Second review of « Combining seismic signal inversion and numerical modeling improves landslide process reconstruction », Yan et al.

EGUSPHERE – 2022 – 19

In comparison to the first version of the manuscript, this new version has been greatly improved. The contributions, the aim, and the methodology is now clearer. The authors chose not to move some methodological parts from the Results section to the Methodology section. I understand their point of view that it helps clarifying some explanation. Yet, I still think it would be better to separate the Methodology from the Results to clarify the whole process, from seismic analysis to simulation calibration, including the intermediate steps of trajectory reconstruction, mass estimation and acceleration/deceleration phases identification. However, this is not a reason not to accept this manuscript, and I recommend its publication.

I still have some comments though, and in my opinion, some minor modifications are still needed before publication. They are detailed below (line numbers refer to the version with changes highlighted). In any case, I commend the authors for this very nice work.

Main comments

l.117-133 : I would present the three methods in this order: 3D continuum, 2D continuum (i.e. thin-layer models), discrete models. Because in the paragraph starting at l. 134, you talk about MatDem that is a discrete model. It would thus be a more logical transition.

l.146 – 158 : It is still not clear, at this point in the manuscript, if simulations have already been performed in previous studies for the Baige landslide (see my previous comment C8). I think the studies are cited in the manuscript, certainly in the introduction, but the reader does not know if the simulations were performed on the Baige landslides, or on other landslides. Thus, I would be more specific (in the introduction or in the "Study area" paragraph), saying XX did that, YY dit that, etc. Then, in the discussion, these previous studies can be compared to the present one, which the authors do well.

l.188 -200 : As stated in your response R12, you have two criteria to evaluate the quality of seismic signal: 1) check that seismic energy lies between the NLNM and NLNM, 2) check the SNR of the signal associated to the landslide. If I'm not wrong, you only mention point 1 at this point in the manuscript (it is explained latter), but the SNR is also important and I would mention it, at least briefly.

l.328 : Following my previous comment C17, it is still not clear to me how you adapt your simulation parameters if you criteria (CSI>0.6 or criteria on \delta) are not met. For instance, if for one simulation CSI=0.5, how do you choose the new values of \mu_i, C_u and T_u to be tested?

l.337-338 : Following my previous comment C24, the definition of the variance is, in statistics, the average of the square difference between values and their mean. So if I understand well your definition, what you call S^2 in the manuscript is not a variance, it is a square residue.

l.409-411: "high SNR of the N component of the landslide signal and low SNR of the E component". At l.397-398, don't you say that "E" has a high SNR, and "N" a lower SNR? Or if the latter sentence refers to the end of the signal, it should be stated more explicitly.

l.432: you say that Fig 6 displays acceleration curves (this is also what the caption says), but the unit of y-axis is that of a velocity.

l.435-436 : I'm not sure to understand your interpretation. If in Fig 6 you display acceleration, and not velocity, shouldn't acceleration changes be correlated to a change in sign, rather than to maxima (as for e.g. your point 4). When acceleration is positive, the velocity increases and the landslide accelerates, when acceleration is negative the velocity decreases and the landslide decelerates.

l.488 : If I'm correct, that is the first mention in the manuscript of the second landslide that occurred on October 12. The latter should be mentioned when you present the Baige landslide.

l.609-611 : Are these masses consistent with the volume estimated from DEM analysis? I would add a comment on that matter.

Specific comments

l.124 : "The thin-layer model, it is based..." -> "The thin-layer models are based…"

l134 – 139 : That is a single sentence, it is too long. Besides, I think there is problem in the sentence. In particular "used to quality" is not a correct expression I believe.

l.161 : By DOM, do you mean Orthophotograph? If yes, you could simply use "orthophotograph". Alternatively, explain what "DOM" means in the main body of the article (maybe it already is and I missed it).

l.200 : The lines for the NHNM and NLNM are red an green in the new version of the figure, not white as stated in the legend.

l.263 : The notation "10.10" is used in the introduction, but repeated until l.263. To improve the readability of the manuscript, I would use it also in Section 2, where you present the event.

l.289-290 : "cutting particles": what do you mean?

l.293 : When you first apply gravity, are particles re-arranged? Do you have compaction, or are particles already compacted?

l.300 : I would add a reference to Fig. 5 before you start explaining the method, so that the reader can refer to it while reading.

l.304 – 305 : "the micro-parameters … can be obtained". There is problem in the sentence, it is not clear how and from what the parameters can be obtained. Besides, you could remove capital letters I think.

l.399 : Shouldn't it be "E" and "V", instead of "E" and "N"?

l.407 : "and from north-south limited to east-west limited", there is problem in the formulation I think.

l.406-407 : "During the…limited", I would actually delete this sentence, the following one is much clearer.

l.418, Fig 6 : You should say in the caption what numbers 1 to 7 refer to.

l.440 and forward : I would say "landslide duration" instead of "landslide time".

l.449 : "is to help" -> "helps"

l.470-471 : Specify the frequency bandwidth use to compute the PSD in Fig. 7d.

l.613 : “for the same event” -> “for a given event” (otherwise we may think all previous studies refer to the Baige landslide).

l.644 : “even” -> “even if”

l.752-753 : “Concentrating … ambiguity”, there seems to be a problem in this part of the sentence. What do you mean by concentrating?

l.772 : “Each of the three methods”, it is not clear what these 3 methods are.

l.777 : “We use” -> “We used”, to be consistent with the next sentences where you use the past.

l.778 : “to provides” -> “to provide”

l.782 – 783 : “With the assessment of numerical simulation…” -> “After calibrating the parameters of the numerical models, thedynamic process of the “10.10” Baige landslide was analysed”.