

## **Geophysical Characterization of BSUIN Underground Laboratories: Geophysics at the Research and Education Mine Reiche Zeche in Freiberg, Germany**

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The Baltic Sea Underground Innovation Network (BSUIN <http://bsuin.eu>) aims at forming an efficient platform for future, innovative research and business concepts. The BSUIN network consists of six underground laboratories in Finland, Sweden, Russia, Poland and Germany with associated business and research partners. Each of the underground laboratories is unique in its geology and thus provides different challenges for geophysical characterization.

A detailed geophysical and resulting geotechnical description of the underground environment is crucial to analyze and improve the innovation potential of each underground laboratory in the BSUIN network. Due to their differences, a direct comparison of geophysical measurements in the underground laboratories is difficult. Nevertheless, it is important to describe each underground laboratory as detailed as possible. For this, different geophysical methods are used but seismic methods play a major role.

We present various geophysical data sets from the research and education mine Reiche Zeche at Technical University Freiberg. Besides large-scale overview maps from gravity and magnetics, there are several data sets from recent decades covering smaller scales from centimeters to hundreds of meters. The results are used to characterize specific areas of the mine and serve as a base for monitoring in recent research projects such as mineral exploration.

Seismic tomography is used at several places underground to detect ore veins or faults within the host rock (gneiss). Additionally, high-resolution geoelectrics and ground-penetrating-radar investigations complement the results from seismic analysis.

The unique conditions provide a perfect environment for geophysical tool development underground. This is not only important in the frame of mining exploration but also for geophysical tools used in tunnel excavation or drill holes.

In addition to its role in research, the Reiche Zeche mine is also used for geophysical training in specific underground practicals where students get to know the challenges and specifications of geophysical surveys performed in a mine. Thus, the mine plays an important role in university education and shapes future geophysicists.