.1	28	5
5	USA	Springfield-Capital AP	39.85	-89.68	12.3	12.7	1.5	26	40
5	USA	Sterling-Rock Falls-Whiteside County AP	41.75	-89.67	11.0	12.2	1.2	28	28
5	USA	University of Illinois-Willard AP	40.06	-88.37	11.8	12.6	1.0	25	24
5	USA	Waukegan Rgnl AP	42.42	-87.87	9.5	12.3	-0.6	32	32
5	USA	Delaware County-Johnson Field	40.23	-85.40	11.9	12.1	1.2	31	42
5	USA	Evansville Rgnl AP	38.05	-87.53	14.3	10.9	0.7	22	19
5	USA	Fort Wayne Intl AP	41.00	-85.20	10.2	12.8	0.7	28	48
5	USA	Grissom AFB	40.65	-86.15	11.0	11.8	-1.1	30	-25
5	USA	Huntingburg Muni AP	38.25	-86.95	14.7	9.9	0.7	26	-32
5	USA	Indianapolis Intl AP	39.72	-86.27	12.0	12.3	0.7	22	25
5	USA	Lafayette-Purdue University AP	40.42	-86.93	11.5	12.4	1.4	28	27
5	USA	Monroe County AP	39.13	-86.62	12.6	11.1	0.8	24	5
5	USA	South Bend-Michiana Rgnl AP	41.70	-86.33	11.0	12.4	0.7	26	33
5	USA	Terre Haute-Hulman Rgnl AP	39.45	-87.30	13.2	11.7	1.1	27	6
5	USA	Chanute-Martin Johnson AP	37.67	-95.48	15.0	12.0	2.5	20	-6
5	USA	Concordia-Blosser Muni AP	39.55	-97.65	13.7	12.8	0.6	23	17
5	USA	Dodge City Rgnl AP	37.77	-99.97	13.5	12.0	0.6	24	-1
5	USA	Emporia Muni AP	38.33	-96.18	12.8	13.2	0.9	21	3
5	USA	Fort Riley-Marshall AAF	39.05	-96.77	14.5	11.3	0.8	27	-4
5	USA	Garden City Muni AP	37.93	-100.72	12.9	11.3	-0.5	23	18
5	USA	Goodland-Renner Field	39.37	-101.70	11.5	11.5	1.0	22	-16

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Great Bend AWOS	38.35	-98.87	13.7	11.6	0.3	25	13
5	USA	Hays Muni AWOS	38.85	-99.27	13.6	11.9	1.4	27	-31
5	USA	Hill City Muni AP	39.38	-99.83	12.3	11.7	-1.0	27	-10
5	USA	Hutchinson Muni AP	38.07	-97.87	14.4	11.3	1.0	21	1
5	USA	Liberal Muni AP	37.03	-100.97	13.8	11.1	-0.8	25	39
5	USA	Manhattan Rgnl AP	39.13	-96.67	13.8	12.3	0.8	21	-4
5	USA	Newton AWOS	38.05	-97.28	13.6	11.5	0.7	31	-1
5	USA	Olathe-Johnson County Executive AP	38.85	-94.73	14.3	11.3	0.9	29	-6
5	USA	Olathe-Johnson County Industrial AP	38.83	-94.88	13.9	11.9	0.7	21	-8
5	USA	Russell Muni AP	38.88	-98.82	13.5	12.0	0.3	23	6
5	USA	Salina Muni AP	38.82	-97.67	14.6	12.4	0.7	29	6
5	USA	Topeka-Forbes AFB	38.95	-95.67	13.8	11.4	1.2	21	4
5	USA	Topeka-Phillip Billard Muni AP	39.07	-95.63	13.6	11.7	0.9	21	4
5	USA	Wichita-Col Jabara Field	37.75	-97.22	14.2	11.9	1.6	22	-18
5	USA	Wichita-McConnell AFB	37.62	-97.27	14.5	12.3	-0.1	26	5
5	USA	Wichita-Mid Continent AP	37.65	-97.43	14.6	11.1	0.7	26	2
5	USA	Bowling Green-Warren County AP	36.98	-86.43	14.7	10.9	1.2	29	7
5	USA	Cincinnati-Northern Kentucky AP	39.05	-84.67	12.7	11.0	0.8	22	28
5	USA	Fort Campbell AAF	36.67	-87.48	14.8	11.2	0.4	27	4
5	USA	Fort Knox-Godman AAF	37.90	-85.97	13.7	10.5	0.0	25	1
5	USA	Henderson City County AP	37.82	-87.68	13.0	10.1	0.0	24	11
5	USA	Jackson-Julian Carroll AP	37.58	-83.32	14.6	9.1	0.4	24	9
5	USA	Lexington-Bluegrass AP	38.03	-84.60	13.5	11.0	1.0	23	15
5	USA	London-Corbin-Magee Field	37.08	-84.08	13.6	10.0	1.5	25	9
5	USA	Louisville-Bowman Field	38.23	-85.67	14.9	10.1	0.9	20	21
5	USA	Louisville-Standiford Field	38.18	-85.73	14.3	11.0	0.6	24	27
5	USA	Paducah-Barkley Rgnl AP	37.05	-88.77	15.3	9.8	0.2	22	11
5	USA	Somerset-Pulaski County AWOS	38.00	-84.60	14.8	10.3	1.0	22	29
5	USA	Alexandria-England AFB	31.32	-92.55	19.4	7.6	0.9	22	9
5	USA	Alexandria-Esler Rgnl AP	31.40	-92.30	18.7	8.2	1.1	23	-23
5	USA	Barksdale AFB	32.50	-93.67	18.1	8.7	0.7	24	26
5	USA	Baton Rouge-Ryan AP	30.53	-91.15	19.6	7.8	0.8	19	0
5	USA	Fort Polk	31.05	-93.18	18.8	8.1	1.3	21	12
5	USA	Houma-Terrebonne AP	29.57	-90.67	20.1	7.3	1.0	23	19
5	USA	Lafayette RgnlAP	30.20	-91.98	20.0	7.5	0.1	31	-9
5	USA	Lake Charles AP	30.22	-93.17	19.9	8.2	1.7	16	-4

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Lake Charles Rgnl AP	30.12	-93.23	19.9	7.8	0.9	23	8
5	USA	Monroe Rgnl AP	32.52	-92.03	18.4	8.5	0.6	22	0
5	USA	New Iberia	30.03	-91.88	19.7	7.8	1.1	25	-14
5	USA	New Orleans-Alvin Callender Field	29.82	-90.02	20.3	6.6	0.2	23	2
5	USA	New Orleans-Lakefront AP	30.05	-90.03	21.2	7.4	0.1	25	15
5	USA	New Orleans Intl AP	30.00	-90.25	20.7	7.2	0.9	22	7
5	USA	Patterson Mem AP	29.72	-91.33	20.0	7.1	-0.6	22	38
5	USA	Shreveport Downtown	32.53	-93.75	18.2	10.0	1.4	25	-14
5	USA	Shreveport Rgnl AP	32.45	-93.82	18.5	9.0	1.5	20	-2
5	USA	Barnstable-Boardman Poland AP	41.67	-70.28	11.4	9.1	-0.2	36	10
5	USA	Beverly Muni AP	42.58	-70.92	9.7	11.1	-0.6	35	-31
5	USA	Boston-Logan Intl AP	42.37	-71.02	11.2	11.3	-0.1	31	-17
5	USA	Chicopee Falls-Westover AFB	42.20	-72.53	10.2	10.7	-0.7	32	-19
5	USA	Lawrence Muni AP	42.72	-71.12	10.8	10.7	0.6	31	28
5	USA	Marthas Vineyard AP	41.40	-70.62	11.6	8.7	0.5	36	-30
5	USA	Nantucket Mem AP	41.25	-70.07	11.8	8.3	0.5	44	-17
5	USA	New Bedford Rgnl AP	41.67	-70.95	11.6	9.8	-0.7	33	-26
5	USA	North Adams AP	42.70	-73.17	9.4	10.6	1.0	31	21
5	USA	Norwood Mem AP	42.18	-71.18	10.4	11.3	-0.4	34	-4
5	USA	Otis ANGB	41.65	-70.52	11.1	9.5	-0.1	34	-7
5	USA	Plymouth Muni AP	41.92	-70.73	11.1	9.4	0.8	34	-1
5	USA	Provincetown AWOS	42.07	-70.22	11.5	9.5	-0.7	41	32
5	USA	Westfield-Barnes Muni AP	42.15	-72.72	9.9	11.6	0.6	33	25
5	USA	Worcester Rgnl AP	42.27	-71.88	8.7	11.7	-0.9	32	-15
5	USA	Andrews AFB	38.82	-76.87	13.8	10.1	-0.4	27	12
5	USA	Baltimore-Washington Intl AP	39.17	-76.68	13.9	10.8	0.5	24	4
5	USA	Hagerstown-Washington County Rgnl AP	39.70	-77.73	13.3	10.4	0.4	27	7
5	USA	Patuxent River NAS	38.30	-76.42	15.8	9.2	-0.1	26	-1
5	USA	Salisbury-Wicomico County Rgnl AP	38.33	-75.52	14.9	9.4	0.5	26	7
5	USA	Auburn-Lewiston Muni AP	44.05	-70.28	7.7	10.7	-0.9	31	7
5	USA	Augusta AP	44.32	-69.80	8.5	12.0	0.4	37	-2
5	USA	Bangor Intl AP	44.80	-68.82	8.1	11.9	-1.3	34	7
5	USA	Bar Harbor AWOS	44.45	-68.37	7.0	9.7	-1.1	40	12
5	USA	Brunswick NAS	43.90	-69.93	8.3	11.6	-0.5	35	38
5	USA	Caribou Muni AP	46.87	-68.03	5.1	11.2	-2.1	40	33
5	USA	Edmundston-Northern Aroostook Rgnl AP	47.28	-68.32	5.2	11.0	2.2	36	-50

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Houlton Intl AP	46.12	-67.80	6.2	11.7	-0.9	37	23
5	USA	Millinocket Muni AP	45.65	-68.68	7.7	11.7	-0.7	32	21
5	USA	Portland Intl Jetport	43.65	-70.30	8.0	11.4	-0.8	33	13
5	USA	Presque Isle Muni AP	46.68	-68.05	5.8	10.6	-1.4	38	22
5	USA	Rockland-Knox AWOS	44.07	-69.10	8.1	10.2	-0.5	40	5
5	USA	Sanford Muni AWOS	43.40	-70.72	7.7	10.2	-1.5	31	-7
5	USA	Waterville AWOS	44.53	-69.68	7.4	11.7	-1.8	33	14
5	USA	Wiscasset AP	43.97	-69.72	9.0	10.6	-0.1	37	8
5	USA	Alpena County Rgnl AP	45.07	-83.58	7.2	11.5	-0.7	33	17
5	USA	Ann Arbor Muni AP	42.22	-83.75	10.2	11.0	-1.1	34	-31
5	USA	Battle Creek-Kellogg AP	42.30	-85.25	10.5	11.7	1.2	28	17
5	USA	Benton Harbor-Ross Field-Twin Cities AP	42.13	-86.43	10.6	11.8	1.0	26	-19
5	USA	Cadillac-Wexford County AP	44.28	-85.42	7.9	11.2	-1.8	34	4
5	USA	Chippewa County Intl AP	46.25	-84.47	5.5	10.5	-1.7	38	26
5	USA	Detroit-City AP	42.40	-83.00	10.5	12.6	-1.1	32	-13
5	USA	Detroit-Willow Run AP	42.23	-83.53	10.2	13.0	-0.1	30	11
5	USA	Detroit Metro AP	42.22	-83.35	9.8	12.6	-0.6	29	-12
5	USA	Escanaba AWOS	45.75	-87.03	6.0	10.6	-1.8	38	20
5	USA	Flint-Bishop Intl AP	42.97	-83.75	9.2	12.3	-0.5	29	-22
5	USA	Grand Rapids-Kent County Intl AP	42.88	-85.52	9.4	12.3	-1.0	29	-19
5	USA	Hancock-Houghton County AP	47.17	-88.50	6.1	11.4	-1.9	35	37
5	USA	Houghton-Lake Roscommon County AP	44.37	-84.68	7.6	12.0	-1.1	31	12
5	USA	Howell-Livingston County AP	42.63	-83.98	10.5	12.2	-0.2	28	-1
5	USA	Iron Mountain-Ford Field	45.82	-88.12	7.8	12.4	-1.1	30	14
5	USA	Ironwood AWOS	46.53	-90.13	6.3	11.8	-1.9	36	29
5	USA	Jackson-Reynolds Field	42.27	-84.47	10.3	12.2	0.8	27	36
5	USA	Kalamazoo-Battle Creek Intl AP	42.23	-85.55	10.4	11.7	0.8	31	34
5	USA	Lansing-Capital City AP	42.78	-84.58	9.3	12.4	-0.8	27	-15
5	USA	Manistee AWOS	44.27	-86.25	8.9	12.1	-1.0	31	13
5	USA	Menominee AWOS	45.13	-87.63	8.1	12.0	-0.8	39	17
5	USA	Mount Clemens-Selfridge ANGB	42.62	-82.83	11.1	9.4	-1.4	31	21
5	USA	Muskegon County AP	43.17	-86.23	9.1	12.2	-1.1	32	0
5	USA	Oakland County Intl AP	42.67	-83.42	10.7	12.2	-0.7	32	-35
5	USA	Oscoda-Wurtsmith AFB	44.45	-83.40	8.8	11.3	-0.7	32	-3
5	USA	Pellston-Emmet County AP	45.57	-84.78	8.4	11.6	-0.6	27	3

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Rhinelander-Oneida County AP	45.63	-89.47	7.2	12.7	-0.9	31	9
5	USA	Saginaw-Tri City Intl AP	43.53	-84.08	9.2	11.8	0.0	32	1
5	USA	Sault Ste Marie-Sanderson Field	46.47	-84.35	5.7	10.9	-1.3	39	26
5	USA	St Clair County Intl AP	42.92	-82.53	10.1	11.9	-0.1	28	9
5	USA	Traverse City-Cherry Capital AP	44.73	-85.58	8.0	11.8	-0.9	34	14
5	USA	Aitkin AWOS	46.55	-93.68	6.2	11.5	-1.1	37	23
5	USA	Albert Lea AWOS	43.68	-93.37	9.6	13.3	-1.2	34	7
5	USA	Alexandria Muni AP	45.88	-95.40	7.4	13.5	-0.3	33	8
5	USA	Austin Muni AP	43.67	-92.93	8.4	13.0	-0.6	29	46
5	USA	Baudette Intl AP	48.72	-94.60	6.2	11.7	-0.9	32	21
5	USA	Bemidji Muni AP	47.50	-94.93	6.3	12.6	-1.3	36	18
5	USA	Benson Muni AP	45.32	-95.65	7.7	13.2	-2.1	32	29
5	USA	Brainerd-Crow Wing County AP	46.40	-94.13	7.1	12.0	-0.6	29	13
5	USA	Cambridge Muni AP	45.57	-93.27	7.4	12.6	-0.9	27	29
5	USA	Cloquet AWOS	46.70	-92.50	6.1	11.5	-2.2	32	40
5	USA	Crane Lake AWOS	46.27	-92.57	5.0	11.2	-1.1	41	30
5	USA	Crookston Muni Field	47.85	-96.62	6.1	12.5	-2.1	28	29
5	USA	Detroit Lakes AWOS	46.83	-95.88	6.9	13.0	-1.3	32	19
5	USA	Duluth Intl AP	46.83	-92.22	5.5	11.4	-1.6	34	33
5	USA	Edin Prairie-Flying Cloud AP	44.82	-93.45	9.1	13.8	-1.1	30	17
5	USA	Ely Muni AP	47.82	-91.83	6.1	11.7	-0.9	31	23
5	USA	Eveleth Muni AWOS	47.40	-92.50	5.5	11.8	-1.9	33	30
5	USA	Fairmont Muni AWOS	43.65	-94.42	8.4	13.0	-1.4	32	17
5	USA	Faribault Muni AWOS	44.33	-93.32	8.9	12.3	-0.9	27	-12
5	USA	Fergus Falls AWOS	46.28	-96.15	8.1	13.3	-1.4	33	24
5	USA	Fosston AWOS	47.58	-95.77	5.8	12.2	-1.6	35	34
5	USA	Glenwood AWOS	45.65	-95.32	7.4	13.0	-1.6	28	29
5	USA	Grand Rapids AWOS	47.22	-93.52	6.2	11.9	-1.9	33	12
5	USA	Hallock	48.78	-96.95	6.7	13.2	-1.5	30	17
5	USA	Hibbing-Chisholm Hibbing AP	47.38	-92.85	5.3	11.8	-1.3	40	42
5	USA	Hutchinson AWOS	44.87	-94.38	7.4	13.1	-2.6	33	25
5	USA	International Falls Intl AP	48.57	-93.40	5.2	12.1	-1.5	34	25
5	USA	Litchfield Muni AP	45.10	-94.50	8.9	12.8	1.1	23	43
5	USA	Little Falls AWOS	45.95	-94.35	6.3	12.5	-2.1	29	27
5	USA	Mankato AWOS	44.22	-93.92	8.6	12.9	-1.5	31	6
5	USA	Marshall Muni-Ryan Field AWOS	44.45	-95.82	8.4	13.0	-1.4	34	26
5	USA	Minneapolis-Crystal AP	45.07	-93.35	7.9	13.1	-0.6	30	3

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Minneapolis-St Paul Intl AP	44.88	-93.23	8.6	13.3	-1.2	26	4
5	USA	Mora Muni AWOS	45.88	-93.27	7.5	12.3	-0.7	34	57
5	USA	Morris Muni AWOS	45.57	-95.97	6.6	12.5	-2.1	30	21
5	USA	New Ulm Muni AWOS	44.32	-94.50	8.6	13.1	-1.3	36	3
5	USA	Orr Rgnl AP	48.02	-92.87	4.3	11.3	-1.9	33	43
5	USA	Owatonna AWOS	44.12	-93.25	8.5	13.1	-1.1	27	17
5	USA	Park Rapids Muni AP	46.90	-95.07	6.2	12.3	-0.8	32	19
5	USA	Pipestone AWOS	43.98	-96.32	7.9	13.5	-1.4	28	26
5	USA	Red Wing Muni AP	44.58	-92.48	8.9	13.3	-1.2	32	17
5	USA	Redwood Falls Muni AP	44.55	-95.08	8.4	13.1	-1.1	28	-17
5	USA	Rochester Intl AP	43.90	-92.50	7.7	12.9	-0.9	30	16
5	USA	Roseau Muni AWOS	48.85	-95.70	5.5	11.8	-1.2	40	29
5	USA	Silver Bay Muni AP	47.20	-91.40	4.1	10.0	2.1	35	-45
5	USA	South St Paul Muni AP	44.85	-93.15	8.7	13.6	-1.1	29	23
5	USA	St Cloud Muni AP	45.55	-94.05	7.2	12.8	-1.3	30	17
5	USA	St Paul-Downtown AP	44.93	-93.05	8.5	13.2	-0.6	33	14
5	USA	Thief River AWOS	48.07	-96.18	6.2	12.0	-1.9	34	20
5	USA	Two Harbors Muni AP	47.05	-91.75	5.7	11.3	-1.7	29	30
5	USA	Wheaton AWOS	45.70	-96.50	7.4	13.2	-1.1	30	34
5	USA	Willmar Muni AP	45.12	-95.08	8.8	12.5	-0.7	26	20
5	USA	Winona Muni AWOS	44.08	-91.70	8.8	13.0	-0.2	30	5
5	USA	Worthington AWOS	43.65	-95.58	8.3	13.2	-1.7	32	25
5	USA	Cape Girardeau Muni AP	37.23	-89.57	14.3	10.3	0.5	26	8
5	USA	Columbia Rgnl AP	38.82	-92.22	13.0	11.8	1.2	22	0
5	USA	Farmington Rgnl AP	37.77	-90.40	13.9	9.9	0.9	21	-24
5	USA	Fort Leonard Wood-Forney AAF	37.75	-92.15	14.3	10.8	-0.1	23	4
5	USA	Jefferson City Mem AP	38.58	-92.15	14.5	10.9	0.8	25	-11
5	USA	Joplin Muni AP	37.15	-94.50	16.3	10.8	1.3	28	2
5	USA	Kaiser-Lee Fine Mem AWOS	38.10	-92.55	14.3	11.2	1.0	25	-13
5	USA	Kansas City Downtown AP	39.12	-94.60	15.4	11.7	1.5	22	-18
5	USA	Kansas City Intl AP	39.30	-94.72	13.1	12.4	0.8	22	8
5	USA	Kirksville Muni AP	40.10	-92.55	11.2	13.5	1.0	23	32
5	USA	Poplar Bluff AWOS	36.77	-90.47	15.1	10.9	0.9	22	-3
5	USA	Rolla National AP	38.13	-91.77	13.4	9.9	0.7	21	3
5	USA	Springfield Rgnl AP	37.23	-93.38	14.0	10.7	0.6	24	13
5	USA	St Joseph-Rosecrans Mem AP	39.77	-94.90	12.6	12.6	0.0	24	12
5	USA	St Louis-Lambert Intl AP	38.75	-90.37	14.2	11.7	1.1	20	-9
5	USA	St Louis-Spirit of St Louis AP	38.65	-90.65	14.4	10.5	1.1	22	24

