

Interactive comment on “Towards a hydrological classification of European soils: preliminary test of its predictive power for the base flow index using riverdischarge data” by M. K. Schneider et al.

M. K. Schneider et al.

Received and published: 7 August 2007

We are grateful to the three anonymous reviewers for their constructive comments, which significantly helped to improve the manuscript. We have adopted most of their suggestions and therefore discuss only the most important issues at this point. An itemised response with all changes will be submitted together with the revised manuscript.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

Issues of scale

Reviewers 1 and 3 mentioned the common origin of pedological information in the SGDBE for England & Wales and the original HOST map. We clarified this issue in the manuscript. The process-based HOST classification was derived from the National Soil map of the UK at a scale of 1:250000. The SGDBE was initiated earlier and its STU attribute data is based partly on data compiled later for the 1:250000 National Soil Map. Hence, although both maps do have a limited amount of data in common, the origin of their polygon boundaries is different and the range of soil types included in the SMU data for the SGDBE is considerably simplified compared to that used to derive the HOST map. It is thus far from evident that the much more sophisticated HOST map can be represented by a reclassified SGDBE. The good predictability of BFI in the UK also emphasises the strong link between the quality of the underlying pedological data (which is comparably high for the UK) and the goodness of the predicted BFI.

Reviewers 1 and 2 pointed to the fact that a 90 m DEM may be too coarse to represent important geomorphological features in Mediterranean catchments as well as to calculate the topographic index. It would certainly be questionable to use a 90 m DEM for hydrological modelling or the identification of critical source areas. However, our aim was a hydrological soil classification at the European scale driven by the increasing need to evaluate environmental pressures and risks at this scale. We therefore only used data which was available at a European scale, fully aware that this may be inappropriate in many cases and that a classification may be strongly improved using regional data of higher quality. We are also convinced that the correlation between BFI and the mean topographic index, is noteworthy, even if it was calculated from the 90 m SRTM DEM. The correlation between BFI and mean topographic index was stronger than the correlation between BFI and mean slope, altitude or climatic factors. This shows that the mean topographic index is obviously a useful measure of catchment topography by combining slope and contributing area.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

Suggested extensions of the hydrological soil classification

Reviewer 3 stated that we did not fully acknowledge the potential of HYPRES for a hydrological classification of European soils. We agree with the reviewer that it would be worthwhile to explore the link between HYPRES and HOST in the further development of a hydrological classification of European soils. However, we are convinced that the more conceptual classification of HOST incorporates features that are not captured by water retention curves but are crucial for catchment hydrology (as mentioned by reviewer 2).

Reviewer 2 suggested incorporating land use information into the evaluation, especially of catchments response under a Mediterranean climate. We agree on the importance of vegetation for rainfall to runoff transformation and this should certainly be taken into account when predicting discharge dynamics of ungauged catchments at a European scale. We are also convinced that the incorporation of effects of vegetation into a European hydrological soil classification should be evaluated in its further development.

Reasons for low predictability of BFI in Mediterranean catchments

Our analysis has demonstrated important differences between hydrology in humid-temperate and semi-arid climates. The concepts developed in one zone may not necessarily be applicable in the other. Reviewer 2 has provided important suggestions for an improved discussion of the different behaviour of semi-arid catchments. We have incorporated his suggestions into section 4.3, which we have rewritten.

Furthermore, we put additional emphasis on event-based measures such as Surface Percentage Runoff. SPR may be more flexible to incorporate effects of variable precipitation and vegetation, which are of crucial importance in a Mediterranean climate. Testing a refined soil classification including information of vegetation and soil surface structure against an event-based measure of runoff response to rainfall may provide an integrated view on catchment hydrology at the European scale.

Improved reproducibility through an updated Supplementary Information

Reviewer 2 criticised that our investigation was difficult to understand and not reproducible. However, he did not consider the supplementary information, where we provided the complete logical decision tree used for reclassification. Using this information, the reclassification might be easily reproduced in any programming environment. Furthermore, all data used for our analysis is publicly available.

Because reproducibility of research is also of crucial importance to us, we have revised the supplementary information completely and included a list of the catchments used for validation. This should facilitate the reproduction of the validation part.

It is difficult to tell from the comment of reviewer 2 for which part he would like to see a flow chart. We believe that the multi-dimensional layout of Table 1 is better suited to represent the HOST classification than a flow chart. Again, readers interested in the details may refer to the logical decision tree provided as supplementary information.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 831, 2007.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)