Petroleum Systems in the Zones of Trap Intrusions

STAROBINETS, I.S., VNIIGeosystem, Moscow, Russia In Russia, trap formations are discovered mainly on the Siberian platform (Lena-Tunguska region).

According to a complex of geological-geochemical parameters, two zones are distinguished: 1. Northwestern zone, where trap bodies make up 20-45% of the sedimentary cover thickness. Only noncommercial hydrocarbon accumulations are known. Oil and gas systems have unusual properties. Oil and condensates are enriched in aromatic hydrocarbons (up to 60%), resins (15%), sulfur (20%), microelements (V, Ni, Co, and others);
gases - in C02 (up to 60%) and H2S (up to 3%). Aromatics are believed to be generated due to dehydration of naphtenes by sulfur (abiogenic sulfate reduction). Hydrocarbon pool preservation is poor (disturbed folds, thin seals). 2. Southeastern zone. Trap bodies compose no more than 10% of the sedimentary cover thickness. Commercial pools are discovered in the sub-salt formations (Yurubchen, Sobin, and other fields). Petroleum systems are sharply different from those of the previous zone. Dominant in oils and condensates are methane hydrocarbons (up to 90%); aromatics make up 3-5%, resins 2-4%, sulfur 0.05-0.2%; C02 content in gases is 0.2-0.5%, H2S is not found. Seals for hydrocarbon pools have low permeability and sufficient thicknesses. Conditions for pool preservation are rather good.
So, a low content of trap bodies in sedimentary rocks does not influence the formation of commercial hydrocarbon pools. However, their high proportion hinders the formation of large accumulations and determines anomalous geochemical parameters of petroleum systems.