

The Influences of Diagenetic Process on the Resistivity Values of Oil Sandstone Reservoirs

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Abstract : A better understanding of the factors that control the resistivity values of Sandstone reservoirs is very important for petroleum exploration and production. This study is an attempt to find out the factors that could be the reason for the decrease in resistivity values of the Lower Akakus Sandstones, which are the main reservoir in the area in an onshore field located in the northern part of Ghadames Basin - Northwest of Libya in the contracted area 47, block 2. The study achieved is based on: 30 core chip samples taken from two wells (A3-47/02 and J1-47/02) and Routine Core Analysis (RCA). The results of petrography analysis (thin section, X-ray diffraction and SEM) demonstrated that the depth sits (intervals) which illustrated low resistivity values have a relatively high content of diagenetic clay and cement minerals, hence we can conclude that diagenetic events have a more significant impact on the resistivity values of studied interval for possibly two following reasons: The first essential reason, the extensive micro pores that mostly exist within clay minerals (Chlorite and Kaolinite where, about 30-50 % of their composition considered micro pores), resistivity log read low as noticed through the study. The highest value of micro pores recorded in core1 of J1-47/02 well due to most likely the kaolinite amount which was a slightly higher than the chlorite amount in this well (the bond water porosity for chlorite clay considered relatively the lowest porosity compared to other clay minerals). The second reason, the presence of diagenetic cement minerals (Siderite and Hematite, which contain an iron element as one of their components) within the studied interval as remarked from my study may cause decreasing in resistivity of the formation of the reservoir.

Keywords : diagenetic cement, diagenetic clay, resistivity, petrography analysis

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