

## Field techniques for measuring soil water content of unsaturated soils using ground-penetrating radar

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A fast, simple and nondestructive procedure to measure near-surface soil water content profiles in unsaturated sandy soils is proposed. Surface ground-penetrating radar (GPR) system is employed to estimate the average soil water content in the survey region as a function of the soil dielectric constant measured by electromagnetic wave velocities. GPR has a couple of advantages over the intrusive soil moisture sensors. GPR system offers a simple approach for in-situ determination of soil water content and a completely non-intrusive measurement. GPR may be a suitable for low-cost mapping of soil water content profiles in large sample volume. The utility of our proposed method was demonstrated by using field infiltration experiments for Tottori dune sand.