

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2021-103

Anonymous Referee #2

Referee comment on "MPR 1.0: a stand-alone multiscale parameter regionalization tool for improved parameter estimation of land surface models" by Robert Schwappe et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-103-RC2>, 2021

General comment

This paper addresses a key topic for earth system modelling related to the physical parametrization and the associated uncertainties. For land surface models the representation of soil water transfer relies on transfer functions which relate soil texture properties (that can be accessed from soil map at global and regional scale) to the soil hydraulic parameters. As largely documented by previous studies, these transfer functions are important sources of uncertainties which can be related to their calibration and/or their application at coarse grid resolution. This paper presents a new configuration of the Multiscale Parameter Regionalization framework used for soil water parametrization in land surface model and shows its ability and flexibility to generate continental-scale soil hydraulic parameters at distinct scales. The tool is evaluated for the simulation of evapotranspiration flux using two land surface models largely used by the land surface community.

My main concern for this paper, is that most of the content is dedicated to the development of the tool which include a large part of technical and programming components. While this information is of importance for the user community, the scientific part of the paper dedicated to the evaluation of the tool is quite limited. I wonder whether this imbalance between the technical development and the actual scientific outcomes can be a problem for publication in GMD. My main recommendation is major revision to emphasize the scientific value-added of the presented parametrization tool. For this reason, I provide very light feedbacks because I think that the content needs to be modified before doing any additional review.

Specific comments related to the structure of the paper

- Section 2: This section is quite atypical for a scientific paper. Part of the content concerning the rationale/motivation of this study (e.g. section 2.3), background information on parameter estimation workflow (section 2.1 and 2.2) should be moved to a dedicated paragraph in Introduction. There are also methodological statements that belong to a method section. The IT details given in 2.2 (e.g. line 148-152) may not be relevant in the main part of the paper, I suggest including them in additional material.
- The current structure of the paper is difficult to read. The data section which is in appendices should be a main section of the paper. Also, a method section is clearly missing.

Overall the structure of the paper needs to be improved since sometimes method, model description and results are included in the same section that does not facilitate the reading of the paper

- The objective of section 4.4.1 is not clear, why comparing the results from both models ? as underlined the models have very different configurations that make their comparison quite hazardous. Maybe I missed the objective here.