FORECASTING OF PETROPHYSICAL PROPERTIES OF RESERVOIR ROCKS AND DEPOSITS OF THE SOUTH CASPIAN BASIN

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Prediction of rock properties of oil and gas reservoirs is quite an actual issue due to the importance of data during the exploration process for prospective structures of the sedimentary basin.

Currently, when setting up the prospecting and exploration process, all the empirical material available for the basin is used, the patterns of changes in the rock properties of hydrocarbon reservoirs are studied and the potential of these rocks is evaluated, including the involvement of seismic data with the construction of a geological model of the object. This approach is generally accepted and quite effective.

In this article, the problem of forecasting reservoir properties of rocks of the Productive Series South Caspian sedimentary basin is considered and a discrete approach to solve this problem is adopted. The use of this approach is due to the rhythmicity of the sedimentary process in this basin, which is reflected in the composition of rocks and their reservoir properties. The study of the patterns of changes in reservoir properties was carried out for individual formations that make up the sedimentary rhythm of the productive formation.

We used a cluster analysis procedure with different depth intervals of rock samples to group rocks by lithological features and reservoir properties. The influence of the depth of reservoir rocks of Productive Series on their reservoir potential was studied for each stratigraphic unit, taking into account that within the basin the depth of individual formations varies widely from several hundred meters (in some cases several tens of meters) to 5-6 thousand meters or more.

Analysis of the mineralogical composition of reservoir rocks of Productive Series shows that the rocks of the upper (Balakhany formation), middle (Fasila formation) and lower (NKG, NKP, KS, PK formation) departments differ in mineralogical composition, which indicates a difference in the geological conditions of their formation, in particular, the difference in the

mineralogical composition of the clastic material. As an example, we focused on the Fasila formation.

In conclusion, a discrete approach was proposed to study the properties of reservoir rocks, taking into account the rhythmicity of the sedimentation process, which is characteristic of the sediments of the Productive Series of the South Caspian sedimentary basin. Using the interval clustering procedure of a multidimensional sample, the dependences of the change in porosity of rocks on the depth for the main formations of the Productive formation were obtained, taking into account the rock composition and quality of rocks. Using the example of the sediments of the Fasila formation, maps of the porosity distribution of reservoir rocks are constructed and regional patterns of changes in these properties according to the South Caspian Basin were studied.