

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 mud-volcanoes, 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.