

Interactive comment on “The impact of landscape evolution on soil physics: Evolution of soil physical and hydraulic properties along two chronosequences of proglacial moraines” by Anne Hartmann et al.

Anonymous Referee #1

Received and published: 12 August 2020

The manuscript presents experimental data of soil physical and hydraulic properties along glacial moraines of different ages. These basic soil properties (texture, bulk density, porosity, organic carbon content, water retention and hydraulic conductivity) provided here are very useful because they are essential for any quantitative modelling of water and element balances of such soil ecosystems. I congratulate the authors for such a large effort and service for the scientific community. The data basically confirm the theoretically expected pedologic and soil structural development; however, since similar data in comparable quality are extremely rare and relatively difficult to obtain

C1

in reproducible way, so much the better are those of the current manuscript. I would also not be too disappointed about the problems with the description of the hydraulic conductivity functions based on the evaporation data. These data if made available maybe analysed in the future with other methods; it did not seem to me that it was the aim to do it in this data paper. Still, I have a few comments and suggestions for clarification, discussion, and possible improvements:

1. The soil depth is defined related to the current soil surface. During the long times of development, the surface topography may have changed (erosion, colluviation) such that the surface-depth relation could be different at the different locations. This may affect the variability in space and time. Would it be possible, perhaps for future studies, to identify an alternative reference such as, for example, the depth to the intact parent material or other marker?
2. I missed a soil profile description or classification – even a simplified description of soil type and soil horizon characterization would increase the information content on conditions in the sampled soil depths.
3. The particle-size analysis seems to be non-standard, so this could be described a bit more detailed. The sample preparation and dryness state (air, oven) of “Dry sieving”, for example, could be defined, the samples should then not be aggregated in any form. Usually, the organic matter and the carbonates are destroyed before wet sieving, and dispersion agent is added. Of course, for the carbonaceous parent material, another method is needed and also the methods to distinguish between organic and inorganic carbon content complicate the analyses. The organic particles could also be water repellent.
4. The discussion (Page 19) on problems with the evaporation method seems too detailed in comparison to other aspects; it shifts the focus too much towards critical evaluation of the application of this method.
5. Overall, the text could be condensed a bit.
6. The use of the past tense and the present tense in the English text is not always consistent and should be checked.