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Whiteman AFB	38.72	-93.55	13.8	10.8	-0.3	24	1
5	USA	Biloxi-Keesler AFB	30.42	-88.92	19.8	7.9	0.8	24	11
5	USA	Columbus AFB	33.65	-88.45	16.6	10.3	1.4	20	-17
5	USA	Golden Triangle Rgnl AWOS	33.45	-88.58	16.5	9.8	0.6	20	2
5	USA	Greenville Muni AP	33.48	-90.98	18.6	8.9	1.0	18	-18
5	USA	Greenwood-Leflore AP	33.50	-90.08	17.9	8.7	0.7	24	-9
5	USA	Gulfport-Biloxi Intl AP	30.40	-89.07	19.9	7.5	0.5	24	-12
5	USA	Hattiesburg-Laurel AP	31.47	-89.33	17.8	8.3	1.0	16	5
5	USA	Jackson Intl AP	32.32	-90.08	18.0	8.8	1.1	20	-12
5	USA	McComb-Pike Co AP	31.23	-90.47	18.6	8.1	1.4	21	-13
5	USA	Meridian-Key Field	32.33	-88.75	17.7	8.6	1.3	17	-14
5	USA	Meridian NAS	32.55	-88.57	18.0	8.3	0.8	22	13
5	USA	Natchez-Hardy Anders Field	31.62	-91.30	18.6	7.2	1.1	19	-5
5	USA	Tupelo Muni-C D Lemons AP	34.27	-88.77	17.0	9.4	1.4	18	-23
5	USA	Billings-Logan Intl AP	45.80	-108.55	9.9	11.0	0.0	28	8
5	USA	Bozeman-Gallatin Field	45.80	-111.15	6.9	11.1	-1.9	29	28
5	USA	Butte-Bert Mooney AP	45.95	-112.50	6.1	9.7	-2.0	30	34
5	USA	Cut Bank Muni AP	48.60	-112.37	7.4	9.2	-0.8	29	16
5	USA	Glasgow Intl AP	48.22	-106.62	8.0	12.4	-1.2	28	12
5	USA	Glendive AWOS	47.13	-104.80	7.3	12.0	-2.7	29	23
5	USA	Great Falls Intl AP	47.47	-111.38	8.3	10.6	-0.4	33	-1
5	USA	Havre City-County AP	48.55	-109.77	7.9	11.3	-1.8	31	12
5	USA	Helena Rgnl AP	46.60	-111.97	8.2	10.6	-0.9	27	21
5	USA	Kalispell-Glacier Park Intl AP	48.32	-114.25	7.0	10.4	-1.2	26	29
5	USA	Lewistown Muni AP	47.05	-109.45	6.8	10.0	-1.0	35	9
5	USA	Livingston-Mission Field	45.70	-110.45	8.7	10.4	-0.9	29	49
5	USA	Miles City Muni AP	46.43	-105.88	8.9	12.3	-1.0	27	0
5	USA	Missoula Intl AP	46.92	-114.10	8.1	10.5	-0.7	23	46
5	USA	Sidney-Richland Muni AP	47.70	-104.20	6.1	12.3	-2.5	33	35
5	USA	Wolf Point Intl AP	48.31	-105.10	6.5	11.4	-1.0	32	2
5	USA	Asheville Rgnl AP	35.43	-82.53	13.4	8.9	0.7	21	-9
5	USA	Cape Hatteras	35.27	-75.55	17.8	8.5	0.7	27	-6
5	USA	Charlotte-Douglas Intl AP	35.22	-80.95	16.4	9.1	0.7	23	-13
5	USA	Cherry Point MCAS	34.90	-76.88	16.2	9.6	0.5	26	-29
5	USA	Elizabeth City CGAS	36.30	-76.25	17.4	8.5	0.1	28	6
5	USA	Fayetteville-Pope AFB	35.17	-79.02	16.3	9.7	0.5	23	-11
5	USA	Fayetteville Muni AP	34.98	-78.88	15.8	9.6	0.9	21	3
5	USA	Fort Bragg-Simmons AAF	35.13	-78.93	16.6	9.3	-0.1	23	5

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Goldsboro-Seymour Johnson AFB	35.35	-77.97	16.0	10.0	0.7	20	-1
5	USA	Greensboro-Piedmont Triad Intl AP	36.10	-79.95	15.0	9.8	1.0	20	0
5	USA	Hickory Rgnl AP	35.73	-81.38	15.5	9.2	0.7	22	26
5	USA	Jacksonville AWOS	34.83	-77.62	15.4	9.3	0.2	21	6
5	USA	Kinston Stallings AFB	35.32	-77.63	16.2	9.6	0.3	24	2
5	USA	Manteo-Dare County Rgnl AP	35.92	-75.70	16.7	9.3	-1.1	40	-28
5	USA	New Bern-Craven County Rgnl AP	35.07	-77.05	17.8	7.7	1.0	27	-31
5	USA	New River MCAS	34.70	-77.38	17.2	9.2	1.1	31	18
5	USA	Pitt Greenville AP	35.63	-77.40	16.3	8.5	0.1	29	5
5	USA	Raleigh-Durham Intl AP	35.87	-78.78	15.9	9.5	0.6	23	13
5	USA	Rocky Mount-Wilson AP	35.85	-77.90	16.3	8.2	0.8	20	3
5	USA	Southern Pines-Moore County AP	35.23	-79.40	15.5	8.8	-0.3	27	2
5	USA	Wilmington Intl AP	34.27	-77.90	17.8	8.5	0.2	25	2
5	USA	Winston Salem-Smith Reynolds AP	36.13	-80.22	15.8	8.4	0.9	20	13
5	USA	Bismarck Muni AP	46.77	-100.77	7.5	12.6	-1.3	28	14
5	USA	Devils Lake AWOS	48.12	-98.92	6.2	12.4	-1.0	40	25
5	USA	Dickinson Muni AP	46.80	-102.80	6.9	12.6	0.0	31	-5
5	USA	Fargo-Hector Intl AP	46.93	-96.82	7.0	13.2	-0.8	29	10
5	USA	Grand Forks AFB	47.97	-97.40	6.1	12.0	-2.8	31	29
5	USA	Grand Forks Intl AP	47.95	-97.18	6.7	13.6	-1.2	29	16
5	USA	Jamestown Muni AP	46.92	-98.68	6.2	13.1	-2.3	30	34
5	USA	Minot AFB	48.42	-101.35	6.3	11.4	-2.1	40	22
5	USA	Minot Intl AP	48.27	-101.28	6.8	12.6	-1.4	32	12
5	USA	Williston-Sloulin Field Intl AP	48.20	-103.65	7.3	12.4	-1.5	32	36
5	USA	Ainsworth Muni AP	42.58	-100.00	10.3	11.7	0.8	27	-29
5	USA	Alliance Muni AP	42.05	-102.80	9.9	11.6	-1.7	24	46
5	USA	Beatrice Muni AP	40.30	-96.75	11.6	12.7	0.9	25	18
5	USA	Bellevue-Offutt AFB	41.12	-95.92	10.8	13.3	0.0	23	3
5	USA	Broken Bow Muni AP	41.43	-99.65	9.4	12.7	-0.6	30	37
5	USA	Chadron Muni AP	42.83	-103.08	10.5	11.4	-0.8	26	33
5	USA	Columbus Muni AP	41.45	-97.33	10.2	13.4	-0.1	29	4
5	USA	Falls City-Brenner Field	40.08	-95.60	11.7	12.7	1.2	27	24
5	USA	Fremont Muni AP	41.45	-96.52	10.3	13.3	0.7	28	5
5	USA	Grand Island-Central Nebraska Rgnl AP	40.97	-98.32	10.2	13.9	0.1	25	6
5	USA	Hastings Muni AP	40.60	-98.43	11.1	13.0	-0.2	26	11
5	USA	Holdrege-Brewster Field	40.45	-99.33	10.0	12.7	0.1	23	9

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Imperial Muni AP	40.52	-101.62	11.5	11.4	-1.3	26	26
5	USA	Kearney Muni AWOS	40.73	-99.00	10.2	12.4	-0.4	26	13
5	USA	Lincoln Muni AP	40.83	-96.77	11.6	13.3	0.9	19	0
5	USA	McCook Muni AP	40.20	-100.58	11.7	13.1	1.2	22	-12
5	USA	Norfolk-Karl Stefan Mem AP	41.98	-97.43	9.8	13.9	-0.2	26	6
5	USA	North Platte Rgnl AP	41.12	-100.67	9.8	12.4	-0.6	27	-3
5	USA	Omaha-Eppley Airfield	41.32	-95.90	11.6	13.8	0.9	27	31
5	USA	Omaha WSFO	41.37	-96.02	11.0	14.0	0.8	25	22
5	USA	ONeill-Baker Field	42.47	-98.68	9.2	13.2	0.0	28	6
5	USA	Ord-Sharp Field	41.62	-98.95	10.2	13.0	-0.7	23	-19
5	USA	Scottsbluff-W B Heilig Field	41.87	-103.60	10.3	11.5	-0.4	24	8
5	USA	Sidney Muni AP	41.10	-102.98	9.7	10.8	-0.5	22	8
5	USA	Tekamah AWOS	41.77	-96.17	10.8	13.2	0.5	26	3
5	USA	Valentine-Miller Field	42.87	-100.55	10.2	12.3	0.4	26	-15
5	USA	Berlin Muni AP	44.58	-71.18	6.0	10.9	-1.4	42	29
5	USA	Concord Muni AP	43.20	-71.50	8.5	12.0	-0.6	30	0
5	USA	Keene-Dillant Hopkins AP	42.90	-72.27	8.8	11.5	-0.8	32	0
5	USA	Laconia Muni AWOS	43.57	-71.42	8.6	11.4	-1.3	33	0
5	USA	Lebanon Muni AP	43.63	-72.30	8.4	11.7	-0.6	35	-2
5	USA	Manchester Muni AP	42.93	-71.43	10.2	11.2	0.1	34	0
5	USA	Mount Washington	44.27	-71.30	-0.4	5.0	0.2	46	13
5	USA	Pease Intl Tradeport	43.08	-70.82	9.5	11.3	-0.9	33	5
5	USA	Atlantic City Intl AP	39.45	-74.57	12.9	10.2	0.1	27	10
5	USA	Belmar-Monmouth County AP	40.18	-74.07	12.5	10.4	-0.8	31	-14
5	USA	Caldwell-Essex County AP	40.88	-74.28	12.4	9.4	-0.7	32	-29
5	USA	Cape May County AP	39.00	-74.92	14.1	9.2	-1.0	35	9
5	USA	McGuire AFB	40.02	-74.60	13.1	10.4	0.6	30	13
5	USA	Millville Muni AP	39.37	-75.08	13.5	9.6	-0.8	28	-24
5	USA	Newark Intl AP	40.72	-74.18	13.3	11.3	0.6	26	4
5	USA	Teterboro AP	40.85	-74.07	12.9	9.3	0.5	28	31
5	USA	Trenton-Mercer County AP	40.28	-74.82	13.3	10.7	0.5	27	10
5	USA	Albuquerque Intl AP	35.04	-106.62	14.1	10.0	0.9	22	-28
5	USA	Carlsbad Cavern City Air Terminal	32.33	-104.27	17.7	10.0	0.5	22	21
5	USA	Clayton Muni AP	36.45	-103.15	13.4	10.4	0.2	24	3
5	USA	Clovis-Cannon AFB	34.38	-103.32	14.3	10.9	-0.3	24	8
5	USA	Clovis Muni AWOS	34.43	-103.08	14.0	10.6	1.0	21	-30
5	USA	Deming Muni AP	32.25	-107.72	17.0	9.4	0.9	17	-5

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Farmington-Four Corners Rgnl AP	36.75	-108.23	12.4	11.0	-0.8	18	46
5	USA	Gallup-Sen Clarke Field	35.52	-108.78	10.4	9.9	-1.2	21	48
5	USA	Holloman AFB	32.85	-106.10	16.5	9.7	1.3	19	-24
5	USA	Las Cruces Intl AP	32.28	-106.92	17.2	9.6	0.2	23	3
5	USA	Las Vegas-Muni AP	35.65	-105.15	11.6	8.2	0.0	21	11
5	USA	Roswell Industrial Air Park	33.30	-104.53	17.2	9.2	0.6	20	-4
5	USA	Ruidoso-Sierra Blanca Rgnl AP	33.47	-105.53	13.3	7.8	1.0	15	-26
5	USA	Santa Fe County Muni AP	35.62	-106.08	11.6	9.9	1.0	17	-21
5	USA	Taos Muni AP	36.45	-105.67	8.7	10.7	-0.1	19	13
5	USA	Truth or Consequences Muni AP	33.23	-107.27	16.4	9.4	0.6	17	-33
5	USA	Tucumcari AP	35.18	-103.60	14.4	10.2	0.4	25	-18
5	USA	Elko Muni AP	40.83	-115.80	9.0	10.5	-1.0	22	34
5	USA	Ely-Yelland Field	39.30	-114.85	8.6	9.8	-1.1	24	40
5	USA	Fallon NAS	39.42	-118.72	12.6	10.5	0.9	22	-32
5	USA	Las Vegas-McCarran Intl AP	36.08	-115.15	19.5	10.7	0.6	22	-36
5	USA	Lovelock-Derby Field	40.07	-118.55	12.3	10.6	-1.3	23	49
5	USA	Mercury-Desert Rock AP	36.63	-116.02	17.4	10.3	-1.5	24	49
5	USA	Nellis AFB	36.25	-115.03	20.1	10.9	-1.0	20	37
5	USA	Reno-Tahoe Intl AP	39.48	-119.77	11.6	9.7	-1.2	22	40
5	USA	Tonopah AP	38.07	-117.08	11.8	10.1	-1.3	24	34
5	USA	Winnemucca Muni AP	40.90	-117.80	10.9	10.3	-1.1	22	42
5	USA	Albany County AP	42.75	-73.80	9.5	12.0	-0.9	29	-27
5	USA	Binghamton-Edwin A Link Field	42.20	-75.98	8.9	11.5	-1.1	30	-17
5	USA	Buffalo-Greater Buffalo Intl AP	42.93	-78.73	9.6	11.7	-0.1	32	20
5	USA	Elmira Rgnl AP	42.17	-76.90	9.6	10.3	0.6	28	10
5	USA	Fort Drum-Wheeler Sack AAF	44.05	-75.72	8.1	11.2	-1.4	31	11
5	USA	Glens Falls-Bennett Mem AP	43.35	-73.62	8.9	11.9	-0.8	33	-14
5	USA	Islip-Long Island MacArthur AP	40.78	-73.10	13.1	10.4	-0.2	30	2
5	USA	Jamestown AWOS	42.15	-79.27	8.5	10.3	-1.3	35	-7
5	USA	Massena AP	44.93	-74.85	7.7	12.2	-1.1	31	6
5	USA	Monticello AWOS	41.70	-74.80	8.8	11.7	-0.6	32	4
5	USA	New York-Central Park	40.78	-73.97	13.3	11.0	0.3	27	1
5	USA	New York-J F Kennedy Intl AP	40.65	-73.80	13.4	10.7	0.0	30	-3
5	USA	New York-LaGuardia AP	40.78	-73.88	14.3	10.6	0.1	32	3
5	USA	Newburgh-Stewart Intl AP	41.50	-74.10	10.8	11.5	-1.0	30	-12

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Niagara Falls Intl AP	43.10	-78.95	10.0	11.4	-1.6	37	-11
5	USA	Poughkeepsie-Dutchess County AP	41.63	-73.88	10.7	11.1	1.1	27	36
5	USA	Republic AP	40.72	-73.42	13.2	9.8	1.0	34	-31
5	USA	Rochester-Greater Rochester Intl AP	43.12	-77.68	9.9	12.0	-0.9	31	-37
5	USA	Saranac Lake-Adirondack Rgnl AP	44.38	-74.20	6.1	11.1	-2.0	30	23
5	USA	Syracuse-Hancock Intl AP	43.12	-76.10	9.7	11.8	-0.8	28	-33
5	USA	Utica-Oneida County AP	43.15	-75.38	9.2	11.7	-0.2	30	7
5	USA	Watertown AP	44.00	-76.02	8.4	12.0	-0.2	35	-2
5	USA	Westhampton-Suffolk County AP	40.85	-72.63	11.7	9.5	0.9	33	-13
5	USA	White Plains-Westchester County AP	41.07	-73.72	11.3	10.5	1.0	28	8
5	USA	Akron Canton Rgnl AP	40.92	-81.43	10.4	11.8	-1.2	29	-27
5	USA	Cincinnati Muni AP-Lunken Field	39.10	-84.42	13.0	10.4	0.4	25	7
5	USA	Cleveland-Burke Lakefront AP	41.52	-81.68	11.2	12.0	0.2	32	0
5	USA	Cleveland-Hopkins Intl AP	41.40	-81.85	10.7	12.5	-1.1	29	-33
5	USA	Columbus-Port Columbus Intl AP	39.98	-82.88	12.0	10.9	0.9	25	44
5	USA	Dayton-Wright Patterson AFB	39.83	-84.05	11.8	10.5	-0.8	29	3
5	USA	Dayton Intl AP	39.90	-84.22	11.7	11.7	0.6	23	25
5	USA	Findlay AP	41.02	-83.67	11.4	10.4	1.2	24	16
5	USA	Mansfield-Lahm Muni AP	40.82	-82.52	9.8	12.3	-1.1	31	-23
5	USA	Ohio State University AP	40.07	-83.07	12.6	11.4	1.3	30	-21
5	USA	Toledo Express AP	41.58	-83.80	10.0	12.3	0.7	26	42
5	USA	Youngstown Rgnl AP	41.25	-80.67	9.7	11.5	-0.1	30	10
5	USA	Zanesville Muni AP	39.95	-81.90	12.7	9.2	0.1	21	9
5	USA	Altus AFB	34.65	-99.27	17.6	11.2	0.1	22	4
5	USA	Bartlesville-Phillips Field	36.77	-96.02	14.8	10.8	0.7	16	9
5	USA	Clinton Sherman AP	35.33	-99.20	15.5	11.6	0.7	25	2
5	USA	Fort Sill-Henry Post AAF	34.65	-98.40	17.1	11.3	0.2	24	-1
5	USA	Gage AP	36.30	-99.77	15.6	11.8	0.6	21	8
5	USA	Hobart Muni AP	35.00	-99.05	16.9	11.7	1.2	26	-20
5	USA	Lawton Muni AP	34.57	-98.42	17.1	9.8	0.4	21	-19
5	USA	McAlester Rgnl AP	34.90	-95.78	17.1	9.8	0.7	22	2
5	USA	Oklahoma City-Tinker AFB	35.42	-97.38	15.9	11.3	-0.4	23	7
5	USA	Oklahoma City-Wiley Post Field	35.53	-97.65	15.9	11.5	0.2	25	10
5	USA	Oklahoma City-Will Rogers World AP	35.38	-97.60	16.4	10.9	1.3	23	-7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Ponca City Muni AP	36.61	-97.49	16.7	11.7	1.4	26	-25
5	USA	Stillwater Rgnl AP	36.15	-97.08	16.3	11.4	1.1	21	-21
5	USA	Tulsa Intl AP	36.20	-95.88	16.2	11.5	0.5	21	9
5	USA	Vance AFB	36.33	-97.92	15.2	12.0	0.9	26	-33
5	USA	Astoria Rgnl AP	46.15	-123.88	11.7	4.4	0.1	30	9
5	USA	Aurora State AP	45.25	-122.77	12.8	6.3	-1.0	26	43
5	USA	Baker Muni AP	44.83	-117.82	8.8	9.5	-1.3	27	36
5	USA	Burns Muni AP	43.52	-119.02	8.2	9.9	-1.1	25	39
5	USA	Corvallis Muni AP	44.48	-123.28	13.0	6.5	0.0	26	6
5	USA	Eugene-Mahlon Sweet AP	44.05	-123.07	12.0	6.5	-1.1	26	49
5	USA	Klamath Falls Intl AP	42.22	-121.74	9.3	8.5	-1.7	24	40
5	USA	La Grande Muni AP	45.28	-118.00	10.4	8.5	-1.4	25	57
5	USA	Lakeview AWOS	42.17	-120.40	8.9	8.9	-1.2	26	36
5	USA	Medford-Rogue Valley Intl AP	42.19	-122.70	12.5	8.0	-1.4	24	51
5	USA	North Bend Muni AP	43.42	-124.25	12.0	3.5	0.4	32	-22
5	USA	Pendleton-Eastern Oregon Rgnl AP	45.70	-118.83	11.9	8.8	1.1	26	-31
5	USA	Portland-Hillsboro AP	45.53	-122.95	12.2	6.2	0.0	20	10
5	USA	Portland-Troutdale AP	45.55	-122.40	12.8	6.5	-1.0	29	45
5	USA	Portland Intl AP	45.60	-122.62	12.9	6.6	1.1	26	-26
5	USA	Redmond-Roberts Field	44.25	-121.17	9.6	8.0	-1.3	25	51
5	USA	Roseburg Rgnl AP	43.23	-123.35	13.3	6.0	-0.9	24	49
5	USA	Salem-McNary Field	44.90	-123.00	12.4	6.6	-0.1	26	10
5	USA	Sexton Summit	42.60	-123.37	11.1	7.1	-0.9	39	29
5	USA	Allentown-Lehigh Valley Intl AP	40.65	-75.45	11.4	11.7	0.0	27	-5
5	USA	Altoona-Blair County AP	40.30	-78.32	11.2	10.2	1.1	25	-13
5	USA	Bradford Rgnl AP	41.80	-78.63	7.1	11.0	-1.0	30	14
5	USA	Butler County AWOS	40.78	-79.95	9.4	11.2	-0.8	29	-1
5	USA	DuBois-Jefferson County AP	41.18	-78.90	8.9	11.3	0.1	29	7
5	USA	Erie Intl AP	42.08	-80.18	9.9	11.8	-1.1	32	-24
5	USA	Franklin-Chess Lemberton AP	41.38	-79.87	9.2	10.5	-0.2	28	6
5	USA	Harrisburg-Capital City AP	40.22	-76.85	12.2	11.1	0.8	24	13
5	USA	Harrisburg Intl AP	40.20	-76.77	11.7	12.5	-0.3	27	-4
5	USA	Johnstown-Cambria County AP	40.32	-78.83	10.1	10.9	0.8	26	-2
5	USA	Lancaster AP	40.12	-76.30	13.0	10.0	0.0	21	9
5	USA	Philadelphia-NE Philadelphia AP	40.08	-75.02	13.7	10.9	0.5	29	6
5	USA	Philadelphia Intl AP	39.87	-75.23	13.5	11.0	0.4	25	11

