[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-P03]Surface seismic survey using horizontal ground vibrations for monitoring shallow ground conditions

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Surface seismic survey is frequently used to survey shallow ground structures. The method of surface seismic survey mainly observes and analyzes propagation of Rayleigh wave. Recently, the technology of distributed acoustic sensing (DAS) using a fiber optical cable has been developed. The DAS technology use optical fiber cable with reasonable price for transducer device and can measure records of ground vibration in a long section so that it is considered to have high potential to use for monitoring ground conditions. When the DAS technology will be used to survey shallow ground, it becomes important to observe and analyze records of surface wave. The DAS technology has high sensitivity of the expanding direction of an optical fiber, which is different from the measuring condition using standard vertical vibration. Thus, we evaluate surface survey using horizontal vibration along a survey direction. 10 Hz geophones of three components was used for our study. Amplitude of a horizontal component is lower than the amplitude of a vertical component in the source condition of a vertical shot, but we could acquire dispersion curves from horizontal vibrations along a survey line similar to that from vertical vibration. Surface seismic survey is considered to be able to be applied using the DAS technology. Optimum depths set for optical fibers and difference between a vertical component and horizontal components are also discussed.

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