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

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Open Discussion Comment: Goldstein et al. (2013) – Hybrid sorted bedform model

What I find especially commendable about this article is that the authors deconstruct a technical, complicated, two-fold concept (the application of machine learning to derive a physical parameter from a trove of empirical data, then the incorporation of that parameter into a morphodynamic model) into a readable and transparent explication.

In an era of Big Data and cheap computing, the authors open a door to a variety of new analytical and numerical approaches that quantitative geomorphology is now equipped to handle. Equally exciting is that even as new grant proposals and research agendas argue for new and more data acquisition – always new and more – development of

"globally optimal predictors" (P533) suggests a way to still embrace geomorphology's historical legacy by incorporating archived empirical datasets.

The authors conclude their Abstract (P532) with a promise to "discuss the challenges of integrating these disparate pieces and the future of this type of modelling." They deliver their discussion on P551–552 in the paragraph beginning, "Finally, the promising results of data driven parameterizations as components in the sorted bedform model suggests that this approach could be extended to other morphodynamic models and other parameterizations." I wonder if the authors might expand on this paragraph: writ even larger, what possibilities do they envision beyond variations on the theme of suspended sediment? What about other morphodynamic environments where sorting feedbacks can be important (e.g. river channels and floodplains)? Are there extensions to ecology, which has its own menagerie of parameters to capture the dynamics of individuals, communities, and populations? The authors might be able to at least point out a few research opportunities that are particularly ready for hybrid models – research fields that have produced diverse empirical datasets as well as complexity-based morphodynamic models.

I look forward to seeing the final version of this work – which, after iteration, will likely demonstrate both low MSE and low complexity (apropos of the authors' Fig. 5) – in the pages of ESurf.

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