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Pittsburgh-Allegheny County AP	40.35	-79.92	12.2	9.5	0.8	24	6
5	USA	Pittsburgh Intl AP	40.50	-80.23	11.5	10.6	0.1	25	0
5	USA	Reading Mem AP-Spaatz Field	40.37	-75.97	12.9	10.4	0.8	27	26
5	USA	State College-Penn State University	40.72	-77.93	10.3	11.1	-1.7	34	-29
5	USA	Washington AWOS	40.13	-80.28	11.3	9.6	-0.6	27	5
5	USA	Wilkes-Barre-Scranton Intl AP	41.33	-75.73	10.3	11.9	-1.0	28	-37
5	USA	Williamsport Rgnl AP	41.25	-76.92	11.1	11.6	0.9	26	34
5	USA	Willow Grove NAS	40.20	-75.15	13.2	9.5	-0.2	29	10
5	USA	Aquadilla/Borinquen	18.50	-67.13	25.5	1.4	-0.1	43	-8
5	USA	Eugenio Maria De Ho	18.25	-67.15	25.5	1.2	-0.2	21	-7
5	USA	Mercedita	18.00	-66.55	26.0	1.5	0.0	26	13
5	USA	Roosevelt-Roads	18.25	-65.63	27.0	1.6	-0.1	36	-13
5	USA	SanJuanIntlArpt	18.42	-66.00	26.5	1.6	-0.3	40	-43
5	USA	SanJuanLMMarinIntlAP	18.43	-66.00	26.3	1.6	0.0	33	8
5	USA	Block Island State AP	41.17	-71.58	11.9	8.7	-0.9	40	23
5	USA	Pawtucket AWOS	41.92	-71.50	10.3	10.3	-0.3	31	5
5	USA	Providence-T F Green State AP	41.72	-71.43	11.4	10.7	0.1	30	14
5	USA	Anderson County AP	34.50	-82.72	15.7	9.5	0.4	27	-4
5	USA	Beaufort MCAS	32.48	-80.72	18.5	8.2	0.4	24	6
5	USA	Charleston Intl AP	32.90	-80.03	18.8	8.1	0.5	25	19
5	USA	Columbia Metro AP	33.95	-81.12	17.6	8.8	0.9	21	6
5	USA	Florence Rgnl AP	34.18	-79.73	18.2	8.5	0.8	23	-21
5	USA	Greenville-Downtown AP	34.85	-82.35	15.2	9.7	0.5	27	17
5	USA	Greer Greenville-Spartanburg AP	34.90	-82.22	16.1	9.2	0.7	22	-14
5	USA	Myrtle Beach AFB	33.68	-78.93	18.0	8.4	0.6	22	5
5	USA	North Myrtle Beach-Grand Strand Field	33.82	-78.72	17.7	8.4	0.6	23	7
5	USA	Shaw AFB	33.97	-80.47	16.5	8.9	0.5	22	-25
5	USA	Aberdeen Rgnl AP	45.45	-98.42	8.6	13.4	-1.0	30	8
5	USA	Brookings AWOS	44.30	-96.82	8.3	12.3	-0.5	26	25
5	USA	Ellsworth AFB	44.15	-103.10	8.2	12.4	-2.8	29	17
5	USA	Huron Rgnl AP	44.40	-98.22	8.0	13.3	-1.4	30	9
5	USA	Mitchell AWOS	43.77	-98.03	8.4	13.9	-2.5	30	30
5	USA	Mobridge Muni AP	45.53	-100.43	7.6	13.7	-2.1	28	33
5	USA	Pierre Muni AP	44.38	-100.28	9.3	13.6	-0.3	27	4
5	USA	Rapid City Rgnl AP	44.05	-103.05	8.8	12.5	-0.7	27	28
5	USA	Sioux Falls-Foss Field	43.58	-96.75	9.0	13.5	-0.6	28	14
5	USA	Watertown Muni AP	44.93	-97.15	7.2	13.0	-0.8	33	23

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Yankton-Chan Gurney Muni AP	42.92	-97.38	9.6	13.8	-1.3	31	10
5	USA	Bristol-TriCities Rgnl AP	36.47	-82.40	13.5	9.6	0.7	23	13
5	USA	Chattanooga-Lovell Field AP	35.03	-85.20	16.1	9.5	0.5	22	-2
5	USA	Crossville Mem AP	35.95	-85.08	14.2	8.7	0.8	22	4
5	USA	Dyersburg Muni AP	36.02	-89.40	16.0	10.2	0.2	29	16
5	USA	Jackson-McKellar Sipes Rgnl AP	35.60	-88.92	16.0	8.9	1.1	19	2
5	USA	Knoxville-McGhee Tyson AP	35.82	-83.98	15.1	10.2	0.8	24	4
5	USA	Memphis Intl AP	35.07	-89.98	17.4	10.0	0.7	23	0
5	USA	Nashville Intl AP	36.12	-86.68	16.0	10.4	0.8	25	9
5	USA	Abilene-Dyess AFB	32.43	-99.85	19.3	9.9	0.3	21	1
5	USA	Abilene Rgnl AP	32.47	-99.71	17.5	10.2	1.5	23	8
5	USA	Alice Intl AP	27.73	-98.03	22.6	7.0	0.9	19	7
5	USA	Amarillo Intl AP	34.99	-101.90	14.5	10.3	0.0	22	16
5	USA	Austin-Camp Mabry	30.32	-97.77	20.1	8.5	0.9	21	-5
5	USA	Austin-Mueller Muni AP	30.29	-97.74	20.6	7.3	0.6	23	7
5	USA	Brownsville-South Padre Island AP	25.90	-97.43	22.8	6.6	1.1	21	9
5	USA	Childress Muni AP	34.43	-100.28	16.7	10.1	-0.8	26	28
5	USA	College Station-Easterwood Field	30.58	-96.37	19.8	7.7	1.2	21	-33
5	USA	Corpus Christi Intl AP	27.88	-97.63	21.9	6.9	1.0	26	14
5	USA	Corpus Christi NAS	27.68	-97.28	23.1	6.2	0.7	29	1
5	USA	Cotulla AP	28.45	-99.22	22.4	7.1	1.7	11	-15
5	USA	Cox Field	33.63	-95.45	17.2	9.4	0.7	23	-21
5	USA	Dalhart Muni AP	36.02	-102.55	12.8	10.4	-1.2	26	43
5	USA	Dallas-Addison AP	32.97	-96.83	18.7	10.3	0.0	26	15
5	USA	Dallas-Fort Worth Intl AP	32.90	-97.02	19.0	9.8	1.3	21	-11
5	USA	Dallas-Love Field	32.85	-96.85	19.9	10.6	0.9	26	-6
5	USA	Dallas-Redbird AP	32.68	-96.87	19.9	9.0	1.8	19	-22
5	USA	Del Rio-Laughlin AFB	29.37	-100.78	22.6	8.2	1.1	18	-2
5	USA	Del Rio	29.38	-100.91	21.0	8.1	0.1	26	-4
5	USA	Draughon-Miller Central Texas AP	31.15	-97.40	19.1	8.8	0.6	23	-4
5	USA	El Paso Intl AP	31.77	-106.50	18.0	9.0	0.5	17	6
5	USA	Fort Hood	31.13	-97.72	19.6	9.3	1.1	22	12
5	USA	Fort Worth-Alliance AP	32.98	-97.32	18.0	9.7	0.7	25	27
5	USA	Fort Worth-Meacham AP	32.82	-97.37	18.5	10.5	-0.9	23	40
5	USA	Fort Worth NAS	32.77	-97.45	19.2	8.9	1.2	19	-14
5	USA	Galveston	29.30	-94.80	21.6	7.4	0.8	26	-23
5	USA	Georgetown AWOS	30.68	-97.68	19.2	8.5	0.3	26	3

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Greenville Muni AP	33.07	-96.07	18.0	9.5	0.6	24	24
5	USA	Harlingen-Valley Intl AP	26.23	-97.65	23.1	5.8	-0.3	29	-6
5	USA	Hondo Muni AP	29.37	-99.17	20.1	8.2	1.1	22	-10
5	USA	Houston-Bush Intercontinental AP	30.00	-95.37	20.5	7.6	0.7	24	9
5	USA	Houston-D W Hooks AP	30.07	-95.55	20.6	7.3	1.3	21	2
5	USA	Houston-Ellington AFB	29.57	-95.09	20.6	7.3	0.7	29	11
5	USA	Houston-William P Hobby AP	29.65	-95.28	21.2	6.4	0.0	23	14
5	USA	Killeen-Fort Hood Rgnl AP	31.07	-97.83	19.9	8.1	1.2	25	0
5	USA	Killeen Muni AWOS	31.08	-97.68	19.2	8.7	1.1	25	5
5	USA	Kingsville	27.50	-97.82	22.1	6.7	0.4	27	18
5	USA	Laredo Intl AP	27.57	-99.49	22.4	8.1	1.5	22	29
5	USA	Longview-Gregg County AP	32.29	-94.98	18.8	8.3	0.3	29	-2
5	USA	Lubbock Intl AP	33.67	-101.82	16.0	9.8	0.7	21	3
5	USA	Lufkin-Angelina Co AP	31.23	-94.75	19.1	8.0	0.7	23	5
5	USA	Marfa AP	30.37	-104.02	15.5	7.9	0.8	21	-8
5	USA	McAllen-Miller Intl AP	26.31	-98.17	22.8	6.4	1.1	25	-24
5	USA	McGregor AWOS	31.48	-97.32	18.9	9.2	0.1	31	3
5	USA	Midland Intl AP	31.95	-102.18	17.7	8.9	0.2	19	4
5	USA	Mineral Wells Muni AP	32.78	-98.07	18.5	9.2	0.6	25	-9
5	USA	Nacogdoches AWOS	31.58	-94.72	18.3	8.0	0.5	27	10
5	USA	Palacios Muni AP	28.72	-96.25	21.1	7.4	0.9	26	28
5	USA	Port Arthur-Jefferson Co AP	29.95	-94.02	20.6	7.5	0.7	23	19
5	USA	Randolph AFB	29.53	-98.28	20.3	7.9	1.2	22	6
5	USA	Rockport-Aransas Co AP	28.08	-97.05	22.8	6.4	0.4	27	23
5	USA	San Angelo-Mathis AP	31.35	-100.50	18.1	9.2	1.2	20	2
5	USA	San Antonio-Kelly AFB	29.38	-98.58	21.1	7.8	1.1	23	32
5	USA	San Antonio-Stinson AP	29.33	-98.47	20.5	7.8	0.5	17	11
5	USA	San Antonio Intl AP	29.53	-98.47	20.6	8.2	0.9	24	9
5	USA	Tyler-Pounds Field	32.35	-95.40	18.5	8.7	0.5	25	-7
5	USA	Victoria Rgnl AP	28.87	-96.93	21.0	7.4	0.8	25	-4
5	USA	Waco Rgnl AP	31.62	-97.23	19.2	9.5	1.2	21	-13
5	USA	Wichita Falls Muni AP	33.98	-98.50	17.8	10.1	0.8	23	-10
5	USA	Wink-Winkler County AP	31.78	-103.20	19.1	10.0	0.6	17	19
5	USA	Blanding Muni AP	37.62	-109.48	11.9	10.9	-1.6	24	37
5	USA	Bryce Canyon AP	37.70	-112.15	6.3	9.9	-1.7	32	25
5	USA	Cedar City Muni AP	37.70	-113.10	11.4	10.4	0.0	23	2
5	USA	Delta Muni AP	39.33	-112.58	11.0	9.9	-2.4	23	41
5	USA	Hanksville AP	38.37	-110.72	12.3	11.3	-1.6	18	40

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Moab-Canyonlands Field	38.58	-109.54	12.9	11.7	1.1	17	-31
5	USA	Ogden-Hill AFB	41.12	-111.97	11.4	11.2	-1.4	26	31
5	USA	Ogden-Hinkley AP	41.20	-112.02	11.8	11.5	0.0	22	12
5	USA	Provo Muni AWOS	40.22	-111.72	11.3	10.7	-1.4	19	52
5	USA	Saint George AWOS	37.08	-113.60	18.0	10.9	0.0	17	10
5	USA	Salt Lake City Intl AP	40.77	-111.97	12.3	11.0	-1.7	24	56
5	USA	Vernal AP	40.43	-109.52	9.8	11.3	0.0	17	11
5	USA	Wendover USAF Auxiliary Field	40.72	-114.03	11.4	11.9	-0.9	19	41
5	USA	Abingdon-Virgina Highlands AP	36.68	-82.03	12.8	9.2	-1.2	26	33
5	USA	Arlington-Ronald Reagan Washington Natl AP	38.87	-77.03	14.8	10.7	-0.6	28	-8
5	USA	Blacksburg-Virginia Tech AP	37.22	-80.42	12.3	9.8	0.4	29	5
5	USA	Charlottesville-Albemarle County AP	38.13	-78.45	14.8	9.1	0.9	24	34
5	USA	Danville Rgnl AP	36.57	-79.33	15.5	9.7	1.4	23	-16
5	USA	Davison AAF	38.72	-77.18	14.0	10.5	-0.6	27	-13
5	USA	Farmville Muni AP	37.35	-78.43	14.5	9.8	0.7	31	25
5	USA	Franklin Muni AP	36.70	-76.90	16.3	8.7	1.0	26	-17
5	USA	Fredericksburg-Shannon AP	38.27	-77.45	13.9	10.4	-0.6	27	13
5	USA	Hillsville-Twin County AP	36.77	-80.82	11.9	9.5	-0.6	28	33
5	USA	Hot Springs-Ingalls Field	37.95	-79.83	9.8	9.2	0.0	29	9
5	USA	Langley AFB	37.08	-76.35	14.9	10.2	-0.1	27	10
5	USA	Leesburg Muni AP-Godfrey Field	39.08	-77.57	12.7	10.7	-0.2	27	18
5	USA	Lynchburg Rgnl AP-Preston Glen Field	37.33	-79.20	14.4	10.1	0.7	23	6
5	USA	Manassas Muni AWOS	38.72	-77.52	12.6	10.1	-0.8	26	10
5	USA	Marion-Wytheville-Mountain Empire AP	36.90	-81.35	12.5	9.4	1.0	22	-5
5	USA	Martinsville-Blue Ridge AP	36.63	-80.02	13.4	9.7	-0.7	25	24
5	USA	Melfa-Accomack County AP	37.65	-75.77	15.2	9.8	-0.9	35	-25
5	USA	Newport News	37.13	-76.50	16.2	9.5	0.1	24	6
5	USA	Norfolk Intl AP	36.90	-76.20	16.2	9.7	0.4	27	9
5	USA	Norfolk NAS	36.95	-76.28	16.7	8.7	0.4	25	1
5	USA	Oceana NAS	36.82	-76.03	16.3	9.1	0.7	26	-37
5	USA	Petersburg Muni AP	37.18	-77.52	15.4	9.2	-0.8	22	-22
5	USA	Pulaski-New River Valley AP	37.13	-80.68	12.1	9.4	0.1	28	8
5	USA	Quantico MCAS	38.50	-77.30	14.7	10.0	0.7	27	-18
5	USA	Richmond Intl AP	37.52	-77.32	15.3	10.0	0.5	25	26

