

Interactive comment on “A coupled soilscape-landform evolution model: Model formulation and initial results” by W. D. Dimuth P. Welivitiya et al.

A.J.A.M. Temme (Referee)

arnaudtemme@ksu.edu

Received and published: 10 May 2018

The manuscript by Welivitiya and co-authors presents a simulation performed with their novel soil-landscape evolution model. The model and the rationale behind it are presented in detail. The model simulation is on a simplified 2D landscape (i.e. a row of cells) representing a plateau over a hillslope and a valley. Two scenarios are simulated, with different depth-dependent weathering functions. Findings are discussed in details, and appear to indicate that the model functions well, and that basic expectations about the joint development of soils and landscapes (co-evolution) are met. The paper is interesting to me as a soil-landscape modeler, and I greatly enjoyed the detailed model

C1

layout and accompanying figures.

I have detailed suggestions in the attached annotations, that amount to minor revisions in and of themselves. Below, I add three general concerns.

1. Although the paper is very interesting to me, I am not sure that it is to the general audience of ESurfD. The meat of the paper is the model presentation, to my mind. That makes me wonder whether an outlet such as Geoscientific Model Development of Computers and Geosciences is not a better choice.
2. The simulation that illustrates the model's performance, is interesting but hypothetical. The paper does a great job of explaining what the results are, but does not give much attention to what that means for how we should think about landscape evolution. This may be possible only in a limited way, given the hypothetical setup, but I do think some comparisons with existing thinking and findings from others are possible. I do one suggestion in the annotations. In another outlet, a lack of connection with existing thinking would be no problem at all, but I think that in ESurfD the readership is particularly interested in that aspect (and perhaps less in model workings).
3. Although the model description is detailed and accurate, it would benefit from pointing out differences with existing models or a few more tradeoffs between accuracy and efficiency, especially where some of the innovative aspects are covered. How do these differ from existing models such as Lorica? I give a few suggestions for improvement.

I am glad to see this work in manuscript form, and I am happy to have it in the public domain so it can be used by colleagues. I wish the authors good luck in considering the changes suggested.

Please also note the supplement to this comment:

<https://www.earth-surf-dynam-discuss.net/esurf-2018-16/esurf-2018-16-RC2-supplement.pdf>

C2

