

Interactive comment on “Earthquake-induced debris flows at Popocatépetl Volcano, Mexico” by Velio Coviello et al.

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We thank the referee for his constructive comments and suggestions.

We agree, the mass movements directly triggered by earthquake are slope failures and the water content has an important role in the transformation of those landslides in debris flows. However, the Puebla-Morelos earthquake is the main factor controlling this mass-wasting chain. This is the main reason why we would prefer keeping the original title, short and concise. In addition, in this paper we focus on the larger landslides and on their transformation into debris flows.

Concerning the transformation of the main landslides into debris flows, we discussed these topics based on the available data in the source area, which are very scarce.

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Discussion paper



We added some additional discussion about the water content of the deposits to the section 5.3 Transformation into long runout debris flows and implications for hazard assessment: “Volcanoes store or drain water in and through aquifers that can develop and empty, as impermeable barriers develop or as they are breached by deformation, respectively (Delcamp et al., 2016). Even if not completely saturated, ground vibrations induced positive pore pressure and triggered liquefaction and slopes failure (Kameda et al., 2019; Wang et al., 2019). [. . .] Detailed field investigations of the role of aquifer on volcanic landslides are very scarce to the date (Delcamp et al., 2016). Knowledge of the distribution of perched aquifers and water content of volcanic deposits can provide precious insights on a complex mass wasting chain like the one that experienced Popocatepetl volcano in 2017.” Based on our findings, new studies on the hydrology of the volcano are surely needed.

Figure 1 was improved: we added to the map the northamerican plate and the cocos/rivera plates to Figure 1a, we indicated the location of Mexico City and we put the geographical coordinates in Figure 1b. Also, we modified Figure 12 adding some graphical elements indicating the presence of water in the pumice deposits. Finally, we'll provide the original data presented in Table 1 (elevation, area, and depth of the main landslides) as a supplementary material.

Please find the manuscript enclosed with track changes.

Best regards, Velio Coviello

Please also note the supplement to this comment:

<https://esurf.copernicus.org/preprints/esurf-2020-36/esurf-2020-36-AC2-supplement.pdf>

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