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Roanoke Rgnl AP-Woodrum Field	37.32	-79.97	14.2	9.8	0.4	23	0
5	USA	Staunton-Shenandoah Valley Rgnl AP	38.27	-78.90	13.3	10.1	-0.4	30	-2
5	USA	Sterling-Washington Dulles Intl AP	38.98	-77.47	13.3	10.5	0.4	23	10
5	USA	Winchester Rgnl AP	39.15	-78.15	12.9	10.7	-0.5	26	11
5	USA	Wise-Lonesome Pine AP	36.98	-82.53	12.7	9.5	0.4	33	14
5	USA	Charlotte-AmalieHarrySTrum	18.35	-64.97	27.0	1.8	0.4	51	-10
5	USA	Burlington Intl AP	44.47	-73.15	8.6	12.1	-1.1	30	-8
5	USA	Montpelier AP	44.20	-72.57	8.0	11.3	-0.2	34	27
5	USA	Rutland State AP	43.52	-72.95	8.4	12.6	-0.7	32	7
5	USA	Springfield-Hartnes State AP	43.35	-72.52	8.3	11.4	-0.3	33	7
5	USA	Bellingham Intl AP	48.80	-122.53	10.4	6.1	-0.7	27	26
5	USA	Bremerton National AP	47.48	-122.75	10.8	5.8	-0.9	24	44
5	USA	Ephrata Muni AP	47.30	-119.52	12.1	10.9	1.3	22	-28
5	USA	Fairchild AFB	47.63	-117.65	8.4	10.4	-2.3	26	56
5	USA	Fort Lewis-Gray AAF	47.08	-122.58	10.8	6.8	-1.5	30	58
5	USA	Hanford	46.57	-119.60	12.0	11.1	-1.8	22	60
5	USA	Hoquiam AP	46.98	-123.93	11.3	4.6	0.1	32	9
5	USA	Kelso AP	46.13	-122.90	11.8	5.8	0.0	25	17
5	USA	Moses Lake-Grant County AP	47.20	-119.32	11.8	9.9	1.3	19	-30
5	USA	Olympia AP	46.97	-122.90	11.0	6.1	0.0	28	5
5	USA	Pasco-Tri Cities AP	46.27	-119.12	12.7	9.2	-0.5	18	39
5	USA	Port Angeles-William R Fairchild Intl AP	48.12	-123.50	10.1	5.4	0.5	30	-38
5	USA	Pullman-Moscow Rgnl AP	46.75	-117.12	9.7	8.6	-1.3	26	49
5	USA	Quillayute State AP	47.93	-124.57	10.4	4.6	0.0	30	6
5	USA	Renton Muni AP	47.48	-122.22	12.5	6.0	-1.0	24	43
5	USA	Seattle-Boeing Field	47.68	-122.25	12.4	5.7	0.8	27	-35
5	USA	Seattle-Tacoma Intl AP	47.47	-122.32	12.0	5.8	-0.1	27	24
5	USA	Snohomish County AP	47.90	-122.28	11.3	5.1	-1.1	33	42
5	USA	Spokane-Felts Field	47.68	-117.32	10.3	9.5	-1.5	27	41
5	USA	Spokane Intl AP	47.49	-117.59	9.6	9.6	0.8	23	-26
5	USA	Stampede Pass	47.28	-121.33	5.9	7.9	-1.5	31	31
5	USA	Tacoma-McChord AFB	47.15	-122.48	10.7	6.9	-1.3	28	46
5	USA	Tacoma Narrows AP	47.27	-122.58	11.8	5.8	-0.5	28	30
5	USA	The Dalles Muni AP	45.62	-121.15	13.3	9.0	0.0	22	6
5	USA	Toledo-Winlock-Ed Carlson Mem AP	46.48	-122.80	10.1	6.7	0.0	24	8
5	USA	Walla Walla City-County AP	46.10	-118.28	12.7	9.1	-1.7	23	47

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Wenatchee-Pangborn Mem AP	47.40	-120.20	11.5	10.9	1.0	22	-25
5	USA	Whidbey Island NAS	48.35	-122.67	10.8	4.5	0.0	30	11
5	USA	Yakima Air Terminal-McAllister Field	46.57	-120.55	10.7	9.8	1.2	17	-24
5	USA	Appleton-Outagamie County AP	44.25	-88.52	9.1	11.7	-0.7	30	5
5	USA	Eau Claire County AP	44.87	-91.48	7.7	13.1	-1.1	30	18
5	USA	Ephraim AWOS	45.15	-87.15	7.3	12.8	-1.8	29	29
5	USA	Green Bay-Austin Straubel Intl AP	44.48	-88.13	8.1	12.7	-1.2	31	4
5	USA	Janesville-Rock County AP	42.62	-89.03	9.6	9.8	-0.3	28	9
5	USA	La Crosse Muni AP	43.87	-91.25	9.1	13.2	-0.8	29	-1
5	USA	Lone Rock AP	43.20	-90.18	9.9	11.5	-1.6	31	-36
5	USA	Madison-Dane County Rgnl AP	43.13	-89.33	8.6	13.1	-0.6	27	7
5	USA	Manitowac Muni AWOS	44.13	-87.68	8.8	11.3	-0.6	37	-23
5	USA	Marshfield Muni AP	44.63	-90.18	8.6	12.2	0.2	31	0
5	USA	Milwaukee-Mitchell Intl AP	42.95	-87.90	8.8	12.5	-0.5	33	18
5	USA	Minocqua-Woodruff-Lee Field	45.93	-89.73	6.9	12.5	-0.9	33	14
5	USA	Mosinee-Central Wisconsin AP	44.78	-89.67	7.3	12.5	-1.4	28	20
5	USA	Phillips-Price County AP	45.70	-90.40	7.0	12.4	-0.9	34	4
5	USA	Rice Lake Muni AP	45.48	-91.72	7.5	12.8	-0.9	32	10
5	USA	Sturgeon Bay-Door County AP	44.85	-87.42	8.5	12.1	-0.2	36	1
5	USA	Watertown Muni AP	43.17	-88.72	9.8	12.4	-1.1	33	-15
5	USA	Wausau Muni AP	44.92	-89.63	8.0	13.2	-1.6	36	16
5	USA	Wittman Rgnl AP	43.98	-88.55	8.2	12.0	-0.4	31	5
5	USA	Beckley-Raleigh County Mem AP	37.80	-81.12	11.9	9.7	1.0	21	-11
5	USA	Bluefield-Mercer County AP	37.27	-81.24	12.9	8.4	-0.2	29	-19
5	USA	Charleston-Yeager AP	38.38	-81.58	13.4	10.2	0.5	23	23
5	USA	Clarksburg-Harrison Marion Rgnl AP	39.28	-80.23	12.6	10.2	1.5	20	-21
5	USA	Elkins-Randolph County AP	38.88	-79.85	10.3	10.1	0.6	23	27
5	USA	Huntington-Tri State Walker Long Field	38.38	-82.55	13.7	10.2	0.7	23	30
5	USA	Lewisburg-Greenbrier Valley AP	37.87	-80.40	10.5	9.7	-0.8	24	27
5	USA	Martinsburg-Eastern WV Rgnl AP	39.40	-77.98	13.4	9.1	0.6	25	5
5	USA	Morgantown Muni-Hart Field	39.65	-79.92	12.5	9.6	1.1	23	17

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
5	USA	Parkersburg-Wood County-Gill Robb Wilson AP	39.35	-81.43	13.1	10.7	1.2	27	21
5	USA	Wheeling-Ohio County AP	40.18	-80.65	11.5	10.2	0.0	26	-8
5	USA	Casper-Natrona County Intl AP	42.90	-106.47	8.8	10.9	-1.1	31	30
5	USA	Cheyenne Muni AP	41.15	-104.80	8.6	9.8	-1.0	30	34
5	USA	Cody Muni AWOS	44.52	-109.02	8.5	10.7	-0.1	26	8
5	USA	Evanston-Uinta County AP-Burns Field	41.28	-111.03	6.7	11.1	-1.6	31	29
5	USA	Gillette-Gillette County AP	44.35	-105.53	9.9	11.3	-1.3	27	43
5	USA	Green River-Greater Green River Intergalactic Spaceport	41.46	-109.44	7.6	10.5	-1.2	28	30
5	USA	Jackson Hole AP	43.60	-110.73	4.8	9.5	-2.0	31	37
5	USA	Lander-Hunt Field	42.82	-108.73	8.6	11.3	-0.9	26	28
5	USA	Laramie-General Brees Field	41.32	-105.68	7.2	10.5	-1.0	29	36
5	USA	Rawlins Muni AP	41.80	-107.20	7.8	10.8	-1.6	24	28
5	USA	Riverton Rgnl AP	43.05	-108.45	9.0	12.2	-1.4	29	25
5	USA	Sheridan County AP	44.77	-106.97	9.0	10.8	-0.5	26	18
5	USA	Worland Muni AP	43.97	-107.95	8.9	11.9	-1.0	27	48
6	ARG	AEROPARQUE-BS-AS	-34.57	-58.42	18.2	-5.8	0.4	28	-20
6	ARG	BAHIA-BLANCA-AERO	-38.73	-62.17	15.9	-6.5	0.0	24	5
6	ARG	BARILOCHE-AERO	-41.15	-71.17	9.3	-5.5	-0.6	24	52
6	ARG	CATAMARCA-AERO	-28.60	-65.77	20.8	-6.6	0.9	9	6
6	ARG	CERES-AERO	-29.88	-61.95	19.0	-5.6	0.6	18	21
6	ARG	COMODORO-RIVADAVIA	-45.78	-67.50	13.6	-5.1	0.6	24	-16
6	ARG	CONCORDIA-AERO	-31.30	-58.02	18.5	-5.5	0.3	16	16
6	ARG	CORDOBA-AERO	-31.32	-64.22	17.5	-5.4	0.4	17	14
6	ARG	CORRIENTES-AERO	-27.45	-58.77	21.4	-4.8	0.4	18	-19
6	ARG	DOLORES-AERO	-36.35	-57.73	15.6	-5.9	0.5	21	-9
6	ARG	ESQUEL-AERO	-42.93	-71.15	9.2	-5.8	0.8	23	-16
6	ARG	EZEIZA-AERO	-34.82	-58.53	17.1	-5.9	0.0	24	14
6	ARG	FORMOSA-AERO	-26.20	-58.23	22.4	-4.8	0.9	18	-7
6	ARG	GUALEGUAYCHU-AERO	-33.00	-58.62	17.7	-6.0	0.1	21	14
6	ARG	IGUAZU-AERO	-25.73	-54.47	21.0	-4.0	0.7	14	-16
6	ARG	JUJUY-AERO	-24.38	-65.08	19.1	-4.7	0.8	9	-5
6	ARG	JUNIN-AERO	-34.55	-60.92	16.1	-6.0	0.5	21	-12
6	ARG	LA-RIOJA-AERO	-29.38	-66.82	19.8	-7.2	1.2	13	14
6	ARG	LABOULAYE-AERO	-34.13	-63.37	16.5	-6.4	0.2	18	19
6	ARG	LAS-LOMITAS	-24.70	-60.58	22.2	-4.6	1.1	5	-14
6	ARG	MALARGUE-AERO	-35.50	-69.58	12.3	-6.7	-0.1	19	16

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
6	ARG	MAR-DEL-PLATA-AERO	-37.93	-57.58	14.3	-5.2	0.3	28	5
6	ARG	MARCOS-JUAREZ-AERO	-32.70	-62.15	17.2	-6.0	0.6	16	1
6	ARG	MENDOZA-AERO	-32.83	-68.78	16.8	-7.3	0.4	14	-6
6	ARG	MONTE-CASEROS-AERO	-30.27	-57.65	19.4	-5.6	0.0	17	17
6	ARG	NEUQUEN-AERO	-38.95	-68.13	15.0	-7.4	0.0	17	11
6	ARG	PARANA-AERO	-31.78	-60.48	18.3	-5.7	0.5	21	-17
6	ARG	PASO-DE-LOS-LIBRES	-29.68	-57.15	19.6	-5.5	-0.1	19	19
6	ARG	POSADAS-AERO	-27.37	-55.97	22.1	-4.3	0.4	18	13
6	ARG	PRESIDENCIA-ROQUE-S	-26.82	-60.45	21.2	-4.7	0.5	15	7
6	ARG	RECONQUISTA-AERO	-29.18	-59.70	20.0	-5.1	0.0	21	8
6	ARG	RESISTENCIA-AERO	-27.45	-59.05	21.2	-5.0	0.7	19	-15
6	ARG	RIO-CUARTO-AERO	-33.12	-64.23	16.7	-6.2	0.4	17	-12
6	ARG	RIO-GALLEGOS-AERO	-51.62	-69.28	8.9	-5.5	0.3	20	19
6	ARG	RIO-GRANDE-BA	-53.80	-67.75	7.0	-4.6	0.6	19	-13
6	ARG	ROSARIO-AERO	-32.92	-60.78	17.8	-5.9	0.2	19	12
6	ARG	SALTA-AERO	-24.85	-65.48	17.1	-4.7	0.8	12	15
6	ARG	SAN-ANTONIO-OESTE-A	-40.78	-65.10	15.5	-6.7	0.2	19	2
6	ARG	SAN-JUAN-AERO	-31.40	-68.42	18.0	-8.3	0.9	14	-10
6	ARG	SAN-JULIAN-AERO	-49.32	-67.75	10.4	-5.6	0.4	18	1
6	ARG	SAN-LUIS-AERO	-33.27	-66.35	17.6	-6.5	0.5	12	-6
6	ARG	SAN-RAFAEL-AERO	-34.58	-68.40	15.4	-6.6	0.0	16	16
6	ARG	SANTA-ROSA-AERO	-36.57	-64.27	15.8	-7.0	0.5	19	-29
6	ARG	SANTIAGO-DEL-ESTERO	-27.77	-64.30	20.2	-5.8	0.7	13	0
6	ARG	SAUCE-VIEJO-AERO	-31.70	-60.82	18.8	-5.8	0.0	14	16
6	ARG	TANDIL-AERO	-37.23	-59.25	14.2	-6.0	-0.4	24	56
6	ARG	TARTAGAL-AERO	-22.65	-63.82	21.2	-4.4	1.0	3	-5
6	ARG	TRELEW-AERO	-43.20	-65.27	14.1	-6.4	0.1	21	15
6	ARG	TRES-ARROYOS	-38.33	-60.25	14.9	-6.3	-0.2	22	15
6	ARG	TUCUMAN-AERO	-26.85	-65.10	19.7	-5.5	0.7	16	10
6	ARG	USHUAIA-AERO	-54.80	-68.32	7.2	-3.5	0.3	19	0
6	ARG	VIEDMA-AERO	-40.85	-63.02	14.8	-6.5	0.4	25	-17
6	ARG	VILLA-DOLORES-AERO	-31.95	-65.13	18.2	-6.5	0.3	14	17
6	ARG	VILLA-REYNOLDS-AERO	-33.73	-65.38	16.3	-6.7	0.7	12	6
6	BOL	COCHABAMBA	-17.42	-66.18	17.3	-2.6	1.1	0	9
6	BOL	LA-PAZ-ALTO	-16.52	-68.18	8.2	-1.9	0.6	18	17
6	BOL	SANTA-CRUZ-EL-TROMP	-17.80	-63.18	23.6	-2.7	1.1	3	-6
6	BOL	VIRU-VIRU	-17.63	-63.13	23.4	-2.9	0.9	3	-2
6	BRA	ARACAJU(AP)	-10.98	-37.07	27.3	-2.6	0.5	68	-1
6	BRA	BELEM(AP)	-1.38	-48.48	27.6	0.0	-0.5	14	14
6	BRA	BOA-VISTA(AP)	2.83	-60.70	27.9	-0.6	0.9	16	5

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
6	BRA	BRASILIA(AP)	-15.87	-47.93	21.4	-1.6	0.9	1	6
6	BRA	CAMPINAS(AP)	-23.00	-47.13	21.3	-2.6	0.7	18	-19
6	BRA	CAMPO-GRANDE(AP)	-20.47	-54.67	24.3	-2.3	1.0	-2	8
6	BRA	CARAVELAS(AP)	-17.63	-39.25	24.6	-3.1	0.1	38	5
6	BRA	CUIABA(AP)	-15.65	-56.10	26.2	-2.1	0.7	14	6
6	BRA	CURITIBA(AP)	-25.52	-49.17	18.1	-3.6	0.6	33	-23
6	BRA	EDUARDO-GOMES-INTL	-3.03	-60.05	26.6	1.0	0.8	74	-16
6	BRA	FERNANDO-DE-NORONHA	-3.85	-32.42	26.7	-0.1	0.1	4	12
6	BRA	FLORIANOPOLIS(AP)	-27.67	-48.55	21.5	-3.7	0.4	31	-13
6	BRA	FORTALEZA(AP)	-3.78	-38.53	27.0	-0.5	0.3	-2	48
6	BRA	FOZ-DO-IGUACU(AP)	-25.52	-54.58	21.7	-3.9	0.5	16	-11
6	BRA	GOIANIA(AP)	-16.63	-49.22	23.3	-1.5	1.1	6	-6
6	BRA	ILHEUS(AP)	-14.82	-39.03	25.3	-1.3	0.6	44	20
6	BRA	LONDRINA(AP)	-23.33	-51.13	21.9	-3.3	0.8	16	6
6	BRA	MACEIO(AP)	-9.52	-35.78	25.4	-1.2	0.4	34	2
6	BRA	MANAUS(AP)	-3.15	-59.98	27.3	-0.1	0.3	-11	48
6	BRA	NATAL-AP	-5.92	-35.25	26.9	-1.3	0.6	38	26
6	BRA	PORTO-ALEGRE(AP)	-30.00	-51.18	20.1	-4.7	0.7	24	-11
6	BRA	PORTO-VELHO(AP)	-8.77	-63.92	25.8	-0.8	-0.1	-39	-18
6	BRA	PORTO-VELHO	-8.77	-63.92	25.5	-0.3	1.0	27	7
6	BRA	RECIFE(AP)	-8.07	-34.85	27.4	-1.3	0.5	32	11
6	BRA	RIO-BRANCO	-10.00	-67.80	25.4	-1.5	-0.2	-17	35
6	BRA	RIO-DE-JANEIRO(AP)	-22.90	-43.17	24.3	-2.5	0.4	41	-15
6	BRA	SALVADOR(AP)	-12.90	-38.33	26.0	-1.4	-0.4	34	-16
6	BRA	SANTAREM-AP	-2.43	-54.72	27.4	0.0	0.7	21	18
6	BRA	SAO-LUIZ(AP)	-2.60	-44.23	27.4	0.1	0.0	1	17
6	BRA	SAO-PAULO(AP)	-23.62	-46.65	20.2	-3.1	0.5	24	-1
6	BRA	TERESINA(AP)	-5.05	-42.82	27.6	-0.9	0.7	-55	24
6	BRA	VITORIA(AP)	-20.27	-40.28	24.9	-2.3	0.4	38	-12
6	CHL	ANTOFAGASTA	-23.43	-70.45	17.1	-2.6	0.2	35	-23
6	CHL	ARICA	-18.47	-70.17	19.2	-3.1	0.0	40	3
6	CHL	BALMACEDA	-45.92	-71.70	8.0	-5.4	0.5	19	-28
6	CHL	CONCEPCION	-36.77	-73.07	13.5	-3.3	-0.3	25	29
6	CHL	COPIAPO	-27.30	-70.42	16.1	-3.5	-0.6	23	57
6	CHL	CURICO	-34.97	-71.23	14.1	-5.9	-0.4	15	37
6	CHL	IQUIQUE	-20.53	-70.18	18.9	-3.0	-0.1	36	10
6	CHL	ISLA-DE-PASCUA	-27.17	-109.43	20.9	-2.6	0.4	49	-22
6	CHL	JUAN-FERNANDEZ	-33.62	-78.82	15.7	-2.8	0.0	48	-14
6	CHL	LA-SERENA	-29.92	-71.20	14.8	-2.8	0.3	26	-25
6	CHL	PUDAHUEL	-33.38	-70.78	14.9	-5.8	0.0	22	7

