

Interactive  
Comment

## ***Interactive comment on “Comparison between experimental and numerical stratigraphy emplaced by prograding bedforms with a downstream slip face” by E. Viparelli et al.***

**Dr Kleinhans (Referee)**

m.g.kleinhans@uu.nl

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The paper presents an application of existing model concepts to existing data of an experiment with a prograding one-dimensional bed load-dominated delta with poorly sorted sediment. The model predicts the shape and progradation but most importantly the size-sorting of the sediment. The results are not surprising and serve as a confirmation of our understanding of these processes.

Two comments on the manuscript and two minor comments on the presentation.

The model is well-presented but a sensitivity analysis and validation is not really shown. How sensitive is the model to grid size horizontal and vertical? To active layer thick-

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ness? To the chosen empirical hiding function? This needs to be tested (which the authors probably did) and presented. In particular it is interesting to do that analysis with different hiding functions. As a control numerical experiment, for example, the authors should present the equal mobility case. Because many people use Egiazaroff and Wilcock's work, that would also be really interesting to show. How do these sorting patterns depend on these choices? So how important are these particular small-scale processes for the large-scale sorting? It is in fact quite interesting that the hiding factor is different from equal mobility and also this needs an explanation. There are two papers, one by Wilcock and Parker, and one by myself (Kleinhans 2005 in JGR), where it is shown that experiments with sediment feeding inevitably show equal mobility, in contrast to experiments with sediment recirculation. The fact that this is not the case now deserves discussion.

The change in sediment composition and the storage of sediment in the delta topset deserves a better explanation (page 1170). The previous point of deviation from equal mobility is probably related to this. In my experiments (Kleinhans 2005 in Sedimentology) the topset kept a constant slope so that as the delta prograded the amount of sediment stored in it PER UNIT OF TIME increased. Given sorting on the topset due to dynamic armouring the sediment stored in the topset was mostly finer than the feed mixture. This led as the authors also observe here to a coarsening of the sediment arriving at the brinkpoint. Now I understand the point because I did similar experiments, and I think the authors understand it, but it is not clearly presented for the readership beyond ourselves.

The title of the present paper is not covering the contents. The sedimentological phenomenon here is not a bedform but a delta. The work has been inspired by, and inspires, research on sorting in bedforms but bars and deltas are different beasts altogether. I propose "by a prograding delta" in the title.

The colour figure with sorting can be improved significantly with software such as matlab.

Finally, please do NOT refer to my PhD thesis. All that work has been published in proper journal papers which can all be found online (and on my website).

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Interactive comment on Earth Surf. Dynam. Discuss., 1, 1151, 2013.

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