

***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.***

**Anonymous Referee #1**

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GENERAL COMMENTS

The authors have made a nice job of transferring a hydrologically relevant classification of soils (HOST) to a wider geographic range, and exploiting the relevant data. The authors encounter some interesting difficulties in using the European soil classification to predict BFI, but this does not detract from the progress they have made in developing this new and valuable data source.

SPECIFIC COMMENTS

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1. P837 The HOST report (Boorman et al. 1995) is downloadable from ... *A table of HOST attributes would be useful at this point, or alternatively the authors might insert a comment to the effect that the structure of the HOST database is similar to that shown in Table 1.*
2. P837 WR describes whether a soil is wet within a certain depth and for how many months per year. *This WR is a combination of hydrogeological, climatic and topographic factors. I think it is worth noting that WR is not purely a soil attribute, and that assignment of the WR class is affected by climate and topographical setting.*
3. P839 No restriction on the number of available record years was set at this stage. *What is the range of record lengths?*
4. P840 the catchment boundaries had to be determined. *It is remarkable that catchment boundaries were not already available. I imagined that projects by FRIEND or University of New Hampshire and GRDC had produced useful information.*
5. P840 the BFI, average slope, altitude, and mean topographic index were calculated. *Was it the mean of the topographic index? Is 90metre data really suitable for calculating topographic indices? See e.g. Quinn et al (1995) and many more recent references on the effect of grid size on topographic indices.*
6. P842 The coarser spatial resolution of the SGDBE. *What map scale is used for SGDBE in its coverage of the UK?*
7. P848 The importance of soil for the discharge dynamics is decreasing from Northern to Southern Europe but it does not change *I found this title hard to understand because it seems to contain a contradiction: "importance of soil is decreasing" and yet "it does not change"*
8. P848 The residuals are larger in hillier regions further South and in the Mediterranean. *This "hilliness" of southern and Mediterranean catchments is certainly one possible explanation. But surely there are other hypotheses? It is also possible that the warmer and drier climate or the generally sparser vegetation could provide explanations for the residuals*
9. P849 Topography was found to be the main determinant of water residence in

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some study catchments located in the Western US *I think this citation oversimplifies the matter. It is true that the topography explained the water residence in the McGuire et al data, but those catchments are not a representative sample of the wide variety of hydrology in the Western US.*

10. P850 The second factor is the high variability of climate in the Mediterranean zone. In order to use soil characteristics and hence the HOST classification as a meaningful measure for the discharge dynamics in a catchment, it is necessary that the soil compartment towards rainfall events remains more or less equal from year to year. In most of the catchments located in Southern Europe, variability in yearly BFI was very high. This suggests that variable factors such as precipitation were the main driving force of the variability.

*To further explore this hypothesis, it would have been informative to check whether the discharge records in Southern Europe were long enough to comprehensively sample over the interannual variability. What is the sampling error of the BFI data? Is the BFI data more uncertain in Southern Europe?*

#### TECHNICAL COMMENTS

11. P832 "knowledge on the distribution" should be "knowledge of the distribution"

12. P833 "1:1 Mio scale." should be "1:1 million scale."

13. P834 no agreement regarding the distribution of data has been reached with the participating institutions

14. P834 Thus, there is a need

15. P835 Boorman et al. (1995) used multiple linear regression to estimate a BFI regression coefficient for each of the 29 HOST classes.

16. P835 "although it is commonly derived, as in this study, from the hydrograph only with little physical underpinning." should be "although since it is commonly derived, as in this study, from the hydrograph alone, it has little physical underpinning. "

17. P835 "Lacey et al (1988)" should be " Lacey and Grayson (1988)"

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18. P836 is built upon Soil Mapping Units (SMU), which are geo-referenced and composed of one or more Soil Type Unit (STU). *At which scale are these mapped?*
19. P842 "NA<sub>1:1</sub>" should be "NR<sub>1:1</sub>"
20. P844 the resolution of the SGDBE is not homogeneous throughout Europe. *What is the scale of the map in places with finest resolution?*
21. P844 A total of 13 catchments were identified where the runoff regimes were governed by major artificial influences or large lake fractions (Figs. 3 and 4, triangles). *The figure captions indicate that other reasons were also used to exclude catchments (subsurface water sources, extreme climate). These should be noted here too*
22. P844 two more catchments with insufficient flow data. *How short was the flow record in those two cases?*
23. P845 Most catchments in Southern Europe had large negative residuals
24. P845 Of all the catchment properties included in the analysis *These properties should be listed in a table*
25. P845 were consistent to their response models." should be "were consistent with their conceptual response models."
26. P846 "1:1 Mio scale." should be "1:1 million scale."
27. P848 The topindex *This term is not defined in the paper. Presumably it is the mean topographic index.*
28. P850 it is necessary that the soil compartment towards rainfall events remains more or less equal from year to year. *This sentence needs to be expressed differently – I do not understand it.*
29. P850 Since Southern Europe usually shows a higher interannual climatic variability *higher variability relative to which other location?*
30. P855 "reclassify of Soil Geographical Database" should be "reclassify the Soil Geographical Database"
31. P857 The two maps are not quite the same size
32. P858 Figure 2 would be much easier to interpret if it used the same colour legend as in Figure 1

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## References

Quinn, P.F., Beven, K.J. and Lamb, R., 1995. The  $\ln(a/\tan b)$  index: how to calculate it and how to use it in the TOPMODEL framework. *Hydrological Processes* 9, pp. 161–182.

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**HESD**

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