

EGU24-15575, updated on 17 Apr 2025  
<https://doi.org/10.5194/egusphere-egu24-15575>  
EGU General Assembly 2024  
© Author(s) 2025. This work is distributed under  
the Creative Commons Attribution 4.0 License.



## Insights into geological and hydrogeological characteristics using airborne geophysical investigations of former opencast lignite mining areas

**Elisabeth Schönfeldt**, Olaf Cortes Arroyo, Marcus Fahle, Bernhard Siemon, Silvio Janetz, and Erik Nixdorf

Federal Institute for Geosciences and Natural Resources, Centre for research and development of post mining areas, Germany (elisabeth.schoenfeldt@bgr.de)

The region Lusatia in northeastern Germany, which is located about 100 km south of Berlin, is strongly affected by over a century of both former and on-going opencast lignite mining. Although, there is an abundance of borehole data from former excavation surveys both varying data quality and heterogeneous coverage is a challenge for deriving spatially continuous subsurface properties. To overcome these obstacles we combined airborne geophysical investigations with borehole data. Different machine learning-algorithms (Random Forest and K-means) are used to determine spatially and depth-related insights into the variability of geological and hydrogeological characteristics. An aeroelectromagnetic (AEM) survey was carried out in summer 2021 using BGR's (German Federal Institute for Geosciences and Natural Resources) helicopter, which covered flight lines of 1680 km in an area of about 200 km<sup>2</sup>. First results show that the machine learning approach can predict fine-grained sediments (clay and silt) in untrained areas and can distinguish between clusters of mining-affected regions and undisturbed ones. The results of the study will be further used to improve the parameterization of existing regional groundwater flow models to address challenges of water allocation in the region of Lusatia.