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Combining interpretation of geophysical date for characterization of the cover layer along a hillslope

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Using of the geophysical methods can give important information about the underground for many environmental applications, such as the determination of soil water content, and the detection of aquifers. The aim of this study supporting in the framework of CAOS-project (catchments as organized systems) is to compare different geophysical methods, namely electrical resistivity tomography (ERT), refraction seismic and electromagnetic induction (EMI), for the precise determination of the contrasting bedrock and zones of different soil moisture. Besides we would like to extract information about the underground water-bearing layers for the water flow modeling. Combination of this methods based on different physical parameters (electromagnetic and elastic) can provide better interpretation of geophysical data and image of subsurface. During the field campaign in October 2012 we collected the geophysical data sets in Schäfertal catchment, which is located in the Lower Harz Mountains, Germany. In this place, six transects of ERT (Wenner array, 0.5 m electrode spacing), five transects of refraction seismic (1 m geophone spacing, 4 m shoot spacing, 32 shoots along every transect) and an area 2.5 ha of EMI were measured. To compare the geophysical measurements were interpreted to determine the bedrock depth of the investigated area and zones of different soil moisture. ERT and refraction seismic showed good performances for predicting the bedrock depth along the hillslope. ERT and EMI correctly predicted the areas of different soil moisture. This study shows applying method is quite suitable for estimation of soil properties for hydrology tasks. Future, we would like to apply this routine for other catchment.