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Hydrogeophysical characterization of the E-Test site in the Euregio Maas-Rhine

The characterization of the subsurface in terms of geological structure and hydrogeological behavior is of great importance to design the Einstein Telescope at depths greater than a few hundreds of meters. Hydrogeophysical approaches aim at contributing to the conceptual models used in hydrogeology to study the environmental impacts and to understand the hydrodynamic response of the geological layers.

In order to perform an accurate hydrogeophysical characterization at depth, geoelectric surface measurements will be combined with results from cross-borehole measurements, which provide a better resolution at larger depths.

Two different approaches were chosen to address the geoelectric surface measurements. Conventional 2D ERT profiles are conducted to gather information on lithology and potential faults in the area of interest, especially in the potential corner points of the telescope.

In order to obtain data from the target depth of the Einstein Telescope deep 3D ERT surveys will be performed, requiring specific survey design accounting for realistic geological structures and lithological information.

To make a quantitative interpretation possible, an inversion approach, giving the opportunity to couple petrophysical models to the measured electrical parameters, is developed and validated on synthetic data. Laboratory measurements are performed on samples of the relevant rock formations, providing a basis for calibration of the inversion and for the interpretation of the results.

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