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SEDIMENTATION IN BARMER BASIN, RAJASTHAN

We have followed with interest the 'Discussion' that appeared in the journal on the paper by Masroor Alam on the "Generic Provenance, Tectonics and Petrofacies Evolution of Sandstones, Jaisalmer Formation (Middle Jurassic), Rajasthan (Jour Geol Soc India, v60, 2002, pp 480-481, v 59, 2002, pp 47-57)

In this paper Alam analyses the petrofacies of Jaisalmer sandstone in the light of local model of Aravalli-Delhi Fold belt (ADFB) In the discussion, Saifuddin (2002) further suggests that the source of the Barmer basin sediment is from the Aravalli in the southwest In our recent studies (Kumar, 2002, Mathur and Kumar, 2002) on the sedimentation in Barmer basin we observe that

- 1 Barmer and Jaisalmer basins are in fact two separate basins and have different depositional history
- 2 Siddiqui (1963) conceived a barrier between the Barmer and Jaisalmer basins Subsequently, Dasgupta and Chandra (1978), Biswas (1982), Dutta (1983) and Pareek (1984) also suggested basement ridge of Malam igneous suite which acted as a barrier between the two, which was uplifted during Jurassic time resulting in the reactivation of the weaker zones forming various basins in the western Rajasthan (Biswas, 1987)
- 3 Bouguer gravity anomaly map (Dasgupta and Bulgauda, 1994) of western Rajasthan clearly depicts a zero gravity anomaly around Devikot north of Fatehgarh, which we consider as Devikot High (Fig 1) The upliftment of Devikot High resulted in the formation of grabens to the north (Jaisalmer basin) and south (Barmer basin) which gave a new shape to the terrain Thus, a new fluvial system started, draining western Rajasthan shelf on either side A fault known as Fatehgarh fault is the limit of the outcrops of Barmer basin in the north
- 4 In the northern part of the Barmer basin, the sediments of Fatehgarh Formation represent the basal unit (conglomerate at the base followed by siliciclastic, carbonate and phosphorite facies) The conglomerate is a key horizon and provides necessary evidence regarding the Devikot High as the provenance for the Barmer basin
- 5 In this context, our studies of Barmer basins show that Fatehgarh conglomerate is a polymictic conglomerate mainly composed of pebbles of rhyolite, granite, jasper and quartz indicating plutonic and volcanic acid igneous rocks (granite and rhyolite) as source material Further, the presence of sandstone, quartz arenite, chert and limestone pebbles are suggestive of sedimentary rocks as source In all probability they have been derived from overlying rocks of Lathi Formation and Jaisalmer Formation
- 6 The palaeocurrent analysis suggests that sand dispersal system in the area worked between south and south westerly directions Hence, provenance of sand bodies of the area existed in a wider area between north and northeasterly direction with respect to Barmer basin Obviously, it points to the Devikot High
- 7 The heavy mineral suite of basal siliciclastic sequence of Fatehgarh Formation is dominantly represented by bluish and greenish tourmaline which is also suggestive of plutonic and igneous parentage
- 8 Further, our studies shows that basal fining-upward siliciclastic facies comprises coarse to fine pebbly sandstone overlying basal conglomerate, followed by coarse sandstone, medium to fine sandstone and siltstone-clay stone at the top representing typical autocyclic deltaic depositional environment
- 9 The basal deltaic sequence is succeeded by a typical near shore carbonate and phosphorite facies which contain numerous microvertebrate fossils and gastropods of marine affinity, possibly of Late Cretaceous-Early Palaeocene age (paper under preparation) also signifies the influx of detritus from north-northeast side of the basin

In view of the above, it is clear that the Devikot High is the provenance for the Barmer basin Further, Devikot High

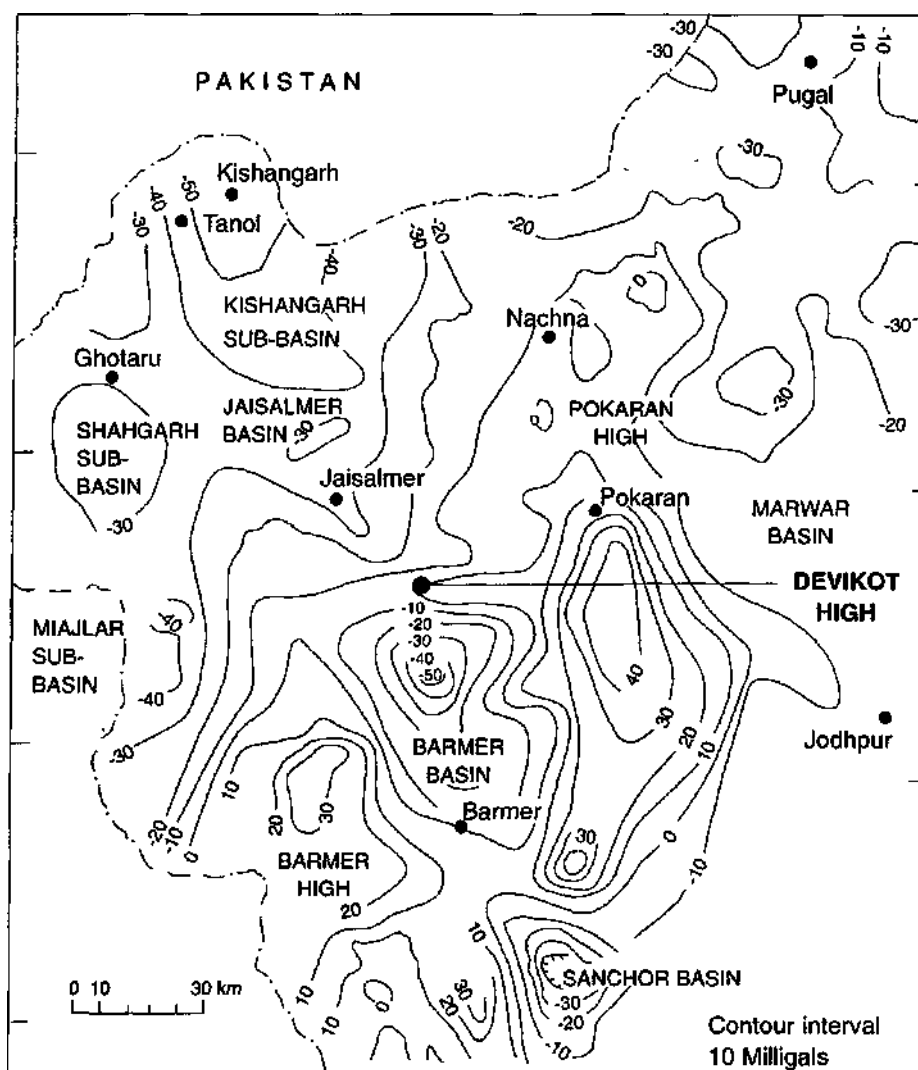


Fig.1. Bouguer gravity anomaly map showing configuration of sedimentary basins of Western Rajasthan (after Balakrishna, 1980).

may possibly represent the provenance for Jaisalmer basin. As such, the view that only ADFB as provenance in Rajasthan shelf, needs a review. •

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