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Hydrology and Earth System Sciences
Discussions

Interactive comment on "The temporally varying roles of rainfall, snowmelt and soil moisture for debris flow initiation in a snow dominated system: the compound trigger concept" *by* Karin Mostbauer et al.

Anonymous Referee #1

Received and published: 29 November 2017

General comments (evaluating the overall quality of the discussion paper)

The paper is interesting and well written.

However, being based on modelling results (that, as also the authors acknowledge, is an oversimplification of reality) the assessments presented in the results and discussion section are somehow speculative.

I believe that less emphasis (i.e. by not mentioning it in the title, for instance) should be given to the so-called "compound triggering concept" that, in my perspective, is quite

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obvious and possibly over-rated. As matter of fact, Authors have honestly demonstrated (and clearly synthetized in Fig. 7) that in the majority of the debris flows cases they have considered there is a “dominant” trigger (which in most cases is, as usual, precipitation). Thus, despite their modelling effort, I have the feeling that still it is impossible to demonstrate/quantify, without having field monitoring data, the extent to which the other factors where co-influential at the time of triggering.

In general Figure 4 - together with fig. 5 (and other similar graphs and plots provided in supplementary material) are the “key” to estimate how significant are the Authors findings. However, there is little or no description and discussion in the paper about the NON-EVENT days. It is actually quite clear already from Fig. 4, that the days with debris flows are not that much different (in terms of the analyzed parameters) from many other days in the series. So, please, integrate the discussion.

Moreover, Fig. 5, plot “f” clearly indicated substantial difference between the modelled and recorded runoff on 3 out of 6 debris flow events during which observed runoff was available. I believe that, also this fact, deserves some comments/discussion.

I also somehow question the fact that (as mentioned in page 8, lines 24 to 28) the exceedance probability of precipitation was analyzed over the limited period May-October. This choice should be more clearly explained/justified. Also: (i) it is not clear if this probability is based only on the 15 may- 15 oct period of years with debris flows or – rather – of any year in the series. (ii) Is May 15 as lower limit correct ??, as the plots in fig 4 and supplementary material, seem to start in march 15. Please check.

Specific comments (Individual scientific questions/issues) 1. Does the paper address relevant scientific questions within the scope of HESS? YES

2. Does the paper present novel concepts, ideas, tools, or data? YES

3. Are substantial conclusions reached? YES

4. Are the scientific methods and assumptions valid and clearly outlined? YES

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5. Are the results sufficient to support the interpretations and conclusions? YES

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? YES

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? YES

8. Does the title clearly reflect the contents of the paper? YES

9. Does the abstract provide a concise and complete summary? YES

10. Is the overall presentation well structured and clear? YES

11. Is the language fluent and precise? YES

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? YES

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? YES,

At least one Figure (picture) showing the physiographic setting of the study area should be added. In caption of Figure 3, please include descriptions of Abbreviations (now, the reader is posted to Table1 and sect.2.2, thus making it difficult to follow in case - during editorial setup - these elements are placed in different pages) Figure 6 should, in my opinion, be eliminated, as it does not really add much real information, as the concept of combined probability is quite easily understandable even without such scheme.

14. Are the number and quality of references appropriate? YES

15. Is the amount and quality of supplementary material appropriate? YES

Technical corrections (Listing of purely technical corrections: typing errors, etc.).

Nothing to point out

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