



Large scale characterization of unsaturated soil properties in a semi-arid region combining infiltration, pedotransfer functions and evaporation tests

Marouen Shabou (1), Rafael Angulo-Jaramillo (2), Laurent Lassabatère (2), Gilles Boulet (3), Bernard Mougenot (3), Zohra Lili Chabaane (1), and Mehrez Zribi (3)

(1) INAT, University of Carthage, Tunis, Tunisia, (2) LEHNA, ENTPE, Claude Bernard Lyon 1 University, Vaux en Velin, France, (3) CESBIO, Toulouse III University, Toulouse, France

Water resource management is a major issue in semi-arid regions, especially where irrigated agriculture is dominant on soils with highly variable clay content. Indeed, topsoil clay content has a significant importance on infiltration and evaporation processes and therefore in the estimation of the volume of water needed for crops. In this poster we present several methods to estimate wilting point, field capacity volumetric water contents and saturated hydraulic conductivity of the Kairouan plain (680 km²), central Tunisia (North Africa). The first method relies on the Beerkan Estimation of Soil Transfer parameters (BEST) method, which consists in local estimate of unsaturated soil hydraulic properties from a single-ring infiltration test, combined with the use of pedotransfer functions applied to the Kairouan plain different soil types. Results are obtained over six different topsoil texture classes along the Kairouan plain. Saturated hydraulic conductivity is high for coarse textured and some of the fine textured soils due to shrinkage cracking-macropore soil structure. The saturated hydraulic conductivity values are respectively 1.31E-5 m.s⁻¹ and 1.71E-05 m.s⁻¹. The second method is based on evaporation tests on different test plots. It consists of analyzing soil moisture profile changes during the dry down periods to detect the time-to-stress that can be obtained from observation of soil moisture variation, albedo measurements and variation of soil temperature. Results show that the estimated parameters with the evaporation method are close to those obtained by combining the BEST method and pedotransfer functions. The results validate that combining local infiltration tests and pedotransfer functions is a promising tool for the large scale hydraulic characterization of region with strong spatial variability of soils properties.