

## Temporal variation in the groundwater discharged around lou-yama, Kirishima volcanic group.(Follow-up report)

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Since December 2013, Volcanic earthquakes and tremors, inflations have been observed in the lou-yama, Kirishima volcanic group. In April 2017, expansion of thermal anomalies and increased fumarolic activities were confirmed, and May 8 small volcanic ash were confirmed. JMA issued the eruption alert level raised to level 2.

In order to understand the shallow groundwater system in the lou-yama and contribute to volcanic mitigation, we installed the continuous monitoring of EC and water temperature and began collecting spring water samples from multiple locations for continuous water chemical analysis.

We are performing continuous monitoring at three locations. At site No. 1, only water temperature is being measured, while at sites No. 2 and No. 3, both EC and water temperature are being measured. At all three sites, large fluctuations in the data have been observed. Both EC and water temperature were observed to correlate with rainfall, with both EC and water temperature temporarily decreasing during rainfall, and EC in particular shows sensitivity to rainfall. On the other hand, the relationship with volcanic activity is less clear. The spring water at Site No. 3 (southwest of Fudouike crater) was depleted on September 25, 2017, and no data collection from the site has been possible since then.

Temporal variation was observed in all the samples from the eight groundwater discharge points, specifically with respect to the cations and anions at the three sites where data loggers were installed. After September 22, 2017, the samples showed an upward trend in the major ion concentrations, including  $\text{Ca}^+$ ,  $\text{Na}^+$ ,  $\text{SO}_4^{2-}$ , and  $\text{Cl}^-$ , with the major ion concentrations at site No. 1 being particularly significant. Currently, we are examining the correlation between volcanic activity and weather conditions.

Keywords: lou-yama, groundwater, Temporal variation, volcanic mitigation