Hydrol. Earth Syst. Sci. Discuss., 9, C3166–C3167, 2012
www.hydrol-earth-syst-sci-discuss.net/9/C3166/2012/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Assessment of shallow subsurface characterization with non-invasive geophysical methods at the intermediate hill-slope scale" *by* S. Popp et al.

S. Popp et al.

steffen.popp@ufz.de

Received and published: 18 July 2012

Thanks to both referees for their constructive comments. Some remarks are very valuable and will be respected in a revised manuscript. Other comments we want to clarify here. First of all, the study is not about detailed soil-water estimation by EMI. This topic might be focused on due to the given studies in the introduction of the paper. This is an important and up-to-date application of EMI studies, however, in the last paragraph of first chapter on page 2515 our goals are formulated as following: "...reasonable exploration and characterization of the hill-slope subsurface based on mapping of soil

proxy values..." as well as "...we target at a spatially meaningful partitioning of the heterogeneous subsurface as basis for further detailed investigations...". We know that we cannot estimate soil-water contents solely with the obtained data. Instead, we want to assess the application of common geophysical methods at a complex site, and show the difficulties users have to face with when investigating similar (large) sites. We have discussed the limitations of EMI and gamma at the site, which were given by the uncertainties and ambiguous results of both methods with respect to soil properties. Instead, we have used the geophysical data for a clustering approach that allows us to use the ambiguous results for drawing first conclusion on spatial characteristics of the entire hill-slope by discriminating between hill-slope areas with different ECa and gamma behavior. We have compared the cluster zonation of hill-slope area with a previous obtained partitioning in a qualitative manner and we found both the approach and results very promising. Please keep in mind that the map in Fig. 7a was the result of individual mapping of vegetation and describing of soil quantities, and cluster analysis of these data. With respect to the ambiguous relationship of soil properties and physical variables, we obtained a similar trend in hill-slope zonation (Fig. 7), which can serve as a qualitative and primary characterization of the hill-slope area prior to any further detailed investigations. Our suggestions for a revised paper are to rewrite some parts and to less focus on published soil-water studies in the introduction and rather to highlight the merits and possibilities of geophysical applications in landscape research in general in order to avoid misunderstandings and confusion. However, we still keep our results and main parts of the conclusions because we think that we have shown an up-to-date field study for a fast and primary characterization of a complex landscape unit that is too large for detailed point measurements and too small for remote sensing approaches.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 2511, 2012.