Institut für Angewandte Geophysik

Themen für Abschlussarbeiten / *Topics for Theses*

Master-Arbeit / *MSc. Thesis*

Thema/*Topic*

3D Modeling and field based validation for evaluating capabilities of a combined SAEM/“floatFEM” approach to investigate salinity distributions in costal areas

Beschreibung/*Description*

The coastal transition zone remains largely underexplored, despite its critical importance for understanding salinity distribution, seawater intrusion (SWI) pathways, and submarine groundwater discharge (SGD). UAV-based semi-airborne electromagnetics (sAEM) offers an efficient solution for surveying near-coastal landward areas, enabling rapid and flexible data acquisition in otherwise difficult-to-access environments. High-power transmitter sources can be deployed along coastlines, further inland, or even in marine environments. However, flying UAV systems directly over water is often prohibitive due to the significant risk of losing UAV platforms and receiver instrumentation. The implementation of floating receiver systems provides a promising alternative. By combining UAV-based sAEM surveys on land with floating receiver systems deployed on water surfaces, it becomes possible to image the complete coastal transition zone in an integrated manner. Comprehensive 3D forward modeling and inversion studies, based on custEM simulations, will be conducted to assess feasibility with respect to survey design, transmitter–receiver geometry, resolution, and target detectability. These studies will help define optimal configurations for resolving salinity gradients, SWI fronts, and preferential groundwater discharge pathways. Field-based validation experiments will be carried out to characterize noise behavior and operational limitations of floating EM receiver systems, particularly regarding motion-induced noise and potential motor or platform-related interference. Subsequent interpretation of field data from selected, moderately complex test sites will serve to validate the integrated system approach and demonstrate its applicability.

Sprache/*Language*

English

Ansprechperson / *Contact person*

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