ThermoMap – Spatial mapping of superficial geothermal energy resources using WebGIS for information distribution

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Renewable energy resources are becoming more and more important in recent times. Besides the well-researched and already implemented solar, wind, and hydro power domain, less research has been done in the analysis of very shallow geothermal energy resources in Europe.

However, industrial partners from the EU funded project ThermoMap argue for an efficient and inexpensive exploitation of this geothermal resource. Based on existing geodata the authors together with the ThermoMap consortium developed an approach to estimate very shallow geothermal potentials for the first ten meters below surface. Pedological, climatological, topographical, geological, administrative, and groundwater data sets have been used to calculate both the pan-European geothermal energy potential on a small-scale (1:250.000) and selected case study areas on the local (site level) to medium (landscape level) scale. In this talk we will demonstrate the methodological framework for the pan-European approach and its extension to the processing methods developed for the geoscientific data sets in different test areas across the twelve partner countries. Processing methods are unified across Europe and standards developed for the spatial analysis in order to allow a unified geovisulisation approach. For visualisation, a WebGIS prototype was developed to spatially explicit map the different very shallow geothermal energy potentials (http://tinyurl.com/7zpmae4). The results show variations of air temperature and heat flow in depths which are predominantly controlled by soil parameters like grain size, bulk density, pore size distribution and characteristic air- and water balance within the soil matrix. Thus, the modelling approach and the WebGIS toolbox provide target groups such as planners, governments and non-governmental organisations with a common interactive information tool for instance on heat conductivity in W/m*K and heat capacity in MJ/m3*K. This is running on a platform independent web browser. Private users may check the potential of their residential district, community planning and administration authorities may test the geothermal potential of their entire administrative unit. Thus, this tool is intended for multi-purpose use in a transdisciplinary working environment.