

Changes in P and S wave velocity associated with the two-staged reflood of the underground galleries

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We detected changes in P and S wave velocity of the Toki granite around the Tono mine observed by the seismic ACROSS signal during the back-filling of underground galleries. The back-filling in the underground galleries at the Tono mine was started in March 2012. The main drainage pump (altitude 160 m) was stopped on December 9, 2014, and the closure of the galleries and the vertical shafts were completed in March 2015. After the termination of the main drain pump, the reflood started in the buried galleries and the remarkable change in S-wave travel time was observed at the borehole accelerometer installed in the Toki granite, where is located beneath the ACROSS transmitter [Kunitomo et al.(2016)JpGU]. In this study, we analyzed the data of the TRIES borehole observation network and Hi-net and investigated the velocity change of P waves as well as S waves around the mine from a distance. As a result, the advance of the P wave traveltimes were detected from the middle of 2014 at the north and south observation points. Around June 2014, the water level rose from the level of the lower gallery (altitude 152 m) to the upper galleries (altitude 160 m) caused by the failure of the pump in the lower gallery. It is thought that the increase of the P wave velocity of the surrounding rock was caused by the penetration of groundwater.

Keywords: seismic ACROSS, seismic velocity change, groundwater