Technical University of Munich

Chair of Hydrogeology
Geothermal Energy Group

Management of Deep Geothermal

Recent federal and state projects for the exploration and development of the hydrothermal potential in Bavaria

BeM-TG Bayern

Lehrstuhl für Hydrogeologie
TUM School of Engineering and Design
Technische Universität München

Lehrstuhl für Erneuerbare und
Nachhaltige Energiesysteme
TUM School of Engineering and Design
Technische Universität München

gefördert durch:

Bayerisches Landesamt für
Umwelt

GIGA-M

ENERGIE AGENTUR
EBERSBERG – MÜNCHEN

EWG

Landkreis München

Gefördert durch:
Bundesministerium
für Wirtschaft
und Klimaschutz

aufgrund eines Beschlusses
des Deutschen Bundestages

GeoChaNce.Bayern

Professur für Geothermal Technologies
TUM School of Engineering and Design
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gefördert durch:

Bayerisches Landesamt für
Umwelt
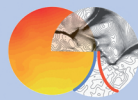
GAB

TUM   FAU   HM

UNIVERSITÄT BAYREUTH   LMU LUDWIG MAXIMILIANS UNIVERSITÄT MÜNCHEN

gefördert durch:

Bayerisches Staatsministerium für
Wissenschaft und Kunst

BeM-TG Bayern

BEurteilungs**M**odell für die hydrothermale **T**iefen**G**eothermische Nutzung in Bayern (Assessment model for deep hydrothermal geothermal utilization in Bavaria)

BeM-TG Bayern

Objectives

- **User-oriented** development of an area-wide assessment model for the use of hydrothermal geothermal energy in the Bavarian part of the Molasse Basin for the approval authorities as basic planning information

- Creation of a holistic **data model**

- Planning and implementation of the update of the relevant database

- Consolidation and joint evaluation of all available basic data for a regional geological and numerical model

- Creation of a coarse-scale regional reservoir model to represent and forecast hydraulic-thermal interactions of existing and planned facilities

- Development and implementation of a modular WebApp-based assessment tool

- Development of simplified procedures and optimization methods for predicting pressure and temperature propagation

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GIGA-M

Large-scale integrated overall analysis of the deep geothermal potential and its synergetic use in the greater Munich area
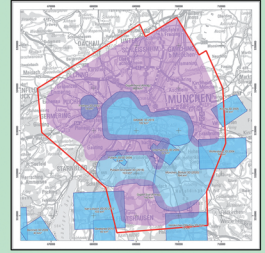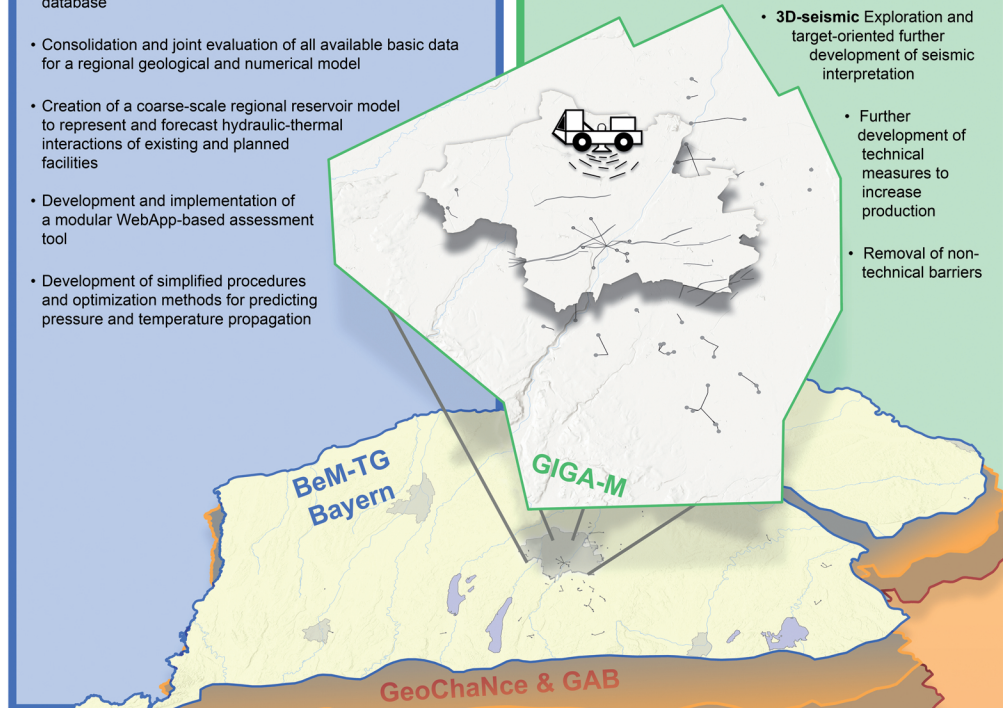
GIGA M

