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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Structural and climate drivers of the historic Masiere di Vedana rock avalanche (Belluno Dolomites, NE Italy)" *by* Sandro Rossato et al.

Anonymous Referee #1

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The paper "Structural and climate drivers of the historic Masiere di Vedana rock avalanche (Belluno Dolomites, NE Italy)" uses a geomorphological and structural approach to decipher predisposing factors of the Masiere di Vedana rock avalanche and a zonation of the present deposit with respect to its sliding dynamics. In short, the work is supported by a considerable amount of original data, by very beautiful figures, it represents an important contribution to the knowledge of these phenomena in the Italian sector of the Alpine arc. The international scientific literature is full of articles on Swiss, Austrian rock avalanches, while Italian literature is somewhat dated and this feature has to be emphasize both in abstract and in conclusion. I think the core results and the outcome of the structural and geomorphological mapping could be highly interesting

for the readership in NHESS, I suggest to:

a- expand the introduction, describing the basic features of rock avalanches in stratigraphic, morphological and depositional terms and related bibliography (Varnes, 1978, Hungr et al., 2001). See for example: G. Bianchi Fasani, E. Di Luzio, C. Esposito, S.G. Evans, G. Scarascia Mugnozza, Quaternary, catastrophic rock avalanches in the Central Apennines (Italy): Relationships with inherited tectonic features, gravity-driven deformations and the geodynamic frame, Geomorphology, Volume 211, 2014, Pages 22-42, https://doi.org/10.1016/j.geomorph.2013.12.027. E Di Luzio, M Saroli, C Esposito, G Bianchi-Fasani, G.P Cavinato, G Scarascia-Mugnozza, Influence of structural framework on mountain slope deformation in the Maiella anticline (Central Apennines, Italy), Geomorphology, Volume 60, Issues 3–4, 2004, Pages 417-432, https://doi.org/10.1016/j.geomorph.2003.10.004.

b- Probably in contrast with other reviewers (Authors write as Information about previous submission: "A former version of this paper has been submitted to Geomorphology: one out of two referees was negative about the potential impact of the article on the community. We revised completely the article, introducing comparisons with other areas and events. Moreover, we enlarged the section regarding the impact of such events on human beings and lives.", I believe that all considerations relating to the hazard and associated risk are superfluous. These assessments require a rigorous approach, advanced numerical modeling techniques that are not present in the work. So, in the absence of such data, absolute considerations on the local hazard and even more regional, should be avoided (see lines 17-18; 257, 312). Undoubtedly, the work presented lays the indispensable knowledge for a future evaluation of these aspects, but hazard evaluation is not the aim of this paper. In addition, the hazard assessment of the slope refers to an unpublished technical report in Italian, of which the methodology used is not known. Therefore, please review the parts of the work in which the hazard is referred to; in particular I would avoid to expand the scale referring to the surrounding peaks (see Fig. 9 and text) as the structural, geological conditions may

vary from place to place influencing the mode of failure of the slopes themselves.

c- Title: in accordance with the above, I suggest a modification of the title including the word dating (this represents an important contribute to the paper); for example "Structural and geomorphological characterization and dating of the historic Masiere di Vedana rock avalanche (Belluno Dolomites, NE Italy)".

d- The term "toma/s" is present 7 times in the text. As the word belongs to a local lexicon/peculiar landforms, a detailed description is necessary (line 154) (see e.g. description in cited ref. More and Wolkersdorfer, 2019).

Specific comments

- lines 5-9: deposit sequence in chronologic order -line 13 Seismic and climatic drivers are discussed better "Seismic and climatic conditions as landslide predisposing factors are discussed" - line 24 rockmass not rock -line 34 ...which led the Municipality of Peron to commission the evaluation of the landslide hazard... -line 36 which author? -line 38: the well known in literature deposit - line 45: in the light also of hazard -line 48: as origin for the deposit -line 54: runout also in similar -line 53: chronology or dating? -line 57: 2 Geological setting -line 85: fine-grained -line 148: bedding is completely -line 197: producing numerous landslides -line 212: the runout of the landslide together with the morphology of the scarp (secondary scarps are present?)indicate a single huge catastrophic event -line 243: Pleistocene conglomerate bedrock -line 251: terraces -line 257: and possible future hazards -line 266: for Randa also (Stead and Eberhardt, 2013 Understanding the mechanics of large landslides. Italian Journal of Engineering Geology and Environment - Book Series 6:85–112.) -lines 266-267: delete “Failure normally occurs when in the rock mass resisting forces weaken till the driving forces overcome them (factor of safety 1; Glade and Crozier, 2005).” FS is a simplistic method for rock avalanches analysis -lines 295-296: Move to line 304 -line 307: overlooking the artificial lake -line 309: a more recent reference instead of Borgatti et. Al., 2004 is necessary for Vajont referred to tsunami i.e. Ward S.N., Day, S. THE

1963 LANDSLIDE AND FLOOD AT VAIONT RESERVOIR ITALY. A TSUNAMI BALL SIMULATION. Ital.J.Geosci. (Boll.Soc.Geol.It.), Vol. 130, No. 1 (2011), pp. 16-26, 9 figs. (DOI: -line 311: provide a new contribution to the knowledge of -line 312: delete: and the potential risk from the Mt. Peron rock wall and surrounding area.

Figure 1. Simplified regional geological map

Figure 3. a) 5-m cell DTM (open data released by Regione Veneto: http://idt.regione.veneto.it/app/metacatalog/). Solid lines in the left frame correspond to the traces of the stratigraphic profiles in Fig. 4. b) Geological map of the study area overlying on DTM. 36Cl are

Figure 4. older to younger i.e. from proximal to distal

Figure 6. The rock avalanche moved compressional structures.

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2019-413/nhess-2019-413-RC1-supplement.pdf

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