

Expected stress changes in bedrock due to backfill of Mizunami Underground Research Laboratory

*Yasuhiro Asai¹, Hiroshi Ishii¹

1. Tono Research Institute of Earthquake Science, Association for the Development of Earthquake Prediction

Backfilling of the Mizunami Underground Research Laboratory (MIU) was started in February 2020. From 2020 to 2021, backfill will be performed from the horizontal gallery at a depth of 500m, and the vertical shafts and the horizontal galleries every 100m will be backfilled sequentially (JAEA, 2020). So far, groundwater/pore pressure decreasing and ground subsidence has been observed in and around the MIU due to the pumping of approximately 700m³/day by the MIU excavation. For example, at the TGR350 borehole site 500 m south of the MIU, the groundwater level decreasing of approximately 50 m was observed, and the ground subsidence of 18 mm at the nearby the shafts has observed during eight years from 2004 to 2012 (Kimata et. al, 2015). The pore pressure in and around MIU will return to its pre-MIU excavation state by groundwater pumping decreases.

In order to observe the stress changes associated with the pore pressure changes during and after MIU backfill. Tono Research Institute of Earthquake Science extended the power supply and signal cables of STG500 and STG200N borehole observation site to the ground, and the observation system was prepared from November to December 2019.

At the end of May 2020, it is expected that the gallery of MIU at a depth of 500m will be backfilled. In the presentation, we will introduce the observation record and analysis results of water pressure and stress records of STG500N during backfilling.

Keywords: Backfilling of the Mizunami Underground Research Laboratory, stress changes in bedrock, pore pressure changes