



## **Non-invasive observation of the shallow soil profile stratification and its effect on soil water regime**

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Arable soils are exhibited to many stresses resulting in changes of the soil structure and properties at various scales. The most affected layer is the topsoil, which is periodically disrupted and consolidated due to tillage, rapid crop growth and changing weather conditions. The compacted layer often forms below the topsoil as a result of the pressure induced by the agriculture machinery and because of the finest particles caught on the divide between the tilled soil and untreated subsoil. The compacted layer is rather homogeneous, but there are features of different sizes, such as wheel tracks, till drainage shafts, local depressions, wormholes or cracks which redirect the water flow pathways or allow water to percolate into deeper horizon. The data acquisition targeting the spatial evaluation of the soil structure is, however, complicated. In this study, we utilize electrical resistance tomography in combination with penetration resistance tests and compare the results with complementary measured soil characteristics. Soil profile samples were taken to gain more complex information of soil physical characteristics possibly influencing the soil resistivity. We tried to relate the observed features to previous management activities at the field. Results showed, that the proposed technique can be used to compacted layer identification, but the information about its macroscopic heterogeneities is only in qualitative manner. The research was performed within the framework of a postdoctoral project granted by Czech Science Foundation No. 13-20388P and internal CTU project.