

STOCHASTIC MODELS OF HETEROGENEITY FOR TRAPS AND RESERVOIRS TO IMPROVE THE QUALITY OF HYDRODYNAMIC SIMULATION FOR NON-STRUCTURAL OIL FIELDS.

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The authors suppose that the quality of hydrodynamic simulation and development of such complex oil fields as non-structural ones can be achieved through the technologies based on the original mathematical modeling of heterogeneity for traps and reservoirs, analysis of heterogeneity models of different types and as a result through accepting adequate decisions for field exploration and development. The technology to be presented is based upon the modeling of heterogeneity for traps and reservoirs as well as upon its quantitative estimation with statistic methods, theory of harmonic processes and information theory. It is founded on complex use of 3D seismic survey, WLD and core data, on hydrodynamic simulation researches. The technology can be applied for primary and detail exploration projects as well as for development of oil fields. It is established that structural and morphological heterogeneity of traps is effectively being modeled by trend analysis (TA), factor analysis (FA) and step-wise regression; sedimentation and facial heterogeneity of reservoirs by methods of harmonic processes (sequences) theory, taxanometry of multi-dimensional data and information theory. For all types of heterogeneity models of traps and reservoirs there are considered the fundamentals, the methods of modeling and analysis as well as the procedures for technology used to improve hydrodynamic simulation quality and oil reserves development. The technology proposed is illustrated by the oil field models being worked out at present in Russia, Belorussia, the Ukraine and Columbia.