

Interactive comment on “The destiny of orogen-parallel streams in the Eastern Alps: the Salzach–Enns drainage system” by Georg Trost et al.

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I have completed my review of ‘The destiny of orogen-parallel streams in the Eastern Alps: Salzach-Enns drainage system’ by Trost et al. In this contribution the authors consider the stability of drainage divides in the Eastern Alps with a variety of metrics that have been recently proposed/codified and then consider the results of this with respect to the tectonic history of the Alps and expected future evolution of the drainage network. In doing so, they present an interesting new take on how to use some of these metrics and point out some important considerations for the applicability of these metrics (especially for the Gilbert metrics) especially in places with recent histories

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of glacial modification. I don't have a ton of comments and most of them are largely editorial (i.e. wording and such). I have one semi major point toward the end of the paper (which I think shouldn't be too hard to deal with and I hope will help to strengthen the applicability of what they discuss beyond this particular use case). Ultimately, I think this paper will make a nice contribution to Earth Surface Dynamics.

L37 – I think you can remove 'abundantly' here.

L46 – Think 'conditions' not 'conditioning' might make more sense.

L75 – Add direction that material was extruded to help those without a lot of familiarity with the geography of the region.

L80-83 – Might be helpful to specifically mark the location of some of the features on a figure, maybe figure 1? Or as an inset?

L203 – Good to see consideration of the choice of base level, but could you maybe elaborate on specific rationales as to those choices? I.e. is there anything special about those, e.g. is 400 m approximately the elevation of the foreland as rivers exit the mountains? Something else?

Figure 2 – This doesn't really matter and is just a point of clarification, but the chi values displayed on this map seem high if a reference area of 1 was used as is implied in the text. It seems more like a value of 1e6 was probably used? Doesn't change anything, but could be a point of confusion for some (if trying to replicate what you've done).

L304-306 – Might expand this to include references that address the extent to which spatial/temporal statistics of rainfall translate into spatial/temporal statistics of runoff which is related to the question of changes in channel geometry that you highlight here.

L309-310 – Which was a primary conclusion of Forte & Whipple, 2018.

L331-333 – This is an interesting approach (i.e. advocating for setting the base level

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just down stream of the channel heads for the chi calculation to isolate what is 'being felt' by the near divide portion of the channels). What comes to mind however is wondering if that is significantly different than (1) looking at the channel steepness of the area near the headwaters (with a 'base level' a little downstream of the channel head, a chi anomaly across a divide will mainly be a reflection of a difference in channel steepness directly downstream of the channel head, I think) or (2) the Gilbert metrics at a larger accumulating area (i.e. with this high base level chi value you're kind of taking the same approach as the Gilbert metrics to focus on what's happening near the divide, but in this case you're considering an area slightly bigger than what you were with Gilbert metrics because of the choice of threshold area for defining channel heads). This is not to imply that there is anything wrong with your approach (I rather like it!), just that I think to make this a more complete contribution, it would be good to consider if these other two would be equivalent or not (I'm definitely not sure they would give you the same answers, but my initial guess would be yes).

L434-435 – It might be better to couch this in terms of 'glacially modified' mountain ranges instead of mid-latitude as (1) while certainly latitude is going to play a big role, moisture availability and detailed local climate will also control the extent of glacial activity and (2) your observations would generally be valid anywhere glacial modification of the landscape has been significant. If you choose to make this change, I would suggest similarly changing it elsewhere in the manuscript.

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