Contribution ID: **10** Type: **Talk**

Geology in the EMR Region and Geological Field Investigations

Monday, 8 November 2021 15:30 (30 minutes)

In order to find optimal position for the Einstein-Telescope (ET) in the Euregio Meuse-Rhine (EMR), a detailed understanding of the geological and structural conditions, both on the ground and subsurface is crucial. The short term (during excavation) and long-term performance of the ET underground infrastructures are primarily depended on the geological and structural conditions of the ground. Literature research provides (a) a description of the rocks occurring in the area, (b) spots where these rocks are present at the surface and (c) an overview of the geological structures being present. The structures in the EMR region can be subdivided in 2 sets based on their orientation. The first set are NE-SW striking structures include folds (synclines and anticlines) thrust faults and fractures. Both features result from the Variscian orogeny. The second set are NW-SE striking faults and fractures. These structures originate from Mid-Devonian tectonics but became reactivated several times. Also these NW-SE striking structures are active today and form the Lower Rhine Embayment.
Within the framework of the project, comprehensive geological and rock mechanical field investigations have taken place in the EMR area to obtain a detailed knowledge on possible host-rocks of the caverns and tunnels. In a first step, representative rocks from surface outcrops within the ET-Project area were subject to a geological and geotechnical assessment, comprising 1) in-situ investigations (determination of rock type, identification and orientation fracture sets and fracture networks), 2) laboratory work in order to determine the petrophysical and mechanical properties (UCS, BTS, P-Wave velocity) and 3) modelling (ground behavior prediction, hydro-mechanical fault zone properties).
As a second step and subsequent to the surface outcrop mapping, two drilling campaigns were started in Summer 2021 and are currently ongoing in the southernmost Netherlands. These two boreholes are planned to reach down to a target depth of 250 m by the end of November 2021. Upon completion of the borehole drilling, geophysical borehole-logging, in-situ hydraulic testing and stress measurements will be carried out. The planned in-situ and laboratory testing will generate a dataset, that is suitable for further assessments of the rocks and structures in the EMR region. In addition, 2-D seismic campaign is also planned which allows to map the structures and rock layers in the subsurface over a longer distance. The combination of literature research, borehole and core investigations and seismic interpretation will set the basis to identify best possible locations for ET in the EMR region.

Primary authors: ZINSER, Jonathan; WALDVOGEL, Marius (Geological Institute, RWTH Aachen University); BURCHARTZ, Raphael; Mr CHUDALLA, Nils (RWTH Aachen University); Dr HAMDI, Pooya (RWTH Aachen University)

Presenters: WALDVOGEL, Marius (Geological Institute, RWTH Aachen University); BURCHARTZ, Raphael

Session Classification: EMR Geology, Long and Short term measurements