

## **PERMEABILITY OF SANDSTONE AQUIFERS/RESERVOIRS FROM LOGGING**

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Well-logging techniques provide continuous profiles of in situ petrophysical properties in shallow and deep geological formations. However, reliable permeability estimates based on downhole measurements and accounting for the diagenesis are still difficult to obtain. A new textural model appropriate to describe the transport properties of clay-coated sandstones is used to interpret downhole measurements in terms of fluid saturations and permeability. This model requires the knowledge of the mineralogy as an input function. We handle the mineralogical inversion of the downhole measurements using a combination of cluster analysis and the inversion formulation. The in situ mineralogy inferred using common downhole measurements (such as the bulk density, the photoelectric effect, and the natural gamma radioactivity of the formation) is in agreement with mineral proportions measured on core samples. The mineralogical profiles are then combined with the textural model in order to !

derive a continuous profile of permeability and gas/water saturations in a case study corresponding to four sandstone formations drilled by the same borehole. We found a very good agreement between the permeability log such derived and core permeability measurements.