

## ***Interactive comment on “Modelling impacts of spatially variable erosion drivers on suspended sediment dynamics” by Giulia Battista et al.***

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The authors investigate the contributions of spatial variability of precipitation and soil erosion parameters on the variability of suspended sediment transport using a distributed model of hydrology, hillslope erosion, and suspended sediment transport. The research is very well designed, implemented and written. The derivation and calibration of the surface erosion parameters was novel. I have no comments on the presentation of this research and the text. I have a few questions for the authors to consider in revising this manuscript.

I was wondering how the SIMs 1, 2, 3, 4 results would look like when plotted as a suspended sediment rating curve as in Fig 3b in comparison to observations?

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Similarly, I would suggest adding observed sediment variability to Fig 9a as box-whisker plots.

I was expecting to see bigger SDR values, based on the description of the channels having bedrock exposure and the model not allowing any exchange of suspended sediment with the bed,  $E=0$ . With these low SDRs there should be deposition in the channel and if  $E=0$  how is deposition modeled? And even if the model allows deposition but not re-suspension how can that assumption be justified. Some clarification on this would be appreciated by readers.

Unless I missed this in the paper, I was wondering how do variability of precip and soil parameters contribute to the observed variability of sediment quantitatively. Could this sediment flux variability be quantified in terms of the variability of precip and soil erosion in an expression. Of course discussions of this nature can go all the way to information content, entropy and so on, but some discussion of whether more/less information in model parameters and forcing can be attributable to the changes in the variability of observed/model sediment would be interesting to see.

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