Reviewer comment on manuscript “Past, present and future rainfall erosivity in Central Europe based on convection-permitting climate simulations” by Uber et al.

The manuscript is very interesting and I enjoyed reading it. The authors test convection-permitting climate simulations (CPS) on their ability to predict rainfall erosivities in Central Europe. The method is of relevance for the soil erosion community and readers of HESS. I generally encourage the publication of the manuscript in HESS after minor revisions. I see some room for improvement in (i) general information about CPS and (ii) clarifying the different data products that were compared.

(i) Many readers are potentially not familiar with the latest state of the art in climate simulations. CPS may bridge the gap between high spatio-temporal resolution that is relevant for process-based studies and long-term and large-scale studies. Hence, readers from the community of process-based studies probably appreciate information on the CPS product like: what input data is required for CPS, how are they computed, what is the methodological reason for them to perform better etc. Some of this could be added to the Introductions section L100ff, while the implementation of the CPS should be strictly placed in section 2.1.

(ii) Within the paper a lot of different data sets and simulation periods were compared against each other. Assisting the reader with some reductions a structure might help to keep an overview.

Introduction:

The state of the art is well highlighted, but I miss more information on CPS that helps to understand their methodological advantage and why this is the case (see above).

Material and methods:

Numerous different simulation periods, (eval. and proj.) runs, rainfall kinetic energy - intensity (KE-I) relations, external erosivity products make it hard to get the main message. It might be worth considering to reduce the number of different comparisons to focus on the main message.

An overview table providing information (name, period, spatial and temporal resolution, unit, type of data set (map, table), reference, etc.) on the different data sets that were compared might help a lot.

I cannot find a definition of the evaluation and projection run. It is not fully clear to mean what was done here.

Can you provide a rough estimate on the sensitivity to use the KE-I relation by Wischmeier and Smith 1978? There are many but some are more frequently used like the exponential function by Brown and Foster 1987 as it is suggested in the RUSLE by Renard et al. 1996.

Results and discussions:

A brief discussion on the usability of CPS for landscape or field scale studies could be interesting. Just out of curiosity, how good does the CPS work for specific points in space? How good is a comparison against long term rainfall gauges?

I do not understand the point of calibrating the transport capacity to end up with same soil redistribution rates. In section 2.3 - L218 the reason to apply WaTEM/SEDEM is named as “To study the effects of changing rainfall erosivity on soil erosion [...]”. From my perspective the benefit to apply WaTEM/SEDEM is to get a rough number on the differences in soil redistribution and sediment delivery to the stream network in Mg ha^{-1} yr^{-1}. On the scale of Fig. 8, the differences between the realisations are not visible. From my perspective, Figure 9 provides a good relative number of the effect in R-factor calculation in CPS and MAE.

The drawback of using a single CPS instead of an ensemble is highlighted multiple times throughout the manuscript. Would it make sense to assess if the model tends to under or overpredict rainfall erosivity in a comparison against rainfall ground observations (rain gauge or laser-distrometer)? See comment on comparison against rain gauge point data above.

Thank you for this nice piece of work!