

Self-potential and geomagnetic total intensity observations at Motoshirane volcano after the 2018 eruption (2)

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A phreatic eruption occurred at Kusatsu-Shirane volcano (Motoshirane volcano) on January 23, 2018, and some craters were formed on the Kagamiike crater-floor and the Kagami-ike northern crater. After the eruption, the temporarily activated seismic activity near the crater has declined, and the fumarolic activity has ceased after late February 2018.

In order to estimate geothermal status after the eruption, we carried out self-potential (SP) and repeat geomagnetic total intensity observations at Motoshirane volcano in 2018 to 2019. The first measurements of the SP were conducted at about 130 points around the summit of Motoshirane volcano from June 30 to July 2, 2018. Copper-Copper sulfate electrodes were used, the measurement interval was about 50 m, and the measurement was carried out by the so-called full potential method. The second measurements were conducted from July 2 to July 4, 2019 at the same survey lines as the first. We applied -1.51 mV/m as correlation coefficient for correction of the topographic effect to all the SP measurement stations. As a result of the SP, we detected a positive anomaly, 200-500mV in magnitude, developing around the summit of Motoshirane volcano. By comparison of the result of the 2018 and the 2019 observations, there was no remarkable changes in the SP distribution. In detail, tens of mV decline of the SP voltage was observed during one year around north-east from Kagami-ike northern crater where was main crater of the 2018 eruption. This may suggest to tend to subside of the volcanic activities.

As for the geomagnetic total intensity observation, we made ten repetitive observation stations around the summit of Motoshirane volcano, and carried out five times observations from 2018 to 2019. As a result, no significant changes in the geomagnetic total intensity during those two years. It suggests that thermal demagnetization or magnetization by cooling does not occur at underground of Motoshirane volcano.

Keywords: Kusatsu-Shirane volcano, Motoshirane volcano, Self-potential observation, Geomagnetic total intensity observation, Thermal demagnetization