Soil thermal properties are of great interest in many scientific and engineering applications. In recent years considerable effort has gone into developing techniques to determine soil thermal properties. One technique that has received attention employs heat-pulse technology. The Dual-Probe Heat-Pulse (DPHP) sensor consists of a pair of stainless steel needles. One needle acts as an heater and the other is used to monitor temperature changes. After the sensor needles are inserted into the sample, a current is applied to the heater for a given time duration. The specific heat of the material is inversely proportional to the height of the sensed temperature rise, and the thermal diffusivity of the material is related to the time taken for the pulse peak to pass the temperature sensor. The thermal conductivity can then be computed as the product of the thermal diffusivity and the specific heat. This solution is a particularly attractive instrument as, apart from providing the thermal properties, it can also assess the water content. Although numerous methods for determining water content are available, such as the time domain reflectometry (TDR), the DPHP sensors are preferred when small volume of soils are investigated like, for instance, when near surface water content is assessed.

The objective of this work is the design of a low cost - open hardware portable device for the measurement of soil thermal properties and water content.

The DPHP probe showed an accuracy comparable to TDR in estimating water content, but the DPHP can be used to investigate smaller volume of soil.

**Acknowledgements**

I thank one of my best friends, who prefers to be anonymous, for his help in assembling and programming the portable device, and my son Angelo Hui Tao Ravazzani for his help in collecting beach sand.