

## 6<sup>th</sup> International Conference on Energy, Sustainability and Climate Change ESCC2019

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**Presentation Title:** “Ground Thermal Characteristics of typical soils in Cyprus for Ground Heat Exchangers”

**Abstract (max 300 words):**

Shallow Geothermal Energy Systems (SGES) rely on exchanging energy between the building and the ground. This is achieved with Ground Source Heat Pump (GSHP) systems by utilizing Ground Heat Exchangers (GHEs). GHEs are essentially a network of pipes installed in the shallow depth of the ground responsible for extracting or rejecting heat to and from the ground.

The thermal characteristics of the ground affect the rate and the performance of the GSHP and, hence, such information is vital for designing a GSHP system. Such characteristics include the thermal conductivity, the thermal diffusivity and the specific heat capacity and can be obtained by using empirical prediction models, laboratory tests and in-situ tests.

This paper presents Laboratory thermal tests, which have the advantage of requiring less time, small volume of soil, and reduction in cost. Evaluation of thermal properties is achieved by using two commercially available transient needle probes; namely the Isomet-2104 and Hukseflux-TPSY02 and one surface probe by Isomet-2104. A comparison on the testing and the accuracy of the equipment is presented. Furthermore, a numerical modeling solution using COMSOL Multiphysics software is presented and validated against the experimental data.

**Topic:** Hydroelectricity, Geothermal & Solar Energy

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