

Interactive comment on “An improved coupling model for water flow, sediment transport and bed evolution (CASFE v.1)” by S. He et al.

Anonymous Referee #1

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I would flag out a major fault in the manuscript, which prevents the manuscript from publishable.

In the general context of river mechanics, the river bed surface is actually the interface between the sediment-laden flow and the bed. The averaged streamwise velocity at the bed surface must vanish (i.e., $u_b=0$), because of the requirement of velocity continuity. Otherwise, the bed (including the bed surface and its substrate) will move downstream, which is apparently not the case. More critically, it is in conflict with the fundamental understanding of river mechanics. In this connection, it is essential to note that the so-called "mobile bed" or "movable bed" means the bed aggrades or degrades vertically, due to unbalanced sediment entrainment and deposition across the bed surface.

The authors claim that the bed surface has a finite velocity (i.e., u_b does not vanish)

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following two references, and suggest it has impacts on the flow, sediment transport and morphological evolution. But this is nothing but a major fault, given the above understanding.

The authors also include the impact of rainfall in the model equations. This really is trivial. Dam-break occurs typically in very short periods of time, and the impact of rainfall is practically negligible.

In conclusion, the present manuscript is faulty in theory, adds nothing new to the modelling of dam-break flood and sediment dynamics. I would have to recommend that it be rejected for publication.

Interactive comment on Geosci. Model Dev. Discuss., 7, 2429, 2014.

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