Nat. Hazards Earth Syst. Sci. Discuss., 2, C413–C416, 2014
www.nat-hazards-earth-syst-sci-discuss.net/2/C413/2014/


Natural Hazards and Earth System Sciences
Discussions



# *Interactive comment on* "A two-phase model for numerical simulation of debris flows" *by* S. He et al.

**Anonymous Referee #1**

Received and published: 16 April 2014

The title of the paper was attracting my interest, and quickly motivated me to act as a reviewer. However the outcome could not be like this! I was very much surprised as I continued reading the manuscript.

This manuscript claims that the authors have presented 'a new two-phase debris flow model', and further mention that the model has been validated. However, as it is made clear below, neither the model, nor the physical setting is new. The major parts of what the authors have claimed can, in principle, either be found in Pitman and Lee (2005, Pros. Phil. Trans. A), or in Pudasaini (2012, JGR). More surprising aspect is that, there are some objectionable statements. The manuscript also breaches the citation principle: without giving the credit to the original source, this manuscript copies, em masse, the papers by Pitman and Le (2005), and Pudasaini (2012). This should have



Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

been avoided.

It is a know fact that, in 2005, Pitman and Le pioneered the two-phase debris flow model by introducing the interaction forces (the simple drag) between the solid and fluid phases, that led to the formulation of separate mass and momentum balance equations for the solid and fluid phases. Later, in 2012, Pudasaini presented a generalized two-phase debris flow model by introducing several new aspects, including the Newtonian and enhanced non-Newtonian viscous stresses, generalized drag, and the virtual mass force induced by the relative acceleration between the solid and fluid phases. In fact, concerning the modelling aspect, what the authors have effectively done (written) in this manuscript is the following: take the model equations by Pudasaini (2012), then, (1) set the virtual mass to zero, (2) consider only the drag experienced by the particle moving in a dilute fluid (Pitman and Le, 2005) and only retain the linear drag from Pudasaini (2012), (3) neglect the solid-volume-fraction-gradient induced enhanced non-Newtonian viscous stress and retain only the Newtonian viscous stress as in Pudasaini et al. (2005, NHESS), (4) neglect the vertical distribution of the solid, and the fluid-phase velocity. Then, what remains is, as explicitly discussed in the Appendix in Pudasaini (2012), the model that looks similar to the previously developed model by Pitman and Le (2005), and written in this paper at Section 5. So, I could not find anything new, and no new physics in the model equations mentioned at Section 5.

Abstract: By dropping the above mentioned additional points, the text concerning the modeling aspect is largely copied from Pudasaini (2012). In the simulation, the authors said that, 'viscous stress of fluid phase has significant effect in the process of movement of debris flow and volume fraction of solid phase significantly affects the debris flow dynamics.' However, this has already been demonstrated in Pudasaini (2012).

Introduction: The use of English, and concepts of debris flow is poor. There are several instances where parts are copied from Pudasaini (2012) and used here without citation, including, lines 22-24 (P2152); lines 21-23 (P2153). At P2154 (lines 1-2) the authors mention that 'But Pudasaini model is too complex and not easy to apply.', which, sci-



NHESSD
2, C413–C416, 2014





entifically, is not a justified, but a sloppy statement. Some papers have already been published by using Pudasaini (2012) model, including Pudasaini and Miller (2012a,b, AIP); Pudasaini (2014, Acta, Mech., In press), etc. Lines 3-10, repeated from Abstract and Pudasaini (2012).

Line 15-21: There are several mistakes in model equations, including the dot in front of p, and possibly incorrect sings in the fluid momentum equation. p is not defined.

P2155: Lines 11-17: largely copied from Pitman and Le (2005).

The entire materials on pages 2156 - 2165 (10 pages): essentially all these processes have already been introduced and implemented by Savage and Hutter (1989); Gray et al. (1999); Iverson and Denlinger (2001); Pitman and Le (2005); Pudasaini et al. (2005); Pudasaini and Hutter (2003; 2007); Pelanti et al. (2008); Pudasaini (2012), etc. Furthermore, the authors seem to say that these are all new. They only mentioned very implicitly and very shortly, some of these references at P2159. The expressions related to the two-phase, are either taken over from Pitman and Le (2005), or Pudasaini et al. (2005), or Pudasaini (2012).

P2162: The text here is copied from Pudasaini (2012), but yet wrongly.

P 2163: As said before, these model equations are reduced from Pudasaini (2012), and are those of Pitman and Lee (2005) when the Newtonian fluid-stress is retained in Pudasaini (2012). Yet, there are mistakes at places, e.g., on the RHS of (29), the 2nd term should contain flow height; the 6th term should contain the density ratio, etc.

P2164-2165: Text substantially copied from Pudasaini (2012).

Although I have carefully read the manuscript, at this stage, I do not think that it is of any value to further comment on this, and also in detail. There are certain aspects the authors tried to present in the simulation section. Nevertheless, I regret to say that that is too few for a manuscript to be a paper in NHESS.



NHESSD
2, C413–C416, 2014





Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 2151, 2014.