EoCoE – Results of the geothermal energy part
Study area:
Task 4.1: Database

**Database comprises:**

- Geological cross sections and maps (used for building the geological model)
- Stratigraphy from boreholes (used for building the geological model)
- Water table contours of 2015 (used for numerical model calibration)
- Temperature data from boreholes (used for numerical model calibration)
- Petrophysical parameters
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Geological model

- Geological model comprises nine different aquifers and aquitards
- Dividing the model based on their hydraulic properties is important for the purpose of modelling groundwater flow and heat transport
Flow model

- Variation of permeability with assessed spatial continuity via variogram analysis yields an average temperature and flow field used for subsequent Borehole Heat Exchanger models (blue model boundary)
BHE Model

Average values of temperature and hydraulic head of the final posterior ensemble of this work are used as initial values in Borehole Heat Exchanger Models (BHE models).
BHE Model

- Representative BHE models for the city quarter were built based on existing building structures.
- Heating power demand is calculated for scenarios considering buildings in original state, or refitted state, and set as input for BHE simulations.
- Offsetting single BHE in East-West improves the performance of BHEs.
Results from long term simulations covering a timeframe of 15 years suggest that the cooling effect of BHE in the subsurface stabilizes after a couple of years.

However, heating power demand curves do not consider extreme events, such as prolonged cold periods. Constant monitoring of BHEs would be necessary to efficiently operate the BHE-field simulated in our models.