



Temperature Dependency of Bound Water Spectral Parameters and its Influence in Soil Moisture Measurements

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An intercomparison between moisture, measured with Delta-T Theta Probe, and microwave moisture index arose an anomaly related with daily temperature cycles on measurements. The objectives of this paper are (1) to characterize the temperature effects on probe measurements, (2) to verify that moisture cycles are related to temperature variations, (3) to parametrize temperature effects on probe and (4) to use this parametrization to correct moisture data. Laboratory measurements were performed for different soil water content and a wide range of temperature to characterize probe response. The experimental results led to the evidence that: (1) bound water relaxation lays in the range of in situ moisture probes measuring frequency and (2) bound water relaxation frequency increases with soil temperature interfering in a significant way in moisture measurements. Microwave remote sensing data is used as a reference for soil moisture, because of the radiometer outstanding characteristics (sensitivity, accuracy, beamwidth and thermal regulation) and because its measuring frequency (1.4 GHz) is far from moisture probes measuring frequency (100 MHz). These results have implications in field experimentation as most in situ moisture sensors work in similar range of frequencies. The correction proposed in this paper can be used to improve accuracy on moisture measurements.