

Deliverable D1.2

Realisation of thermal data catalogue and guideline for a customized GRT for shallow geothermal heat exchangers

WP1

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Dissemination Level

PU	Public	
CO	Confidential, only for members of the consortium (including the Commission Services)	X
CI	Classified, as referred to in Commission Decision 2001/844/EC	

Publishable summary

The deliverable D 1.2 “Realisation of thermal data catalogue and guideline for a customized GRT for shallow geothermal heat exchangers” is a confidential document delivered in the context of WP1 “Geological mapping, climatic data and energy requirements”.

This document reports the activities performed to build up the Geological Thermal Properties Database.

The knowledge of thermal conductivity of materials is one of the main input parameters in geothermal modeling since it directly controls the steady state temperature field. An evaluation of this thermal property is required in several fields, such as designing and modeling ground source heat pumps plant in order to assess the geo-exchange potential of the subsoil.

The aim of this study is to provide original thermal conductivity values of rocks and unconsolidated sediments useful for the evaluation of both low and high enthalpy resources at regional or local scale. In order to overcome the existing lack of thermal conductivity data of rocks and unconsolidated sediments, a series of laboratory measurements has been performed on several samples collected in outcrop or from cores. The samples are representative of the main lithologies distributed in the European region, mainly collected in different parts of Italy or in other parts of Europe. An extensive sampling campaign was carried out covering the main European representative geological contexts, i.e. that is those characterized by the greatest areal extent and the highest density of potential users.

The definition of the lithologies and of the class of the unconsolidated samples follows a practical approach, in order to comply with the applied point of view utilized by the geo-exchange operators on site. The measured thermal conductivity values of rocks and loose materials have been validated by comparison with data published in the international literature. For this purpose, a general review of heat conductivity range obtained by direct laboratory tests reported by different authors has been performed, presented in panels for each lithology and thus organized in a database to be used as reference.

Finally, in order to provide useful and easy-to-handle data to be used to identify the better location and conditions for the development of low enthalpy geothermal systems, all the data have been collected and organized in a database to be inserted into a Decision Support System. In addition, the data have been used to perform specific thematic maps thereby representing the physical parameters (geological, thermal) that most influence the subsoil thermal exchange capacity and drillability in a synergistic and simplified way.