COMMENT

Quaternary valley-fill deposits of the Ravi drainage basin in Chamba, Western Himalaya: definition, lithostratigraphy and depositional framework.

(A comment on the paper by D. D. Joshi and S. K. Tandon, published in the Journal of the Geological Society of India, v. 29, no. 6, pp. 540-553).

I find that the statement 'A hitherto *unstudied* 250 m thick valley-fill sequence occurs in the vicinity of Chamba' may not be correct as there is already a paper on 'Geomorphology of Ravi Basin' as a whole, in Perspectives of Geomorphology Vol. 3, Ed. H. S. Sharma, which came out in 1981.

Further, I seek clarifications on the following:

1. The source of Figure 1 is not given, whether mapped by the authors or borrowed from somewhere else.
2. The map showing spatial distribution of Mangla Formation in Figure 2 is not clear as it appears as outcrop map without boundaries between the different members and *no* levels. These are very important to understand the map.
3. As far as I know that *there is considerable variation in the* fan *valley-fill near Chamba and also there is no* preferred orientation in the spatial distribution/arrangement of the clasts. *This has also been admitted by the authors on page 544* (under the heading Depositional Framework). Hence, it appears that the classification is highly speculative.
4. In view of the remarks at 2 and 3 above, the presentation of a lithostratigraphic scheme in Table 1 on page 543 is a mere supposition.
5. Figure 3 B needs clarification as to whether the quartzite-phyllite bedrock is overridden by Granite-gneiss bedrock with dip into the hill (contact one).

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REPLY

We thank D. K. Ghosh for taking interest in our paper. The reply to the points raised by him are as follows:

1. The linears and the trends of mountain ranges along with the offsets have been plotted by us from LANDSAT imageries on a regional tectonic map compiled from several published sources. The extent of the valley-fill sequence is based on field mapping of Quaternary deposits carried out by one of us (DDJ). This map is given on a scale of 1 : 500,000 and is meant to provide a regional framework to the Quaternary deposits occurring in this stretch of the Ravi river. There seems to be an insinuation by D. K. Ghosh that the map has been *borrowed* (italics ours). Need we remind D. K. Ghosh that this is an area of which the lithological and tectonic features have been mapped several times by different workers since the early maps published by McMohan (1881–1885). Information summarised from such sources on small scale maps over a period of almost 100 years tend to be categorised as

anonymous. This is indeed imperative if the lists of references have to be kept down to a reasonable number. We would like to claim credit for the map inasmuch as it sets out the extent of the valley-fill sequences and brings out its relationship with the regional tectonic features and other linear features recognised on LANDSAT-imageries. We claim no credit whatsoever for the generalised regional tectonic units plotted on this map.

2. Figure 2 is indeed an outcrop map meant to convey the distribution of different members. We agree with D. K. Ghosh that this map will find its maximum utility only when levels are given. It is on the basis of such field maps (where contour data is available) prepared on SOI Sheet nos. 52D/2, 52D/3 that the present published map has been derived from. This map requires to be read together with Figs. 3 A and 3 B for understanding it. The relative vertical position of the different members is specified therein.

3. The remark given at point 3 by the discussant requires some degree of elaboration. The significant point of our study has been that there are two major lithofacies types (fan type/braided stream type). Furthermore, in the paraglacial fan deposits, the clast type is predominantly granite. These two major lithofacies show a particular order of superposition outlined in Figure 3 B. The corresponding stratigraphic scheme is given in Figure 3 A and Table I. We do agree with D. K. Ghosh that there are variations in the fan valley-fill sequence near Chamba. It is only to be expected that variations will take place when two major depositional systems are interacting. Furthermore, variations in fans necessarily exist because of the changing process characteristics along the axes of fans (proximal-distal trends). Should that deter us from studying and building up a vertical order of superposition of a sequence in which 2 major lithofacies tend to recur vertically over $\sim$ 300 m?

D. K. Ghosh has raised the point that the proximal fan facies lacks imbrication. Yes, it does lack imbrication—nevertheless the proximal-distal trends in these fans can be established by various fan properties, the most important of which is depositional dip. May we also draw the attention of D. K. Ghosh to the well imbricated Gm facies described under the category of braided stream environment on p. 548 by us.

The inclined line in Figure 3 B representing the contact between the quartzite-phyllite bedrock and the granite-gneiss bedrock carries no implication of dip. This may be taken as a schematic representation of the extension of the inferred contact into the hill. The scope of our work was limited to understanding the Quaternary deposits; hence, details of the nature of this contact relationship were not examined by us.

D. K. Ghosh then has gone on to pass judgement that the stratigraphic scheme proposed by us is a mere supposition. The properties of the two major lithofacies, their recurrence patterns, and fan properties have been used by us to arrive at the order of superposition. We, therefore, are unable to see the logic in the argument of D. K. Ghosh that a stratigraphic scheme for these deposits is not possible to arrive at or is at best speculative.

In conclusion, we hope that this discussion will serve the purpose of attracting the attention of geoscientists for more work on these sequences. They had remained stratigraphically unstudied; we hope that this will no longer be the case.

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