

Earth Surf. Dynam. Discuss., author comment AC1  
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## **Final response on esurf-2021-83 " Investigation of stochastic-threshold incision models across a climatic and morphological gradient"**

Clément Desormeaux et al.

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Author comment on "Investigation of stochastic-threshold incision models across a climatic and morphological gradient" by Clément Desormeaux et al., Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2021-83-AC1>, 2022

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### **Dear Dr Clubb,**

Here you will find our responses (as an attached supplement) to yours and reviewer's comments on the manuscript entitled "Investigation of stochastic-threshold incision models across a climatic and morphological gradient" (esurf-2021-83), on behalf of myself and co-authors. We thank you and the reviewer for the positive and constructive comments on our manuscript. Please find below a summary of the main changes and as an attached supplement, our detailed responses (highlighted in blue).

- As requested, we have clarified the links between the climatic parameters observed, the denudation rates and morphometric parameters. For this purpose, we produced an additional figure that highlights aspects concerning the relationship between  $k_{sn}$  and denudation rates with variation in runoff and discharge variability (in the supplementary material). The figure showing the relationship between runoff and denudation rates have been moved in the main text and we have added a panel concerning the relationship between runoff and relief with variation in denudation rates that highlights the orographic effect over the studied area.
- We have responded to the general points about divide migration, long-term representatives of discharge variability and D50 predictions by developing several paragraphs in the corresponding parts of main text, notably in the discussion.
- We have provided additional developments in the discussion on the topic of the relatively better performance of R-SPM when compared with complex models (ST and SVT-SPM) on the basis of reviewer #1 comments the suggested references.
- Finally, we have also discussed the possibilities of local deviations from steady state with respect to the assumption of the stream power model, and the implications for our dataset.

We will provide an edited version of the article including all these modifications and we have complied with all the minor comments and suggestions relative to improving the figures (font and figures sizes, labels). We also produced a document highlighting all the difference between the initial manuscript submitted in October and the current version with all the majors and minors revisions (added highlighted in blue and removed crossed-out in red).

Best regards,

Clément Desormeaux

Please also note the supplement to this comment:

<https://esurf.copernicus.org/preprints/esurf-2021-83/esurf-2021-83-AC1-supplement.pdf>