

Fractal geofluidodynamics of petroleum systems

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The geofluidodynamics of the petroleum collectors in essential measure is determined by stochastic factors, and porous petroliferous matters behave as the systems with the fractal structure. New methods of fractal analysis of the petroleum areas geofluidodynamics by superposition of technogenic processes, bonded with geological prospecting and industrial petroleum engineering, are presented in this report.

The fractal-geometrical description of the stochastic elements of the behaviour of unordered systems has been utilized very effectively in recent years. The present communication reports an analysis of the problems of the fractal geofluidodynamics of the petroleum reservoirs, an elucidation of the role of the fractal-geometrical indices in geofluidodynamics of the porous collectors.

The correlation of the fractal structure of the strained petroliferous elastic medium with the fracton peculiarities of seismic and acoustic waves is investigated by propagation and scattering in this medium. The phenomenon of transformation in time of the fracton spectrum of seismoacoustic signals in the petroliferous systems under influence of technogenic processes is predicted and described. The diagnostics method of petroleum fields is elaborated, which allows to measure the saturation ratio of elastic medium by petroleum on spatial changes of the fracton descriptions.