

第7回 IEST セミナー

「Subsurface hydrology and environment」

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Abstract

Soil moisture in the shallow subsurface is crucial for proper decision making in various civil, geotechnical, environmental engineering, and agricultural applications. From the environmental standpoint, a lot of attention has been paid to problems such as understanding how we conserve groundwater resources and keep it safe, or how contaminant is transported in groundwater and so on. Another type of ground pollution that needs immediate attention but not well-known in Japan is the “landmines (地雷)” buried in the shallow subsurface. Approximately 100 million landmines are buried over 64 nations over the world and United Nations states that “*One of the most widespread, lethal, and long lasting forms of pollution*”. Typically, detection of landmines is based on identifying dielectric and/or thermal anomalies at the ground surface. Both dielectric and thermal properties are known to vary with soil moisture. Using the state-of-the-art sensor technologies, we have investigated the thermal properties of soils as a function of soil moisture using four test sands with varying grain sizes. The methodology and results of the well-controlled laboratory experiments will be presented as well as extended applications of the soil thermal properties to different engineering problems, e.g., utilizing renewable energy.



Figure 1 . Anti-tank landmine



Figure 2 . Ground-source heat pump

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