GEOCHEMISTRY OF ORGANIC-RICH ROCKS FROM MUD-VOLCANO EJECTA IN AZERBAIJAN: A NOVEL APPROACH FOR REGIONAL ASSESSMENT OF SOURCE ROCK QUALITY

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The South Caspian Basin is a prolific oil and gas province. As a result of its very thick sedimentary package (up to 25 km), likely Jurassic oceanic crust, and rapid sedimentation rate (10 to 12 km of sediment fill deposited in the last 6 million years), the basin is relatively cool. Geothermal gradients range from 20 C/km in the Kura Depression to 15 C/km in the SCB proper. Consequently, source rocks for oil remain immature for oil generation down to approx. 6 km. The rapid burial and compressional regime has resulted in the formation of numerous mudvolcanoes, which are common in the Gobustan area of eastern Azerbaijan and throughout vast regions of the SCB.

Rock ejects brought to the surface by mud volcanoes offer a unique opportunity to characterize sedimentary units both within, and beyond, conventional drilling depths. Biostratigraphic analyses along with lithological comparison of the samples with age-equivalent outcrop samples have enabled age-dating of the ejects. The organic-rich rocks of the Oligogene-Miocene Maikop Formation are the primary source rocks for oil and gas in the basin and are present as ejecta. These rocks have total organic carbon contents up to 7% wt. and hydrogen indices up to 500 mg HC/g org. C. They are dominated by marine, algal amorphous organic matter which accumulated under dysoxic to anoxic conditions. The high content of algal material in the kerogen is also evidenced by a predominance of C27 regular sterane biomarkers. Based on biomarkers and stable carbon isotopic data we have identified depositional environments and integrated these data to reconstruct the paleo-geography of the source intervals.