



Comparison of surface NMR with non-invasive and in-situ measurements of soil water content at a floodplain field site

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Quantification of soil water content is a very relevant issue in soil and environmental studies. There is a broad spectrum of methods applied for measuring soil water content in the field either deployed in situ or non-invasively from the surface. For many reasons the latter is preferred in field studies. Nuclear Magnetic Resonance (NMR) is one of the rare methods that measure the water content directly. Whereas others, e.g. geophysical methods, make use of proximal relationships for determination of soil water content. We applied a new single-sided NMR sensor to non-invasively measure in-situ soil moisture profiles at several points along two transects in a floodplain. The field site exhibits variations in soil water content due to morphology, e.g. flood channels and alluvial fan structures. Furthermore we applied at the same transects (1) in situ methods: soil sampling for gravimetric analysis and TDR and (2) non-invasive methods: electromagnetic induction, mobile cosmic-ray neutron sensing with a rover and gamma-ray spectrometry. We will present results that confirm agreement of NMR and gravimetric analysis from soil sampling and discuss issues that arise when using non-unique proxy methods and relationships for determination of soil water content.