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Earth Surface Dynamics Discussions

Interactive comment on "Glaciation's topographic control on Holocene erosion at the eastern edge of the Alps" *by* Jean L. Dixon et al.

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I find the manuscript very interesting and look forward to its final version. Below, please find some comments and proposed edits that may help improving the manuscript.

—- Introduction —-

Page 2, Sentence L3-5. Suggest rephrasing. Second clause does not preclude first clause.

L7. Perhaps, the transition to glacial buzzsaw concept is not properly backgrounded by previous sentence.

L13. Suggest rephrasing for flow with previous sentence. E.g., first say that glacial landscapes can be preserved . . ., influencing. . .

L15. Widely glaciated mountain belts?

L16. References missing.

L18. Rephrase: not all glaciers are. . .

L25. Complete "Climate's influence on . . .

—- Section 2.3, Digital Terrain Analysis —-

Page 4, L31. Suggest mentioning that SRTM is 1 arc-second, instead of 80 m grid (dependence of cell size on latitude).

Page 5, L4-5. This remark, specifically the last sentence, is too precise, or off what would be reasonable to discuss based solely on the differences in the topographic metrics. Basin slope gradient average is not indicative of local scale morphometry independently of DEM cell size and an average gives no information about spatial variation. Either remove or rephrase and extend this discussion by adding more information (references?).

(Table 2: refer that slope gradient values are averages)

Which parameters were used for stream and catchment delineation? Was a flow accumulation threshold used? I presume from Fig 1 that delineation was based on the location of sampling sites (basin outlet). I believe it is important to justify location of sampling sites as well as its influence on basin delineation and morphometry.

—- Section 3, results and discussion —-

The message would be clearer and the manuscript a better read if the discussion was separated from the results; there would be less back and forth. The discussion would benefit from the inclusion of further morphometrics (e.g., of elevation dispersion). In instances, the conclusions within the discussion overshoot what would be reasonable to conclude from the presented data (see below). I think that it is important to include an evaluation of lithology as a conditioning factor of the observed differences in erosion

rates (even if it is null).

Page 5,

L11. which lowland basin catchments? In the Styrian Basin?

L22. Rephrase. “these data” refers to both mean elevation and slope gradient but this sentence and following sentences address slope only.

L23. Whereby –> where

L23, 24. The described relationship between mean slope and erosion rates does not imply non-linear relationship. Perhaps reword results.

Page 6,

L11-13 (paragraph’s last sentence) Recommend rephrasing. Remove first clause and reword last clause.

L16-21. This is too simplistic. For example, note that glaciated catchments generally are higher in elevation and non-glaciated catchments vary widely in mean elevation (Table 2) (differences in potential energy).

L25. segmenting –> segmented

L23-36. Too simplistic and somewhat confusing. Differences in average elevation between basins and elevation-slope relationships within basins are different things. Why should the relative location of the steepest slopes be positively related to basin average slope gradient? Justification for interpreting that to be signal of past glacial sculpting is insufficient.

Page 7,

L11. ‘However’ should be preceded by semi-colon.

L14-16. Is the abundance of slopes >35° in gradient a good proxy for frost cracking? Address it directly.

L24, 25 (Sentence). Explain; and what are area-normalized stream gradients? (area of what?)

L26, 27 (Sentence). Add reference.

Last paragraph. What is the authors’ take on this discussion?

Page 8,

L5-7. It was referred before that Legrain et al., 2015 looked at non-glaciated basins. Does “previously suggested” refer to Legrain et al., 2015?

—- Conclusions —-

Page 9,

L1. “Repeated” meaning supporting previous studies? –> Add references

Page 10,

L2, 3. Not clear where these values are from; add references?

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