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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Hydrological control of large hurricane-induced lahars: evidences from rainfall, seismic and video monitoring" *by* Lucia Capra et al.

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Response to RC1. We would like to thank the reviewer for the comments and constructive suggestions made to improve the present work. Please find below the reviewer's comment and authors' replies to these comments.

The paper provides an interesting study about the relationship between the rain induced by hurricanes and the generation of lahars. The paper mostly requires an English grammar revision. Nevertheless, I suggest that as the Coulomb failure criterion was not mentioned in the paper, to include it within the paper, perhaps when the authors mention landslide triggering empiric criterion (section Discussion).

-We consider that the Coulomb failure criterion is out of the focus of the present paper, we are not discussing the condition of lahar initiation; lahars at Volcan de Colima originate from a progressive erosion of material from the river bed.

It draws attention that in the abstract, numerical modeling of rain and infiltration is promised. None of them are fulfilled. The O'Brian model is a shallow water approach for surface flows, despite the claim done by the authors within the paper that it was used for rain fall modeling.

-We agree with the reviewer and we were wrongly using the terminology, in fact the paper presents rainfall-runoff simulations, as also point out by the SC1.

In addition, there are few more suggestions listed below.

-We took into account of the following suggestions. The English revision was based on the suggestions made by RC2 and SC2.

1 Abstract

Review English

2 Methods and data

1. line 132: use primary source (Gravelius, 1914)

done

2. line 175. Review English.

3. Line 224: Mistake, the aim of Flo2D is not to do rainfall simulations.

Changed to rainfall-runoff simulation

4. Line 228: clarify how do you simulated the precipitation.

This is now clarified as follow.

The rainfall is applied to the entire watershed, without a spatial variation, and it is

discretized as a cumulative percent of the total precipitation each 10 minutes.

5. Line 235: zones

done

3 Results

1. Line 278, figure 5: keep the previously used convention for the sub-figure numbering (top left hand side).

done

8. Line 400: if actually “it could have been possible” , why it was not possible? It is always risky to extrapolate, thus to advise extrapolations.

This refers that if at the time of Patricia event this model was ready, the simulation could have been run to have a forecast of the arrival times of the main lahar surges. The text was slightly modified as follow

For the 2015 Hurricane Patricia event the weather forecast predicted an estimated value for the total rainfall, and also the approximate time of its landfall. Based on the deigned storm obtained with the rainfall/time distribution of the analyzed events, it would have been possible to anticipate when lahars started along the La Lumbre ravine, and the arrival time of main pulses. Then, this first prediction could be constrained using rainfall-runoff modeling based on real-time monitoring data, as simulations do not take more than 30 minutes to run.

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