Nat. Hazards Earth Syst. Sci. Discuss., 2, C1800–C1801, 2014
www.nat-hazards-earth-syst-sci-discuss.net/2/C1800/2014/

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "A theoretical model for the initiation of debris flow in unconsolidated soil under hydrodynamic conditions" *by* C.-X. Guo et al.

Anonymous Referee #3

Received and published: 8 August 2014

This paper presented a theoretical model to analyze the initiation of debris flow. This is an old but interesting topic. First the authors summarized the advances in this area. Then they presented a theoretical model based on experimental observation. This paper has some problems should be clarified. (1) Since in experiments the particles with diameter larger than 60mm excluded, the data of "cumulative ratio" should be modified in Table 2. (2) The description of the experiment should be detailed introduced. How much is the size of flume? How to layout the artificial rainfall apparatus? Were the artificial rainfall and water flow occurred at the same time or rainfall happened first and then water flow happened? The author said that water flow was supplied by an-

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

other flume in experiment. But in practice it is most formed by rainfall. So the water is changed with rainfall intensity and duration. To adopt a water flow with stable depth and velocity in analysis is very idealized. At least this point should be an assumption. Actually the change of flow depth has obvious effects on the initiation of debris flow because it can cause excess pore pressure and increasing pore pressure gradient. (3) Eqs.(12) or (14) can only be used in case of infinite condition or a«l. In the experiment (Figs.2,4), the failure is more like a finite model. Other methods such as circular slide method may be more suitable in this case. (4) Depth of initiation “a” cannot be a factor to analyze the sensitivity. It is a dependent variable determined by independent factors such as rainfall intensity, water flow velocity and parameters of soil layer. Because the material has only 10% of particles with diameter less than 2mm, the cohesion can be ignored. So it can be excluded from eq.(14) and the sensitivity analysis. (5) It’d better provide more experimental results to support the theoretical results. This paper should be carefully revised before publication.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 4487, 2014.