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Minisymposium

Thermal site characterization for power cable and shallow geothermal energy design

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Under main theme: 700 Thermal and thermomechanical site characterization

Abstract

With the global focus on sustainable energy solutions, there is an increasing demand for accurate site characterization of thermal properties of soils. This demand stems from two significant applications (1) design of geothermal energy solutions such as ground source heat systems and geothermal energy structures and (2) design of power cable networks, including cables which transport electricity from offshore wind farms to land. This minisymposium focuses on thermal site characterization for shallow geothermal applications and the design of power cables embedded in soil.

Thermal properties of soils include (1) thermal conductivity/resistivity and (2) volumetric/specific heat capacity. Currently, thermal properties of soils are characterized within ground models which are build up by a variety of datasets, including geological, geophysical, and geotechnical (geothermal) data. Geotechnical data can be obtained from laboratory tests and in situ tests.

Topics addressed during the minisymposium may include:

- Effects of installation and operation of energy structures and cables on the thermal behaviour of soils
- Benefits and challenges of laboratory thermal testing of soils
    - Effects of sample disturbance and/or specimen reconstitution
    - Effects of degree in saturation
- Benefits and challenges of in situ thermal testing of soils
    - Effects of soil disturbance by in situ test tool
    - Reliability of results
- How to integrate point data into site-wide geothermal characterization
- Future of thermal site characterization