

Earth Surf. Dynam. Discuss., author comment AC2  
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## Reply on RC2

William H. Booker and Brett C. Eaton

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Author comment on "Morphodynamic styles: characterising the behaviour of gravel-bed rivers using a novel, quantitative index" by William H. Booker and Brett C. Eaton, Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2021-55-AC2>, 2021

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### RC2

[Comment] This manuscript presents an approach to analyse channel behaviour, using a new index

(the throughput ratio), from repeat, high-resolution topographic data. Such data are becoming increasingly attainable, as the authors note, not only in the laboratory but also potentially in the field. The manuscript thus makes a timely contribution and is likely to be drawn upon by an increasingly large number of geomorphologists who are generating, or have access to, such datasets. Figures are produced to a high quality and the manuscript is mostly written to a high quality. A recommend that a series of revisions are made, as listed below. Most of these are minor in nature but the consideration of uncertainty in the DEM of Difference analysis may require some further technical analysis to verify the results.

[Authors] We would like to thank the referee for providing their time and highlighting some very key improvements that will be made to the paper.

[Comment] Can you give more detail to the reader on the "implications" that will be discussed?

[Authors] The implications here are meant as the interpretation of results as it pertains to the differences between the systems, and the use-case limitations of the methodology for data availability. Both of these points are in the discussion but are not properly conveyed through the structure; we will amend the text to more clearly signpost these 'implications' for use.

[Comment] L88-99. I found the explanation in these paragraphs difficult to navigate. I think the

expression could be improved with consistent terms e.g. "reaches" and "zones" / "wandering rivers" and "wandering channels". If there is a reason for their difference then please explain the terms. Also, the framing of the difference between transport zones and storage zones was confusing with the insertion of "in contrast (then reference"; L94), which at first reading made me think that an alternative hypothesis had been presented. I recommend some restructuring. Finally, the final sentence on "hazard severity" is rather isolated. I don't think you return to this theme but it could be part of the implications, in the discussion. At present, this comment on societal relevance of the research is rather "lonely" within the broader manuscript.

[Authors] We will endeavour to simplify the text here to better, and more consistently, convey the intention of this methodology. The changing use of terms is just an avoidance of repetition, not of semantic origin, and will be removed to avoid confusion. The inclusion of 'hazard severity' is at present vestigial and we shall alter our discussion to reflect its earlier inclusion.

[Comment] It appears that there has been no DEM of Difference uncertainty analysis applied.

However, such methods are now widely established (e.g. <https://gcd.riverscapes.xyz/>). I recommend that the authors undertake an uncertainty analysis to verify their results.

[Authors] Thank you for bringing this up and providing a very useful tool for this analysis. As mentioned in response to the other referee, we will conduct an uncertainty analysis to bolster our results.

[Comment] Figure 2. This is potentially a very powerful illustration of the methodology but it is too

full of acronyms to be understood by itself with searching for definitions in the text.

This could be made more accessible to a general audience, who may look through the manuscripts figures before reading the text in detail.

[Authors] We will reorganise this figure to be more independent of the text and inaccessible acronyms.