

Evaluation of soil thermal properties for geothermal heat pump systems

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[Outline]

This study developed a method for in-situ measurement of thermal conductivity and an evaluation method for heat exchangers using the effective thermal conductivity.

[Details]

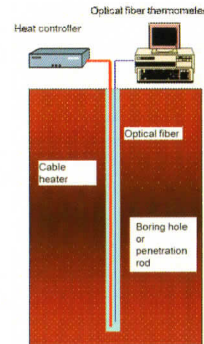
The efficiency of geothermal heat pumps partly depends on thermal properties of the soil, thus heat-pump design requires knowledge of the effective thermal conductivity of soil. This study developed an in-situ logging method using a small-diameter borehole and a penetration rod. A heat-conduction simulation based on a cylindrical model was developed that achieved a good correlation with the result of an actual heat-pump experiment.

- Jinguuji et al. (2010) Journal of The Geothermal Research Society of Japan, 32 (3), 185-191 (in Japanese).

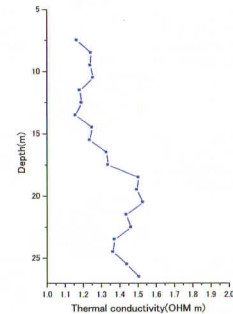
[Application of research results]

Use preliminary ground survey results in cost estimates for geothermal heat pump systems

Promote adoption of geothermal heat pumps through faster and simpler design process.

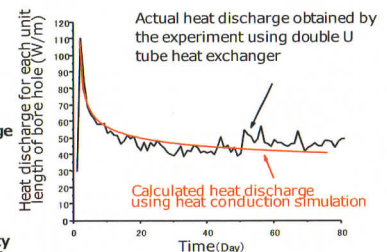
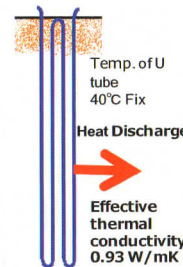


Schematic view of thermal conductivity logging.



Thermal conductivity and resistivity profiles with depth.

Double U Tube



Schematic of cylindrical simulation model (left) and actual experiment using geothermal heat pump (right).