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243-6 Field Tests of a Down-Hole TDR Profiling Water Content Measurement System.

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Tuesday, October 18, 2011: 9:25 AM

Henry Gonzalez Convention Center, Room 206A, Concourse Level

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Joaquin J. Casanova¹, Steven R. Evett¹, Robert C. Schwartz¹ and Scott K. Anderson², (1)Conservation & Production Research Laboratory, USDA-ARS, Bushland, TX
(2)Acclima, Inc., Meridian, ID

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Accurate soil profile water content monitoring at multiple depths has heretofore been possible only using the neutron probe (NP) but with great effort and at unsatisfactory intervals. Despite the existence of several capacitance systems for profile water content measurements, accuracy and spatial representativeness has been precluded by fundamental problems related to conductivity and soil structure effects on the volume explored by the static electromagnetic (EM) field of these sensors, which causes nonrealistic spatial variation in profile water contents. Time domain reflectometry methods have the distinct advantage of employing a moving EM field that must pass through and be affected by both the drier and wetter soil structures in which the TDR electrodes are embedded. This gives rise to the expectation that a profiling water content system based on TDR methods will provide realistic spatial variations in profile water content and may be competitive with the NP for accuracy while providing unattended, real-time, wireless data acquisition. Such a system is described and results of field tests are reported.

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