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Interactive comment on "Including informal housing in slope stability analysis – an application to a data-scarce location in the humid tropics" *by* Elisa Bozzolan et al.

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We thank Reviewer 1 for taking the time to read our paper. We think the Reviewers' comments can be addressed in a revised manuscript as follow.

Comment (1): The study site map should be added to the C1 NHESSD Interactive comment Printer-friendly version Discussion paper reviewed manuscript. Meanwhile, the basic geological setting and rainfall information may be helpful to readers.

The methodology applied allows evaluation of the probability of failure of slopes for which there is scarce and/or uncertain data. Rather than referring to a specific site with

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measured geometry, urbanisation, soil and rainfall data, we stochastically generate tens-of-thousands of possible slope cross-sections that represent the population of slopes that might be observed in the case study region (using data from literature and previous fieldwork). Adding a map could therefore be misleading. Though, we will modify the text of the introduction to render the concept of stochastic generation of slopes clearer to the reader. Additionally, we will replace the term “site” with “case study” or “case study region” to avoid any confusion. Furthermore, we will add, as suggested, more information on the type of climate (humid tropical) and on the type of soil and weathering grade usually found in the region in section 2.1, where other information about the geological setting are given.

Comment (2): The thickness of the soil layer is crucial to the model calculation. How to consider the question in the improved model

We agree with the reviewer on the importance of the thickness of the soil layers. Indeed, our results confirm this point via both the sensitivity analysis and CART. Soil thickness is considered in our modelling as an uncertain input factor and it is stochastically varied within a reasonable range, deduced from previous fieldwork. We are thus not completely sure about what the Reviewer means by the statement “how to consider the question [which question?] in the improved model.

Comment (3): According to the reviewer’s knowledge, the point water sources from informal housing may be closely related to preferential flow practically. Does your new model take into account the preferential flow?

We did not include preferential flows in CHASM+. We agree with the Reviewer that leaking pipes and buried tanks can induce soil pipe erosion in response to increasing water inputs. This could be simulated for example with a dual permeability model, but then it would be difficult to implement the pore pressure calculated into the slope stability model. Furthermore, the inclusion of preferential flows requires the definition of additional input factors which may be difficult in data-scarce contexts. So, given

the spatial scale, the purpose of the analysis and the data available, we believe that the current CHASM+ representation is sufficient to depict landslide initiation due to flow accumulation around the point water source. We will add this discussion in the supplement (S1.1). We will also add in the same section a comment about the fact that a dynamic change in the hydraulic properties due to the water leaked is anyway already taken into account by the model, given the way that CHASM represent hydrological processes.

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