Lapillone et al. report of results from a debris-flow monitoring station in the Real torrent and suggest a data processing protocol for a more consistent and transparent derivation of debris-flow parameters from field observations. I think this is a well-written and well-structured contribution that will be very valuable for the community.

I have only minor to moderate comments and suggestions:

We would like to greatly thank you for your helpful insights and constructive suggestions to our paper. We believe the manuscript to be improved by your clear and thorough feedback, and feel lucky to benefit from your expert feedback.

L 1: "…debris flows" (plural)

Thank you, done.

L 5: "…at the surge scale" (instead of "at surge scale")

Thank you, done.

L 17: I think you refer here to the Nagl et al. (2022) paper (impact forces).

Thank you, correct, done.

L 16: I think one should write "debris-flow monitoring", but "debris flow". Check throughout the manuscript to be consistent.

Thank you, done.

L 100-101: this sentence is unclear. Please re-formulate.

Thank you, done. Reformulated to 'Immature debris-flow surge can also trigger instantaneously high seismic signal, but differ from mature debris flow because the signal consistently drops to zero during the event. This is why the criterion on determination between debris flows and immature debris flows cannot only be based on instantaneously high seismic signals.'

L 145ff: it is not clear to me, how these hypotheses will be tested. Probably it would be better to term them "assumptions".

Thank you, done.

Table 1: I recommend to add a column with the location along the channel (or distance between stations) and a column with the mean slope of the channel reach where stations are located. Both information may help with interpretations given later.

Thank you, done.

Figure 4: for the reader's convenience, I suggest to modify this figure for better readability: (1) the labeling is not intuitive and not consistent with labeling in Figure 5. E.g., why is flow stage termed "rad"? What is geo_21 and geo_21ref? (2) change line color/style to allow an easier differentiation between seismic sensors and flow state. You may also consider to plot diagrams above each other (makes them wider and probably easier to read) or show only one.

Thank you, done. 1)The labelling will be change to be clearer and more consistent between Fig.4 and 5 2) Thank you for this suggestion, that will be much easier to read.

L 169: what is meant with "the least noisy flow stage signal is chosen"? Please re-formulate.

Thank you, done. Reformulated to 'If multiple flow stage signals are available, the most reliable one is chosen, i.e. the flow height sensor that does not present any artefact (unphysical values, very noisy signal, …). Choosing consistently the same sensor across all events when it did not have any malfunctions is preferable."

L 172: bracket is missing.

Thank you, done.

L 204: Delete ""Finally,"

Thank you, done.

Section 3.2: it is not clear to me which type of base level change was used (see L 145ff). Did you compare different assumptions? Are the differences small compare to e.g. peak flow?

True, for stations S2 and S3, only the logarithmic assumption is shown because we assume it to be the most realistic assumption of the three. All the values are recorded in the database and could be shown as uncertainty brackets on Fig. 7. Because it only concerns a few events in our application, we will modify the figure 6 to show these ranges. On Fig.7 we decided not to show the ranges because it will overcrowd the figure in our opinion.

We realized we forgot to clarify something on station S1, which will be added to the manuscript : in our section there are two assumptions for the cross section shape (which are described by Bel in [1]). An average is shown as we cannot assume preference between the shapes easily, and the range of variability is low (see Fig. 11, points in blue). This will be clarified in the revised manuscript.

L 210: write "literature", not "litterature" throughout the manuscript.

Thank you, done.

L 212: I recommend to stay more general and replace "viscosity" with "mixture composition", that's safer.

Thank you, done.

L 234: unclear sentence. Please re-formulate.

Thank you, done. Reformulated to "It seems that debris flow surges of large volume require a strong inertial input to flow, as there are no subcritical Froude numbers for volumes of the selected range. Their heavy granular content, increasing their macroscopic viscosity,cause that subcritical, slower flows, with high volumes would stop or deconstruct."

L 248: unclear. What do you mean by "witnesses".

We meant proxy, this sentence has been changed to' Figure 7c shows no definitive relationship between proxies of inertial and potential inputs in the flow.'

Section 4.3: I encourage to add some interpretation of the observations and measurements with regard to channel slope at the stations and distance between stations. E.g., is deposition to be expected at flatter reaches between stations?

Thank you for the suggestion. Local slopes will be added to Table 1. The slopes measured show that these are transfer zones where both erosion and deposition are observed, which is more thoroughly investigated in [2]. Interpretations will be added in text.

Figure 10: I am wondering other symbols color may help to make the time component more readable. Probably grey-scale increasing over time?

Thank you, done.

Figure 11: can you add the range of uncertainty from volume and peak discharge estimates (assumptions on base level changes, L 145ff) to the diagram? In the Figure caption you may write "debris-flow surge volume".

 I am not sure I understand weather you mean adding the uncertainty for each assumption ? If so, adding them makes the graph very hard to read. The three symbols represent the three assumptions.

Thank you, done for the second part.

We thank you for your time spent in helping us improve the work thanks to your constructive comments.

References :

[1] : C. Bel, Analysis of debris-flow occurrence in active catchments of the French Alps using monitoring stations, Ph.D. thesis, Université Grenoble Alpes, 2017

[2] : J.I. Theule, F. Liébault, D. Laigle, A. Loye, M. Jaboyedoff,Channel scour and fill by debris flows and bedload transport, Geomorphology,Volume 243, 2015,