



## **ThermoGIS: An Integrated Web-Based Information System for Geothermal Exploration and Governmental Decision Support for Mature Oil and Gas Basins**

Jan-Diederik Van Wees (1), Ieslie Kramers (1,2), Alexander Kronimus (1), Maarten Pluymaekers (1), and Harmen Mijnlief (1)

(1) TNO, Utrecht, Netherlands (jan\_diederik.vanwees@tno.nl), (2) VU University Amsterdam, The Netherlands

In the recent years the uptake of geothermal energy through implementation of low enthalpy geothermal production systems for both electricity and heating has been growing rapidly in north-western Europe. Geothermal exploration and production takes largely place in sedimentary basins at depths from 2 to 5 km. Geothermal activities can take considerable advantage from a wealth of existing oil and gas data.

To governmental bodies, such as geological surveys, it is a major challenge to put relevant oil and gas data and derived subsurface structural, temperature, and flow property models available to the geothermal community and to facilitate in quantitative assessment of geothermal potential of targeted areas, for both heat and electricity production (EGS). In order to face this challenge, TNO has developed a public web-based 3D information system connected to a geothermal performance assessment tool.

The public information system (thermoGIS) includes high resolution 3D geological models covering the complete onshore of the Netherlands, outlining key geothermal reservoirs and allowing users to assess relevant parameters and their underlying uncertainties. State-of-the-art 3D modeling techniques have been used and developed to obtain the reservoir structures, flow properties and temperatures, using constraints from over a thousand deep wells, and detailed subsurface mapping from 3D and 2D seismic. Users can obtain key reservoir parameters, and underlying uncertainties at any location and for any reservoir. In an automated workflow these parameters are fed into the performance assessment tool, in order to assess the probability of success to meet minimum requirements on key performance indicators such as Coefficient of Performance (COP), power produced, and Unit Technical Cost (UTC). The use of the ThermoGIS will aid exploration business decisions and Dutch governmental institutions, law makers and insurance companies. ThermoGIS can be used both for direct heat as well as EGS exploration.