

Measurements needed to ground-truth surface soil water content across a homogenous terrain

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Abstract. Soil moisture impacts a range of major hydrologic and geographic processes including evaporation, weather and climate, flooding, erosion, and solute transport. Soil moisture is highly variable in space and time, and recognizing the characteristics involved with moisture variability is important for understanding and predicting these hydrological processes. Soil water content can vary greatly across a seemingly homogenous environment and it is important to acknowledge and interpret this variation to better understand how it relates to climate and environmental processes such as water flow. Relative soil water content of the near surface was measured using Time Domain Reflectometry (TDR) probes across several small-scale study sites with homogenous terrain; specifically open fields with little human traffic and no canopy. Data were collected at a 1-m resolution or finer across from three 50-meter transects per site. Standard statistics were used to characterize the soil water content at each site, and variogram analysis was used to define the scale of variability as well as the fractal nature of soil moisture. Subsequently, an approximate sampling strategy is illustrated to measure soil moisture on the ground to evaluate remote sensing.