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GENERIC PROVENANCE, TECTONICS AND PETROFACIES EVOLUTION OF SANDSTONES, JAISALMER FORMATION (MIDDLE JURASSIC) RAJASTHAN

by M. Masroor Alam. Jour. Geol. Soc. India, v.59, Jan.2002, pp.47-57.

Saif ud din, Natural Resources and Environmental Research Institute, NRERI/PEC, King Abdul Aziz City for Science and Technology, P.O. Box No. 6086, Riyadh - 11442, Saudi Arabia comments:

In the above paper Alam has tried to analyze petrofacies of the Jaisalmer sandstones in the light of local model of Aravalli-Delhi Fold Belt.

The lithostratigraphic and petrofacies variation in the Barmer and Jaisalmer Basins of Rajasthan, India forced the authors to conceive them as separate basins. Siddiqui (1963) conceived a barrier between Barmer and Jaisalmer basins. The source of the Barmer basin sediments is from the Aravallis in southeast. But the assignment of provenance of Jaisalmer sandstone of Jaisalmer Formation to the Aravalli-Delhi Supergroup by Alam (2002} following Siddiqui (1963) needs review.

The author has correctly identified that Jaisalmer sandstones plot in the "mature craton interior field" rather than the recycled orogen and/or basement uplift provenance as may be expected from clastics from Aravalli-Delhi Fold belt.

The Malani succession was very much exposed in the northeast of Jaisalmer basin, wherefrom it provided sediments to the Marwar Supergroup of the Nagaur basin in Rajasthan. Malani Succession was never entirely covered by the Marwar Supergroup. The geological map by Das Gupta and Chandra (1978) published by the authors clearly demonstrates the limit of Marwar Supergroup. It never touched the Aravalli and Delhi Supergroups. The Malani Rocks have remained exposed beyond the limits of Marwar Supergroup.

Thus, lack of first cycle detritus of volcanic origin and plots of clastic population of Jaisalmer sandstone in 'mature

craton-interior field' make it essential to review the provenance, which is probably other than the Aravalli region.

It may be relevant to look into an alternative source of the provenance. Qureshy and Iqbaluddin (1992) have suggested that the Trans-Aravalli block of Rajasthan is a dismembered part of the Arabian crust. Possibly, the provenance of Jaisalmer sandstone can be the Arabian shield, which has all the attributes to satisfy the 'mature craton-interior field' arrived by the author from petrofacies analysis of the sandstones.

M. Masroor Alam, Department of Civil Engineering, A.M.U., Aligarh - 202 002, replies:

I thank Dr. Saif-ud-din for taking interest in my paper and for his comments. I furnish my reply as follows:

1. Barmer and Jaisalmer basins are in fact separate basins. Not only Siddiqui (1963) but many have documented this (Datta, 1983; Pareek, 1984 to name a few). More recently ONGC, on the basis of geological and geophysical database came out with a detailed lithostratigraphy of the Indian petroliferous basins in which Misra et al. (1993) have also shown Barmer and Jaisalmer as two separate basins.
2. The geological map in my paper by Das and Chandra (1978) shows present limits of various rock groups and does not represent the palaeogeographic set-up during Jurassic times.
3. The general absence of detritus supposed to be shed from Malanis in studied sandstones of Jaisalmer Formation does not necessarily warrant one to look for an alternate provenance because there may be other reasons such as its concealment, underdeveloped fluvial system and lack of regolith at that time. Nevertheless, sandstones of just older Lathi Formation do have appreciable amount of volcanic lithics from Malanis (Ahmad et al. 2000), which is suggestive of contribution from limited exposures. The contribution from the Malanis is expected to be more in the clastics of Randha, Birmania and Bhuana Formations which are directly overlying the Malanis and are below Jaisalmer Formation (Misra et al. 1993).
4. Both the vector and scalar palaeocurrent studies and basin geometry suggest slope towards W and SW implying provenance to be the Aravalli-Delhi fold belt (Aquil, 1985; Akhtar, 1985; Akhtar and Aquil, 1986; Mitra et al. 1993; Sinha et al. 1993). The idea of source rocks in Arabian shield will directly contradict the palaeogeographic and palaeocurrent studies particularly for the clastics of Jaisalmer basin.
5. As far as the paper by Qureshi and Iqbaludin (1992) is concerned, which moots an idea based mainly on the geophysical data, separation of Trans-Aravalli Block from Arabian plate during Miocene is to be seen in the light of palaeocurrent and palaeogeographic studies made on the rocks of different ages of so called Trans-Aravalli Block. The studies on Marwar Supergroup (Late Proterozoic - Early Cambrian) by Awasthi and Prakash (1981), Kachchh basin (Jurassic) by Nageshwar and Chatterjee (1997) and Saurashtra basin (Early Cretaceous) by Casshyap and Aslam (1992) all show the provenance in Aravalli-Delhi fold belt rather in Arabian-Nubian shield.

