

STRATIGRAPHY AND STRUCTURE OF SIWALIKS IN ARUNACHAL PRADESH by V. Srinivasan, Jour. Geol. Soc. India, v.62(2), 2003, pp.139-151

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The above paper has brought out the stratigraphic and structural lay-out in the inaccessible areas of Arunachal Pradesh by using remote sensing techniques. It establishes three tectonic units separated by two *en echelon* faults in the Siwalik belt. The physical discontinuity of pebble beds outcropping in different tectonic units suggests that the "Kimin" beds of earlier workers may not be one and the same everywhere. Srinivasan has also noticed lateral facies transition between pebble beds and sand rocks. A likely preferential concentration of pebble beds close to some river courses like Kameng, Dikrang, Subansiri and Siang may suggest their descent from the then existing Siwalik rivers. Middlemiss (1890) had made a similar observation for the rivers in Western Himalayan foothills. The pioneering works of geologists of ONGC in Arunachal Pradesh, summarized in Karunakaran and Ranga Rao (1979) suffers perhaps from one lacuna – not using aerial photographs, which Srinivasan has filled up. His work proves once again the importance of remote sensing tools in highly inaccessible areas.

I agree with Srinivasan that the structures in the foothills fold belt are an expression of vertical tectonics. In my fairly extensive field work in the Western Sub-Himalaya, I have repeatedly noticed the importance of basement tectonics, reviewed in a recently published book (Raiverman, 2002). Basement tectonics manifests in multifaceted modes in the sediment-fill, for example, lateral facies changes, thickness variation of stratigraphic units and unconformities. It introduces structural complexities by non-uniform uplift of blocks, often with a strike-slip component, in a commonly heterogeneous and fractured basement. Thin skinned tectonics, on the other hand, tends to force uniformity on both structure and stratigraphy.

I have a few questions to the author for comparing the structural layout of the Siwalik belt of Eastern Himalaya with that in the western:

- 1 Structures in the Arunachal Siwalik belt are autochthonous, as pointed out by Srinivasan. Is there any evidence of strike-slip faults parallel to the regional strike? Wrench faults abound in the autochthon of Western Sub-Himalaya (Pivnik and Sercombe, 1993; Raiverman et al., 1993; Raiverman, 2002).

- 2 Is there a parautochthon unit in the Eastern Himalaya as in the Western? Parautochthons involve, of course, pre-Siwalik Cenozoic strata. They may also lift to surface the floor rocks of the Cenozoic like the Proterozoic Jammu Limestone in J & K State or the Bandla Limestone in Himachal Pradesh. Considering the recent discoveries of extensive outcrops of Eocene beds in Arunachal Pradesh, could a parautochthon be a possibility there?

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- 1 The faults discussed in this paper are not strike-slip faults. However minor involvement of strike-slip component cannot be ruled out. Evidences for existence of major transcurrent faults have not been observed in the Siwalik belt of Arunachal Pradesh.
- 2 Eocene beds (such as Nummulitic limestone) in Arunachal Pradesh are confined more or less along the narrow Gondwana belt, which extends just north of Main Boundary Fault. These Eocene rocks occur as discontinuous widely separated small-scale outcrops and they may be considered as slivers of basement brought up by the vertical movement along MBF.

Siwaliks in Arunachal Pradesh and Siwaliks in Western Sub-Himalaya are different in another aspect. Vertebrate fossils are more or less completely lacking in the Siwaliks in Arunachal Pradesh. I am of the humble opinion that more works still need to be carried out to understand the Siwalik belt and solve its mysteries

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