[JJ] Evening Poster | H (Human Geosciences) | H-TT Technology & Techniques

[H-TT19]New Developments in Shallow Geophysics

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The session of shallow geophysics calls many research contributions on geophysical exploration techniques for the near surface. Our target depth is strictly restricted in the depth zone from 5 cm to 30 m (or from 2 in to 100 ft) below the surface of the ground. It may be the closest unknown territory for human society and advanced societies cannot have controlled yet to avoid disasters caused by dynamics in the shallow near surface. Peoples require techniques to manage levee, landslide and earth constructions also knowledge to control groundwater, liquefaction and soil pollution. The near surface has many geotechnical, environmental and hydrogeologic problems.

Major survey techniques are surface wave method, electric exploration, ground-penetrating radar and land streamer, but any methods will be discussed if your target is located in the specified depths. This session welcomes to discuss laboratory tests and rock physics for unconsolidated porous media in the vadose zone. Also, we will welcome not only cutting-edge technologies but also classic theory, if the knowledge is useful for human living.

[HTT19-P07]Monitoring of Shear-wave velocity in the vadose zone.

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Shear wave velocity is geophysical parameter related to stiffness. This is useful indicator to assess the stability of ground. We observed change of shear wave velocity due to the water infiltrated into a vadose zone. An experiment of time-lapse S-wave tomography was conducted at PWRI tsukuba site. First, we monitored artificial water infiltration process. We dug a small trench on a crown of 2 m high model levee. Then, we poured fresh water into a trench under constant water level. A survey line was set across the center of trench. As a result, the extension of decrease in shear wave velocity was clearly imaged as time passes. Next, we measured just after rain and compared shear wave structure between before and after rain. As a result, an area of decrease in shear wave velocity distributed in shallow ground. Two types of result showed that decrease of stiffness in ground due to the water infiltrated into a vadose zone and shear wave velocity of unsaturated soil was a parameter depended on volumetric water content of a soil. Monitoring of shear wave velocity enables us to extract a weak zone due to rainfall. In addition, this method is expected to assess the stability of levee and road embankment during rainfall.