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Interactive comment on "Rivers as linear elements in landform evolution models" *by* Stefan Hergarten

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Dear Taylor Perron,

thanks for starting the discussion so soon! I think we need to discuss your point in more detail.

I think I got the subpixel approach of Howard's model and the meaning of the channel width w correctly. However, my key point is that all the stream power stuff comes from the analysis of river profiles, starting from the work of Hack. These rivers probably erode their bed plus the adjacent hillslopes (the material coming from the hillslopes into the river). Taking this into account, my result is that the parameter w in Howard's model is not channel width, but a property depending on the threshold where fluvial erosion starts and on the network topology. This property is indeed constant for the entire drainage network, and it scaling properties are developed in my manuscript. So

Howard's (and your) approach is correct with constant w, except that w is physically not the channel width. In this sense I would only disagree to your statement "noting that future studies intending to apply this model to a specific field site will need to calibrate the channel width function." Inserting a channel width depending on the catchment size for w and leaving the rest as it would make the model inconsistent with observed river profiles.

Best regards,
Stefan Hergarten

Interactive comment on Earth Surf. Dynam. Discuss., https://doi.org/10.5194/esurf-2019-77, 2020.