Interactive comment on “The influence of the grain-size, mineralogical and geo-chemical composition on the Verdesca landslide” by V. Summa et al.

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Dear Editor,

On the behalf of my co-authors, I would like to thank you and the Referees for the suggestions aimed at improving the proposed study. Following the suggestions, we have carefully revised the manuscript. We hope that the manuscript in its revised version will meet your approval and that it will be accepted for publication in the Natural Hazards and Earth System Sciences journal. Thank you in advance for your attention.

Kind regards
Vito Summa
Changes to be made to the manuscript

Page 5 Line 25 of the proof: To be added: “Tests were performed on specimens reconstituted with distilled water.”

4. Correlations between mineralogical composition and shear strength are very week and should be better explained.

Reply: All the correlations considered in the paper were deemed statistically significant when $R > 0.81$. This value was chosen taking into account table 13 of Biometrika tables for statisticians (Pearson & H.O. Hartley; Cambridge University Press, NY, 1970), with freedom degrees $dfr = 4$ and significance level $\alpha = 0.05$.

REPLIES TO THE SPECIFIC COMMENTS

1. Page 5049, line 4: What does it mean term “land degradation process”? Please explain or in and better and appropriate term.

Reply: We used the term “land degradation” referring in particular to soil erosion processes, frequent and widespread in the Agri Valley, especially in the form of gullies and biancane. We will add these specifications to the manuscript.

Changes to be made to the manuscript

Page 3 Lines 3-6 of the proof: “Our attention has been focused on a pilot area in the Agri Valley, an intermountain basin in the Southern Apennines (Basilicata, Italy), often affected by land degradation processes (especially in the form of gullies and biancane) and mass gravitational movements mainly involving fine sediments with clay components.”

2. Page 5049, line 8: What does it mean term “geochemical and mineralogical hazard factors”? Please explain or in and better and appropriate term.

Reply: The geochemical and mineralogical hazard factors with respect to the slope stability are those compositional characters able to influence the physical-mechanical behavior of the sediments and trigger the slip zone. The purpose of this study was to precisely identify these factors.

3. Page 5050, line 1: “peaty levels” or “peaty layers”?

Reply: We will replace the term “levels” with the term “horizons”, as indicated in the detailed stratigraphies reported in the cited paper of Zembo (2010).

Changes to be made to the manuscript

Page 4 Line 1 of the proof: “horizons” in place of “levels”

Page 6 Line 14 of the proof: “horizons” in place of “levels”

4. Page 5050, line 8: Mechanism of the landslide should be better explain. It should be related to Figure 1 which should be improved or another one im a geologue of landslide engineering-geological map should be added.

Reply: All additional information requested and a more detailed geomorphological description of the landslide are present in Gueguen et al.’s paper, as indicated in the manuscript.

5. Page 5050, line 17: “. . .residual shear strength, residual friction angle”. Friction angle is strength parameter. Better term is Residual shear strength parameters.

Reply: As suggested by the Referee, we will insert the term “Residual shear strength parameters”.

Changes to be made to the manuscript

Page 4 Lines 14 - 18 of the proof: “A geognostic hole equipped with an inclinometer tube (S1, Fig. 1-2) was used to reconstruct the stratigraphic sequence of the deposits involved in the landslide and collect the sediment samples submitted for physical-mechanical characterization (Atterberg’s limits and residual shear strength parameters) and compositional analyses (grain-size, mineralogy and geochemistry).”
6. Page 5051, line 21: Please present results of shear strength testing. What does it mean term shear strength? See also Specific Comment 6.

Reply: Shear strength results are reported in table 1. The large amount of data and the available space do not allow us to insert all the graphical outputs from geotechnical tests and the several mineralogical and granulometric analyses carried out. Residual shear strength was calculated considering friction angle values, obtained from shear tests, and litostatic loads in situ, determined for each sample on the basis of sampling depth, groundwater depth, stratigraphies and unit weight of sediments, also compared with those indicated in the geotechnical literature.

7. Page 5051, line 26: Please present results of Atterberg’s Limits values.

Reply: Atterberg’s Limits values determined are reported in table 1. As indicated in reply 6, the large amount of data and the available space do not allow us to insert the graphical outputs from geotechnical tests.


Reply: See reply 6.

9. Page 5054, line 27: This conclusion is too general and it is well know in landslide science.

Reply: It is a synthetic sentence summarizing what was discussed in detail in our manuscript.

10. Figures 13 and 14: It is not clear what does it mean residual shear strength. Correlations are based on only few points and obtained correlation coefficient are very doubtful.

Reply: Residual shear strength was calculated considering friction angle values, obtained from shear tests, and litostatic loads in situ, determined for each sample on the basis of sampling depth, groundwater depth, stratigraphies and unit weight of sediments, also compared with those indicated in the geotechnical literature. All the correlations considered in the paper were deemed statistically significant when \( R > 0.81 \). This value was chosen taking into account table 13 of the Biometrika tables for statisticians (Pearson e H.O. Hartley; Cambridge University Press, NY, 1970), with freedom degrees \( df = 4 \) and significance level \( \alpha = 0.05 \).

The English has been edited by an English native speaker.

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