

## Overview

The authors improved their work but there are still some deficiencies:

1) The work, even if valuable, is yet not well explained. The paper, even if improved in some parts, is still hard to read. A clear or direct focus is missing and the parts seem untied. As an example, the analyze of the bed profile should be directly linked to the proof and determination of the angles  $\alpha_i$ . Moreover, the paper should be written in a more concise form.

2) The writer does not the share the authors approach on the limiting slope angles because it is uncorrected and misleading as it is shown.

The triggering of debris flow along channel is mostly due to runoff. Unfortunately, as we do not know runoff, we cannot incorporate it in the scheme based on a static equilibrium-based relationship (equation 5). Therefore, the justifications of the authors appears physically uncorrected.

Moreover, you can have debris flow with slope angle smaller than that given by equation (5) due to runoff. I suggest the authors to rewrite this part, justifying their approach with the impracticality of introducing the runoff contribute in the equilibrium relationship. The limiting inferior angles could be that given by flume laboratory experiments ( $15^\circ$  according to Takahashi, 1978).

3) The second part of the text (from subsection 4.3), is again not fluid but very hard to read. Moreover, because in some parts it is too detailed, it is not readable.

4) In subsection 4.3 the writer does not understand the technique used for the topographical measurement? Photographs or ALS. This part should be rewritten in a clear form. Moreover, what is it the meaning of **“estimated from terrain by ALS”**?. Finally, I suggest the authors to initially and briefly summarize all the techniques they used and the scope.

5) In subsection 5.3 analyzing the bed profile after two events the authors observe that in the medium part it remains unchanged. They explain this by the absence of deposition. A consequence of this explanation is that in the upstream and downstream reaches there is deposition. This fact means that the considered reach is not the initiation area where

entrainment should occur rather deposition. In this case the scheme proposed by the authors at section 2 cannot be applied here.

The following are the detailed comments and specifications.

1. Page 1 – line 12: perhaps usually is better than often.
2. Page 1 - line 23: The sentence “The small-scale channel....” should be rewritten. At the beginning it should be specify that debris flows form some channel within the bed. If the writer has understanden what the authors mean.
3. Page 2 - line 22: the reference Gregoretti and Dalla Fontana, (2008) should be placed here and not at line 26.
4. Page 4 – line 15: terrain with a slope smaller than is better.
5. Page 4 - lines 15-19: this sentence could be neglected.
6. Page 5 – line 5: the reference Gregoretti, 2000 could be substituted by Gregoretti, 2008.
7. Page 7 – line 2: perhaps it is better “is” rather than “was”;
8. Page 7 – line 2: place there is before a
9. Page 7 – line 3: place is after bedrock
10. Page 7 – line 7: decreased?
11. Page 8 – line 9: please mark the position of the monitoring station on the map.
12. Page 8 – line 11: then moved upstream to P2 is better.
13. Page 9 – line 13: is runoff increasing or decresing slowly?
14. Page 19 – lines 19-20: In this sentence it is stated that in the middle part the bed is unchanged because there is no deposition. This indirectly states that changes in the upper and lowest are only due to deposition. In other words in the upper and lower reaches there is only deposition and no entrainment. Is this correct? Authors should introduce this information at the beginning of the subsection.
15. Page 23 – lines 1-8: Confused sentences: the writer does not understand their meaning.
16. Page 23 – line 13: overall and sometimes cannot be in the same sentence that results confused.
17. Page 23 – lines 19-20. This sentence contradicts what written at line 25 of page 13.
18. Pag. 24 – lines 3-7. The writer agrees with the authors that the amount of storage influence the type of debris flow front (partially or fully saturated) but not the rainfall. In Rovina di

Cancia, in the summer two debris flows were triggered by two convective storms of nearly equal duration. The front of the first debris flow was partially saturated while the second was fully saturated (Gregoretti et al., 2016). This means that rainfall type in the determination of the front type could be secondary respect to the available storage volume.

Caption of Figure 1: please substitute water table with water level.

Gregoretti C., Degetto M., Bernard M., Crucil, G., Pimazzoni A., De Vido G., Berti M., Simoni A. Lanzoni S. Runoff of small rocky headwater catchments: Field observations and hydrological modeling. *Water Resources Research*. 52(8) doi: 10.1002/2016WR018675