



Fault-and-Block Tectonics of the Dnieper-Donets riftogenous basin

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In geotectonic evolution of the Dnieper-Donets rift basin it was clearly recognized a rift (Late Devonian) and syncline (Carboniferous-Late Permian) tectonic stages.

During first stage at pre-Famennian and pre-Carboniferous sub-stages of intense crustal-mantle diapir pulse movements marginal and near-axial faults were formed, and the Marginal and Axial rifts along with Near-flank, Near-Axial and Axial along-strike structural zones, respectively. Among them the flank and near-axial zones of higher elevation were characterized by intense erosion of Devonian sediments. Transversal and along-strike faults were opened under upward movements and influenced onto vertical and horizontal migration of magma, gases and fluids that stipulated accumulation of large hydrocarbon pools in Devonian sediments. Under syncline stage the pulsation processes governed descending movements of less intensity than at rift stage. It favored for sedimentation of regional reservoir and aquitard rock sequences and forming of plicative folds and accumulation of large to giant oil, gas and condensate fields. Pre-rift deep faults that crossed the Ukrainian shield, Dnieper-Donets basin and Voronezh crystalline massif have stipulated a fragmentation of the paleorift onto three parts (northwestern, central and southeastern ones). Within them on the west it is recognized transversal saddles (Love-Bragin, Uday and Psoil-Vorskla) and depressions on the east (Nizhyn, Lokhvytsia, Karlivka). The saddles complicated by pre-rift faults and presence of Devonian volcanics are characterized by high altitude of Precambrian basement (up to -3,5 km), wide distribution of Frasnian sediments and less number of hydrocarbon fields (in 1.5-2 times) and their reserves (in 5-6 times) than in the depressions.

Along-strike faults have favored to latitudinal tectonic zonation of the rift. In the Dnieper-Donets rift it is recognized the Northern and Southern Near-flank, Northern and Southern Near-flank Near-Axial and Axial zones. The latter is bounded by the Northern and Southern near-axial faults with amplitudes about 4.3 and 3.5 km. The Northern and Southern near-axial zones are complicated by 15 and 20 uplifts respectively, which were at higher position during pre-Famennian and pre-Carboniferous times being favorable for hydrocarbon accumulations.

Along-strike deep and crustal faults are of northwestern stretching in general. At intersection points with transversal faults they are shifted dextrally or sinisterly on distance of 10-14 km. Approaching to the Sribne crustal-mantle diapir the strike of the Baranovichi-Astrakhan marginal fault and Northern Near-axial one is changed from northwestern one to almost latitudinal and further westward again become of northwestern orientation. On the same time the amplitudes of marginal and near-axial faults are grown (up to 3,5 4,2 km).

Top priority prospects to search for anticline and combination traps are broad zones of along-strike and transversal faults (Northern near-axial in particular). As to Devonian rift sequences the most promising are zones of near-flank uplifts.