

Earth Surf. Dynam. Discuss., author comment AC1  
<https://doi.org/10.5194/esurf-2021-54-AC1>, 2021  
© Author(s) 2021. This work is distributed under  
the Creative Commons Attribution 4.0 License.

## Reply on RC1

Maxwell P. Dahlquist and A. Joshua West

---

Author comment on "The imprint of erosion by glacial lake outburst floods in the topography of central Himalayan rivers" by Maxwell P. Dahlquist and A. Joshua West, Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2021-54-AC1>, 2021

---

Thank you for your thoughtful and constructive review and for your enthusiasm for our work! We appreciate the suggestions and will incorporate as many as possible into the revised manuscript. In the meantime, I want to address some of the specific issues you raise.

**Regarding the  $k_{sn}$  analysis:** This is an excellent point regarding the low reference concavity and we agree it could raise some issues with our interpretations. Factoring in discharge instead of drainage area alone may have ultimately led me to overfit to the tributaries, which appear more convex in slope-discharge space than in slope-area. In the revised manuscript we will address this via one or both of your suggestions of using a more standard theta value and looking at drainage area alone, or with a unit stream power analysis.

**Regarding valley width scaling:** Only a small fraction of our valley width measurements were actually taken from elevations above 3,000 meters. If any measurements are compromised due to measuring valleys directly widened by glacial action, it should only be a handful at the most, probably not enough to substantially affect the results. We will revisit this though, remove measurements from any problematic valleys, and be more explicit about our approach in the revised manuscript.

As you say, aggradation and high sediment supply is a hallmark of upstream glaciation. I think that the trends we identify don't purely reflect this on the basis that we find systematically narrower valleys where there is more potentially glaciated terrain upstream, opposite what would be expected if it's all an artifact of supply. We would argue that in the reaches where our measurements were taken, most of the boulders are derived from landslides and the narrowing trends reflect the competence of GLOFs to mobilize them.

**Regarding knickpoints and hanging valleys:** What you're suggesting might be quite a bit more doable if/when the 2-meter EarthDEM becomes available. Hopefully that will be soon. Either way, we can add a bit more depth to this analysis and find other ways of examining convexities on the tributaries to GLOF paths.

Thanks again,

Max Dahlquist

