

Interactive comment on “Hidden Hazards: the conditions that potentially enabled the mudflow disaster at Villa Santa Lucía in Chilean Patagonia” by Marcelo A. Somos-Valenzuela et al.

Anonymous Referee #3

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General Comments

The authors analyze a complex and composite mass movement event (a rockslide followed by a mudflow) occurred in Chile in 2017. They carry out the numerical simulation of the mud flow involved in the process, without addressing the issue of what actually triggered the rockslide event, which is not part of this research work. The authors compare the results obtained with the simulations carried out using two different available and already known software (FLO-2D and r.avaflow) that are used to back-calculate the propagation of the event and its main parameters. From this numerical study the authors derive a series of information, that they integrate/interpret with the results of

C1

some field surveys and field tests, to provide an explanation of what has occurred. In particular, the study has helped to understand if the event was possible without the presence of a lake or a large water reservoir at the glacier that provided the amount of water needed to mobilize the mass. The results show that in fact the water available in the saturated soil around the Burritos River was sufficient to transform the detritus flow into a mudflow.

The paper appears more as a technical paper describing and analyzing a case study than a research paper, and it should be presented as such, starting from the title. A possible suggestion would be for instance:

The mudflow disaster at Villa Santa Lucía in Chilean Patagonia: understandings and insights derived from numerical simulation and post event field surveys

The topic and the contents of the paper are certainly of interest for the scientific community and deserve publication, but the paper should be shortened and should focus on its real core. Unfortunately, the paper is also written in an awkward English that does not help its understanding and clean reading. So the text requires substantial revision, possibly by a native speaker. I recommend a major revision, to be carried out also on the basis of the comments below.

Specific comments

Abstract - I would suggest to shorten the abstract and focus it on the main content of the paper, which is the interpretation of the catastrophic event and its causes based on field survey and numerical simulation. The reader expects to rapidly find in the abstract information regarding the main content of the paper, more than general comments on the treated issues. I have also reported some possible corrections to the English language, which are not intended, however, to be exhaustive because the entire paper requires substantial revision, possibly by a native speaker. Introduction - The same shortening suggested for the abstract should be done with the introduction, that should expand the focus regarding the interpretation of the mudflow event and its causes through field

C2

surveys and simulation. For this purpose I would move lines 94-104 to the beginning of the introduction and then proceed with the other comments, substantially reduced. Methodology - The chapter should be restructured because it would be much better to have the content of the chapters 4.1 (Geotechnical results) and 4.2 (Soil Classification) presented all together in the chapter 3.1 (Fieldwork and Geotechnical sampling). This for two reasons: 1) the reader may have an idea of all the available geotechnical data collected in the field, finding them in the same place, without having to skip here and there in the paper 2) the reader would expect to find, within a chapter titled "results", the output of the calculations of the mathematical modelling, not the data deriving from field surveys and tests which concern more data acquisition than results of analysis or calculations. The titles of the chapters (or sub-chapters) should be restructured too: there are three chapters titled the same way, that is "numerical modeling": 3.2 Numerical Modeling 3.2 Numerical Modeling 5.2 Numerical Modeling This is somewhat misleading and does not reflect an describe the real content of each of these sections.

Conclusions. This is the best written part of the entire paper. It is simple, clear, straightforward. It declares what has been done, without any general digression. The entire paper should be restructured to adhere and to reflect what the authors write in their final conclusions, which should appear as the final synthesis of what has been written and developed before.

Technical corrections

See attached file.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2019-419/nhess-2019-419-RC3-supplement.pdf>

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2019-419>, 2020.