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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Comparing Thixotropic and Herschel-Bulkley Models for Avalanches and Subaqueous Debris Flows" *by* Chan-Hoo Jeon and Ben R. Hodges

Anonymous Referee #1

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Manuscript ID nhess-2017-258 entitled "Comparing Thixotropic and Herschel-Bulkley Models for Avalanches and Subaqueous Debris Flows" which the authors submitted to the NHESS has been reviewed. The manuscript contains very interesting information, and very educative for debris flow rheologist, particularly for understanding of the rheology of clay with respect to the debris flow mobility in solid-liquid transition.

Accepted, but minor revision is recommended. Recommended comments are as follows:

In title, the terms of "avalanches and subaqueous debris flows" were used in the text; they are also shown in Session 6 and Session 7. In Discussion, the authors mentioned

"mudslides". Locat and Lee (2002) at Canadian Geotechnical Journal had presented the landside classifications: submarine landslides can be classified as five different types, such as spread, slide, flow, topple, and fall. It can be recommended that the authors should be defined/explain them in the manuscript: what is the difference from avalanche and debris flow. In Page 10, line 17-18, the avalanches were explained, but not for subaqueous debris flow.

In Table 1, 2, and 5, the yield stresses used in the text are very small, which are ranged from 5 to 30 Pa; it seems to me that the materials considered in this paper are in the stage between fully fluidized muds as a clay suspension and at liquid condition. As noted in the text, Chanson et al. (2006) used the bentonite clays, with volumetric concentration of solid ranging between 10 and 17%, that are mixed with fresh water. In reality, actual subaqueous debris flows are run with large-sized particles during debris flow motion. They are having a large yield stress value, which can be ranged from 1000 to 5000 Pa, even for mud-rich materials. Please explain the role of clays contained avalanche/debris flow/mudslides in subaqueous environment and how they influence upon the landslide motion.

No conclusions in this paper?

Recommendation:

Page 2, line 6, 19 (moller et al.) should be checked with page 7, line 16. Page 2, line 23, yield stress vs page 23, line 2 yield-stress Page 6, line 18 ODE (9): ODE (Eq. 9)? Page 7, lineg 7, 8: Session 6, Session 7? Page 12, Fig. 3: the shape of landslide is triangular? Why not for parabolic shape? Any reason? Page 15, Fig. 7: x-axis of nondimensional time (t*) is the time scale for the landslide initiation or landslide motion or debris flow propagation?

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