

# The terrestrial heat-flow density database in the framework of geothermal potential studies

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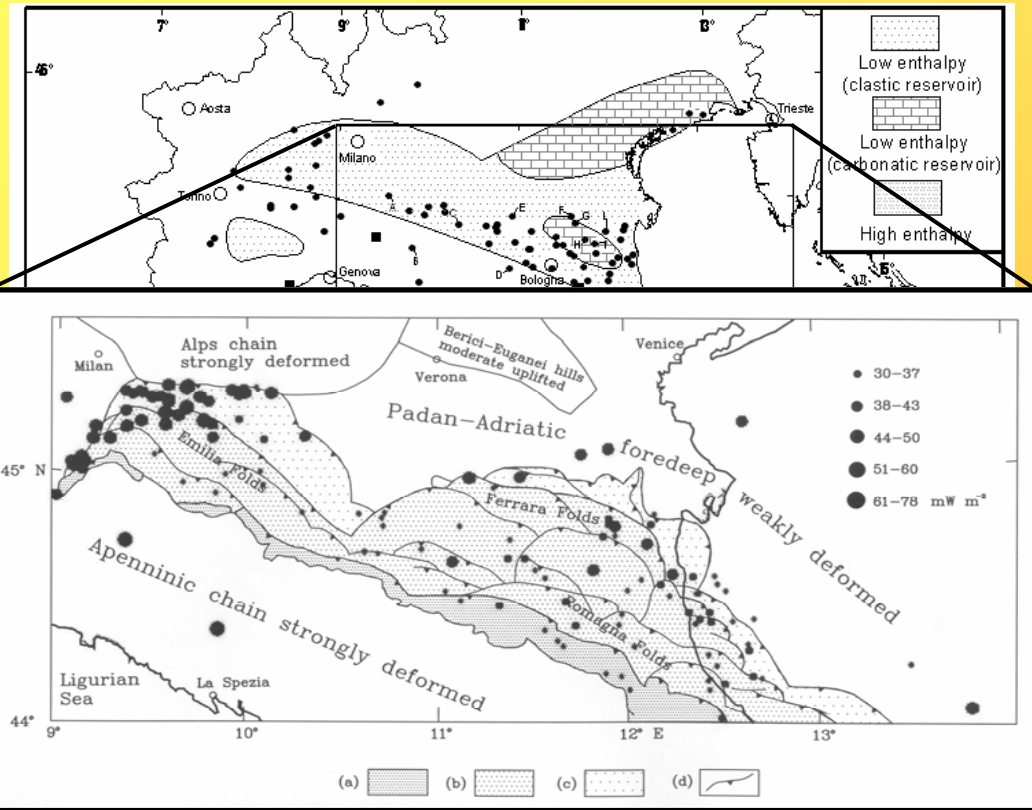
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The terrestrial heat-flow density is the unique measurable evidence of the internal heat sources, which supply energy for fundamental geodynamic processes (uplift, subduction, rifting, subsidence etc.). Moreover, it is an important constraint for the assessment of geothermal resources of a region.

Concerning the geothermal potential of the central-northern Italy, in the last decade the Geothermal Group of the Genoa University has implemented a database using about 600 heat-flow density values collected during international research projects.

The onshore heat-flow density estimate is based mainly on bottom hole temperature and thermal conductivity data from petroleum exploration wells.

So far, the database was implemented in the area of the Northern Apennines, with a large number of new temperature data and conductivity measurements collected in oil wells.



We compiled these data into a relational database provided with a flexibility and completeness of information. This format includes additional information about the measurements, corrections to temperature, lithologies and corresponding tectonic unit. This methodological approach will be extended to the other areas of Italy and adjacent seas to obtain a more homogenous database useful for geothermal potential studies.

The methodological approach and the techniques of analysis are described in the poster. Considerable amount of work is needed to verify the entire data set and reformat it in a form suitable for scientific analysis. The objectives and proposed activities of our research group include:

- processing of temperature data from boreholes and inversion of the observed thermal signal for the reconstruction of the thermal state of the underground and of groundwater flow in permeable media
- determination of thermo-physical properties of rocks and soils (porosity, density, conductivity, diffusivity, specific heat, radiogenic heat production) at our lab of Experimental Geophysics and Radiometrics (empowered Ministry of University and Research - MIUR, DM 593/00 Art. 14 Lab)
- studies on the geothermal potentiality with analytical and numerical modeling taking into account the thermal effects of heat convection in deep carbonatic aquifers
- studies on the tectonic subsidence and the degree of thermal maturity of organic matter in the sedimentary basins
- thermal models of lithosphere stretching and overthrusting, of crustal doubling and subduction for the reconstruction of the evolution of the main recent tectonic processes