



EGUsphere, referee comment RC4
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Comment on egusphere-2022-181

Joris Eekhout (Referee)

Referee comment on "Does soil thinning change soil erodibility? An exploration of long-term erosion feedback systems" by Pedro V. G. Batista et al., EGU sphere,
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The manuscript describes a model experiment on how erosion induced changes in soil properties (by soil thinning) affect soil erosion rates at large temporal scales. The authors applied the modified MMF model to 265 soil profiles in the UK over a 500-year time period. The results show that only 39% of the profiles were sensitive to the changes in soil properties by soil thinning and most of these profiles showed decelerating erosion rates.

In general, the manuscript is very well written and accompanied by clear figures. I think that the model experiment is very useful and gives some interesting insights on the feedback between soil thinning and soil erosion rates. However, I have the feeling that the implications for soil erosion modelling may be a bit overstated. The authors apply a 500-year simulation period, which generally speaking is much longer than normally applied in soil erosion modelling studies, which mostly apply a decadal time period. The results show that over this 500-year simulation period there are some notable changes in soil erosion rates, however, when focusing on the first few decades, the changes are negligible. Of course, as the authors point out in the Discussion section, there are some processes that are not accounted for by the MMF model, which may affect the results, also in the first few decades. But still, I doubt if the results of this study have significant implications for soil erosion modelling. The authors may agree or disagree with this, but I welcome to the authors to discuss this point somewhere in the manuscript.

Below I have provided specific comments to the text.

Specific comments

Line 205: Table 2 shows the parameter values used in the Monte Carlo simulation. I'm not sure if this is really important, but if you would calculate the ground cover occupied by the

number of stems (i.e. stem area times number of plants per unit area = $(0.025^2 * \pi) * 250$) then I arrive at a value of around 0.49, while the ground cover is assumed 0.3.