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SEDIMENTARY FACIES AND STRATIGRAPHIC SIGNIFICANCE OF CUMBUM AND BAIRENKONDA TYPE SECTIONS OF NALLAMALAI FOLD BELT, CUDDAPAH BASIN, ANDHRA PRADESH by G. Lakshminarayana.

Jour. Geol. Soc. India, v.59, 2002, pp.167-177.

K.V.S. Reddy, Geological Survey of India, Southern Region, Bandalaguda, Hyderabad - 500 068, comments:

I would like to point out a technical flaw in the above paper.

If the Kakarla ridge (KR) diplays F_1 isoclinal synform (Figs.1, 2 and 3) then:

a) Structurally, Urakonda forms a major F_2 fold i.e., a refolded F_1 synform. If it so, such structures are uncommon in Cuddapah Basin, prior to cross-folding;

b) Stratigraphically the older unit of Cumbum Formation occurs towards south along the plunge direction (SSW) of the synform, which is occupied by the younger Bairenkonda Formation towards north in the fold core. It is also uncommon while establishing stratigraphy from structure;

c) Bhairavunikonda and/or Cumbum tank ridge quartzite towards west and east of Urakonda fold respectively are stratigraphically younger to Cumbum Formation and structurally occupies F_1 synformal (open to isoclinal) cores flanked by the Cumbum Formation only. These quartzites are not correlatable stratigraphically with the sequence in the Urakonda fold.

The aforementioned points imply that the data recorded/ interpreted (structurally/stratigraphically) may not be correct / tenable.

The alternate plausible explanation is that Kakarla ridge forms the steeply dipping eastern limb, in which case:

1) Structurally, Urakonda represents a major F_1 anti-formal fold, marked by folding of bedding (S_0) and plunging moderately [inferred from the folded bedding (S_0) dips in the fold closure] towards SSW.

2) Stratigraphically, the younger unit of Cumbum Formation occurs towards south along the plunge direction of the antiform, which is occupied by the older sequence of phyllite, phyllitic quartzite and thick, bedded orthoquartzite towards north in the fold core.

G. Lakshminarayana, Sandhyagiri Apartments, F-304, Kalyan Nagar, Gaddiannaram, P&T Colony (P.O.), Hyderabad - 500 060, replies:

a) Shri Reddy should have specified 'common' and 'uncommon' structures along with examples and published references on the Cuddapah Basin;

b) He has assumed SSW plunge, which is not shown/ recorded by the author in Fig.1.

c) Kindly see the first sentence of second para on p.169 and the line drawings.

Assumptions cannot form the basis for plausible explanation. Field data cannot be assumed/changed/altered for the sake of convenient interpretation as attempted. Hence points 1 and 2 of the comments are untenable.

The above mentioned points indicate that the paper has not been thoroughly read. Hence, it is premature to use the term – "technical flaw".