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
6	CHL	PUERTO-MONTT	-41.43	-73.10	11.1	-3.3	-0.4	23	32
6	CHL	PUNTA-ARENAS	-53.00	-70.97	7.4	-4.0	0.3	26	6
6	CHL	TEMUCO	-38.75	-72.63	12.2	-3.9	-0.6	26	48
6	COL	BARRANQUILLA-ERNEST	10.88	-74.78	27.7	0.7	-0.5	11	-1
6	COL	BOGOTA-ELDORADO	4.70	-74.13	14.1	-0.4	0.3	70	7
6	COL	CALI-ALFONSO-BONILL	3.55	-76.38	23.4	0.2	0.0	4	18
6	COL	CARTAGENA-RAFAEL-NU	10.45	-75.52	27.4	1.0	0.0	7	19
6	COL	RIONEGRO-JM-CORDOVA	6.13	-75.43	16.9	0.3	0.4	-21	24
6	FLK	MOUNT-PLEASANT-AP	-51.82	-58.45	7.5	-3.7	0.0	26	5
6	GUF	ROCHAMBEAU	4.83	-52.37	26.1	-0.1	-0.1	14	1
6	PER	AREQUIPA	-16.33	-71.57	14.8	-0.6	0.4	17	30
6	PER	CHICLAYO	-6.78	-79.82	23.9	-1.8	1.9	75	-18
6	PER	CUZCO	-13.53	-71.93	12.8	-1.3	0.7	-2	22
6	PER	IQUITOS	-3.78	-73.30	25.6	-0.3	0.4	-3	30
6	PER	LIMA-CALLAO-AP	-12.00	-77.12	20.7	-2.9	-1.0	31	38
6	PER	PISCO	-13.73	-76.22	20.8	-1.6	1.6	31	-33
6	PER	PIURA	-5.20	-80.60	24.6	-1.5	0.2	51	-25
6	PER	PUCALLPA	-8.37	-74.57	25.5	-0.7	0.2	-24	28
6	PER	TACNA	-18.05	-70.27	18.5	-2.7	0.7	21	-26
6	PER	TALARA	-4.57	-81.23	24.8	-1.1	0.7	59	36
6	PER	TRUJILLO	-8.08	-79.10	22.4	0.4	-0.7	44	-30
6	PRY	ASUNCION-AP	-25.25	-57.52	22.9	-3.9	0.5	6	-15
6	PRY	CONCEPCION	-23.42	-57.30	23.6	-4.3	0.9	12	-7
6	PRY	ENCARNACION	-27.32	-55.83	21.4	-4.4	0.7	15	-6
6	PRY	VILLARRICA	-25.75	-56.43	22.1	-4.1	0.0	15	17
6	URY	ARTIGAS	-30.38	-56.50	19.2	-5.3	-0.1	20	9
6	URY	BELLA-UNION	-30.27	-57.58	19.7	-5.5	0.5	20	9
6	URY	CARRASCO	-34.83	-56.00	16.7	-5.2	0.0	32	13
6	URY	COLONIA	-34.45	-57.83	17.6	-5.9	0.5	25	-19
6	URY	DURAZNO	-33.35	-56.50	17.0	-5.8	0.0	23	11
6	URY	MELO	-32.37	-54.18	17.3	-5.3	0.1	23	14
6	URY	MERCEDES	-33.25	-58.07	17.7	-5.8	0.0	21	13
6	URY	PASO-DE-LOS-TOROS	-32.80	-56.52	17.8	-5.7	0.8	24	-28
6	URY	PAYSANDU	-32.33	-58.03	18.4	-5.9	-0.1	21	11
6	URY	RIVERA	-30.88	-55.53	18.4	-5.4	0.1	23	11
6	URY	ROCHA	-34.48	-54.30	16.3	-4.9	0.4	26	-9
6	URY	SALTO	-31.38	-57.95	18.9	-5.7	-0.2	21	11
6	URY	TACUAREMBO	-31.70	-55.98	17.5	-5.9	-0.2	20	14
6	URY	TREINTA-Y-TRES	-33.22	-54.38	17.0	-5.6	0.4	25	-7
6	URY	YOUNG	-32.68	-57.63	17.8	-6.1	0.8	22	1

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
6	URY	CARACAS-MAIQUETIA-A	10.60	-66.98	25.7	1.0	0.7	85	11
6	URY	GUANARE	9.02	-69.73	26.3	-0.9	-0.1	75	-41
6	URY	MERIDA	8.60	-71.18	20.6	0.4	0.5	24	-15
7	ASM	PAGO-PAGO-WSO-AP	-14.33	-170.72	27.7	-0.5	0.1	37	4
7	AUS	ADELAIDE-AP	-34.95	138.53	16.8	-4.6	0.1	25	14
7	AUS	ADELAIDE-REGIONAL-O	-34.92	138.62	17.1	-4.9	-0.5	26	41
7	AUS	ALBANY-AP	-34.93	117.80	15.2	-3.3	0.1	39	-19
7	AUS	ALICE-SPRINGS-AP	-23.80	133.88	21.1	-7.1	1.4	13	-9
7	AUS	ARARAT-PRISON	-37.28	142.98	13.5	-4.8	-0.5	29	45
7	AUS	BALLARAT-AERODROME	-37.52	143.78	12.3	-4.8	0.0	29	-2
7	AUS	BENALLA	-36.55	145.97	14.9	-6.0	-0.7	21	39
7	AUS	BILOELA-THANGOOL-AP	-24.48	150.57	20.1	-5.3	0.9	19	10
7	AUS	BIRDSVILLE-POLICE-S	-25.90	139.35	22.4	-7.9	0.5	15	1
7	AUS	BOULIA-AP	-22.92	139.90	23.7	-6.5	0.9	16	1
7	AUS	BOWEN-AP	-20.02	148.20	24.0	-3.8	0.7	25	15
7	AUS	BOWRAL(PARRY-DRIVE)	-34.48	150.40	13.7	-4.9	0.8	22	-4
7	AUS	BRISBANE-AERO	-27.38	153.13	20.2	-4.4	0.6	24	11
7	AUS	BROOME-AP	-17.95	122.23	25.7	-4.3	1.2	20	26
7	AUS	CAIRNS-AERO	-16.88	145.75	24.2	-2.8	0.5	21	20
7	AUS	CANBERRA-AP	-35.30	149.20	13.6	-6.5	0.0	21	15
7	AUS	CAPE-BORDA	-35.75	136.58	15.4	-3.0	-0.4	37	18
7	AUS	CAPE-BRUNY-LIGHTHOU	-43.50	147.15	12.5	-2.7	0.2	33	0
7	AUS	CAPE-OTWAY-LIGHTHOU	-38.85	143.52	14.2	-2.8	0.4	39	-15
7	AUS	CARNARVON-AP	-24.88	113.67	21.9	-4.4	1.0	39	-13
7	AUS	CEDUNA-AMO	-32.13	133.70	17.3	-4.6	0.5	24	-19
7	AUS	CHARLEVILLE-AERO	-26.42	146.27	20.4	-7.1	0.5	16	14
7	AUS	COBAR-MO	-31.48	145.83	17.9	-7.0	0.7	23	-2
7	AUS	COFFS-HARBOUR-MO	-30.32	153.12	18.7	-4.4	0.4	23	17
7	AUS	COOKTOWN-MISSION	-15.43	145.18	25.2	-2.3	1.2	10	29
7	AUS	COONABARABRAN-NAMOI	-31.27	149.27	15.3	-6.8	0.1	19	12
7	AUS	CORRIGIN	-32.33	117.87	17.1	-6.2	0.1	32	5
7	AUS	COWRA-AP	-33.85	148.65	15.6	-7.1	-0.3	21	4
7	AUS	CUNDERDIN	-31.65	117.25	17.4	-6.5	-0.4	26	13
7	AUS	CUNNAMULLA-POST-OFF	-28.07	145.68	20.7	-6.8	0.8	17	5
7	AUS	DARWIN-AP	-12.42	130.88	26.8	-1.9	1.1	2	23
7	AUS	DEVONPORT-AP	-41.17	146.42	13.0	-3.8	0.0	32	8
7	AUS	EAST-SALE-AP	-38.10	147.13	14.2	-4.3	0.5	26	-34
7	AUS	ELLISTON(PO)	-33.65	134.88	16.7	-3.7	0.4	26	-7
7	AUS	ESPERANCE	-33.83	121.88	16.6	-3.5	0.2	37	0
7	AUS	GABO-ISLAND	-37.57	149.90	15.6	-3.3	0.3	38	-5

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	AUS	GAYNDAH-POST-OFFICE	-25.63	151.62	20.6	-5.2	0.7	18	12
7	AUS	GEORGETOWN-POST-OFF	-18.30	143.55	24.9	-3.9	-1.0	7	-70
7	AUS	GERALDTON-AP	-28.80	114.70	19.5	-5.0	0.0	40	-10
7	AUS	GILES-METEOROLOGICA	-25.03	128.30	22.3	-7.2	1.2	18	2
7	AUS	GOONDIWINDI-AP	-28.52	150.32	19.2	-6.4	0.6	18	-1
7	AUS	GOVE-AP	-12.28	136.82	25.7	-2.1	-0.8	31	-28
7	AUS	HALLS-CREEK-AP	-18.23	127.67	25.3	-4.7	1.6	7	17
7	AUS	HOBART-AP	-42.83	147.50	13.3	-3.7	0.3	30	-18
7	AUS	HOBART-ELLERSLIE-RO	-42.88	147.33	13.0	-3.6	0.0	26	6
7	AUS	JURIEN	-30.30	115.03	19.2	-3.8	0.1	42	5
7	AUS	KALBARRI-PO	-27.72	114.17	20.4	-5.0	0.3	38	-23
7	AUS	KALGOORLIE-BOULDER	-30.78	121.45	18.7	-6.4	0.5	22	-13
7	AUS	KATOOMBA	-33.72	150.28	12.4	-5.3	0.5	28	-7
7	AUS	KULGERA	-25.85	133.30	20.9	-7.3	0.9	17	-4
7	AUS	KYANCUTTA	-33.13	135.55	16.9	-5.5	0.1	22	12
7	AUS	LAKE-GRACE	-33.12	118.47	16.3	-5.3	0.2	31	-4
7	AUS	LAMEROO	-35.33	140.52	16.0	-5.8	0.3	25	-9
7	AUS	LANCELIN	-31.02	115.32	19.1	-3.9	0.2	37	-2
7	AUS	LAUNCESTON-AP	-41.53	147.20	12.3	-4.5	-0.4	28	42
7	AUS	LAVERTON-AERODROME	-37.87	144.75	14.6	-4.2	0.5	30	-1
7	AUS	LEARMONTH-AP	-22.23	114.08	23.6	-5.1	0.9	33	-10
7	AUS	LEONORA-POST-OFFICE	-28.88	121.33	19.9	-6.7	0.2	22	19
7	AUS	LORD-HOWE-ISLAND-AE	-31.53	159.07	19.8	-2.8	-0.1	44	25
7	AUS	MAATSUYKER-ISLAND-L	-43.65	146.27	12.0	-2.1	0.0	55	0
7	AUS	MACKAY-MO	-21.12	149.22	22.8	-4.0	0.6	22	18
7	AUS	MACQUARIE-ISLAND	-54.50	158.95	6.3	-1.7	-0.4	40	47
7	AUS	MAITLAND	-34.38	137.67	16.6	-4.8	-0.1	29	6
7	AUS	MARBLE-BAR-COMPARIS	-21.18	119.75	25.6	-5.8	0.7	13	23
7	AUS	MARLA-POLICE-STATIO	-27.30	133.62	20.2	-7.0	0.8	16	-21
7	AUS	MARYBOROUGH-COMPOSI	-25.52	152.72	20.6	-4.5	0.4	21	21
7	AUS	MELBOURNE-AP	-37.67	144.85	14.6	-4.2	0.5	28	-17
7	AUS	MELBOURNE	-37.82	144.97	15.8	-4.4	0.5	26	-33
7	AUS	MILDURA-AP	-34.23	142.08	17.1	-6.1	-0.5	19	36
7	AUS	MORUYA-HEADS-PILOT	-35.92	150.15	16.3	-3.8	0.6	32	-12
7	AUS	MOUNT-GAMBIER-AERO	-37.73	140.78	13.9	-3.8	0.6	32	-19
7	AUS	MOUNT-ISA-AERO	-20.68	139.48	23.8	-5.8	1.1	15	15
7	AUS	MURRURUNDI-POST-OFF	-31.77	150.83	15.3	-6.1	0.1	21	10
7	AUS	NEPTUNE-ISLAND	-35.33	136.12	15.9	-2.8	-0.3	43	7
7	AUS	NORMANTON	-17.67	141.08	26.3	-3.4	1.3	15	25
7	AUS	NORSEMAN	-32.20	121.78	17.2	-5.7	0.5	27	-15

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	AUS	ONSLOW	-21.63	115.12	24.3	-4.6	0.7	36	5
7	AUS	PARKES(MACARTHUR-S)	-33.13	148.17	16.6	-6.8	-0.2	22	14
7	AUS	PAYNES-FIND	-29.27	117.68	19.5	-7.3	-0.5	26	51
7	AUS	PERTH-AP	-31.93	115.97	18.2	-4.8	0.6	35	-29
7	AUS	PORT-HEDLAND-AP	-20.37	118.63	25.2	-4.9	1.0	25	7
7	AUS	QUILPIE-AP	-26.62	144.25	21.2	-6.8	0.8	19	19
7	AUS	RICHMOND-POST-OFFIC	-20.73	143.13	24.8	-5.1	-1.0	14	-65
7	AUS	ROCKHAMPTON-AERO	-23.38	150.48	22.2	-4.7	0.8	21	15
7	AUS	ROEBOURNE-POST-OFFI	-20.78	117.15	25.8	-4.9	0.8	24	3
7	AUS	SHARK-BAY(DENHAM)	-25.92	113.52	21.6	-4.1	0.6	38	-13
7	AUS	SMOKY-CAPE-LIGHTHOU	-30.92	153.08	19.6	-3.7	0.5	31	-9
7	AUS	SOUTHERN-CROSS	-31.23	119.33	17.9	-6.4	0.5	22	3
7	AUS	ST-LAWRENCE-POST-OF	-22.35	149.53	22.3	-4.1	0.9	23	5
7	AUS	SYDNEY-AP-AMO	-33.93	151.18	18.4	-4.4	0.6	26	-4
7	AUS	TIBOOBURRA-POST-OFF	-29.43	142.00	19.5	-7.0	0.3	21	14
7	AUS	TOWNSVILLE-AERO	-19.25	146.77	24.2	-4.1	0.9	22	14
7	AUS	URANDANGIE	-21.60	138.30	23.7	-6.4	1.3	14	10
7	AUS	WAGGA-WAGGA-AMO	-35.17	147.45	15.5	-6.4	-0.2	26	6
7	AUS	WILLIAMTOWN-RAAF	-32.80	151.83	17.8	-5.1	0.4	24	8
7	AUS	WILLIS-ISLAND	-16.30	149.97	26.2	-2.0	-0.1	41	3
7	AUS	WINDORAH	-25.42	142.65	22.8	-7.2	1.2	17	0
7	AUS	WINTON(POST-OFFICE)	-22.38	143.03	24.4	-5.7	0.9	12	13
7	AUS	WOLLOGORANG	-17.20	137.93	24.4	-4.0	1.2	12	21
7	AUS	WONTHAGGI-COMPOSITE	-38.60	145.58	14.3	-3.9	-0.2	30	9
7	AUS	WOOMERA-AERODROME	-31.15	136.82	19.2	-6.6	0.8	20	-13
7	AUS	WYNDHAM	-15.48	128.12	27.2	-3.3	1.2	0	21
7	AUS	YAMBA-PILOT-STATION	-29.43	153.37	19.7	-3.7	0.0	26	8
7	BRN	BRUNEI-AP	4.93	114.93	26.9	0.9	0.0	-19	36
7	CCK	COCOS-ISLAND-AERO	-12.18	96.83	27.2	0.2	0.4	7	-6
7	COK	RAROTONGA	-21.20	-159.82	24.4	-2.0	0.3	47	-10
7	FJI	NADI-AP	-17.75	177.45	25.0	-1.7	0.3	28	-2
7	FJI	NAUSORI	-18.05	178.57	24.5	-1.8	0.2	38	5
7	FSM	CHUUK-WSO-AP	7.45	151.83	27.8	0.2	-0.1	1	17
7	FSM	KUSAIE-KOSRAE-EAST	5.33	163.03	27.9	0.1	0.3	-3	38
7	FSM	POHNPEI-WSO	6.97	158.22	26.9	-0.3	0.2	40	-2
7	FSM	YAP-ISLAND-WSO-AP	9.48	138.08	27.3	0.3	0.3	33	32
7	GUM	ANDERSEN-AFB	13.57	144.92	27.1	0.3	0.1	15	17
7	GUM	GUAM-WFO	13.48	144.80	27.4	0.4	-0.5	4	-25
7	IDN	BALIKPAPAN-SEPINGGA	-1.27	116.90	27.6	0.5	0.6	39	34
7	IDN	BANDA-ACEH-BLANG-BI	5.52	95.42	26.6	1.0	0.0	-5	17

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	IDN	BANJARMASIN-SYAMSUD	-3.43	114.75	26.8	0.1	0.5	0	20
7	IDN	BANYUWANGI	-8.22	114.38	26.4	-0.2	0.8	20	29
7	IDN	CILACAP	-7.73	109.02	26.3	-1.2	1.0	62	38
7	IDN	DENPASAR-NGURAH-RAI	-8.75	115.17	27.5	-0.3	0.4	-23	36
7	IDN	GORONTALO-JALALUDDI	0.52	123.07	26.2	-0.1	0.4	7	32
7	IDN	JAKARTA-SOEKARNO-HA	-6.12	106.65	27.2	0.1	0.5	10	33
7	IDN	KALIANGET(MADURA-I)	-7.05	113.97	27.7	-0.6	0.6	-60	26
7	IDN	LHOKSEUMAWE-MALIKUS	5.23	97.20	26.7	0.9	0.2	22	17
7	IDN	MATARAM-SELAPARANG	-8.53	116.07	26.0	-0.9	0.5	34	15
7	IDN	MEDAN-POLONIA	3.57	98.68	26.9	0.8	0.7	-28	38
7	IDN	MENADO-SAM-RATULAN	1.53	124.92	26.2	0.5	0.3	28	-2
7	IDN	PADANG-TABING	-0.88	100.35	25.9	-0.7	-0.1	80	-37
7	IDN	PALEMBANG-ST-M-BA	-2.90	104.70	26.7	0.6	0.5	5	27
7	IDN	PALU-MUTIARA	-0.68	119.73	26.9	-0.1	0.1	17	14
7	IDN	PEKAN-BARU-SIMPANGT	0.47	101.45	26.6	0.1	0.5	14	19
7	IDN	RENGAT-JAPURA	-0.33	102.32	26.3	0.1	0.6	3	28
7	IDN	SANGKAPURA(BAWEAN)	-5.85	112.63	27.7	0.2	0.1	14	19
7	IDN	SAUMLAKI-OLILIT	-7.98	131.30	27.3	-0.7	0.0	26	4
7	IDN	SEMARANG-AHMAD-YANI	-6.98	110.38	27.2	0.7	0.7	36	27
7	IDN	SIBOLGA-PINANGSORI	1.55	98.88	26.0	0.0	0.2	11	5
7	IDN	SINGKEP-DABO	-0.48	104.58	26.8	0.3	0.4	12	3
7	IDN	SUMBAWA-BESAR-BRANG	-8.43	117.42	26.3	-0.2	0.7	9	22
7	IDN	SURABAYA-JUANDA	-7.37	112.77	27.6	-0.2	0.7	11	34
7	IDN	TEGAL	-6.85	109.15	27.0	-0.3	0.5	-24	39
7	IDN	UJUNG-PANDANG-HASAN	-5.07	119.55	26.5	-0.1	0.5	-6	27
7	IDN	WAINGAPU-MAU-HAU	-9.67	120.33	26.4	-1.0	1.0	-7	19
7	KIR	TARAWA	1.35	172.92	27.8	0.0	0.1	1	17
7	MHL	MAJURO-WSO-AP	7.08	171.38	27.7	-0.1	0.0	16	13
7	MNP	ROTA-INTL-ROTA-ISL	14.17	145.25	26.8	1.1	-0.2	32	-18
7	MNP	WEST-TINIAN	15.00	145.62	27.9	1.0	0.9	-1	24
7	MYS	BINTULU	3.20	113.03	26.9	0.4	0.0	17	3
7	MYS	KOTA-BHARU	6.17	102.28	27.0	0.7	-0.1	-39	44
7	MYS	KOTA-KINABALU	5.93	116.05	27.4	0.3	0.1	2	17
7	MYS	KUALA-LUMPUR-SUBANG	3.12	101.55	26.9	0.5	-0.1	13	18
7	MYS	KUANTAN	3.78	103.22	26.7	1.0	0.3	10	25
7	MYS	KUCHING	1.48	110.33	26.1	0.5	0.0	22	7
7	MYS	LABUAN	5.30	115.25	27.3	0.0	-0.1	4	15
7	MYS	MALACCA	2.27	102.25	26.9	0.1	0.3	14	4

