

Importance of the Thermal Gradient on the Stratification of the Oil Fluids in the Rocks Reservoirs

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The presence of a oil-bearing accumulation is dependent of the succession of elementary events (from the organic productivity to the formation of a layer) which must be distributed in space and ordered in time and which form an integral part of the geological history of the area; each one of these events has a probability of occurrence more or less weak but never negligible.

The stratification of the oil fluids in the layers is an event which requires to be recognized, analyzed and correctly interpreted.

Oil-bearing accumulations of the post-migration can be seen as rest areas in which the hydrocarbons remained for long time in order to provide a stationary distribution of the species as a function of the gravity action and the geothermal gradient.

The natural lithospheric configurations surrounding the oil layers sites are, in general, compatible with the existence of thermoconvective circulations which, at least in the past could be active for significant geological time. So we can not exclude, at least for these active periods, the presence of a differential enrichment of hydrocarbons by thermodiffusional process and more particularly by thermogravitational diffusion (1) in porous media.

The goal of this study is to show by experimentation the effect of the thermal gradient on the differential migration of crude oils hydrocarbons (2) impregnating porous media. The result stratifications are similar with those of many oil-bearing accumulations post-migration where the higher horizons are relatively rich paraffinic condensates with light products and the bottom (near to the contact with the aquifer) being rich in highly asphaltic heavy oils. The thermodiffusional migration consequences on the evolution of the water-oil interface will be also approached.

Key words : thermal diffusion, migration, hydrocarbons, porous media

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