“Geophysics for agriculture – to the roots!”

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Potatoes often need irrigation during dry summer weeks, because of their shallow root system, high water needs and drought sensitivity. Lack of water at crucial moments can result in low tuber yield and loss of quality. Farmers typically adopt a ridge-furrow plant system for potato, but the fate of rain and irrigation water is not well understood. Incoming water is partitioned by plant leaves and by the microtopography itself, so that setting the boundary conditions in terms of water flow for hydrological modelling is complex. There is a strong need for a better understanding of water and nutrient fluxes in these systems to avoid over-irrigation and over-fertilization, especially on sandy soils.

Non-invasive imaging techniques, such as electrical resistivity tomography (ERT) are increasingly used in the agricultural context to characterize soil moisture patterns and dynamics, amongst other things. Nevertheless, non-uniqueness of the inversion and errors induced by uncertainties related to the measurement process still weigh on the application of DC resistivity techniques for high-resolution agricultural applications. In this talk, we will explore the artefacts we can expect originating from such uncertainties using a virtual experiment and then show the results of a monitoring experiment performed in a potato field in 2018. We will end with an overview of current challenges and perspectives for an emerging branch of geophysics: agro-geophysics.



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