



Stability of time domain reflectometer measurements of water flow and solute transport in different field soils

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Accurate measurements of soil moisture and solute concentration in vadose zone are crucial for sound management of agricultural systems and environment. Time Domain Reflectometer (TDR) is a commonly used technique, among a variety of techniques, to measure soil moisture and solute concentration simultaneously in this zone. Most of the studies conducted by TDR are under laboratory conditions rather than field works. In this study, recently developed TDR (TDR100) was used to measure spatial (vertical) and temporal variations of soil moisture and solute concentration (bulk electrical conductivity, BEC, emerged from CaCl_2) applied on the surface of soil plots in texturally different three field soils. TDR100 readings of soil moisture were in wide range, where the most unstable readings of soil moisture were observed in clayey soil while the most stable readings were observed in sandy soil. Silty soil was in between these two soils in terms of stability of TDR100 readings. Although moisture readings of TDR100 in clayey soil change in wide range, BEC readings were much more stable. After the presentation of the variation of these two parameters (moisture and BEC) with time, the possible reasons of variations of readings in different soils are discussed in this study.

Key Words: Soil texture, vadose zone, soil moisture, solute concentration.