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	MYS	MIRI	4.33	113.98	26.8	0.6	0.3	-43	5
7	MYS	PENANG-BAYAN-LEPAS	5.30	100.27	27.2	0.4	0.0	-53	38
7	MYS	SANDAKAN	5.90	118.07	27.2	0.3	0.3	2	37
7	MYS	SIBU	2.33	111.83	26.3	0.7	0.7	-47	-1
7	MYS	SITIAWAN	4.22	100.70	26.7	1.0	0.7	-23	22
7	MYS	TAWAU	4.27	117.88	26.2	-0.1	0.1	12	15
7	NCL	KOUMAC(NLLE-CALEDO)	-20.57	164.28	24.0	-2.4	0.4	30	-3
7	NCL	LA-TONTOUTA(NLLE-C)	-22.02	166.22	22.5	-3.3	0.3	35	11
7	NCL	NOUMEA(NLLE-CALEDO)	-22.27	166.45	23.4	-2.3	-0.4	40	33
7	NFK	NORFOLK-ISLAND-AERO	-29.03	167.93	19.1	-2.9	-0.3	47	51
7	NZL	AUCKLAND-AP	-37.02	174.80	15.8	-3.7	0.3	35	-31
7	NZL	CHRISTCHURCH	-43.48	172.55	12.0	-4.8	0.1	24	18
7	NZL	TAIAROA-HEAD	-45.77	170.73	11.4	-2.9	0.3	33	-26
7	NZL	WELLINGTON-AP	-41.33	174.80	14.4	-3.3	0.4	42	-33
7	PHL	APARRI	18.37	121.63	26.9	1.9	-0.1	21	0
7	PHL	BAGUIO	16.42	120.60	19.5	0.8	0.6	-6	30
7	PHL	BUTUAN	8.93	125.52	26.8	1.1	0.6	-12	16
7	PHL	CAGAYAN-DE-ORO	8.48	124.63	27.2	0.2	0.4	15	15
7	PHL	CALAPAN	13.42	121.18	26.9	1.1	0.6	1	36
7	PHL	CATARMAN	12.50	124.63	27.2	1.1	0.6	7	38
7	PHL	DAET	14.13	122.98	27.1	1.1	0.2	2	8
7	PHL	DAGUPAN	16.05	120.33	27.7	1.1	0.4	-24	21
7	PHL	DAVAO-AP	7.12	125.65	27.2	0.4	0.3	-10	15
7	PHL	DIPOLOG	8.60	123.35	27.3	0.8	0.1	-32	44
7	PHL	DUMAGUETE	9.30	123.30	27.2	0.3	0.5	13	33
7	PHL	ILOILO	10.70	122.57	27.2	1.1	0.7	-45	23
7	PHL	LAOAG	18.18	120.53	27.0	1.5	0.8	6	33
7	PHL	LEGASPI	13.13	123.73	27.2	1.2	0.6	30	34
7	PHL	LUMBIA-AP	8.43	124.28	26.1	1.0	0.4	4	23
7	PHL	MACTAN	10.30	123.97	27.9	1.0	0.6	1	37
7	PHL	MALAYBALAY	8.15	125.08	23.5	0.6	0.7	-18	26
7	PHL	MANILA	14.58	120.98	27.9	1.1	1.0	-21	41
7	PHL	MASBATE	12.37	123.62	27.7	1.3	0.1	17	10
7	PHL	NINOY-AQUINO-INTERN	14.52	121.00	27.4	1.2	0.8	-14	31
7	PHL	PUERTO-PRINCESA	9.75	118.73	27.1	0.8	0.7	-45	33
7	PHL	ROXAS	11.58	122.75	27.3	0.4	0.4	-15	57
7	PHL	SCIENCE-GARDEN	14.63	121.02	26.7	1.3	0.7	-22	31
7	PHL	TACLOBAN	11.25	125.00	27.5	1.4	0.6	30	3
7	PHL	TAGBILARAN	9.60	123.85	27.3	1.3	0.6	9	47
7	PHL	TAYABAS	14.03	121.58	26.1	1.5	0.9	4	23

Region	Country	Station	Latitude	Longitude	$T_{s,avg}$	$T_{s,amplitude,1}$	$T_{s,amplitude,2}$	PL_1	PL_2
7	PHL	TUGUEGARAO	17.62	121.73	26.3	2.1	0.8	2	34
7	PHL	VIRAC	13.58	124.23	27.3	1.2	0.8	15	52
7	PHL	ZAMBOANGA	6.90	122.07	27.2	0.4	0.1	14	18
7	PLW	KOROR-WSO	7.33	134.48	27.2	0.3	0.3	9	34
7	PYF	ATUONA	-9.80	-139.03	25.8	-0.5	0.4	57	-2
7	PYF	MURUROA	-21.82	-138.80	25.1	-2.2	0.5	40	29
7	PYF	RAPA	-27.62	-144.33	21.2	-2.7	0.5	52	-31
7	PYF	RIKITEA	-23.13	-134.97	23.3	-2.1	0.4	53	-43
7	PYF	TAHITI-FAAA	-17.55	-149.62	26.2	-1.2	0.3	43	25
7	PYF	TAKAROA	-14.48	-145.03	27.7	-0.6	0.4	59	46
7	PYF	TUBUAI	-23.35	-149.48	23.5	-2.1	0.4	50	-1
7	SGP	SINGAPORE-CHANGI-AP	1.37	103.98	27.5	0.7	0.2	-3	-9
7	SLB	HONIARA-HENDERSON	-9.42	160.05	25.6	-0.7	-0.3	36	2
7	TON	FUAAMOTU	-21.23	-175.15	23.7	-2.3	0.1	44	-25
7	TON	HAAPAI	-19.80	-174.35	25.2	-1.9	0.4	48	30
7	VUT	ANEITYUM	-20.23	169.77	23.9	-2.2	0.0	41	-1
7	VUT	BAUERFIELD(EFATE)	-17.70	168.30	23.9	-2.2	0.2	36	-4
7	VUT	LAMAP(MALEKULA)	-16.42	167.80	25.7	-1.1	-0.3	48	8
7	VUT	PEKOA-AP(SANT)	-15.52	167.22	25.4	-0.6	0.3	13	22
7	VUT	WHITE-GRASS-AP	-19.45	169.22	24.0	-1.8	0.0	42	15
7	WLF	HIHIFO(ILE-WALLIS)	-13.23	-176.17	26.6	-0.3	0.0	12	2

Appendix B: Model parameters for short grass and tall grass covered sites, maps

These constants values which are annual average ground temperature $T_{s,avg}$ and annual amplitude of surface temperature variation $T_{s,amplitude,1}$ used in the simplified design model (Equation 5-1) are also presented in continental US maps, as shown in Figures B-1 , ---, B-24. It is not easy to read constants values from these two maps. Furthermore, interpolating values might lead to prediction errors. Thus, it is not recommended for users to read values from the maps. Users might read the constant values from the table for the nearest sites (with the same climate types).

Figure B-1: Annual average ground temperature for Continental US, short grass covered sites

Figure B-2: Annual amplitude of surface temperature variation for Continental US, short grass covered sites

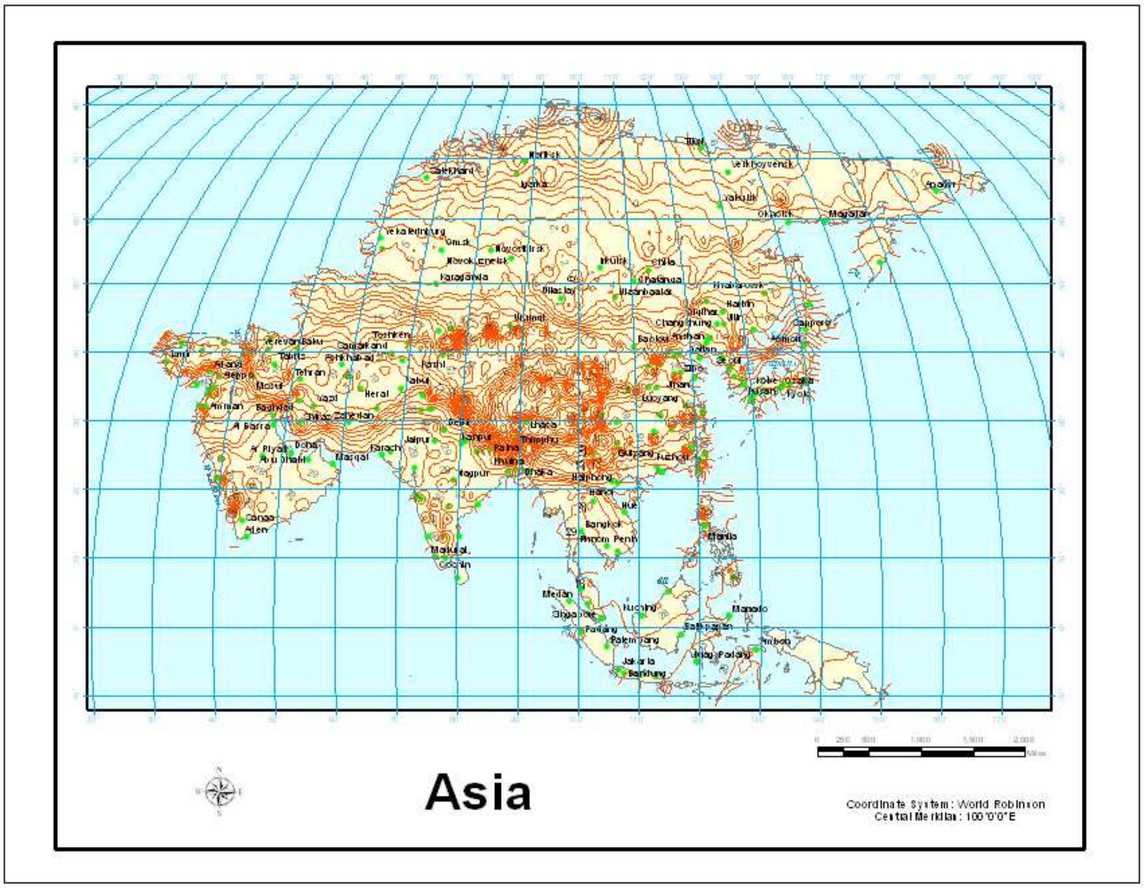

Figure B-3: Annual average ground temperature for Asia, short grass covered sites

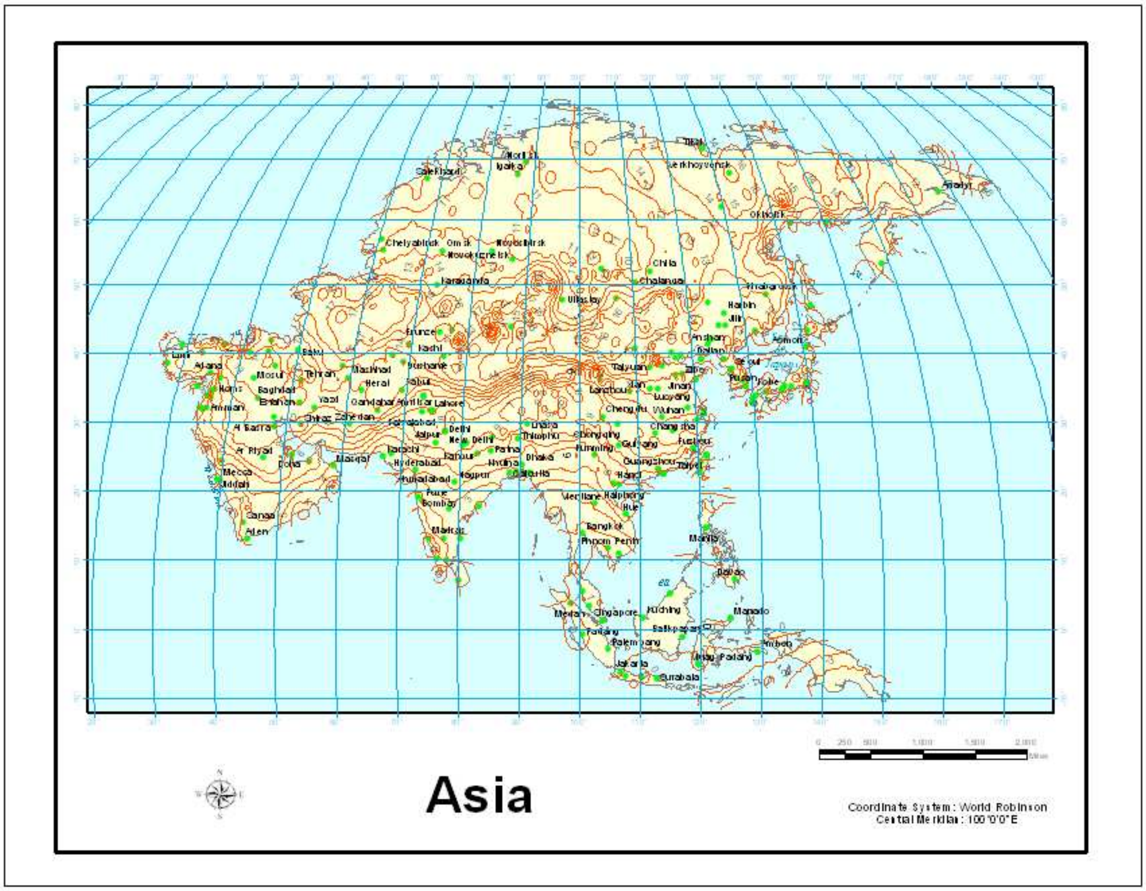

Figure B-4: Annual amplitude of surface temperature variation for Asia, short grass covered sites

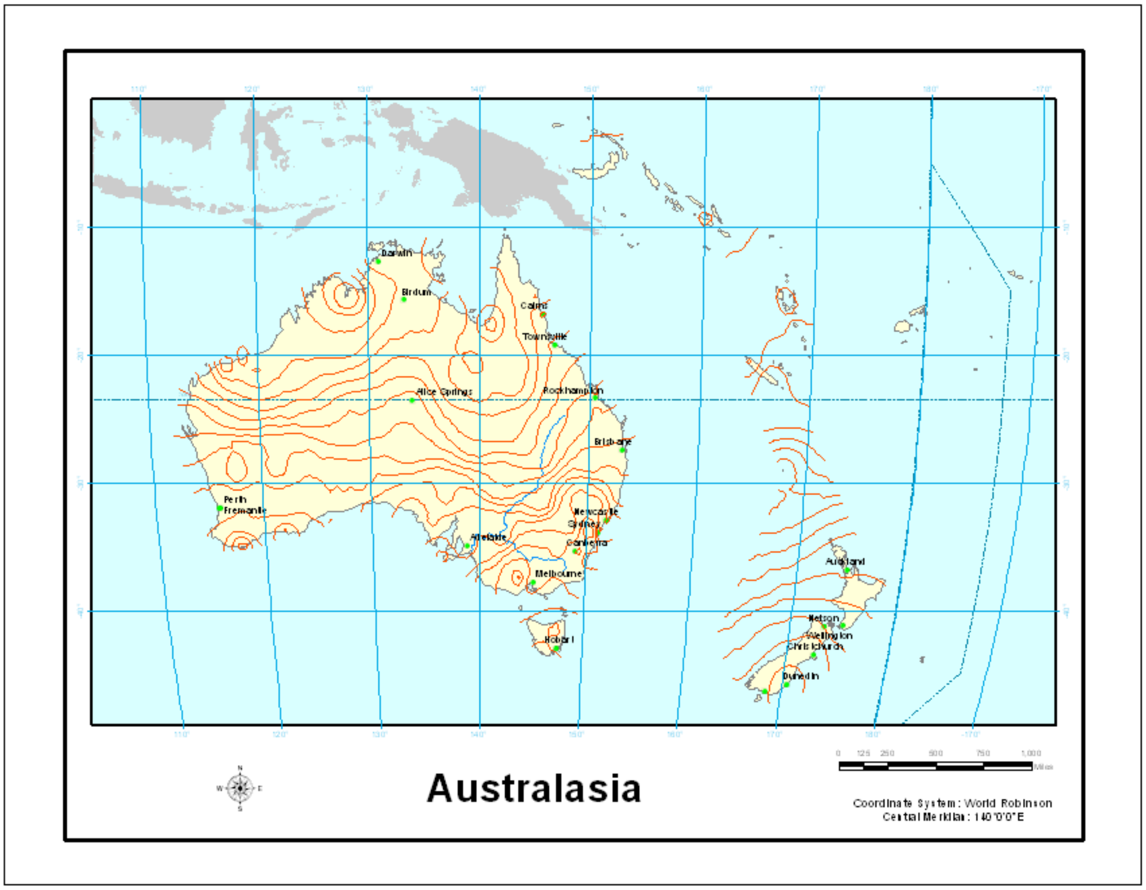

Figure B-5: Annual average ground temperature for Australia, short grass covered sites

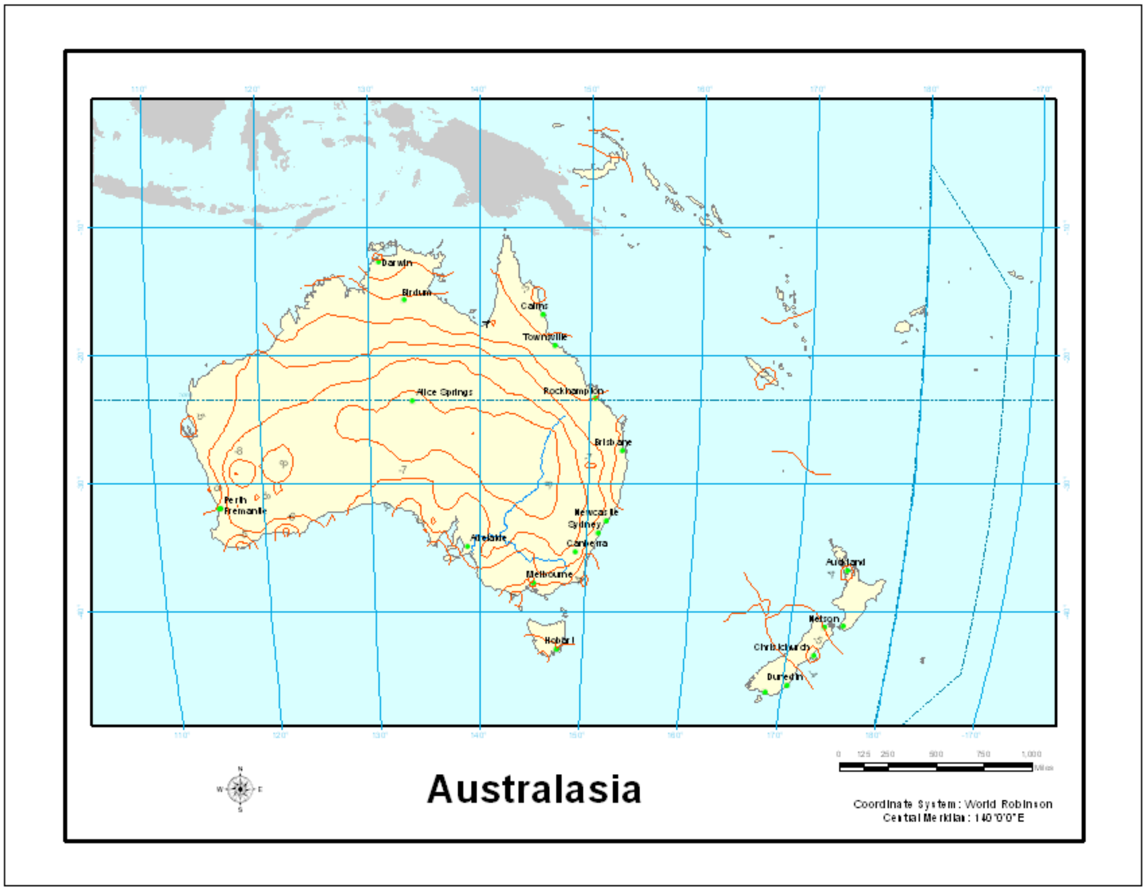

Figure B-6: Annual amplitude of surface temperature variation for Australia, short grass covered sites

