

## ***Interactive comment on “Wet avalanches: long-term evolution in the Western Alps under climate and human forcing” by Laurent Fouinat et al.***

### **Anonymous Referee #2**

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The paper of Fouinet et al. is of great interest considering the low number of publication regarding the long-term trend of avalanche activity in relation to environmental changes. The quality of the paper is good enough for publication. The abstract is representative of the manuscript, the figures are very helpful and the interpretations are consistent with the analyses as well as the results presented herein. I particularly enjoyed the mixed methodology which gives a plus-value to the paper with the interconnected synergistic influence of land cover changes, climate (temperature, precipitation), sedimentology, CT scan and so on.

Nevertheless, before the final acceptance of the paper, I have some minor con-

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cerns about different aspects, hoping that the authors will consider these suggestions/recommendations in order to improve the already high quality of their manuscript.

The title could also be: Wet snow avalanches and floods: long-term evolution in the Western Alps under climate and human forcing.

P2, Line 4 ; Complex climatological conditions over a period of days to several weeks. ...I suggest meteorological conditions or weather conditions rather than climatological, which refers to a different spatio-temporal scale.

P2, Line 8 ; ...dense wet avalanches ; the mass of wet snow per unit volume, generally expresses as a percent water content (10-20% for wet snow) makes wet avalanches a type of dense flow.

P2, Line 25 ; The detection of avalanche deposits. ...with coarse grains in a fine matrix. The authors should give more details by comparison to debris-flow events for example, knowing that in many places debris flows are recorded in wet snow avalanche paths.

P4, Line 25 ; ...at various intervals within the continuous sedimentation. On which basis the locations of the 32 samples for pollen analysis were selected? Sedimentological facies distinction?

P5, Line 1 ; ...is based on short-lived radionuclide. Ok but can you give a little bit more details please ? What kind of radionuclide ? As I understand it is  $^{210}\text{Pb}$  but it will also be useful in a few short sentences to have more details.

P5, Line 17 ; should be written sub-horizontal

P7, Line 11 ; ...vegetation action. What do you mean by vegetation action ? Fire, insect outbreak, or gradual changes induced by climate warming ?

P8, Line 4 ; Same as previously, please give more details about the sediment deposition chronology based on  $^{210}\text{Pb}$ .

P8, Line 26 ; Could it be drop stones like for avalanches ?

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P9, Line 10 ; debris flows are not necessarily subaqueous. Make you statement more clear. Are you talking about submarine landslides, for example, or subaerial sediment-water flows?

P10; Line 12; It is particularly interesting to look at the increase of wet snow avalanche activity after 760 yrs cal. BP. What about flood frequency? Farther in the sane paragraph you present the main period of flooding, but are you able to calculate as you did for wet avalanche the frequency at century scale?

P12, Line 23; 299 events? . . .which represents 153 and 166 events = 319 events

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Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2018-21>, 2018.