

Abstract

With the advances in research of the Hot Dry Rock environment and Enhanced Geothermal Systems, geothermal energy is soon going to compete with other unconventional energy resources in Europe where Germany and France are pushing the research ahead. In the Czech Republic, the geothermal exploration borehole drilled in Litoměřice in 2006 – 2007 provided information that contributed greatly to the understanding of geothermic conditions in the country. In addition to Litoměřice, two other areas have been recently subject to geothermal exploration: Semily and Liberec. These three areas have been studied in detail in this Master's thesis to assess their geothermal potential.

Information on the geology of the selected areas was gathered from numerous scientific papers and reports and was compared with information from geological maps and boreholes. On the basis of this information, geological sections of the area of Litoměřice and Semily were compiled. Drill core samples from five boreholes from the geological units in the areas under investigation were collected and measured using the Lippmann & Rauhen Thermal Conductivity Scanner. Thermal conductivity of geological units inferred in the basement but not intersected in the boreholes was estimated on the basis of values presented in literature. Finally, heat flux was calculated for each locality using the measured values of thermal conductivity and borehole temperature measurements. All these data were used for the construction of 2D geothermic models of the studied areas.

According to these models, Semily seems to be the most suitable area for geothermal energy utilization, with temperature at 5 km depth exceeding 160°C. Liberec and Litoměřice could be less favourable if an unfortunate combination of heat flux and basement rocks was encountered at depth. However, all the models include numerous uncertainties, which should be inspected in terms of further research.