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Interactive comment on "Modelling wet snow avalanche runout to assess road safety at a high-altitude mine in the central Andes" *by* C. Vera Valero et al.

Anonymous Referee #2

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The paper "Modelling wet snow avalanche runout to assess road safety at a high-altitude mine in the central Andes" is of good quality. The topic is definitely an important issue. It gives a clear overview of the actual research on wet snow avalanches explained with 5 examples. The paper consist of two parts: one part deals with wet snow modelling and the second part provides a case study from a mining road in the central Andes. In my opinion the title promises rather a case study, but in the end it is a combination of in depth explanation of the new wet avalanche modelling and the 5 examples in Chile. The material seems for me good enough for two good papers. This enables the authors to describe the new wet avalanche model precisely (with 2-3 different and simple examples for the explanation) as well as to display the applicability

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Discussion paper

of the model in the Andes in more detail in an another paper. The users would be interested to get to know how the model really works in practice (i.e. in the Andes).

I am interested especially in the interface to SNOWPACK in more detail. It seems to me that the fracture depth is insignificant as you have a growth factor (of volume) of about 20-90! What about the xi-values? You are mentioning that you rather concentrate on the current snow conditions, but what about the quite rough and rocky terrain? You are discussing avalanches of max. 10.000m^3, here the local terrain features (even partly without snow cover) will definitely have a strong impact on the simulations. So I would expect a few more sentences on this fact, especially as you have a 2m airborne laser scanner data available.

The purpose of this paper is the explanation of the modelling, so it would be helpful for the readers to display the simulations in a suitable scale. You have aerial photographs, GPS points and mappings, you can display the mappings together with the simulations. The congruence of the avalanche events with the modelling is good, so you can also visualize it.

Have you observed some rather random run out behaviour of the wet avalanches as turning almost in circles in the Andes as well? Have you taken into account this pattern of random turns in wet snow avalanches? What would be the consequence for the modelling? I would be very curious of a few words on this.

Line 89: An additional problem. . . -> there is no previous problem mentioned

Line 108: remove comma

Line 125 (Equ. 2): 3 times the same the equations ->the symbols “a” in the second and “w” in the third equation are missing

Line 158: . . . the notation (°). . . -> already earlier in Equation (3) used (describe already there)

Line 165: this is an important sentence, please elaborate this more in details or give a

cite

Line 179/ 180: explain in more detail or cite

Equ. (12): Suggestion: full derivation in appendix?

Line 208: derivation -> of the thermal layer

Line 216: the symbols i, a, w are used earlier, it would be helpful already in Line 120

Line 275: hs -> see Figure 3?! (no hs in Fig. 4)

Line 297: why? Is this the result of observations? . . . more details on the observation or cite.

Line 326: when access is possible

Line 417: The avalanche -> was observed. . .

Line 447: -> then show the GPS points in the figures of the examples

Line 575: Cite this observation or give more details of the source; tan9°=0,12?? -> see Line 297/298

Line 612 to 619: -> should be in the introduction instead of the conclusion!

Figure 9: description: The model accurately . . ..?? the avalanche . . . -> missing word

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