Earth Surf. Dynam. Discuss., 1, C320–C321, 2013
www.earth-surf-dynam-discuss.net/1/C320/2013/

Earth Surface Dynamics
Discussions

Interactive comment on "Data driven components in a model of inner shelf sorted bedforms: a new hybrid model" *by* E. B. Goldstein et al.

Anonymous Referee #1

Received and published: 21 November 2013

Review of ' Data driven components in a model for inner shelf sorted bedforms: a new hybrid approach'. General comments: This is an interesting manuscript that combines a data-driven approach to determine reference concentration of suspended sediment and a model for inner self sorted bedforms. The approach used in the data-driven component is novel. It is interesting to see the Genetic programming used here detects the dependence of the reference concentration of suspended sediment on a modified form of Shields Parameter. The manuscript is worthy of publication in Earth Surface Dynamics, however after moderate revision. Please note that I ticked 'minor revision' option as there wasn't a 'moderate revision' option.

Specific comments: Section 2 – Even though more detailed of the data sets used in the manuscript are available elsewhere the authors should include important informa-

tion about the datasets (e.g. sampling duration, sampling frequency, height above bed, water depth, etc.) in the manuscript, preferably in a table. Section 2.2 – Explain reasons for using 40 centroids for the GP prediction. You should do a sensitivity analysis to select optimum number of centroids, unless you have done so in Goldstein et al. (in press). Section 5- One of the main reasons for the differences in results between Coco et al (2007a) and the results this manuscript can be the differences in sediment and hydrodynamic conditioned used. To make a direct comparison between the performances of the two models, you should use same conditions. I strongly recommend to re-run the new model using same conditions to that in Coco et al. (2007a) model.

Section 6 – i. The author's claim that the new model needs more energetic conditions to move sediment in the new model than the Nielson (1986) model is obvious as Nielson used smaller sediment sizes than the current model. ii. As well as advantages, you should mention disadvantage of this approach: (a) the formula is not physically based and (b) does not perform well at smaller sediment concentrations

Section 7 – i. I am not sure about the claim that the new model out-performs Lee et al. (2004) model. NRMSE of new model is only marginally lower than Lee et al (2004) model, even though the correlation coefficient is higher. However, it should be noted that the range of validity of Lee at el. (2004) model is significantly larger than the new model (Figure 6). ii. To consolidate the claim that the new model is able to generate novel behaviour in the sorted bedform model where sorted bedform morphology changes when the size of the coarse fraction is modified, you should do the similar experiment using Coco et al. (2007a) model.

Interactive comment on Earth Surf. Dynam. Discuss., 1, 531, 2013.