Reservoir heterogeneity based on sediment sorting associated with GR and permeability in turbidity sandstone sequence, Kitaura Formation, Akita, Japan

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Outcrop and core data from the interbedded with turbidity sandstone and siltstone, Kitaura Formation of Akita basin show that realistic reservoir characterization can be based on stratiogaraphic architecture. This deposit represents turbidity sandstone reservoirs that developed from cyclic turbidity currents within hemipelagic basin. Kitaura Foramtion outcrop are good analogs to CO_2 reservoir characterization and modeling in off Akita area. Analysis and modeling of the turbidity sandstone based on outcrop measurements provide detection and identification of ranging data for sandstone reservoir characterization.
Ourcrop displays of differential weathering, coloration, cementation, and seepage reflect stratigraphic and sedimentary control of fluid flow within the turbidity sandstone. The first step of this study is observations of sedimentary facies that characterized by sedimentary structures, grain-size distribution, thickness of sandstone and siltstone, and cyclicity and lateral variations of sandstones. Measurements of permeability using a field permeameter and conventional soil analysis (e.g. Talsma and Hallam, 1980) yield some of magnitude range of values between distinct populations as follows; a part, b part, and c part of Bouma sequence and low density current deposit composed very fine sandstones. These differences within turbidity sandstones depend on grain size distribution, which indicate sediment sorting. The lateral variations of the sorting of a sandstone layer reveal that various values of reservoir property depend on depositional mechanisms. Natural gamma ray (GR) measured for ratio between clay and sand contents in sandstone layers can regards as a physical property of reservoir heterogeneity. Recognition of physical levels of reservoir heterogeneity can be identified GR and permeability within turbidity sandstone layer even though factor and distribution of physical properties are sampling scale dependent. Outcrop analogs for flow within turbidity sandstones can be generated spatial distribution of reservoir heterogeneity based on sedimentary systems.

Keywords: Reservoir heterogeneity, turbidity sandstone, sediment sorting

