

Replies to the associate editor's comments on manuscript 2020-80-R1

We have implemented the edits suggested by the editor throughout the manuscript, and implemented stylistic simplification, and disambiguation throughout. These changes do not alter in any way the meaning of the sentences.

Please note that further changes may need to be implemented based on the internal review of the USGS (mandatory for the publication of the Ar-Ar ages).

More substantial changes, based on the editor recommendations, are explained hereafter

1. *Figure 2 : volcanic derangement.* It is actually explained at the end of section "2.2. Drainage evolution since the Middle Miocene", but we make more specific reference to figure 2 in this section when mentioning it

2. *Calculation of Chi without precipitation weighting.*

We now explain that the linearization was only aimed at locating the knickpoints. It turns out that the choice of the concavity values had no effect on their location and number, and the profiles were well linearized, so we did not resort to more complex forms. Besides, the current pattern of precipitation, which is already only partly representative of the pattern over the integration time of the ^{10}Be erosion signal, is probably even less so when considering the timescales over which these profiles develop. This particularly true in the SC range, where the profiles have evolved the time range covering a wet phase and then a dry phase. So it seemed better to take the simplest possible approach in this case.

3. *Choice of a concavity of 0.5 for the calculation of chi.*

Likewise, it was not our intention to really determine the best, or most relevant concavity values. We empirically observed that the segmentation was robust over the range over which the successive segments were reasonably linear (0.4-0.6), so the choice of 0.45 or 0.50 does not affect it. We simplified this part to clarify our intention.

4. *Alos DEM:* that's correct, it is the 30 m ALOS DEM, which is indeed, distinct from the Guatemalan national DEM.

5. *Figure 9.* We expanded the caption to make it a bit more self-explanatory

6. *Precipitation vs slope in controlling erosion rates.* We have reshuffled a bit this part, in order to better stress the fact that the most important point is that the slope-precipitation relationship intersect is close to 0, whereas the slope-erosion relationship predicts an absence of erosion on slopes shallower than 19° .

7. *Stressing the contribution of decreased rock uplift to the decrease in erosion earlier in the text.* We added a brief introductory paragraph to the section 5.2, explaining that in section 5.2 we successively review the contributions of climate to hillslope erosion and of tectonics to river incision (contribution of fast uplift in the AC range, river lengthening above the Polochic fault. We split the last part into an autonomous section 5.3, in order to better highlight the contribution of aridification.

8. *Stress why we think the dominant factor is precipitation:* we added some lines here to remind the results from previous sections that support the conceptual model.