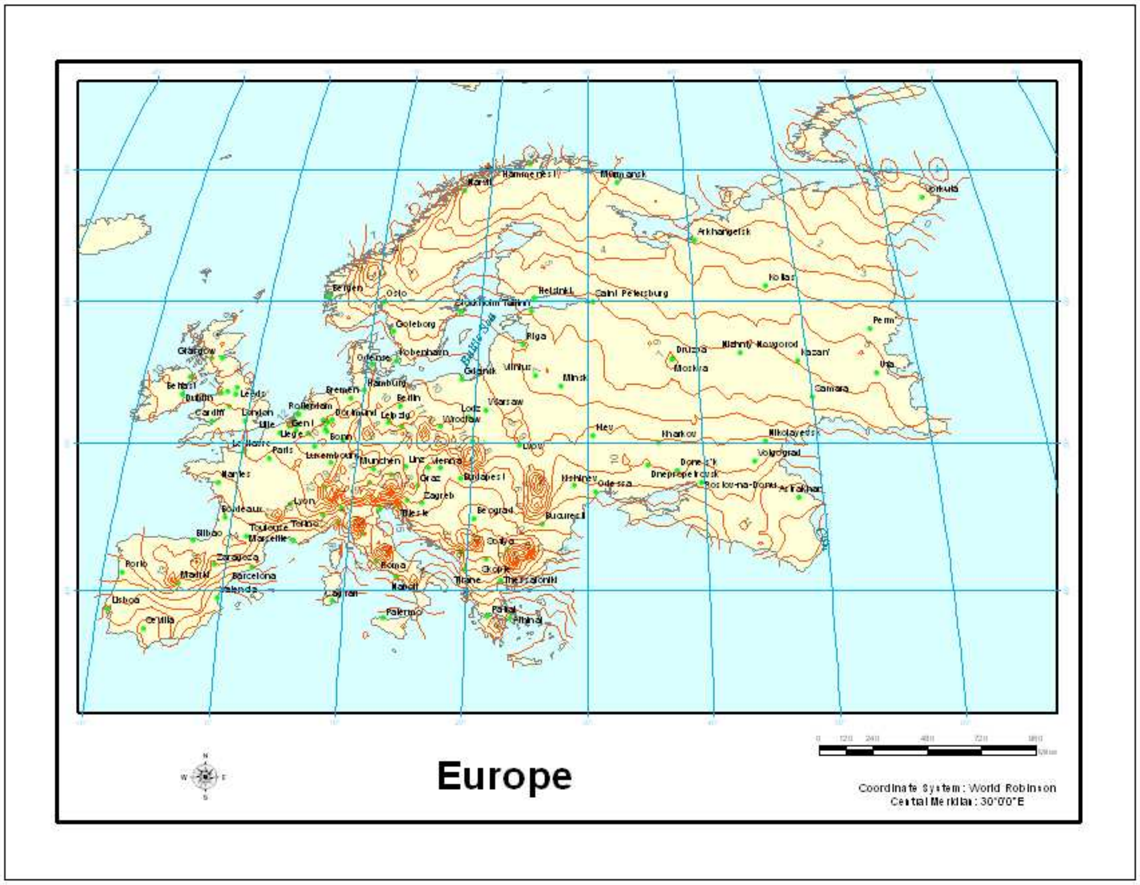

Figure B-7: Annual average ground temperature for Europe, short grass covered sites

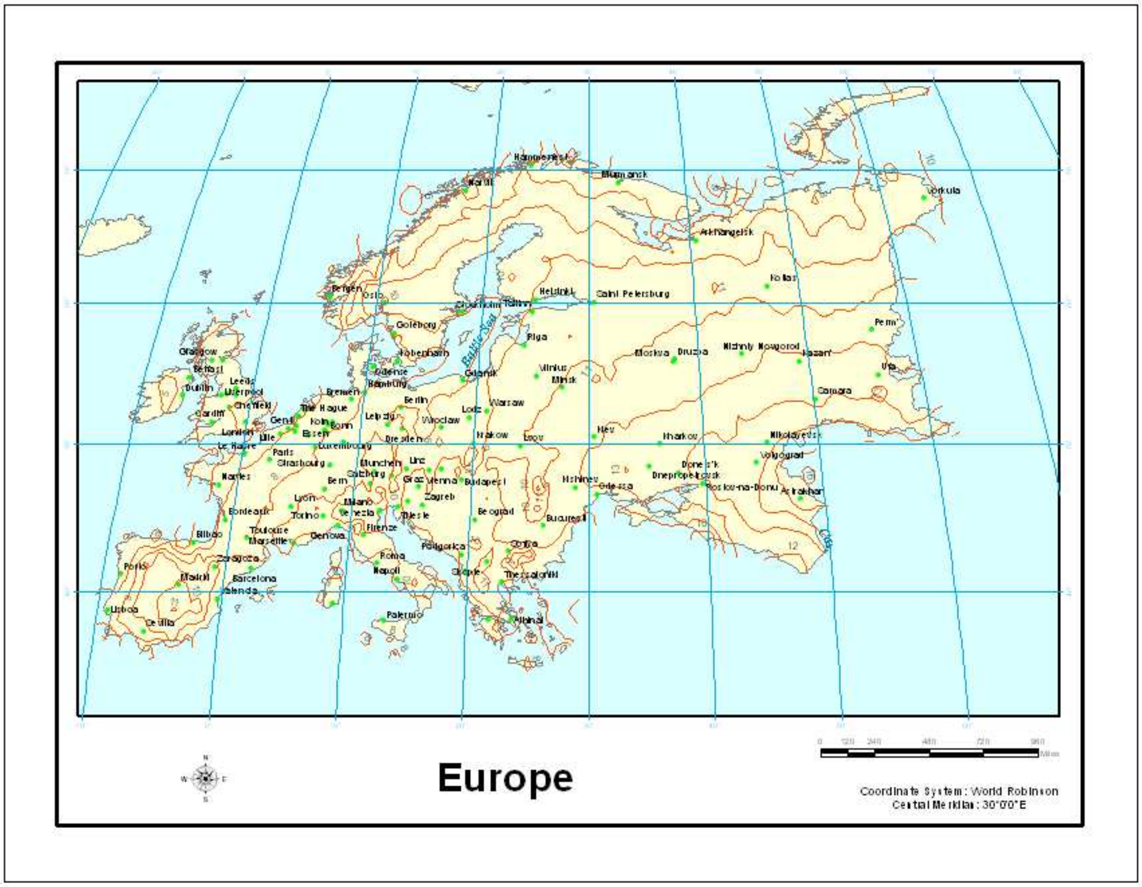

Figure B-8: Annual amplitude of surface temperature variation for Europe, short grass covered sites

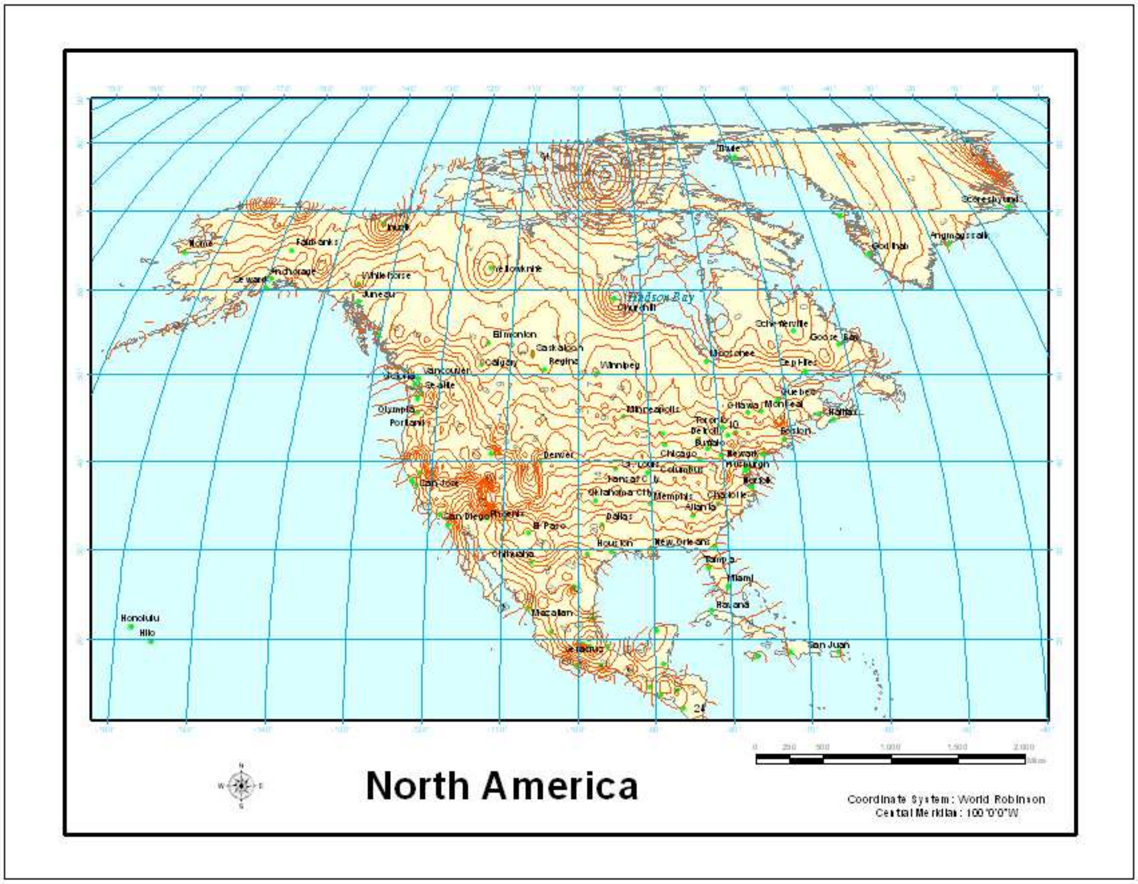

Figure B-9: Annual average ground temperature for North America, short grass covered sites

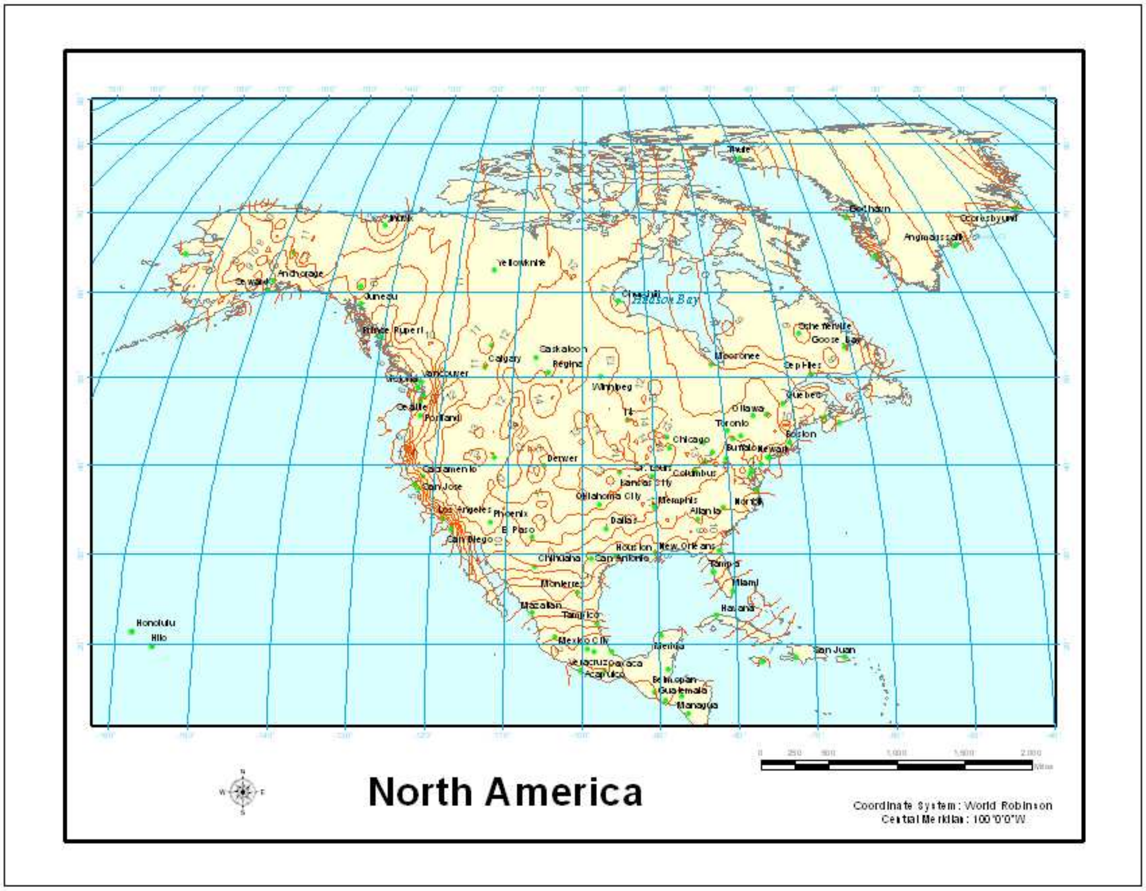

Figure B-10: Annual amplitude of surface temperature variation for North America, short grass covered sites

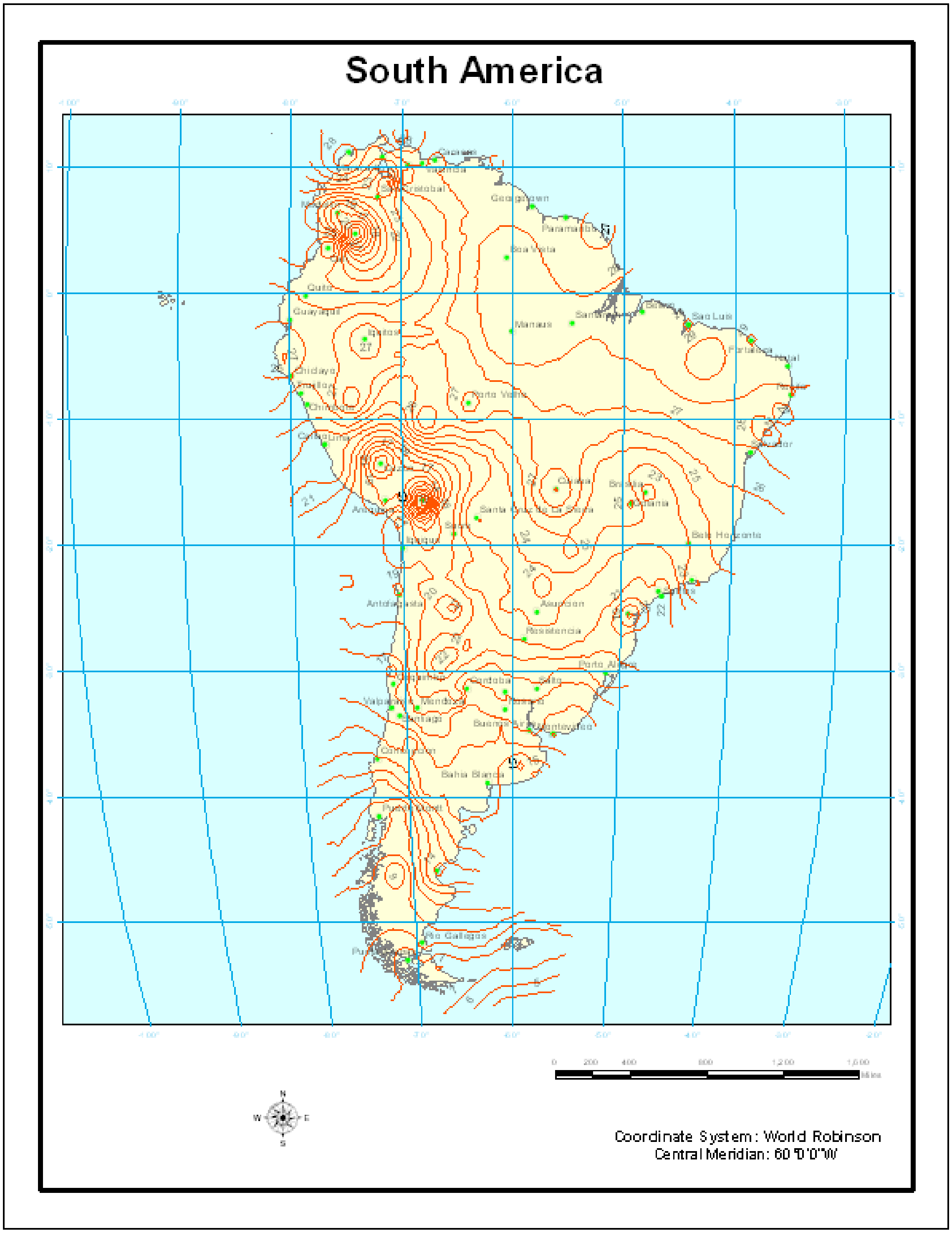

Figure B-11: Annual average ground temperature for South America, short grass covered sites

Figure B-12: Annual amplitude of surface temperature variation for South America, short grass covered sites

Figure B-13: Annual average ground temperature for Continental US, tall grass covered sites

Figure B-14: Annual amplitude of surface temperature variation for Continental US, tall grass covered sites

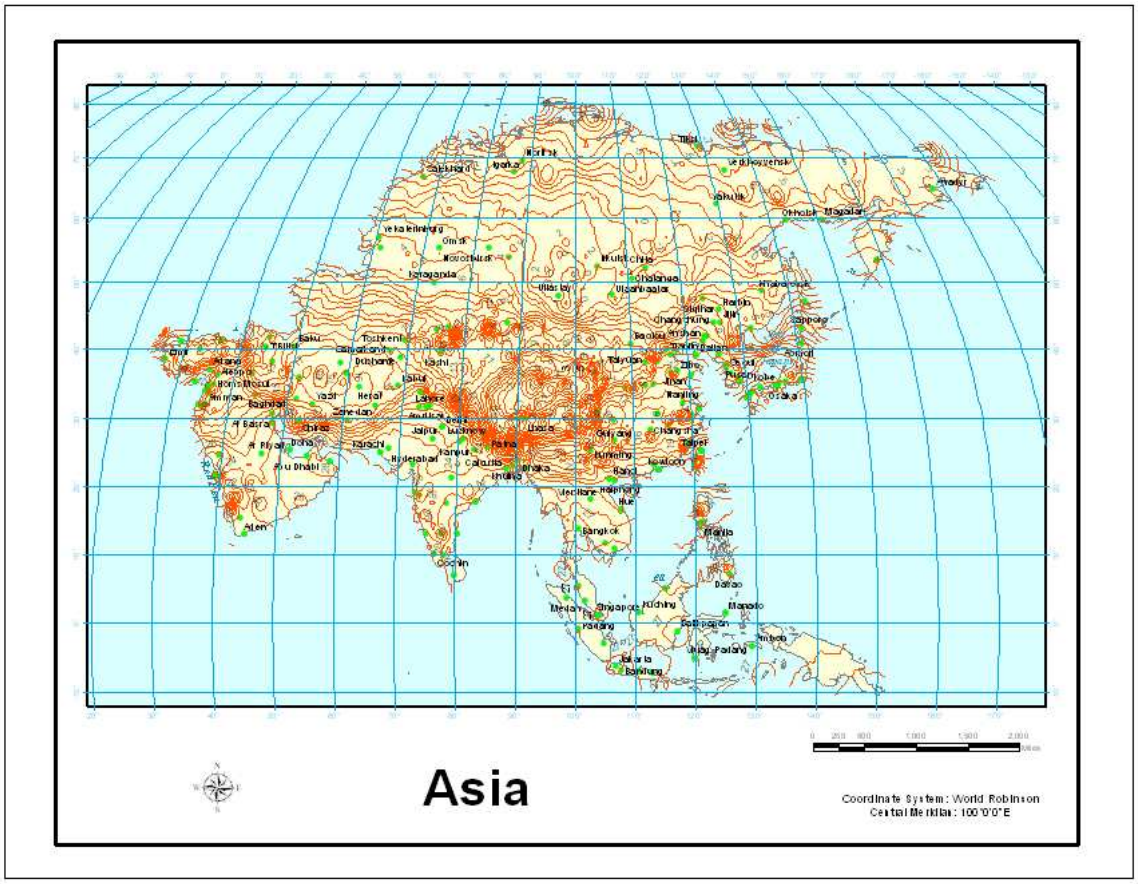

Figure B-15: Annual average ground temperature for Asia, tall grass covered sites

