

Tracking Wetting Front Seamlessly during Infiltration using Array Ground Penetrating Radar

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As an array ground penetrating radar (GPR) electrically switches any antenna combinations sequentially in milliseconds, both common-offset gather (COG) and multi-offset gather (MOG) data can be acquired almost seamlessly. The main objective of this study was therefore to determine if COG and MOG surveys by the array GPR which allows 110 different antenna combinations could detect a wetting front during vertical field infiltration. An infiltration experiment was conducted at an experimental field inside Tottori Sand Dune, Japan. Time-lapse radargrams of COG and MOG by the array GPR clearly show the wetting front evolution with time. Reflection signals in MOG radargrams agree well with two-way travel times predicted from dielectric constant independently observed with a soil moisture sensor. This study confirms the usefulness of the array GPR for monitoring and quantifying the infiltration process in the field.