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Interactive comment on "Transport-limited fluvial erosion – simple formulation and efficient numerical treatment" *by* Stefan Hergarten

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Dear editor,

thanks for your encouraging comments and for the suggestions to improve the manuscript! Im a quite happy that you also tested it in the 1-D case and compared the performance to the implementation of Yuan et al. (2019).

As the official discussion phase will end soon, I just write a few remarks on some points that might also be interesting for other readers and go more into detail when submitting the revised version.

Performance: You are right that the improvement in performance compared to the iterative implementation of Yuan et al. (2019) rapidly increases with increasing G for

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Discussion paper

$G > 1$ as the convergence of the iterative scheme becomes slower. I will discuss it a bit more in detail based on the performance test provided by Yuan et al. (2019) in Fig. 2 in combination with the estimates of G in natural rivers recently provided by Guerit et al. (2019).

Linear decline model: I agree that the extension towards hybrid models is the most interesting part for applications, and that that the concept behind this model should be explained more thoroughly. So I will devote an own section to this topic clarifying the structure of the differential equations (system of two partial differential equations for the height H and the sediment flux Q that collapses to a single equation for the detachment-limited and transport-limited end members), explaining the relation to the approaches of Kooi and Beaumont (1994) and Davy and Lague (2009), and providing a third interpretation in terms of shared stream power that may be useful when different lithologies are considered.

Best regards,
Stefan

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