

Carbonate Reservoirs Heterogeneity Evaluation and Prediction: The Dnieper-Donets Basin Case Study

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The Dnieper-Donets basin is one of the most mature oil and gas provinces in the East European platform. Here it was discovered more than 230 oil and gas fields to present time. Commercial productivity is attributed to Late Paleozoic strata (Permian – Carboniferous). Main reservoir rocks are mainly sandstones and siltstones and contain about of 98% of discovered hydrocarbon pools. Nevertheless, last years there were discovered several important fields in carbonate rocks. The most significant success was achieved in searching for oil and gas in carbonate reservoirs of Tournaisian-Lower Viséan (Mississippian) sediments on Machekhske, Seliukhivske, Campanske, Pryrichne, and Zagoryanske oil and gas condensate fields representing reef type of traps. Reservoirs are of fracture, fracture-porous and fracture-vuggy types.

However, achieved results on the prospecting and further delineation of such leads are faced with serious problems, which are stipulated mainly by lateral and vertical heterogeneity of carbonate reservoirs, so geological risks are at the level of 50-70%. To decrease exploration risks and optimization of prospecting and delineation drilling it was developed and implemented an integrated technique to predict zones of higher porosity in carbonate sediments. The technique is based on structural-dynamic attribute analysis of the seismic wave package accompanied with interpretation of well logs, petrophysical data and facies analysis. Further steps include hydrodynamic modeling and geochemical indicators. Application of the aforementioned gave a possibility to compile a map featuring reservoir properties distribution in the carbonate sequence on Khortitska, Snitynska, and Blichivska prospects and refine development works on Seliukivske, Pryrichne and Bogatoyske hydrocarbon fields.