

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

Anonymous Referee #2

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This paper presents an interesting case study relevant to the estimation of soil water content at the hillslope scale. This is a very active field of research and all contributions can be considered valuable. However I have a few reservations about the substance and the presentation of this case study. In particular, this seems to be an incomplete study. First of all, the dataset is definitely too small to allow for definitive conclusions about the catchment behavior in terms of soil water content changes. I acknowledge that the May-June period is indeed interesting in terms of snow melt effect. But such a short data collection period, in only one year, cannot be considered as sufficient to draw general conclusions on the catchment response. Second, why is moisture content only

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considered at 20 (or 18?) sample points? This is clearly a far too small dataset to draw final conclusions (at one time instant only, by the way). Why not using faster and more extensive TDR surveys? Third, the lack of relationship between ECa and theta shown in Figure 3 would definitely call for an explanatory covariate to correct for. But no such explanatory variable is proposed and cannot be inferred from the only other data available (gamma emission) given the point below. Fourth: I find disturbing the confusion about the dependence of gamma emission on moisture content. On one hand, the authors only perform one gamma ray survey – under the assumption (evidently) that the dependence on moisture content is negligible, and the gamma emission is mainly informative of soil texture (why otherwise a single survey?). On the other hand, the authors conclude (page 2521 – line 27-28) that “the low radioactive emissions [...] are very likely the consequences of high soil-water contents”. There is a clear inconsistency here. And more data shall be collected to prove/disprove such conclusions. I feel that studying the dependence of gamma emission on moisture content would be, at this site, an interesting study of its own. In summary, I feel the described study has some merit, but deserves a more substantial dataset (e.g. adding more measurements in time) to allow for conclusions to be drawn.

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