

Combined geoscientific investigations of geothermal reservoir characteristics in Lower Saxony, Germany

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Introduction

The federal state of Lower Saxony pursues the ambitious goal to maximise the use of its geothermal potential for the supply of thermal heat and electric power.

Lower Saxony is largely situated in the North German Basin. It provides a significant geothermal potential, although temperature gradients are moderate. However, deep drilling up to several thousand meters is required to reach temperatures high enough for efficient generation of electric power. The costs of developing a geothermal reservoir are therefore high, and the risk of missing the optimum drilling location must be minimised.

The gebo project

The collaborative research program "Geothermal Energy and High Performance Drilling" (gebo) started in 2009 and unites several universities and research institutes in Lower Saxony, Germany. It aims at a significant increase of economic efficiency by introducing innovative technology and high tech materials. Furthermore, a better understanding of the geothermal reservoir is essential.

gebo is structured into four main fields: Geosystem, Drilling Technology, Materials, and Technical Systems. Here, we show the combined work of the Geosystem group.



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Projects concerned with geophysical Exploration

G1: Detection of Fault Zones Using Seismic Methods









Projects concerned with Modelling

G7: Modelling of **Coupled thermo-hydro**mechanical Processes in Georeservoirs



Flow pattern in a doublette (black: flowpaths, white: isopotentials, *surface: piezometric head)*

Elastic parameters from Pand S-wave measurements

Impact of fracture geometry on hydraulic parameters

Process coupling between heat transport and fluid flow

> Modelling of chemical processes

Projects concerned with the Characterization of the reservoir

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