3D-GeoModel Berlin - Creation of a 3D Geological Model for Berlin's Subsurface

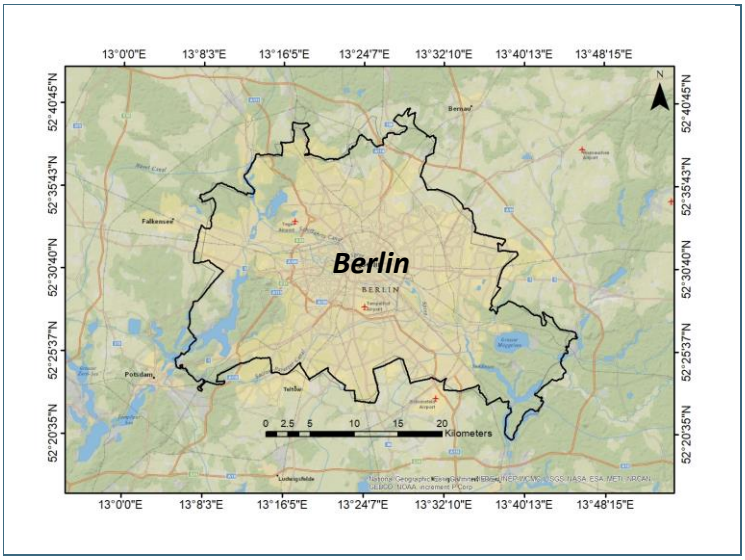

Fig. 1: Project setting **3D-GeoModel Berlin**
Administrative boundary Berlin

Problem Statement

The **subsurface** not only provides space for urban infrastructure such as pipeline networks or traffic tunnels, but also hosts **valuable resources** such as groundwater or energy. However, the rapid growth of cities requires more and more natural resources and space, both above the ground surface and underground. The multitude of potentials, possible uses and growing demands on the subsurface also increase the **spatial conflicts** in its usage. In order to avoid such conflicts and at the same time make optimal use of the **underground potential**, spatial planning and underground management needs to be urgently addressed for securing a sustainable future.

3D geological models are well-known tools in geological sciences for predicting the lithology of the subsurface. A 3D representation allows a more detailed assessment of the subsurface potential, which enables optimized **planning** and design and the basis for examining the suitability of geo-resources extraction and usage. The need for 3D geological models is becoming increasingly relevant in **detrital depositional** environments consisting of sediment mixtures with different grain sizes, as many urban areas around the world are built on such deposits.

The Berlin Senate Department for Mobility, Transport, Climate Protection and the Environment (SenMVKU) has commissioned the Chair of Hydrogeology at TUM to set up a geological 3D subsurface model for the Berlin area using the modeling approach developed at TUM, i.e. the "**Di models**" method, and to adapt and further develop the local conditions.

Project Objectives

- Plausibility and quality control of the drilling database.
- 3D simulation of the composition of clastic and non-clastic deposits of the Quaternary and Tertiary sediments in the Berlin area.
- 3D simulation of the composition of clastic deposits as fictitious grain size distributions of the Quaternary and Tertiary sediments.
- Horizon subdivision, i.e. layer separation, and analysis of the relevant geometries of the aquifers.
- Investigation of the interaction areas between aquifers.
- Classification of filtration of existing groundwater uses according to developed horizon.
- Model parameterization for potential assessment.
- Determination of the near-surface geothermal potential for thermal groundwater use.

Project name: 3D-GeoModell Berlin

Project duration: 2021 to 2025

Funding organization: Senate Department for Mobility, Transport, Climate Protection and the Environment - Berlin

