G.POT: a method for the assessment and mapping of the near-surface geothermal potential

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Shallow geothermal systems are widely recognised as a valuable technology for the heating and cooling of buildings. The most adopted technology is the Borehole Heat Exchanger (BHE), since it can be installed almost everywhere. However, the economic viability of BHEs depends on the thermal load that can be efficiently exchanged with the ground, i.e. the near-surface geothermal potential.

We present the G.POT (Geothermal POTential) method for the assessment of near-surface geothermal potential as a function of the thermal conductivity and capacity of the ground, of its initial temperature, of the thermal resistance of the BHE and of the duration of the sinusoidal thermal load cycle, which reproduces the typical pattern of a thermal load during a heating or a cooling season. The function was calibrated from the results of numerical heat transfer simulations, performed varying the values of the aforementioned parameters over broad ranges.

G.POT is a simple mathematical tool which can be easily implemented for the large-scale assessment and mapping of the near-surface geothermal potential for heating or cooling purpose. An example of its application is also shown, and advice is provided on the processing of input parameters.

References
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