Earth Surface Dynamics Discussions

Earth Surf. Dynam. Discuss., referee comment RC2
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Comment on esurf-2021-14

Anonymous Referee #2

Referee comment on "Landslide-lake outburst floods accelerate downstream hillslope slippage" by Wentao Yang et al., Earth Surf. Dynam. Discuss., https://doi.org/10.5194/esurf-2021-14-RC2, 2021

This manuscript looks at the effect of a large landslide lake outburst flood in the Jinsha River on the adjacent hillslopes. The authors demonstrate that the flood caused channel widening and destabilized the hillslopes in a number of locations along the flood course. This is certainly an interesting and relevant topic, and I think that the authors nicely demonstrate that the LLFs have destabilized hillslopes and caused long-lasting slope deformation in susceptible hillslopes. However, there are several things that need improvement before the manuscript can be publishable, particularly the methods presentation. Also, although what is shown in the manuscript is nice, I found myself disappointed by the lack of depth in the analysis. The paper demonstrates that hillslope deformation following major floods happens, but doesn't explore any further. What influences the locations of the landslides? Did all slopes with tensile cracks end up moving, or are there some that didn't? What might influence the timing and rates of the post-flood deformation? It is nice to document that this effect happens, but I don't feel that I've gained much new insight into it.

More specific points:

Please provide some more information about the methodology. I only realized that COSI-corr is a software from reading the acknowledgments. There needs to be much more explanation of how the method works, exactly what you did, and any parameters or settings used in the COSI-corr software. In addition, there needs to be some information about uncertainty and potential errors in the numbers you obtain. Where does the 2 m cutoff from? And how is this related to the 10 m resolution of the Sentinel imagery?

Is the Nov. 12, 2018 image from before, after, or during the flood on Nov. 12? If before, then how do you differentiate concurrent slope deformation from post-flood slope deformation over the larger area? Does the lack of change from 2015 to Nov. 12 2018 mean that the first flood had no effect?

The temporal pattern of displacement for the MD slopes is interesting, especially the correspondence between MD-1 and MD-2. Do you have any explanation for the changes in rate? Is it related to precipitation or river discharge? What happened in March 2019 when MD-1 and 2 both accelerated?

Line 22: reaches

Line 28: flux of what?

Section 2: I don't think materials and methods is the best descriptor of what's in this section. Maybe study area, materials and methods

Line 50: "created by the collision"

Line 51: replace grand plain with plateau

Line 55: "precipitation combined with active tectonics"

Section 2: this contains more than just materials and methods, so either rename or put the study area in a different section

Line 65: After Nov. 8, 2018, several excavators were deployed

Section 4.3: I found this discussion confusing. What do you mean by downstream erosion? This whole section seems to be about slope stability, and not about things moving downstream. As well, the discussion of possible controls on slope stability seems very speculative. A strong earthquake could have weakened the slopes, but is there any reason

to think that this has happened? Surely there must be some studies about landslide susceptibility in this region.

Lines 165-168 seem pretty repetitive of the point you have been making throughout the paper.

Line 184-185: I don’t understand what you mean with this sentence

Figure 5: y axis looks like channel width, and not change in channel width. What determines the placement of the points on the y-axis? Does this have meaning, or are they just stuck on the width line? If there is no y-axis value for the points then they should not be plotted like this.