Geophysical Research Abstracts
Vol. 18, EGU2016-18030, 2016
EGU General Assembly 2016

Data assimilation for the investigation of deep temperature and geothermal energy in the Netherlands.

Damien Bonté (1), Jon Limberger (1), Lindsey Lipsey (1), Sierd Cloetingh (1), Jan-Diederik van Wees (1,2)

(1) Utrecht University, Budapestlaan 4, 3584 CD Utrecht, The Netherlands (d.d.p.Bonte@uu.nl), (2) TNO, Geo-Energy, Princetonlaan 6, Postbus 80015, 3508 TA Utrecht, The NetherlandsI

Deep geothermal energy systems, mostly for the direct use of heat, have been attracting more and more interest in the past 10 years in Western Europe. In the Netherlands, where the sector took off with the first system in 2005, geothermal energy is seen has a key player for a sustainable future. To support the development of deep geothermal energy system, the scientific community has been working on tools that could be used to highlight area of potential interest for geothermal exploration. In the Netherlands, ThermoGIS is one such tool that has been developed to inform the general public, policy makers, and developers in the energy sector of the possibility of geothermal energy development. One major component incorporated in this tool is the temperature model.

For the Netherlands, we created a thermal model at the lithospheric scale that focus on the sedimentary deposits for deep geothermal exploration. This regional thermal modelling concentrates on the variations of geological thermal conductivity and heat production both in the sediments and in the crust. In addition, we carried out special modelling in order to specifically understand convectivity in the basin, focusing on variations at a regional scale. These works, as well as recent improved of geological knowledge in the deeper part of the basin, show interesting evidence for geothermal energy development. At this scale, the aim of this work is to build on these models and, using data assimilation, to discriminate in the actual causes of the observed anomalies.

The temperature results obtained for the Netherlands show some thermal patterns that relate to the variation of the thermal conductivity and the geometry of the sediments. There is also strong evidence to indicate that deep convective flows are responsible for thermal anomalies. The combination of conductive and local convective thermal patterns makes the deeper part of the Dutch sedimentary basin of great interest for the development of geothermal energy.