Earth Surf. Dynam. Discuss., author comment AC3
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Reply on CC1

Hossein Hosseiny et al.

Author comment on "Development of a machine learning model for river bedload" by Hossein Hosseiny et al., Earth Surf. Dynam. Discuss., https://doi.org/10.5194/esurf-2022-23-AC3, 2022

Thank you for your comment and feedback.

We agree that the large database being used in this study provides a versatile model for bedload predictions. The predictions in this study are within the bounds of one order of magnitude (Fig.2), with a mean absolute error of 16.1 g/s/m . Previous study of Bhattacharya & Solomatine (2006) has shown that even with 407 observations, the machine learning model outperformed several empirical and physically based bedload models. However, they reported that the root mean squared error (RMSE) of the field-based ANN model was 68.4 x 10-5 m2/s (~1812.6 g/m/s; three orders of magnitude larger).

We would like to highlight that the novelty of this work is not solely based on using a large dataset. The proposed model in this study uniquely utilizes a number of easy-to-measure reach-scale variables along with discharge as the inputs to predict bedload flux, which in an of itself represents an advance.

Bhattacharya, B., Price, R. K., & Solomatine, D. P. (2007). Machine Learning Approach To Modeling Sediment Transport. Journal of Hydraulic Engineering, 133(4), 776–793. https://doi.org/10.1061/(ASCE)0733-9429(2007)133:4(440)