Earth Surf. Dynam. Discuss.,
https://doi.org/10.5194/esurf-2019-7-RC1, 2019

Earth Surface Dynamics Discussions
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Interactive comment on "Millennial-scale denudation rates in the Himalaya of Far Western Nepal" *by* Lujendra Ojha et al.

Anonymous Referee #1

Received and published: 28 March 2019

The paper by Lujendra Ojha, Ken L. Ferrier and Tank Ojha presents seven 10Be-derived estimates of catchment-scale denudation rates in Western Nepal. These denudation rates fall within the range of values published elsewhere in Himalaya. The paper is clear, well written and illustrated.

It seems that the main interest of this contribution is to provide new denudation data in a region where they were lacking. The authors do not claim to revolution the debate between the climatic and tectonic control of denudation with their data, which is fair, but the scientific justification of the study is a bit short. Why was it "important" to fill this gap of data? Is it a key place? Was the sampling initially designed for some particular question? The last sentence of the conclusion says that this study "illustrates the need for future denudation rate measurements in the region to test hypotheses". As it, I

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am not sure that this is the case. I agree that new data are always useful and that is why I think that this paper should be published. Nevertheless, this study shows that these new denudation data are not able to discuss the relative contribution between climate and tectonics. Thus where do we need to gather future samples to answer this question and why?

The calculation of the denudation rates is correct and includes a good discussion of uncertainties. Yet, some aspects of these uncertainties could be improved:

Dibiase (Earth Surf. Dynam., 6, 923-931, 2018) recently showed that the topographic shielding correction is usually unappropriated. As denudation values with and without topographic shielding are already given, the authors could only recall the Dibiase's paper. The uncertainty on production rate is not indicated. It can easily reach more than 10% and depends on the production rate model (which one was used in the CRONUS calculator?) and thus should be propagated to the denudation rate uncertainty.

What is exactly the maximum grain size of quartz that was dissolved? Table S1 gives the distribution of grain sizes for each sample. I understand that all these grain sizes were dissolved together. Why doing this, while many studies have shown that the 10Be concentration is grain size dependent? The grain size distribution differs a lot between catchments. Does denudation rate correlate with the mean (or other metrics) grain size in this dataset, as observed in many other cases?

The lithological effect is nicely discussed by exploring two end-members scenarios where only the catchment head or the catchment foot provides quartz. However, how do the relationships between denudation and slope, steepness and stream power change when restricted to the upper or lower catchment parts? For example, by restricting the calculation of ks and mean stream power to the upper Budhiganga catchment, its "anomalous" high denudation may be shifted to the right on diagrams of Figure 4, in a more "classical" configuration. In the studied catchments there is a correlation between lithology (possibly quartz content) and elevation (10Be production rate), as

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elsewhere along the range. Could it be possible that the lithological effect explains the large dispersion observed between denudation and steepness (see for example Carretier et al., Earth Surface Processes and Landform, 2015)?

The discussion on the erodibility of different rocks in the Budhiganga and Kalanga catchments, ruling out lithology as possible control of their different denudations, is maybe a bit short (paragraph 20). Are the crystalline rocks of the Budhiganga catchment weathered or fractured? Are the carbonates of the Kalanga layered and possibly more easy to erode? What do other studies in the region or close say about the lithological control of denudation (e.g. Lave and Avouac, JGR, 2001)? Furthermore, this discussion may change by restricting the calculation of ks and stream power to the quartz-rich lithology (previous comment).

I feel that the answers to these comments are quite straightforward. I encourage the authors to add the suggested analysis.

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