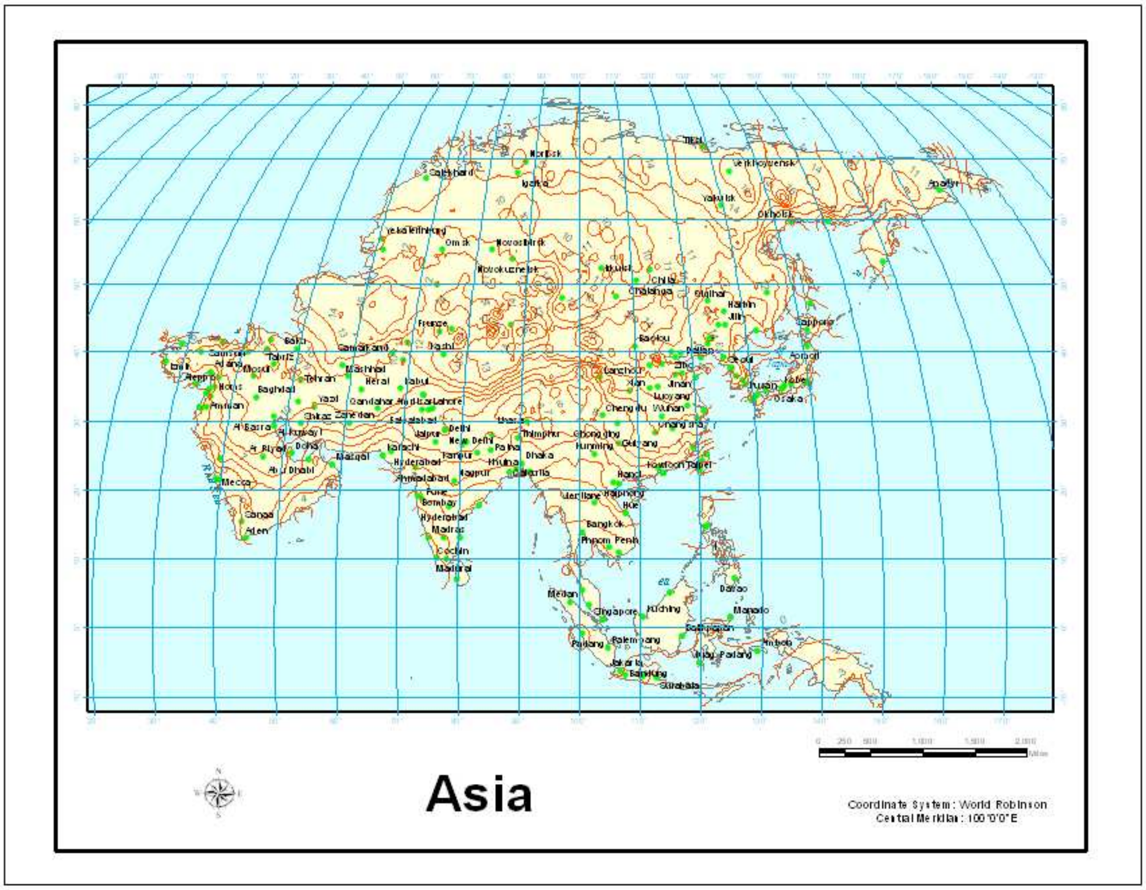

Figure B-16: Annual amplitude of surface temperature variation for Asia, tall grass covered sites

Figure B-17: Annual average ground temperature for Australia, tall grass covered sites

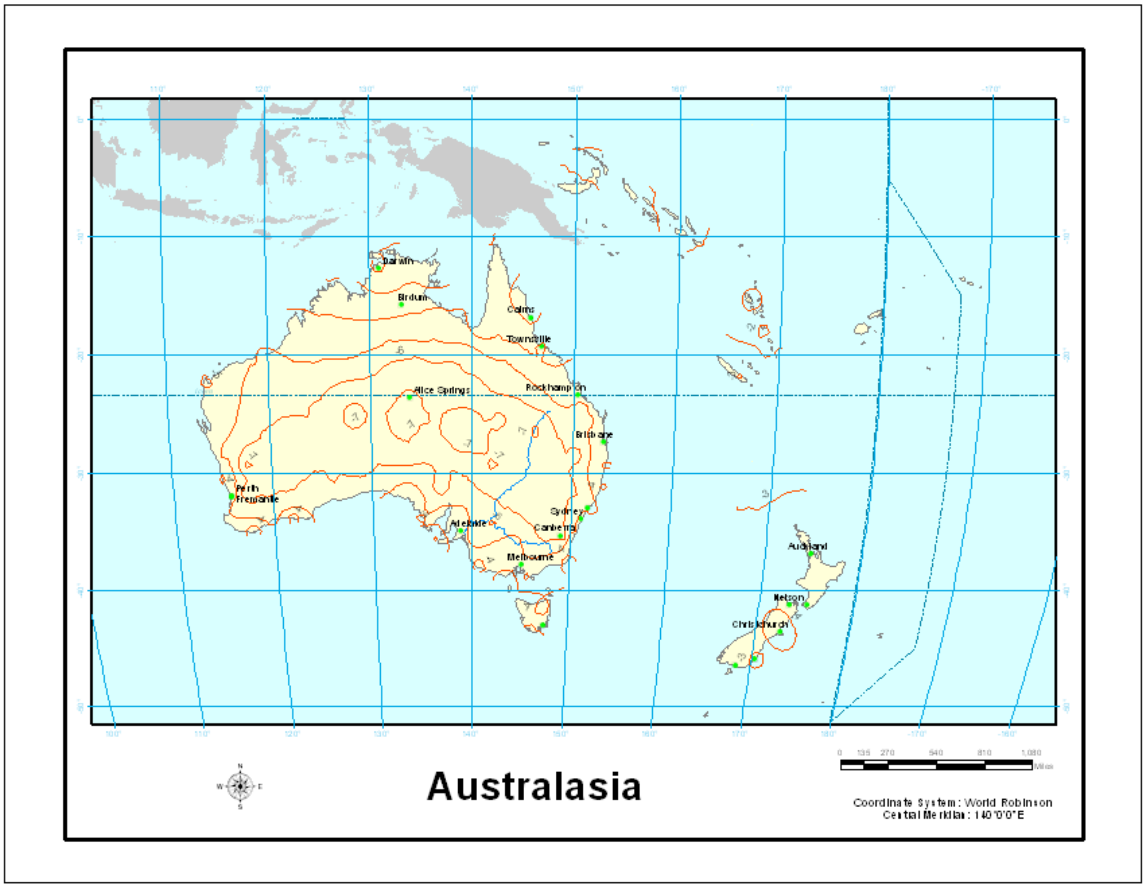

Figure B-18: Annual amplitude of surface temperature variation for Australia, tall grass covered sites

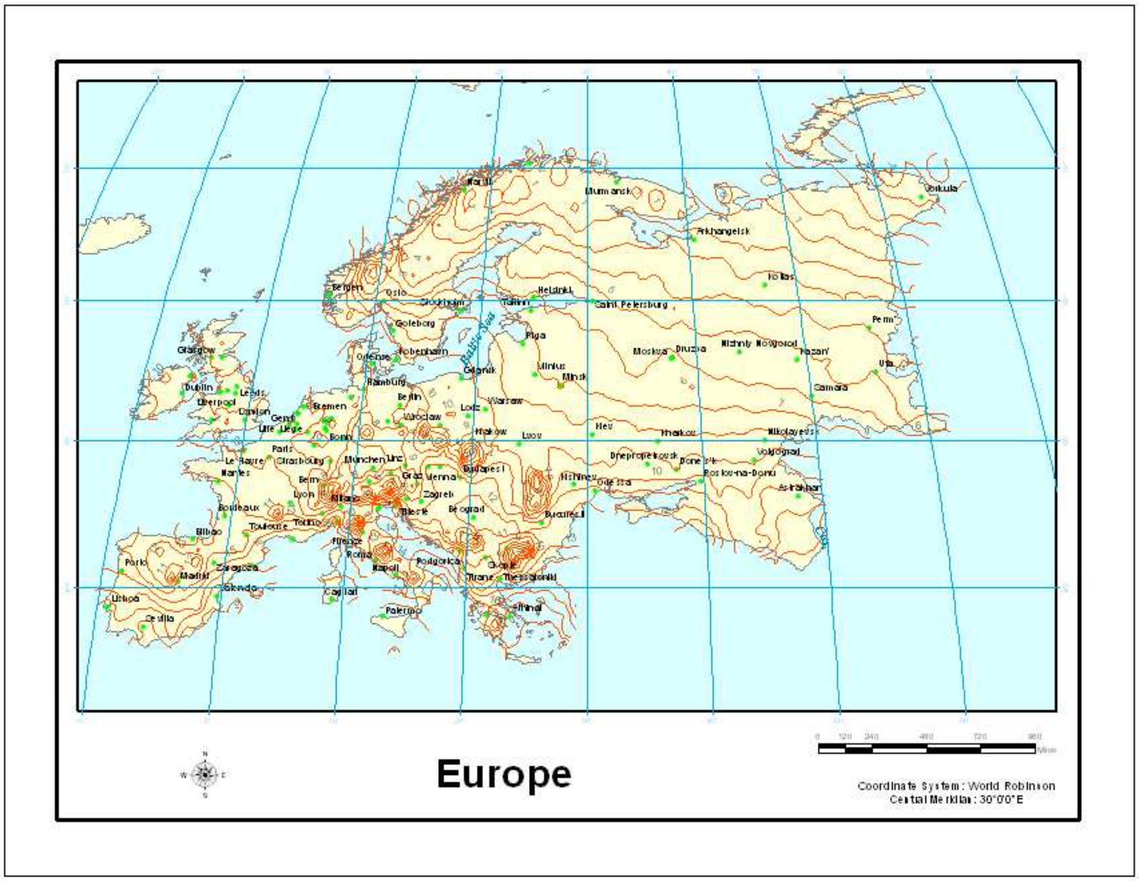

Figure B-19: Annual average ground temperature for Europe, tall grass covered sites

Figure B-20: Annual amplitude of surface temperature variation for Europe, tall grass covered sites

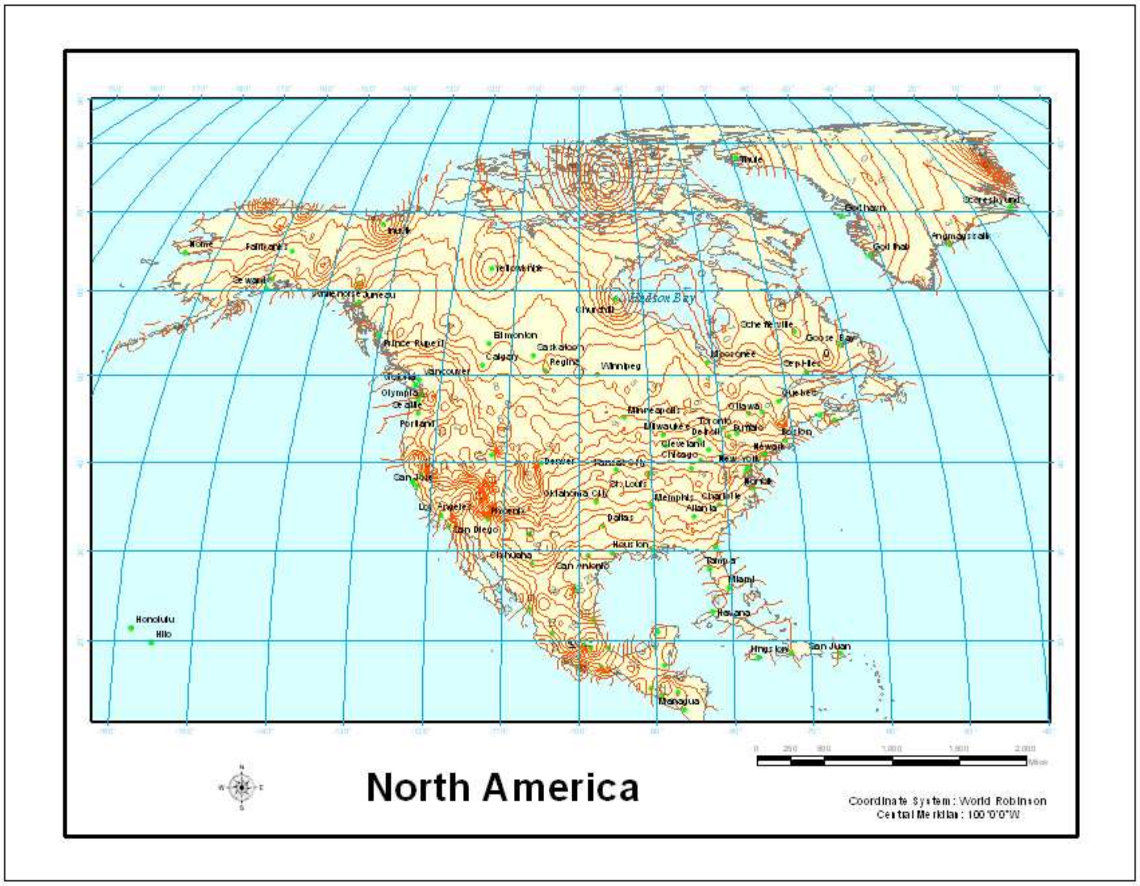

Figure B-21: Annual average ground temperature for North America, tall grass covered sites

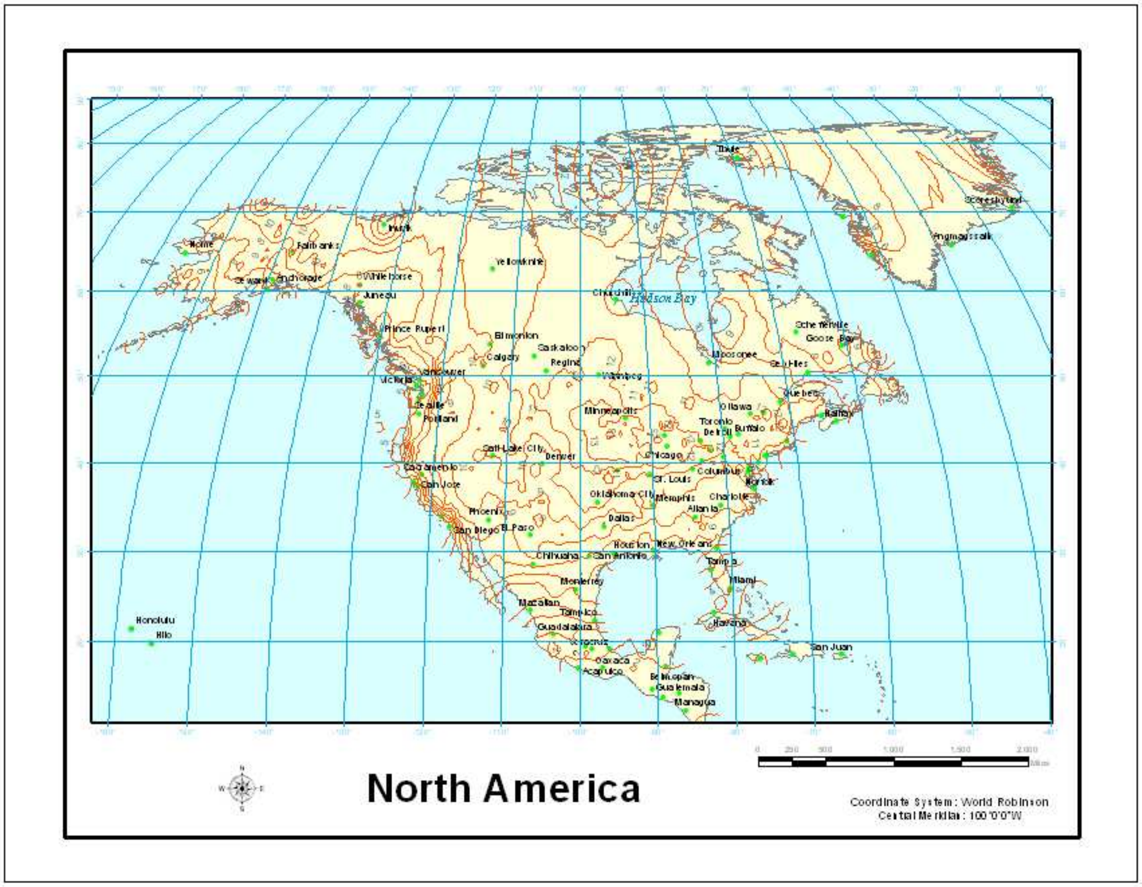

Figure B-22: Annual amplitude of surface temperature variation for North America, tall grass covered sites

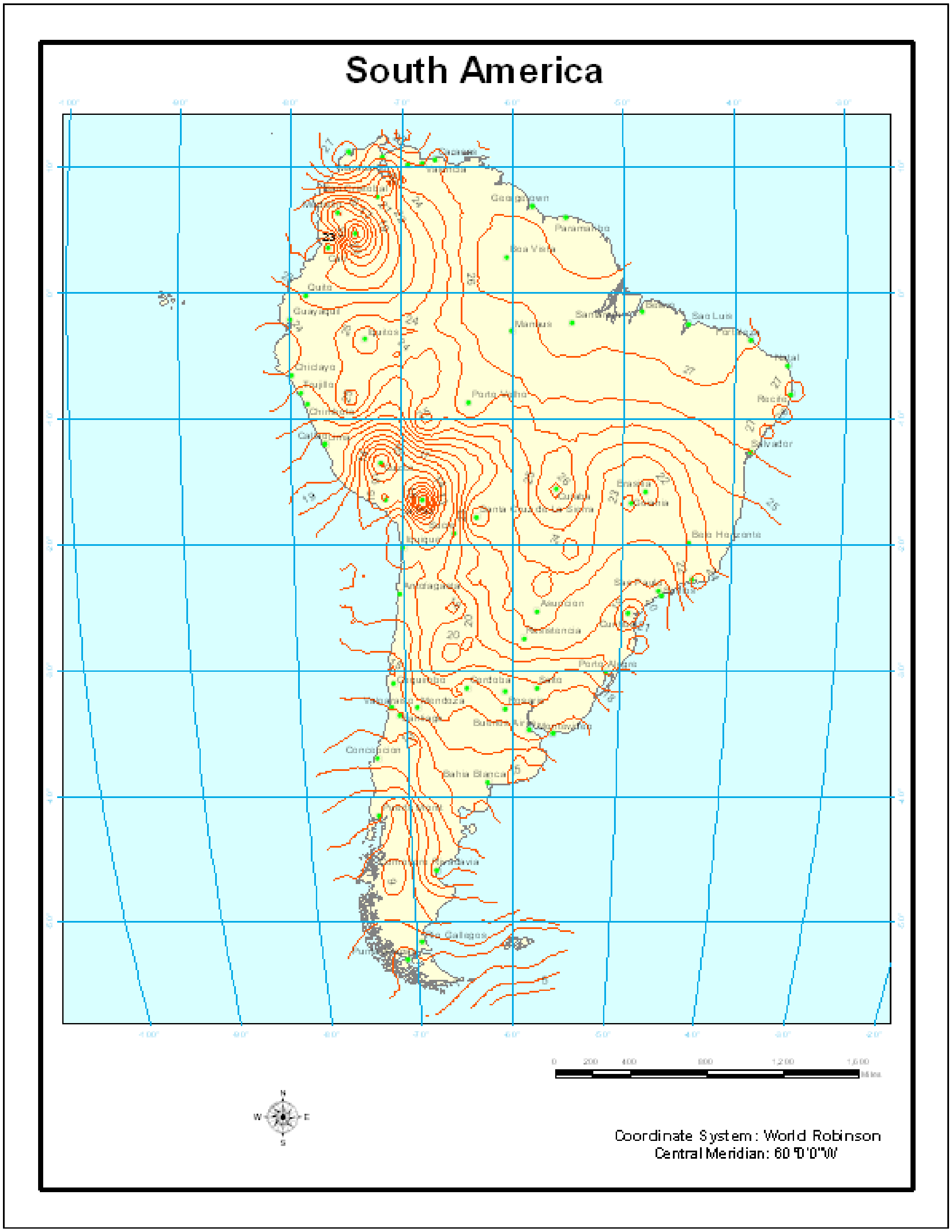

Figure B-23: Annual average ground temperature for South America, tall grass covered sites

Figure B-24: Annual amplitude of surface temperature variation for South America, tall grass covered sites

VITA

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