

A FAST AND DIRECT RCAL METHODS ON AS-RECEIVED BRAZILIAN PRE-SALT CARBONATES CORES

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Abstract. Estimating petrophysical properties from rock samples in a timing suitable to support exploratory formation evaluation is challenging. This is critical for mixed-wet and oil-wet samples as Brazilian Pre-Salt carbonates, which cleaning can take several months, preventing RCAL results to be useful for initial decision making. The present work aims to cope this timing-challenge by evaluating the accuracy of a fast method to measure porosity and permeability in a few days on “as-received” carbonate samples, i.e. without previous cleaning.

A few hundred Pre-Salt reservoir carbonate oil-base-mud cores were used in this study keeping as-received samples condition. Their total porosities were measured by low-field NMR relaxometry after re-saturating the samples with filtrate-equivalent fluid. Absolute permeabilities were measured using a steady-state probe permeameter, which applies a semi-spherical gas flow from a sample plane surface. Then, the samples were cleaned and standard measurements were performed.

Results using as-received samples showed good correlation with standard measurement. While porosity deviations generally does not exceed 2 p.u., permeabilities have mostly the same order of magnitude, despite the uncertainties related to the presence of formation and drilling fluids, and the neglecting of effects like confining pressure.

The reduction of time from months to a few days have enabled these techniques to be valuable tools in supporting decision making and select candidate samples for SCAL. In addition, probe permeametry has been used to assess sample heterogeneity.