Geothermal resources characterization of two areas in southern Tuscany

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Based on a joint analysis of geothermal indicators (e.g. temperature map at different depth, surface heat flux) and practical features (e.g. restricted areas, existing research lease), two promising areas in southern Tuscany were identified to perform a more detailed geothermal resource characterization. An area is located on the north-east of the Larderello-Travale geothermal field, and the other one is located on the west of the Mt. Amiata geothermal field.

A quantitative geothermal resources assessment was performed in the aforementioned areas of Tuscany by solving numerical thermo-fluid dynamic models and by computing the geothermal potential using the ‘ThermoGIS’ software, as further developed for the Italian case (Trumpy et al., 2016).

First of all, geological and geophysical data required for geological and thermo-fluid dynamic modelling were collected and organised. The geological data were used to build a 3D geological model of the two areas of interest suitable for numerical simulations. Static temperature data gathered from the Italian National Geothermal Database together with site-specific heat flow measurements were used to calibrate the simulated steady state temperature distribution.

The geothermal potential computed by integrating geological, thermal and petro-physical information implementing the volume method used in ThermoGIS provided estimates of the heat in place and the geothermal technical potential maps. The resulting technical potential in the area close to Larderello –Travale is 330 MWₑ and in the Mt. Amiata sector is 50MWₑ.

References