



Laboratory and in situ experiments on soil samples for determination of pedotransferfunctions

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One major objective of the iSOIL project is the determination of so called pedotransferfunctions linking measured geophysical parameters (for example conductivity and permittivity) to soil parameters (like clay content or salinity). Some empirical, site-dependent pedophysical functions are already developed, but there are limitations of validation regarding soil types, applied methodology, measuring boundaries etc. To develop new and to extend known models laboratory and in situ experiments of different kinds should be carried out.

For the laboratory experiments we collected disturbed samples (50kg each) of different soil types and from different depths. These samples are dried, crushed and then saturated with rain water in steps of approximately 2-5% volumetric water content. After each saturation step the samples are mixed thoroughly until they are assumed to be homogeneously and filled in a cylindrical container. We then conduct GPR (Ground Penetrating Radar) measurements with a 1.5GHz antenna using a metal plate underneath the container as a reflector to get the permittivity of the soil at each water content step. Also geoelectrical measurements determining the resistivity are carried out in different electrode spacings and configurations for each saturation step. For the whole series of measurements the water content is controlled by gravimetric methods and TDR (Time-domain reflectometry) measurements. Different empirical and hypothetical pedotransferfunctions have been fitted to the electrical (resistivity) and dielectrical (permittivity, radar velocity) parameters and discussed.

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