

Jaisalmer Basin of Western Rajasthan: A Gravity Perspective

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The sedimentary basins of western Rajasthan constitute a part of the shelf zone of the Indus Geosyncline and are contained in structurally controlled basins separated by sub-surface basement ridges (Dutta, 1983), which extend westward into Pakistan (Aziz and Khan, 2007). The development of the Barmer, Jaisalmer and Bikaner Basins of this region evolved as intra-cratonic rift basins from early Jurassic to Tertiary times. The process of rifting also generated episodes of alkaline magmatism. The Luni-Sukri lineament and the Jaisalmer-Barwani lineament dating back to at least Proterozoic times, cut across these formations. The interplay of sub-surface domes and basins with these lineaments may have significance in terms of hydrocarbon accumulation. The Kadanwari gas field in Pakistan is a small part of the prolific Middle Indus Basin and is located very close to the border with this part of Rajasthan. Seismic data indicates depths of 3000-3500 m (Ahmad et al, 2007) for the hydrocarbon bearing formation in Kadanwari.

The surface geology of the Jaisalmer Basin consists of Quaternary sediments in the west, grading to Tertiary and then Mesozoic formations proceeding eastwards. The gravity anomaly map of the area shows the smallest values in the west of about -60 mGal, climbing to values of 40 mGal and more at the eastern edge. A medium wavelength positive anomaly is found at the south-western border. An attempt is made here to generate a first order crustal model based on observed Bouguer gravity along a NW-SE profile cutting across the study area. The model reveals 6-7 km of sediments in the western most part of the basin.