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# Constraining soil hydrodynamic properties using time series of remotely sensed surface temperature

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The specification of the soil hydrodynamic properties is often a limiting factor to accurately describe water and energy transfers at the soil-plant-interface, especially in environments with increasing water scarcity. Hydrodynamic properties are usually derived from generic pedotransfer functions, laboratory analysis, infiltration tests, or a combination of these methods, e.g. adjusting pedotransfer functions to local measurements. The accuracy of such methods is questionable, since textural properties used by pedotransfer functions do not describe the structural properties of the soils with enough precision, while infiltration tests cannot be easily scaled up to the catchment or even the field scale. In order to monitor water stress in a semi-arid irrigation area within the IRRIMED program, we investigated the possibility to use time series of remotely-sensed surface temperature to detect vegetation water stress, and how, under certain conditions, this information can be used to further refine the range of valid hydrodynamic properties at the scale of the remote-sensing measurements. In this presentation, a comparison of the obtained range of values is performed against 1) the amount of information one can retrieve from latent heat flux time series and 2) local estimates of the hydrodynamic properties deduced from infiltration tests. It is shown that deriving a rough estimate of the time-to-stress from remote-sensing brings as much information on the evaporation reduction due to water stress than the evaporation time series it self. Moreover, the soil hydrodynamic properties inversed from this estimate, although spanning a wide range of values in the hydraulic conductivity / retention curve parameter space, is consistent with the estimates obtained by other means (pedotransfer and infiltration tests).