

Interactive comment on “Determination of the runoff threshold for triggering debris flows in the area affected by the Wenchuan Earthquake” by P. Cui et al.

Anonymous Referee #2

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This paper is about the runoff threshold for triggering debris flows. This research fits the themes of this journal and could be beneficial to predict the occurrence of debris flows. However, the determination of the runoff threshold in this study was based on the experiment results rather than the debris flows in the affected area. The link between the experiment results and actual events should be strengthened to match the topic.

1. Abstract: (page 4660 line 3) “including channel width, median particle diameter,” The “median” particle diameter is different from “mean” particle diameter in page 4663. The authors should check the inconsistency. Furthermore, some significant results should be highlighted in the abstract. 2. Experimental design: (page 4663 line 17)

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“The laboratory flume (Fig. 2) had a length of 300cm a width of 20cm and a depth of 250cm depth.” The symbols used in equations (2) and (3) should be added in fig. 2. The depth of 250cm is different from that in fig. 2. 3. Critical equations for debris-flow formation: (page 4666 line 3-11) “This classification of the critical conditions can be explained as follows:” It is not clear whether the reasons were based on the experimental processes and results. More experimental results should be illustrated in the paper. 4. Comparison with other studies: (page 4667 line 14-15) “Our results are similar to those of Takahashi (1978), and intermediate between Gregoretti (2000) and Tognacca et al. (2000), as shown in Fig. 7.” The experimental material and the definitions of dimensionless surface discharge and debris flow formation in those studies were different, which makes the comparison unclear. Moreover, the results are more similar to those of Tognacca et al. than those of Takahashi. 5. Comparison with other studies: (page 4668 line 5-6) “we used a loose soil comprising about 3.5% clay, which is similar to that used by Takahashi (1978).” The experimental material in this study doesn’t seem to comprise about 3.5% clay according to the particle size distribution in fig. 3. Moreover, the particle size distribution of experimental material of Takahashi, Gregoretti, and Tognacca may be added. 6. Validation of the model: (page 4669 line 1-2) “the runoff at different rainfall frequencies by the method known as the... (Eq. 7),” The eq. (7) is the dimensionless critical discharge; the authors should interpret how to use this equation to calculate the runoff at different rainfall frequencies. Moreover, eq. (9) should be interpreted further. 7. English language needs to be revised by a native speaker.

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