Geophysical Research Abstracts, Vol. 9, 01451, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01451

Calibration and characterization of an improved low-cost water content sensor

C. Campbell, **D. Cobos** and G. Campbell
Decagon Devices, Washington, USA
(doug@decagon.com / +1 509 332 2756)

Reliable measurements of volumetric water content in soil and soiless media are important in research and industry. While several high-quality sensors are available, often users are left with a choice between cost and number of installation sites. Further, some low cost sensors can require soil specific calibration and may have considerable sensitivity to soil electrical conductivity (EC). The objective of this study was to further characterize two new, low cost sensors to determine how they performed in soil and soiless media with varying water content and EC, over a range of operating temperatures and to provide dielectric calibrations for the sensors. No differences were found between calibration curves for the sand, silt, and clay soils that were tested (solution EC from 0.1 to 8 dS/m) for either probe. Additionally, electrical conductivity did not appear to affect calibrations in potting soil or rockwool. However, calibration curves for the mineral soils, potting soil, and rockwool were different, but considering the dissimilarity in air-filled porosity, dielectric permittivities of dry materials seemed to account for their differences. The effects of temperature on sensor output in wet media were consistent with the change in the dielectric of water for coarse textured soil and soiless media (negative correlation) but had a positive correlation for finer-textured soils. Concomitantly measured dielectric permittivity showed good agreement with probe output for all measured soil and soiless media.