Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2020-472-AC2, 2021

Hydrology and Earth System Sciences
Discussions
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Interactive comment on "Simulating the evolution of the topography-climate coupled system" *by* Kyungrock Paik and Won Kim

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Received and published: 3 February 2021

We thank Referee 2 for positive review comments. In particular, we appreciate detailed editorial suggestions given as an annotated pdf file. We will accommodate all these suggestions in the revised manuscript which is allowed to be submitted by HESS in the next step. Our replies to two questions of Referee 2 are listed below.

[Referee 2] line 184-185: why would over-erosion happen, please elaborate and explain in more depth

Reply: We will add a sentence as "This occasion is considered as an artifact due to the limited resolution of a numerical approach. The sediment flux is a function of the local slope (equation (13)). Let us take an example of two adjacent cells where the

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upstream cell is to be eroded and the eroded material is supposed to be deposited on the downstream cell. In reality, the local slope between them gradually reduces as the erosion-deposition continues. Accordingly, the sediment flux decreases and becomes nil if the gradient reaches zero. Therefore, no further erosion is possible. However, in the discrete modeling, the local slope is invariant for the calculation time interval. Therefore, the sediment flux from the upstream cell is likely to be over-estimated. If the local slope varies greatly within the calculation time interval, the over-estimation of sediment flux and so erosion can be excessive, which can lower the cell even below the downstream cell. To prevent or minimize over-erosion, it would be necessary to reduce the calculation time interval. This can be done by dividing the storm duration into multiple time steps."

[Referee 2] line 398: while the authors acknowledge that the current work is based on explorations on a virtual landscape, they indicate that testing their results on real landscapes is a challenge. The authors indicate they need to collaborate to obtain co-evolution data. Indeed this is an issue, but still it would be good if the authors could include some first ideas or examples of how / where their model could be tested.

Reply: We will add a sentence as "On this issue, we indeed witness new lights such as thermochronology in topography reconstruction and paleo-climate simulations using General Circulation Models."

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