

Interactive comment on “Influence of weak layer heterogeneity and slab properties on slab tensile failure propensity and avalanche release area” by J. Gaume et al.

Anonymous Referee #1

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The paper by Gaume et al. is a further step in the Authors' research about the dry-snow slab avalanche mechanism.

The paper is not particularly original, in the sense that the mechanical model exploited has been already presented by the Authors in a couple of recent papers. Thus (almost) no equation appears: the investigation is mainly a further parametric analysis of the model.

The main novelty is that the attention is here focussed on the interaction between the basal crack and the secondary tensile crack across the slab. In this sense, the Authors succeeded in giving a mechanical explanation to the well-known observation

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that small density avalanches shows typically a limited release area, whereas highly dense avalanches usually cover all the slope.

For this reason, in our opinion the paper can be published provided some comments/corrections are given according to the following list.

1) The model, as well shown in figure 1, takes into account the weak layer heterogeneity: if a strong zone in the basal layer is met, the tensile failure of the slab is likely to occur. However I expect from the model that the energy release increases as the basal crack increases (i.e. as the crack propagates far from the original spot - red star in figure 1). In other words, I expect that, as the basal crack propagates, it is more and more difficult to arrest. Dynamical effects should also strengthen this observation. Please clarify: in figure 1 it seems that the distance from the position of the super weak zone has no influence on the position of the secondary tensile slab crack.

2) pag 6038, line 7. When referring to the typical length scale of the system " λ ", we suggest citing [Chiaia BM, Cornetti P and Frigo B (2008) Triggering of dry snow slab avalanches: stress versus fracture mechanical approach. Cold Reg. Sci. Technol., 53(2), 170–178]

3) pag 6040 line 14. Change "... with increasing tensile strength from 1 to 0." into "... with increasing tensile strength from 0 to 1."

4) pag 6040 line 23. "Stress" is written twice

Interactive comment on The Cryosphere Discuss., 8, 6033, 2014.

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