RE: NHESS 2016 251R3 Deng et al. Meteorological factors driven glacial till changing and the associated periglacial debris flows in Tianmo Valley, southeast Tibetan Plateau

Overview

The reviewers comments improved the paper that in my opinion is, unfortunately not yet ready for publication. There are still some confusion in presenting data and processes, some unclear sentences, as well the English form of some parts. The following are the detailed comments and specifications.

1. The acronym TM (line 16) should be defined before its use. Moreover, its use in the abstract should be avoided as much as possible.
2. Line 17 the nearby??????
3. Sentence lines 18-20: the glacial till change is a pre-requisite for debris flow formation because it provides sediments. Therefore, the beginning word, "Moreover", can be omitted, and a brief explanation should be introduced.
4. Line 26: "changes,and": the missing of a space after points and commas is seen in all the paper. Please correct.
5. Line 32: "Debris flowsin": the missing of space between two words is seen in all the paper. Please correct.
6. Line 69; maybe "possibility" is better than "complexity".
7. Lines 118-121. "On the morning" is not coherent with "18.00" and add t to even (line 119); I suggest to rewrite the sentence as: ……the triggering area was hit by a rainfall event and after that some loud noise were heard about 18:00…….
8. Lines 121-123 Rewrite the sentences as: a debris flow occurred after a second rainfall event that began at 19:00
9. Lines 122, 131 and 138 debris flows? The writer does not understand if for a debris flow event the authors intend different debris flows or a debris flow composed by several waves or something else. Please explain in the paper.
10. Line 128: Table 2 is not necessary because it deals with debris flows that are not object of present work.
11. Lines 142-143: the finding of Chen (1991) could be due to the increase of melting water, while in present case debris flow has been triggered by rain storm.

12. Lines 185-189. The sentences could be substituted by In the periods 2000-2004 and 2007 rainfall precipitated from July to September was about 50% of the total annual rainfall while in the periods 2005-2006 and 2008-????was about 32% and ???? respectively.
13. Lines 190-196: a more schematic and concise presentation of data is required.
14. Line 216: mapperson??????
15. Line 261: explain in the caption of Figure 8 the meaning of PT.
16. Line 291: were instead of "was"
17. Lines 295-297. The writer does not understand the first sentence and therefore its link and the sense of the second sentence.
18. Lines 301, 313 and 321: 517.9°C: this high value (in centrigade) is not possible.
19. Line 315-316: from that there had been no…….. the sentence becomes unclear.
20. Line 322 What does it mean a steady rainfall?
21. Line 332 write were after "there"
22. Line 335 and following: write sediment source instead of "soil source"
23. Figure 10: perhaps panels C and D should be inverted.
24. Lines 356-368. The link between the thaw process within the till, its duration and the absence of debris flow in 2006 and 2009 is ill explained or missing.
25. Line 409 in which care????
26. Line 411 Delete "a" before "peaked" and write "peaked runoff flows (Kean et al., 2012, Rengers et al., 2016, Gregoretti et al., 20016) "
27. Line 414 add the references Theule et al., 2012, Hurlimann et al., 2014 and Degetto et al., 2015.
28. Line 415 delete the reference Armanini and Gregoretti, 2005 and Kean et al., 2013.
29. Line 418-421 Rewrite the sentence as: Mechanism of this process lies in the hydrodynamics forces exerted on the surface elements of debris layers and surpassing sediment resistance (Gregoretti, 2008; Recking et al., 2009; Prancevic et al., 2014).
30. Line 425 rewrite the initial part of the sentence as: Therefore, debris flows initiated by landslide failure caused by seepage flow and by channelized runoff….
31. Lines 442-452. These sentences should be resumed in a more concise form. The link of the amount of rainfalls and the triggering of debris flow should be clearly explained. Moreover, authors should consider that the two debris flows triggered by rainfall (DF1 and DF2) when the areas not covered by glacier should have reached the largest extension of the year and therefore, runoff in the downstream area should increase.

32. Line 466-467: what is the meaning of variable air temperature condition? The sentence is unclear.
33. Lines 475-477 Last part of the sentence is not well linked to the previous part.

Degetto, M., Gregoretti, C., and Bernard M. 2015. Comparative analysis of the differences between using LiDAR contour-based DEMs for hydrological modeling of runoff generating debris flows in the Dolomites. Frontier in Earth Sciences. 3:21, doi:10.3389/feart.2015.00021

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

Hurlimann M., Abanco C., Moya, J., Vilajosana I. (2014). Results and experiences gathered at the Rebaixader debris-flow monitoring site, Central Pyrenees, Spain. *Landslides*. doi:10.1007/s10346-013-0452-y 161-175

Kean J.W., Staley D.M., Leeper R.J., Schmidt K.M., Gartner J.E. (2012). A low-cost method to measure the timing of postfire flash floods and debris flows relative to rainfall. *Water Resources Research*, 48, W05516, doi:10.1029/2011WR011460

Recking A. 2009. Theoretical development on the effect of changing flow hydraulics on incipient bed load motion. Water Resources Research. 45, W04401; doi:10.1029/2008WR006826

Rengers, F.K., L.A. McGuire, J.W. Kean and D.E. Hobley (2016), Model simnulations of flood and debris flow timing in steep cachments after wildfire, *Water Resources Research*, 52, doi:10.1029/2015WR018176.

Theule, J.I., Liebault, F., Loye, A., Laigle, D., and Jaboyedoff, M., 2012. Sediment budget monitoring of debris flow and bedload transport in the Manival Torrent, SE France. *Natural Hazard Earth Sciences*, 12, 731-749.

.

.