

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

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A phreatic eruption occurred at Kusatsu-Shirane volcano (Motoshirane volcano) on January 23, 2018, and some impact craters were formed on the Kagami-ike 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 geomagnetic total intensity observations at Motoshirane volcano. 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. We applied -1.3mV/m as correlation coefficient for correction of the topographic effect to all the SP measurement stations. The coefficient was obtained from a clear negative correlation (-1.3 mV/m) between the elevation and the potential in the survey line on the eastern slope of the Kagami-ike. As a result of the SP, we detected a positive anomaly, $200\sim 500\text{mV}$ in magnitude, developing around the summit of Motoshirane volcano. By comparison of the result of the 4th Joint Observation of Kusatsu-Shirane Volcano in 2003, we found temporal variations of the SP near Kagami-ike northern crater which may have been caused by the eruption. As for the geomagnetic total intensity observation, we selected ten repetitive observation stations around the summit of Motoshirane volcano, and carried out first observation in June 2018 (June 28-30). Following the first observation, we carried out repeated observation in August (August 28-29) and October (October 7). As a result, no significant changes in the geomagnetic total intensity in the period from June to October, 2018. It suggests that rapid 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