

Comparison Between Methods for Soil Salinity Measurements

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RESUME

Measurements of water content and solute concentrations are essential to control and evaluate the hazard of soil salinity. Traditional measuring techniques like soil sampling are tedious and expensive and thus often do not give the necessary spatial and temporal resolution needed. Thus, there is a great demand for new and more accurate methods of measuring water content and salinity. Time domain reflectometry (TDR) and Sigma probe, which are electromagnetic techniques, are quick and easy equipment to use. However, there is lack of information about the comparison between the two instruments. Consequently, the objective of this study is to compare these two techniques. For this reason, data from Tunisia (Elgoazin hill catchment) was used. About 250 measurement points with TDR and Sigma probe were taken in February 2000 to measure water content, bulk soil salinity, and soil water salinity. A result of the study was that small-scale variation for Sigma probe is greater than that for TDR. This is probably explained by the difference in measurement volume of the two techniques (Sigma Probe measures a few cubic centimeters whereas TDR measures average value within a relatively larger soil volume (around 200 cm³)). This conclusion was verified a separate study performed in Sweden. Six different areas in Sweden with different soil characteristics were chosen for sampling. These measurements were taken at two soil depths (at the surface and at 40 cm depth). Disturbed samples were taken to calculate soil density and investigate soil characteristics. However, Sigma probe shows some advantages. Its measurements can be made over small temporal and spatial scales, and it is easy in use and handling because of its small volume and weight, furthermore, measurements can be made in highly saline soils.

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