Institut für Angewandte Geophysik

Themen für Abschlussarbeiten / *Topics for Theses*

Master-Arbeit / *MSc. Thesis*

Thema/*Topic*

Assessing the Potential of Small-Loop Transient Electromagnetics Combined with Ground Penetrating Radar for Characterizing Peatlands

Beschreibung/*Description*

Loop-source Transient Electromagnetic (TEM) methods are a highly valuable tool for groundwater exploration and hydrogeophysical investigations, providing depth sensitivity of up to approximately 200 m depending on subsurface conditions and acquisition parameters. In addition, small-loop TEM systems with early acquisition times allow high-resolution mapping of very shallow subsurface structures, making them particularly suitable for near-surface environmental applications. In Lower Saxony, peatlands are increasingly investigated in the context of climate change, as drainage and degradation of peat can release significant amounts of stored carbon dioxide. The thickness and spatial distribution of peat layers are key parameters for assessing carbon storage capacity, vulnerability, and potential carbon release. Reliable, non-invasive geophysical methods are therefore essential for characterizing peat thickness and internal structure.

This MSc project aims to apply small-loop TEM and Ground Penetrating Radar (GPR) to characterize peatlands in selected study areas in Lower Saxony. The primary objective is to estimate peat thickness and identify the peat–mineral soil boundary. TEM data will be interpreted using conventional 1D inversion approaches to derive vertical resistivity models, while GPR data acquired along selected transects will provide high-resolution structural information and additional constraints on layer boundaries. The integration of both methods will allow improved interpretation of peat thickness, internal variability, and hydrogeological conditions.The results will contribute to evaluating the potential of small-loop TEM for peatland characterization and support climate-related studies on carbon storage and release in vulnerable peatland environments.

Sprache/*Language*

English

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