Interactive comment on "Spatial organisation of catchments – assessment and usage for impartial sub-basin ascertainment and classification" *by* H. Oppel and A. Schumann

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Thank you for your interest and your comment. I hope the following points will help to clarify the problems:

1) The spatial heterogeneity of catchments can be considered in different ways in hydrological modelling: by fully distributed or semi-distributed models. The last mentioned modelling approach benefits from the option to subdivide a catchment into sub-basins. These sub-basins should be differentiated by the heterogeneities of the hydrological most relevant catchment characteristics. If this heterogeneity is low, neighbouring basins can be modelled together, but if a basin is very different from its neighbours it should be described separately. By analysing this spatial heterogeneity the need for

spatial resolution in modelling can be judged. Within these sub-basins the patterns of hydrological relevant characteristics are interrelated and determined to a certain degree by the landscape. Instead to use combinatorics, these patterns can be used to specify the hydrological spatial units according to flow distances which are used here as order feature. One objective of this study was to automate and objectify the process of sub-basin ascertainment. The second objective was to base the sub-basin ascertainment on the spatial organisation of a watershed.

2) In our opinion there is no impartial method/data for validation, since all subdivisions are either subjective (e .g. manual subdivision) or subject to other objective functions (e.g. based on Stahler order). There are only two aspects that can be proven: applicability to different data (as performed for different data types and basins) and performance (comparison of variance in unseparated and separated basin).

3) The term "available water capacity" follows the nomenclature of the European Soil Database for the maximum amount of water that can be stored in soil and is available for plant growth (Ballabio, et al. 2016). Calculation is based on empirical pedotransfer-functions for soils in Germany (Sponagel 2005), comparable to Wösten, et al. (2001)

Literature: Ballabio C., Panagos P., Montanarella L. Mapping topsoil physical properties at European scale using the LUCAS database (2016) Geoderma, 261 , pp. 110-123. Sponagel, H. (Ed.): Bodenkundliche Kartieranleitung: Mit 103 Tabellen und 31 Listen, 5., verb. und erw. Aufl, 10 Schweizerbart, Stuttgart, 438 pp., 200 (in German) Wösten, J.H.M., Pachepsky, Y.A., Rawls, W.J., 2001. Pedotransfer functions: bridging the gap between available basic soil data and missing soil hydraulic characteristics. J. Hydrol. 251, 123–150.