

# Ultra-microearthquakes observed at Mizunami Underground Research Laboratory

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Mizunami Underground Research Laboratory (MIU) was constructed by Japan Atomic Energy Agency (JAEA) in order to achieve these two main goals: establishing technology for investigation, analysis and assessment of the deep geological environment, and developing a range of engineering technology for deep underground application. MIU has two vertical shafts, and has the horizontal galleries and the sub stages at every 100 m depth from 100 m depth to 500 m depth.

We deployed the seismic observation network in MIU. We installed 3 components accelerometers (JEP-6A3-10, Mitutoyo co.) at each station, and continuously recorded the ground accelerations at 10 kHz sampling (SC-ADH10K, Scimolex co.). Because of the high frequency sampling, we succeeded to detect some ultra-microearthquakes occurred around MIU. An ultra-microearthquake occurred at 16:27 (JST) on January 17, 2019. This event was observed at one of the stations installed at 500m depth. Another station (400m depth) also showed the seismic waveform, although we could not find the clear P and S wave arrivals due to the bad signal-to-noise ratio. If we assume that S-P time is 0.05 s at this 500 m depth station, and that the velocity of S wave is 2200 m/s (Okubo et al., 2012) and  $V_p/V_s$  is 1.73, we obtain that the hypocentral distance is 150 m. Thus, the depth of this event is 650 m assuming this event occurred just beneath this station.

There is the almost vertical fault (Main Shaft Fault) in MIU (e.g., Tsuruta et al., 2013). The hypocenter of the event is likely to locate in this fault. However, we could not determine the location of the event, because we found the clear P or S wave arrivals at only one station. We will discuss some source parameters of the ultra-microearthquakes observed in MIU.

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