Screening Germany´s subsurface: the search for a deep geological repository for high-level radioactive waste

Dr. Christian Derer (Federal Company for Radioactive Waste Disposal – BGE)

Abstract: Nuclear power is, or was, for many countries a pillar in the energy security portfolio. Consequently, is the final disposal of radioactive waste one of its elements which needs a solution. The current consensus is that deep geological disposal is the safest way of achieving that.

The search for a deep geological repository for high-level radioactive waste in Germany is science-based and transparent process which is regulated via various legislative documents. Its final objective is the identification of the most suited location in terms of safety requirements. The key tool for achieving that is the preliminary safety assessment.

The preliminary safety assessment evaluates, via a series of steps, the degree to which the main safety functions (radionuclide retention and preservation of the barrier integrity) of the geological barriers are fulfilled for a given area. The safety assessment is consistently performed on each area of interest, hence allowing the comparison and ranking of areas, and the identification of the most-suited regions.

Currently, the portfolio of potential host rocks for a deep geological repository in Germany include claystone, rock salt (as diapirs and bedded structures), and crystalline rocks. These geological formations can exhibit significantly different geometries, petrophysical properties and key uncertainties relevant to a geological repository. Therefore, an integrated, safety-function-focused characterisation of all relevant geological features (geosynthesis) is required in order to perform the safety assessment.

The presentation will outline some of the key steps of the German Site Selection Procedure, preliminary results and the role of geoscience as a key integral part of the safety assessment.

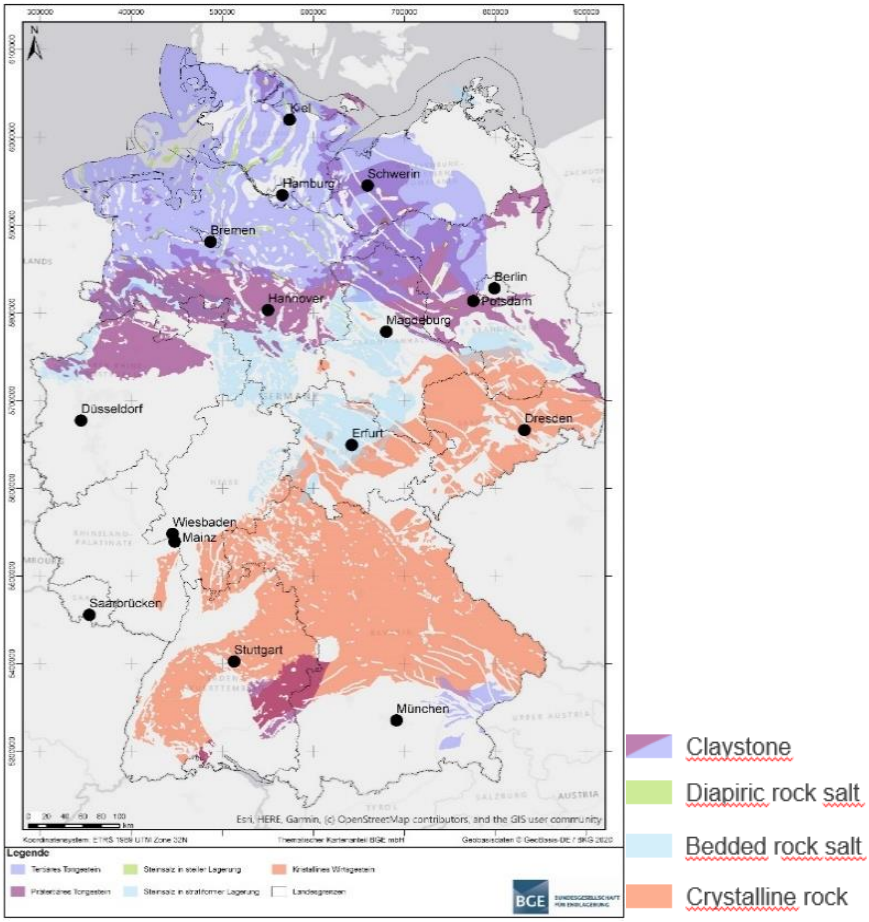


Fig. 1 Sub-areas and host rock occurrences in the current step of the Site Selection Procedure. Source BGE



Fig. 2 Host rocks considered currently in the Site Selection Procedure (claystone, crystalline rock and rock salt). Source BGE.

About the Lecturer:

Christian Derer is a geoscientist who graduated from the University of Bucharest, before completing his doctorate at the University of Bonn on tectonics and sedimentation in the rift-sequences of the Upper Rhine Graben. He subsequently joined the international oil and gas industry where he worked for 18 years with different mid-cap to major companies (Wintershall, E.ON-Ruhrgas, Maersk Oil and Total Energies). During this time, he held various roles in project worldwide: exploration and development geoscientist, project manager, line manager and acting head of geoscience. 2021 he joined the Federal Company for Radioactive Waste Disposal in Germany where he is currently Head of Geoscience and Technical Excellence in the Site Investigation Department. His responsibilities include, among others, competency building of geoscience skills and quality assurance. His particular focus is the mentoring in the integrated workflow from seismic interpretation via rock characterisation to 3D-geomodelling.