Abstract overview

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Abstract title	**Thermal logs as a tool for Darcy velocity determination**

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We propose a technique for the determination of main hydrogeological parameters and characterization of groundwater flow from thermal logs. This information is essential for the reconstruction of the water circulation path in the potential geothermal reservoirs. Thermal profiles are generally analyzed to infer information on the terrestrial heat flow and the geothermal gradient under the assumption of a purely conductive thermal regime. The methodology here proposed is based on the study of temperature recorded in boreholes affected by advection. From these data it is possible to recognize the presence of water flow in permeable horizons, but also to quantitatively describe it. The analysis is performed by using analytical models of interpretation of heat transport by advection and yields an estimation of the Darcy velocity, a key parameter for the development of hydrogeological models also finalized to the exploitation of low-enthalpy geothermal resources. The hydrothermal parameters are determined by matching temperature and thermal data with analytical models comprising both heat and water transfer. As an example of application, we select the Maggiore Valley, located in hilly area (Asti Reliefs) of NW Italy where an important aquifer occurs.The stratigraphic succession consists of Pliocene marine sediments (Asti Sand, Zanclean) and the Lower Villafranchian Complex (Ferrere and San Martino Unit, Piacentian). The application of the analytical model proposed to temperature data recorded in the water wells, an aquifer relatively warmer, with predominant horizontal flow. The higher flow seems to be located at depths greater than 60 m, within the marine sediments with sandy texture, and the inferred horizontal velocity values ranging from 10^{-6} - 10^{-7} $m \cdot s^{-1}$.