

Figure 6. A) Gamma-ray (GR), deep-resistivity (ILD), neutron porosity (NPHI), and density porosity (DPHI) well-log responses for the cored well GHK 1-27 Niece. Five zones are separated by flooding surfaces (FS). Red bar indicates the cored interval. Color fill in neutron and density porosity logs shows the gas-effect (DPHI>NPHI). Mrm:Marmaton. B) Schematic core description from well GHK 1-27 Niece. The cored interval has two coarsening-upward cycles, followed by a fining-upward cycle at the top. C) Gamma-ray (GR), deep-resistivity (ILD), neutron porosity (NPHI), and density porosity (DPHI) well-log responses for the cored interval. Conglomerates have higher gamma-ray values than sandstones and they show cross-over of porosity logs most of the time. Sandstones have low gamma-ray values with cross-over or slight separation of porosity logs. Mudstones have high gamma-ray values and large separation of porosity logs. 1) Lithologies observed in the core. 2) Lithology log used in upscaling and modeling. Muddy sandstones and sandy mudstones are merged with sandstone and mudstone, respectively (See Figures 10, 11). 3) Estimated lithology log by combining Artificial Neural Network (ANN) analysis, gamma-ray cut-off values, and relationship between density porosity, neutron porosity, and lithology. 4) Upscaled lithology logs used to constrain 3-D lithology models. 1.5 ft (0.5 m) of average proportional layering was used in upscaling. Measured depth (MD) is in ft.