Abb. 1. Übersicht der bestehenden 3D-seismischen Überdeckungen (hellblaue Flächen) und in GIGA-M geplanten Messungen (lila Flächen).

- Greater Munich area as pilot region for BeM-TG

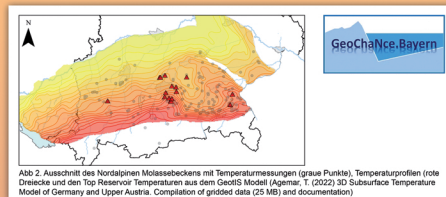- Various operators as well as city and district as project partners

Objectives

- **Reservoir-Management-Model** for the greater Munich area

- **3D-seismic** Exploration and target-oriented further development of seismic interpretation

- Further development of technical measures to increase production

- Removal of non-technical barriers

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GeoChaNce & GAB

GeoChaNce

GEOlogisch-Physikalische **CHA**rakterisierung des **N**ordalpinen Vorlandbe**C**kens in Bay**E**rn

Abb 2. Ausschnitt des Nordalpinen Molassebeckens mit Temperaturmessungen (graue Punkte), Temperaturprofilen (rote Dreiecke und den Top Reservoir Temperaturen aus dem GeotIS Modell (Agemar, T. (2022) 3D Subsurface Temperature Model of Germany and Upper Austria. Compilation of gridded data (25 MB) and documentation)
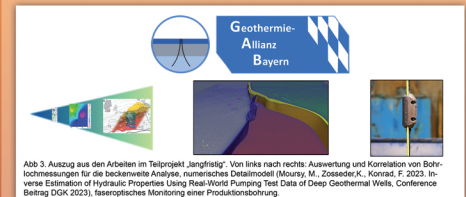
- together with the Assistant Professorship for Geothermal Technologies GTT (Project Lead) at TUM

Objectives

- Regional-scale subsurface mapping of the most important seismic markers and reservoirs

- Alternative reservoirs

- Evaluation of geothermal temperatures at different depths

- Characterization of physical processes and subsurface properties based on sample material and geophysical borehole measurements

- Evaluation of thermal conductivities and heat flux densities

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Geothermie-**A**llianz **B**ayern - Teilprojekt „langfristig" (Geothermal-Alliance Bavaria)

Abb 3. Auszug aus den Arbeiten im Teilprojekt „langfristig". Von links nach rechts: Auswertung und Korrelation von Bohrlochmessungen für die beckenweite Analyse, numerisches Detailmodell (Moursy, M., Zosseder,K., Konrad, F. 2023. Inverse Estimation of Hydraulic Properties Using Real-World Pumping Test Data of Deep Geothermal Wells, Conference Beitrag DGK 2023), faseroptisches Monitoring einer Produktionsbohrung.

The **long-term** sub-project will evaluate the minimization of the **drilling, exploration and production risk** of hydrothermal geothermal energy in the Bavarian Molasse Basin, as well as **sustainable** reservoir management.

Objectives

- **Efficient** and intelligent use of deep geothermal energy

- **Regional development** of geothermal energy throughout Bavaria

- Social **acceptance** and **safe** technology

- **Long-term** and **sustainable management** of the geothermal resource