

Interactive comment on “Tectonic and climatic controls on the Chuquibamba landslide (western Andes, southern Peru)” by A. Margirier et al.

Anonymous Referee #2

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GENERAL COMMENTS:

The data presented in the manuscript are interesting. It was great to read the work and meet this new data. It is a kind of little study on the western edge of the plateau, but extremely important to understanding of these phenomena and also because sometimes occur near populated areas. In addition, little is known about the timing of these processes in this part of the Andes. I am sure that this work will contribute to the knowledge of the neotectonic of the Andes.

PRINCIPAL COMMENTS:

I note, however, that there is little clarity on the new data regarding their presentation and structure, and the scope thereof. I believe that a proper reorganization of informa-

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tion, with a good exploitation of the data, can highlight the understanding of landslides in this part of the Andes.

The dispersion of geomorphological data in context, method and results, suggest that they were obtained in the research. If so, they should be showed as a result, placing in the geomorphological context only the framework that was already published and indicating the used geomorphologic methods. If you do not want to exploit this aspect, then place everything in the geomorphological setting.

Whereas ages are the main results of the work, better treatment of the numbers is needed. The text ages and figures do not always agree among themselves and with the Table. It is important to correct this point to avoid confusion in future cites.

The fact that large earthquakes do not trigger landslides is mentioned isolated in the summary, without linking it to the results. However, the results dedicated an entire paragraph indicating that landslides could be triggering by seismicity; without arguments supporting this possibility. I suggest improving this point in the results and summary.

MODERATE AND MINOR COMMENTS:

- L. 14, page 2 (1130). The point (i) in the abstract is very general. Be more specific.
- L. 2-4, Page 4 (1132). The Huaylillas Ignimbrite is not well defined; its probable age is not mentioned. Explain more.
- L. 3, page 5 (1133). A comma is missing after 'However'
- L. 25-26, page 5 (1133). The age of Huaylillas Ignimbrite is mentioned here. Why not before?
- L. 22, page 5 (1133). It is not mentioned exactly where is located the megafan, although it is a very important feature of the study.
- L. 2 page 6 (1134). Here, the Huaylillas volcanic unit is mentioned. It is the ignimbrite? If so, I suggest using the same name to avoid confusions.

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L. 3, page 6 (1134). The Megafan Acoy is again mentioned as if it was the first time. It should be all together before, to avoid confusions.

L. 9-12 page 6 (1134). Idem.

L. 18-24, page 6 (1134). The description of the specific research is scarce. Can you explain more?

L. 2, page 6 (1134). The 'Huaylillas volcanic formation' was not cited above. Is it the Huaylillas Ignimbrite?

L. 8, page 8 (1136). Ages in the text do not match those of Figure 5a and 5b.

L. 20-21, page 8 (1136). There is a link between the climate event and the megafan. What kind of relationship?

L 7-9, page 9 (1137). It is suggested that an increase of pore pressure in the Huaylillas Ignimbrite by climate event triggered the megafan, but this is not well argued. What are the mechanical and lithological characteristics of the ignimbrite that let you make this proposal? Moreover, it is not establish directly that the age of the ignimbrite is correlated with the age of the climate event.

L. 11-16, page 9 (1137). Similarity is suggested in the proposal on the flow direction of sliding Chuquibamba over other in northern Chile. In the case of Chile landslide it flowed towards the SW, perpendicular to structures; but here appears instead (maybe I'm wrong) that megafan flowed parallel to the structures probably favored by the incision of the river Majes. Should put flow lines of the megafan in Fig.3a to clarify this point?

L. 4, page 10 (1138). Now you are talking about a Huaylillas paleosurface. Which one? It was never before been described. What is it? It is the roof of the Huaylillas Ignimbrite? It is the roof of the Huaylillas Formation?

L. 19, page 10 (1138). The phrase 'This last debris-flow permits new destabilizations

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that enlarge the system' seems very ambiguous. Destabilization of what? Which system? hillsides, valleys, slopes?

L. 2-7, page 11 (1139). I think that this paragraph does not add much to the conclusion.

L. 11-12, page 11 (1139). You mentioned again that the triggering by seismicity but the arguments are lacking.

L. 15, page 11 (1139). Now you talk about the hillslope processes and fluvial erosion, but before the discussion about these topics was ambiguous. Discuss earlier properly.

L. 19-23, page 11 (1139). Here there is a discussion not mentioned before, place it on the discussion item.

L. 24-26, page 11 (1139). You talk about a strong tectonic control / climate on landslide. I think a better discussion about the tectonic control is lacking. There are still uncertainties (at least for me) in the Huaylillas Ignimbrite regard to its geomorphological features ... and apparently is very important. You should have a good figure (map/geomorphologic image?) of the ignimbrite location. In addition, there are inaccuracies in the flow direction of Megafan Acoy to support the affirmation in these lines. Improving Fig. 3a is essential at this point.

TABLE AND FIGURES

Fig. 1. What is the rectangle at the top of the figure?

Fig. 2c. The symbology of structures is lacking.

Fig. 3a. It is not well understood what are the Megafan, T1 and T2, there is a bad relationship with the legend. Improve the legend, the lineaments are not indicated. This figure is fundamental to understanding the manuscript, data presentation and discussion. However, it is unclear for a reader not familiar with the area.

Fig. 3b. The image resolution is not good enough to review the morphological features.

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Fig.3c. I think this image is underexploited in the text.

Fig. 4. Verify that the ages in this figure matches the text and table.

Table and Fig. 5. The ages are used in the text are different from those used in Fig. 5.
Make coherent.

Interactive comment on Earth Surf. Dynam. Discuss., 2, 1129, 2014.

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