Geochemical Monitoring of Hakone Volcano

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Abstract

At Hakone volcano, the number of earthquakes increased in 2015, and a small phreatic eruption occurred at the end of June in the Owakudani geothermal field located at the foot of the central cone, and noticeable changes in the composition of the fumarolic gases were observed (Ohba et al., 2019). In this study, we focused on the increase in the number of earthquakes in May 2019 and examined the temporal changes in the chemical composition and stable isotope ratio of fumarolic gases around Owakudani geothermal field, river water flowing from Owakudani, and thermal water flowing out of Owakudani in the period from January to December 2019. Investigated fumarolic gases were discharged at the 15-2 crater(C) formed next to the No.52 well in the Owakudani geothermal field, at the fumarole(N) beside of the natural promenade, and at the fumarole(S) in the Kamiyuba geothermal field.

He/CH_4 of N and S, and He/CH_4, CO_2/H_2O, CO_2/H_2S, CO_2/CH_4 of C increased from February, March, or April, and decreased from July or August. $\delta^{18}O$, δD of C decreased from March and increased in June. Cl^- of river water increased from January. Cl^- of thermal water increased temporarily from May to July.

He/CH_4 of C, CO_2/CH_4 of C, etc. showed a clear increase from around February or March 2019 when seismic activity was still low. During the activity period in 2015, the fluctuations of these ratios were almost synchronized with the increase in seismic activity, which is different from activity in 2019.

Reference

T. Ohba, M. Yaguchi, K. Nishino, N. Numanami, Y. Daita, C. Sukigara, M. Ito, U. Tsunogai (2019): Earth, Planets and Space, 71:48, p1-18.

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