

River water contamination related to the recent volcanic activity of Mt Iwo-Yama, Kirishima volcanoes, Japan

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Mt Iwo-Yama belonging the Kirishima volcano complex erupted on April 2018 for the first time in 250 years. Although it was a small phreatic eruption, the local economy was damaged especially in the fields of tourism and agriculture.

The eruptions happened on 19 April and 26 April 2018 at south and west sides of the old main crater of Mt Iwo-Yama, respectively. At the eruptions, a large amount of muddy acidic hot water containing heavy metals gushed out from the newly opened vents with the eruptions (the new eruption vents), then the local river was acidified and contaminated with heavy metals. After the eruptions, the vents formed geyser-like mud pools. The overflowing muddy water from the mud pools is continuously flowing into the local rivers since then. The foot of Mt Iwo-Yama is very famous for rice production. Some farmers in the area gave up rice production because of water pollution in the river.

We conducted sampling campaigns for the water samples around Mt Iwo-Yama repeatedly and analyzed the sampled water. The gushing and overflowing water from the new eruption vents (mud pools) are supposed to be originated from the geothermal reservoir underlying beneath Mt Iwo-Yama because they show high acidity with a high concentration of chloride and sulfate ions and contain argillaceous particles formed by hydrothermal alteration. The water discharge amount is not constant, and the fluctuation is considered to be caused by the changes in the state of its volcanic activity and the amount of precipitation. The concentrations of chloride and sulfate ions in those water were roughly 10,000 mg/L and 15,000 mg/L, respectively, and contain 3 to 7 mg/L of arsenic constantly. Spring water around Mt. Iwo became more acidic compared to before volcanic activity was activated. The water from those acidic springs are also affect the water quality of local rivers. The downstream river water in Ebino Basin about 6 km far from Mt Iwo-Yama shows low pH value (pH<3) and sometimes contains heavy metals in the concentration higher than the environmental standard. Volcanic activity of Mt. Iwo-Yama is still active, so the improvement of river water quality in the short term may not be expected.