

MUD VOLCANOES OF THE SOUTH CASPIAN BASIN-SEISMIC DATA AND IMPLICATIONS FOR HYDROCARBON SYSTEMS

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Mud volcanoes and their associated hydrocarbon seeps brought the oil business to Azerbaijan. Yet it is only recently that high quality 3D seismic data has been available to integrate with geological data and this document how these features work. The data illustrates their regional context and allows us to consider their substantial implications for hydrocarbon systems of the South Caspian Basin (SCB).

On land, mud volcanoes range from massive explosive cones with well developed calderas and rift valleys, to simple oozing mud pots. The mud cones can contain Cretaceous to Recent rock fragments usually in a matrix of Eocene to Miocene shale and mud. The volcanoes are all strictly Quaternary-Recent age features. Methane gas is a nearly constant associated feature regardless of size, and oil tends to extrude from vents on the shoulders of volcanic edifices. Offshore mud volcanoes form islands and many sea floor eruptions.

Not only is there a strong correlation between the distribution of the main argillaceous source rock (Maykop Fm.) and the occurrence of mud volcanoes, but its burial history and geometry has a major impact on the type of mud volcano. Although this stratigraphic interval is an important regional detachment level, mud volcanoes have nothing to do with fold formation. Mud volcanoes are secondary, found always in areas of local tension, and can be located in almost any structural position in the SCB.

Detailed seismic studies reveal that mud volcanoes have much in common with normal volcanoes, including the variety of conduits, “magma” chambers, collapse structures, and repeated eruptions from the same edifice. All are fascinating to observe.