

Geochemical Studies of Mud Volcanoes Fluids According to Petroleum Potential of the Lower Kura Depression (Azerbaijan)

Authors : Ayten Bakhtiyar Khasayeva

Abstract : Lower Kura depression is a part of the South Caspian Basin (SCB), located between the folded regions of the Greater and Lesser Caucasus. The region is characterized by thick sedimentary cover 22 km (SCB up to 30 km), high sedimentation rate, low geothermal gradient (average value corresponds to 2 °C / 100m). There is Quaternary, Pliocene, Miocene and Oligocene deposits take part in geological structure. Miocene and Oligocene deposits are opened by prospecting and exploratory wells in the areas of Kalamaddin and Garabagli. There are 25 mud volcanoes within the territory of the Lower Kura depression, which are the unique source of information about hydrocarbons contenting great depths. During the wells data research, solid erupted products and mud volcano fluids, and according to the geological and thermal characteristics of the region, it was determined that the main phase of the hydrocarbon generation (MK1-AK2) corresponds to a wide range of depths from 10 to 14 km, which corresponds to the Pliocene-Miocene sediments, and to the "oil and gas windows" according to the intended meaning of $R_0 \approx 0,65-0,85\%$. Fluids of mud volcanoes comprise by the following phases - gas, water. Gas phase consists mainly of methane (99%) of heavy hydrocarbons (C₂₊ hydrocarbons), CO₂, N₂, inert components He, Ar. The content of the C₂₊ hydrocarbons in the gases of mud volcanoes associated with oil deposits is increased. Carbon isotopic composition of methane for the Lower Kura depression varies from -40 ‰ to -60 ‰. Water of mud volcanoes are represented by all four genetic types. However the most typical types of water are HCN type. According to the Mg-Li geothermometer formation of mud waters corresponds to the temperature range from 20 °C to 140 °C (PC2). The solid product emissions of mud volcanoes identified 90 minerals and 30 trace elements. As a result geochemical investigation, thermobaric and geological conditions, zone oil and gas generation - the prospect of the Lower Kura depression is projected to depths greater than 10 km.

Keywords : geology, geochemistry, mud volcanoes, petroleum potential

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