

USING ROCK COLOR TO QUANTITATIVE ANALYSIS OF RESERVOIR PROPERTIES IN OIL IMPREGNATED SANDSTONES

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In oil fields, the color of the sandstones is strongly influenced by the intensity of the oil impregnation, reflecting sandstone quality as reservoirs. This is true especially for sandstones impregnated with dark oil. Dark colored sandstones usually have higher porosity and permeability. Intercalations of nonreservoir lithologies can also be easily recognized due to color variations.

Within the sandstone facies, important parameters which influence rock color and reservoir quality are cementation, clay content and grain size. The most commonly found cements tend to imprint whitish color, reflecting both mineral colors and decrease in oil impregnation. Clays tend to imprint light greenish, brownish or grayish color, also reflecting both the color of the clay and decrease in oil impregnation. Red colors are rarely preserved in oil fields due to reducing conditions. Very fine/silty sands tend to present relatively more clear colors than coarser ones due to higher amount of interstitial water, held by capillary forces.

The decomposition of core photographs into individual color curves (RGB, HLS, etc) yields easy and fast way to use colors in quantitative analysis of reservoir properties. Results of punctual analysis made in plugs, such as porosity and permeability, when present good correlation with rock color, may be used to calibrate and convert such curves into continuous profiles of porosity and permeability. In this conversion, both geostatistical and statistical techniques can be used. These image curves can also be useful to correct core depths by correlating cores with both conventional and image borehole logs.