Institut für Angewandte Geophysik

Themen für Abschlussarbeiten / *Topics for Theses*

Master-Arbeit / *MSc. Thesis*

Thema/*Topic*

Optimizing ERT Acquisition Parameters for Imaging Spatio-Temporal Dynamics at the High-Energy Beach of Spiekeroog

Beschreibung/*Description*

The high-energy beach of Spiekeroog is a central study site within the Dynadeep project, where permanent horizontal and vertical electrode chains have been installed to investigate subsurface salinity dynamics. These dynamics are strongly controlled by tidal forcing and seasonal variations, leading to rapid changes in the freshwater–saltwater distribution. Over recent years, multi-gradient Electrical Resistivity Tomography (ERT) arrays have been used successfully for monitoring. However, the available acquisition window during low tide is limited to approximately 3–4 hours, including setup. During this time, subsurface conditions may already change significantly, violating the assumption of a static subsurface and potentially introducing artifacts into the data and inversion results.

This MSc project aims to optimize ERT acquisition parameters and measurement sequences to improve data reliability and survey efficiency under these time-constrained and dynamic conditions. A key objective is to identify optimal control points within the measurement sequence to quantify temporal changes during acquisition and to develop potential correction strategies. The impact of survey speed, sequence design, and redundancy will be systematically analyzed with respect to data quality and resolution.

Data quality will be assessed through different analysis, including reciprocal measurements and correlation between repeated configurations. In addition, secondary signals such as induced polarization (IP) and if feasible self-potential (SP), where available, may be evaluated to provide understand subsurface processes and data. The results will contribute to improving ERT monitoring strategies for resolving spatio-temporal salinity dynamics in highly dynamic coastal environments.

Sprache/*Language*

English

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