Implementation: Technical University of Munich Chai of Hydrogeology

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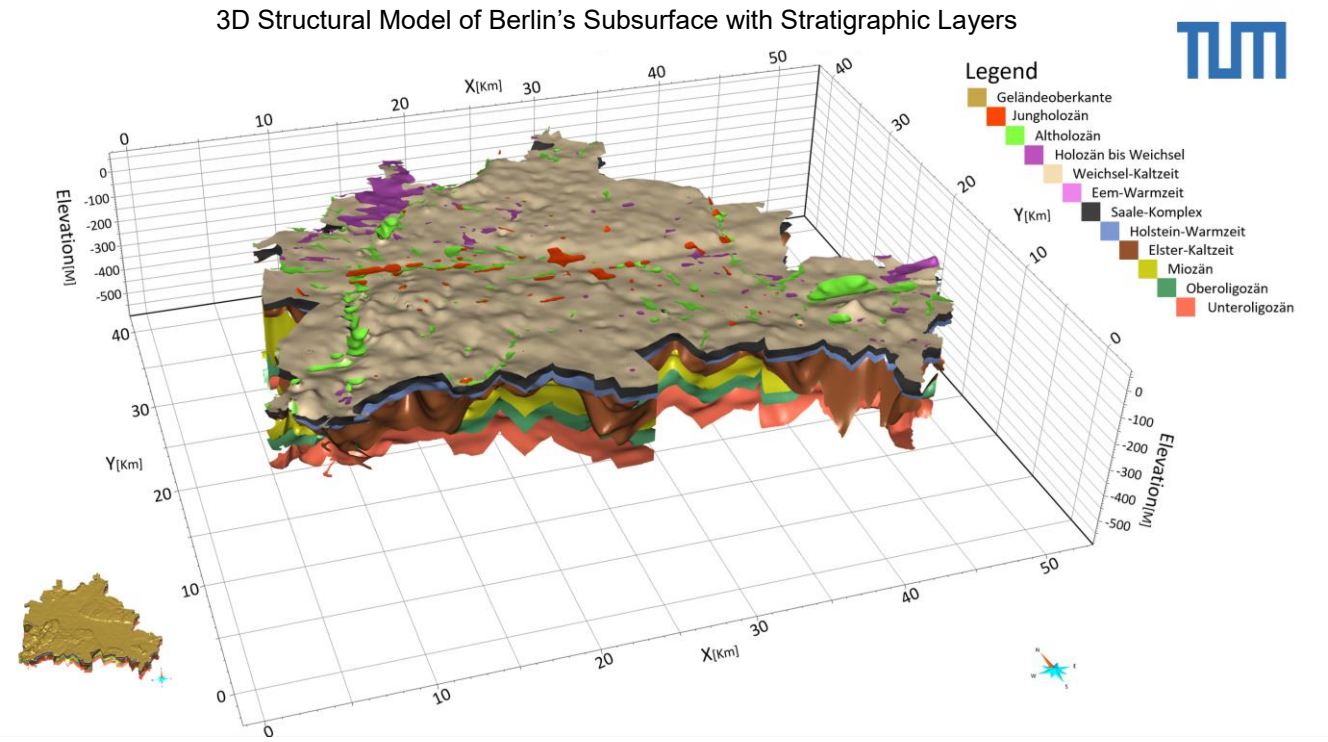

Fig. 2: **3D Structural model** of Berlin's subsurface

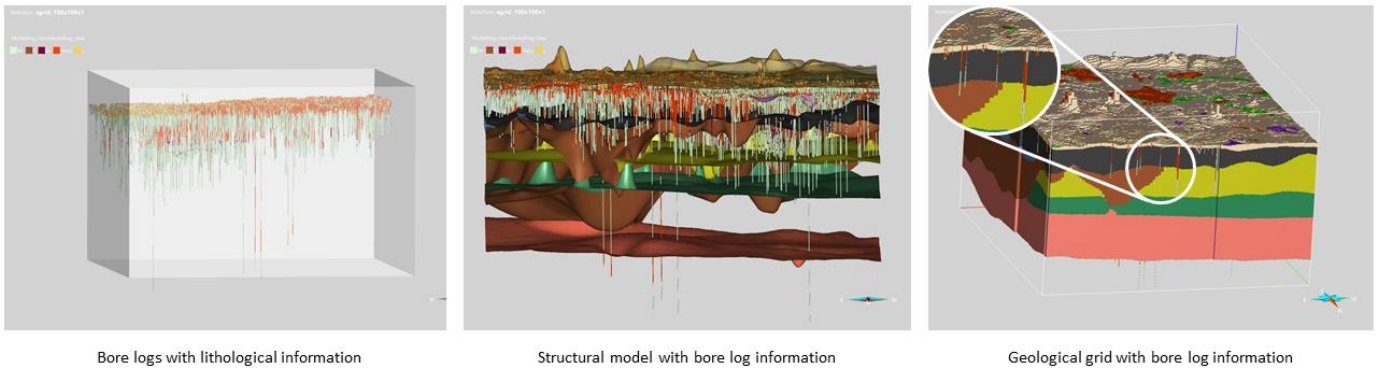

Fig. 3: Transferring the borehole log information into the geological grid