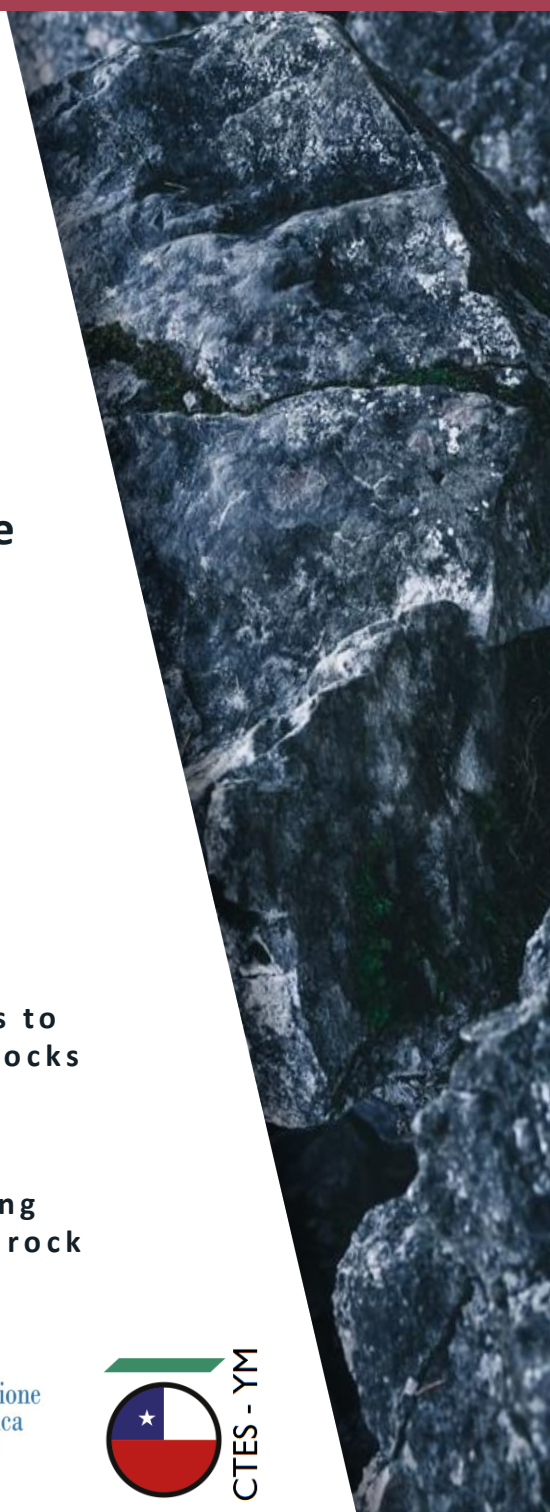
INTERNATIONAL WEBINAR ON ROCK MECHANICS



Thermo-hydro-mechanical behavior of clay-rock in deep radioactive waste repositories

Philipp Braun

Site investigation and design of protective structures in an unstable area in the city of Majukavo - Mayotte - France

Mohammed Annakib

11 March 2021 (17:00 UTC+1)

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Thermo-hydro-mechanical behavior of clay-rock in deep radioactive waste repositories

Abstract

The investigation of different host rocks is an essential part in the feasibility studies of deep geological repositories for radioactive wastes all over the world. In France, the Callovo-Oxfordian claystone was selected as a potential host rock, which is presented in this talk. New laboratory experiments were conceived, which allowed to simulate heating through exothermic radioactive wastes under different stress conditions. In particular, we were able to produce thermal pressurization in the lab, up to pressures where the rock fails, similar to hydraulic fracturing. The observed material behavior finally allowed us to select an appropriate thermo-elasto-plastic constitutive model, which is calibrated through element tests fitted on experimental data.

Speaker

Philipp Braun is currently working as a Post-doc researcher at Laboratoire Navier, Ecole des Ponts ParisTech, where he focuses on the numerical modeling of thermo-hydro-mechanical claystone behavior, in collaboration with the French agency for radioactive waste management Andra. Previously, he developed novel laboratory experiments for fault mechanics investigations during a Post-doc position at Ecole Centrale de Nantes. His PhD thesis work on the experimental study of the Callovo-Oxfordian claystone was carried out at Ecole des Ponts ParisTech and defended in 2019. Prior to that, he completed his Master's studies in civil engineering with a focus on geotechnics at TU Munich.

Site investigation and design of protective structures in an unstable area in the city of Majukavo – Mayotte - France

Abstract

This study is applied to a real problem in the Mayotte area. An instability at the level of an embankment upstream of a national road was assessed. Several events took place, including a rock slide and a landslide blocking the road for several days. Following this, our design office carried out several in situ measurements (pressiometric, inclinometric and piezometric tests) to determine the mechanism of ruptures in the area. After identifying these mechanisms, it was decided to reinforce this embankment by a system of nailed soil and gabion retaining wall. During this presentation we will follow the whole process from characterization to the realization of the work, in parallel to the dimensioning.

Speaker

With a master's degree in geology and geotechics at the University of Rennes (France), **Mohammed Annakib** is currently an engineer in geology and geotechnics at GEOLITHE OCEAN INDIEN, between Mozambique and Madagascar, he works in geotechnical works at the limit of civil engineering. Aged 26, Mohammed has solid experience in all dimensioning of complex works to EUROCODE (European standards).