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New digital methods of estimation of porosity of carbonate rocks

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Abstract

Carbonate stones consist of about 60% of the global reserves of hydrocarbons. The structure of pore space of carbonate rocks considerably differs morphologically and genetically from such one in clastic stones. In the carbonate rocks interconnected and unconnected voids can be equally important. There exists 3D estimation of porosity by the method of liquid saturation, mainly, aimed at interconnected void volume. Digital methods of thin section estimation of porosity make it possible to fix both types of voids and reveal the importance of one or another type in formation of reservoir properties of rocks. It is considered the possibilities of using the program Cluster Image as alternative and express way for estimation of 2D advantages from thin areas of carbonate stones reservoirs by example of Tournasian oil-bearing deposits, penetrated by the well in the southern slope of the South Tatar crest. The program Cluster Image allows avoiding application of estimated percentage of unclassified pixels in the process of estimating photographs of thin porosity carbonate reservoir rocks with significantly lockable voids in the image. It has been determined the specific variations of porosity by well profile depending on lithotypical rocks and structure of void volume. These variations correspond to the zonal structure of natural carbonate oil-saturated reservoir.

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Keywords

Carbonate rocks, Porosity, The program cluster image