Geoscientific
Model Development
Discussions

# *Interactive comment on* "Towards a model for structured mass movements: the OpenLISEM Hazard model 2.0a" *by* Bastian van den Bout et al.

**Anonymous Referee #2**

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The authors present a model to describe mass movements of gravity-driven flows such as debris flows and landslides. Understanding the dynamics of these types of flow is important to mitigate the hazards associated with them as well as the details of river channel dynamics to which they supply a substantial amount of sediment. Much of the community understanding of these flows are drawn from experimental and in-field studies and limited numerical models. Therefore, developing a numerical model to precisely model these types of flows can enhance our understanding regarding their dynamics. However, at this stage, these numerical models can be computationally expensive as authors have mentioned in the discussion of this manuscript, and may not be practical. But this should not be a limit in developing numerical models to describe these types of flow. With that being said, I believe this manuscript and the model

developed by authors is deserved to get published after addressing a few things as mentioned below. Therefore, I recommend a minor revision.

1) The introduction is not labeled. I suggest labeling the "introduction" section as 1, then describe the model in section 2 and so on. This would then be consistent with the outline of the paper in lines 69 to 75. 2) The title in line 76 ("A set of debris flow equations....) should be changed. The description given in lines 78 to 101 is better related to other types of hillslopes transport such as rock avalanches and landslides rather than debris flows. 3) Line 49: remove "the" 4) Line 69-70: "an arbitrary" 5) Line 107: the volume fraction for solid and fluid are not defined correctly. 6) Line 115: Double equal sign. Replace "==" with "=". 7) Line 159: "internal stress of soil" instead of "internal tress of soil"

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