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Earth Surface Dynamics Discussions

Interactive comment on "Long-term erosion of the Nepal Himalayas by bedrock landsliding: the role of monsoons, earthquakes and giant landslides" *by* Odin Marc et al.

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Review of Odin et al. by Manny Gabet

This is an interesting and impressive paper. The authors have compiled a thorough dataset that they use to answer a variety of important questions regarding landslides. Moreover, their analysis seems to have been done with great care. My only quibble is with their assumption that their inventory of small landslides is incomplete, which they use to justify the use of a power-law function to describe the probability distribution of landslide size (as many have done before). As I describe below, I would like to see an analysis of the potential errors associated with this assumption. Otherwise, my

comments are minor.

Comments (keyed to line #)

53 I agree with the general point that the authors are making; however, I'm not sure if it's a good idea to compare Holocene erosion rates with rates averaged over 0-2 Myr to advance the claim that erosion rates increase with measurement time. Clearly, the climate has changed significantly since the Pleistocene and, so attributing the increase in erosion rate to simply a longer measurement period doesn't seem justified unless the climate signal can be accounted for.

77 converted "to" volume

103 It is not clear what the authors mean by "largest single landslides." How does a 'single landslide' differ from just 'a landslide'?

164 the claim that the scars had "fully revegetated" may be a bit strong because it implies that these revegetated areas were indistinguishable from the surrounding areas with respect to plant species, stand age, canopy height, etc; do you mean, instead, that bare ground could no longer be seen?

180 Have you looked at the Tal landslide on the Marsyangdi? If you search for Tal, Nepal in Google Earth, the landslide is about 1 km south of the 'Tal' marker. It is quite large and has completely filled the valley.

189 Please provide a reference for this statement about the terraces.

209 delete "for"?

419 as the authors have done here, the rollover in the pdf at small landslides is typically attributed to incompleteness in the mapping; however, because this rollover is nearly ubiquitous in these types of studies, I think that it would be important to at least entertain the possibility that the rollover is real. The rollover in their data set begins at landslide areas of $\sim$600 m2 which, given the 5-m resolution of their images, would

be visible (vegetation regrowth notwithstanding). From the standpoint of landslide mechanics, I'm not aware of any physical reason why landslide size ought to obey a strict power-law distribution throughout the entire range of sizes. This means, then, that the authors ought to perform another set of calculations with the assumption that the rollover is real. I understand that this makes the math a little bit more complicated but it is not insurmountable. At the very least, the authors ought to present an estimate of the error associated with assuming a strict power-law distribution if, in fact, the rollover is real.

537 word missing?

556 it is encouraging that your rates are similar to what we found in our 2008 paper but I'm not sure that comparing these is entirely valid, at least without making explicit an important assumption. We were measuring sediment yield and so, to compare your values to ours, you are making the assumption that the total volume of sediment mobilized by all of the landslides was conveyed out of the watersheds. For large landslides, however, we know that this is not true. Also, although we did only measure suspended sediment, we did make a correction for bedload so it might be worth clarifying that our erosion rate was not just from the yield of suspended sediment.

603 this result is sobering and important; I would recommend including it explicitly in the Abstract; my concern is that the effect of landslides is too often ignored in 10Be analyses

Figure 2 I found Figure 2 difficult to interpret because all the markers are darkish. Perhaps reduce the line weight of the markers and choose brighter colors?

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