

Figure 5. A) Gamma-ray (GR), deep-resistivity (ILD), neutron porosity (NPHI), and density porosity (DPHI) well-log responses for the cored well GHK 1-34 Finnell. 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 1-34 Finnell. The cored interval has a coarsening-upward cycle from mudstones at the bottom to the sandstones and conglomerates 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 cross-over of porosity logs with slightly higher gamma-ray and resistivity values than sandstones. Sandstones have cross-over or slight separation of porosity logs. Mudstones have higher gamma-ray values with high separation between neutron porosity and density porosity. 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.