Thermobaric conditions in zones of oil and gas accumulations of the southern oil- and gas-bearing region of Ukraine

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The Southern oil- and gas-bearing region is one of the most promising of increasing quantities of recoverable hydrocarbon resources of the Ukraine. 39 fields were discovered in this region.

We have analyzed the distribution of geothermobaric parameters using data reached in the process of exploratory-prospecting work. In our opinion, optimum is the employment of the following geothermobaric parameters: the distribution of background temperatures at a depth of 2000 m (H_{2000m}), the distribution of expected values of temperatures at a depth of 5000m (H_{5000m}), values of average geometrical gradients (G_a) at an interval of "neutral sphere" – maximum depth measurement of temperature in the borehole; of depths of occurrence of isothermal surface 423K (H_{423K}); of thermobaric coefficient ($K_t=T_{for}/P_{for}$) and the coefficient of hydrostatics ($K_{hyd}=P_{for}/P_{conv.hyd}$).

As an example we are giving the zonality of the distribution of the hydrocarbon deposits of the Black Sea-Crimean oil- and gas-bearing area. The temperature field at a level of 2000 m is rather differentiated. A zone of maximum heating occurs within the limits of the shelf and in the region of the Tarkhankut Peninsula. According to the distribution of G_a, two zones of different heating can be distinguished within the area: the area of high values (5.0-4.0 K/100m) which gravitates towards the Crimean Peninsula and the area of low values (about 3.0 K/100m) which stretches in the western direction to Predobrogea. An analysis of the distribution of H_{5000m} has allowed us to distinguish the highly heated (443-473K) eastern and lowly heated (403-443K) western zones. In the eastern part of the area, H_{423K} becomes changed from 4000 to 4500m, in the western part: from 5000 to 6000m. By thermobaric data one can distinguish three zones: the oil zone (T_{for} – 340-370 K; P_{for} – 15.0-30.0 MPa); the gas-condensate zone ($390>T_{for}>320K$; $36.0>P_{for}>16.5$ MPa) and the gas zone (T_{for}-291-425 K; P_{for} – 0.9-45.0 MPa). Abnormality of formational pressures sufficiently influences the phase state of hydrocarbons in the seam. On the basis of K_{hyd} and K_t the zones are characterized: the oil zone – $1.2> K_{hyd}>0.9$; $21.7>K_t>12.3$ K/MPa with $2500>H>1770$ m; the gas-condensate one – $1.2> K_{hyd} >1.7$; $10.8<K_t<19.3$ K/MPa with $2910>H>1400$ m and the gas one – $0.9<K_{hyd}<1.8$; $143>K_t>9.84$ K/MPa with $4420>H>70$ m.

Revealed regularities of the distribution of the hydrocarbon deposits depending on initial formational temperatures and pressures, average geothermal gradient, thermobaric and hydrostatic coefficients confirm the relation between the geothermobaric regime of deposits and spatial position of the hydrocarbon deposits. Established regularities should be accounted while carrying out exploratory-prospecting work for oil and gas that will make it possible to conduct exploration and prospecting for new fields more effectively, including those at great depths.