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COMPLEX OF LABORATORY CORE ANALYSIS AT CPGR IPE RAS

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Abstract. The article presents a complex of laboratory core analysis conducted at the Center for Petrophysical and Geomechanical Research of Schmidt Institute of Physics of the Earth of the Russian Academy of Sciences (CPGS IPE RAS). The complex provides for a multi-scale study of elastic properties, microstructure of rocks, composition and their filtration-capacitive properties. As a result of laboratory studies, dynamic and static elastic moduli, rock strength and creep parameters, acoustic emission characteristics are determined; 2D and 3D microstructure analysis is performed. Dynamic elastic moduli are determined both under normal conditions and under conditions simulating the reservoir. Under normal conditions, a multilevel ultrasonic examination of samples is carried out, the results of which, together with the results of the analysis of the microstructure, are used to determine the degree of inhomogeneity of the elastic properties of the sample and to reveal their anisotropy, and to compare the elastic properties of the rock at different scales. The results of geomechanical rock testing are necessary for constructing geomechanical models of reservoirs. Elastic parameters, determined under normal and reservoir conditions, are the basis for constructing correlation dependencies for forecasting geomechanical properties and principal stresses under reservoir conditions according to well log data. Data on the elastic properties and microstructure of the samples are used to construct different-scale models of the elastic properties of rocks under normal and reservoir conditions using Rock Physics methods, which further serve as the basis for petroleum elastic modeling of deposits, and for predicting the viscoelastic behavior of rocks.

Keywords: laboratory core analysis, microstructure, elastic wave velocities, effective elastic properties, formation conditions, dynamic elastic moduli, geomechanical properties.

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