Volcano-electromagnetic study of Hokkaido Komagatake volcano -Spatial distribution and continuous monitoring of self potential-

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Hokkaido Komagatake is a pyroxene-andesitic strato-volcano which is located at the southwestern part of Hokkaido, Japan. Its eruptic activity was characterized by the Plinian eruption with pyroclastic falls, flows, and surges. After the 1942 eruption, its activity had remained calm, but the small scale phreatic eruptions occurred on Mar. 5, 1996, Oct. 25, 1998 and several times on fall of 2000. This fact suggest that the volcano is now in preparation stage for the next major eruption. The objective of this study is to obtain the hydrothermal circulation system and hydrological environment of the volcano by using the electromagnetic methods.

In order to obtain the detailed electrical structure, we carried out the AMT electromagnetic survey across the edifice of the volcano in 1998. The observation points were 18 in total and distributed along the NE-SW line which was perpendicular to the 1942 fissure on the summit and to the regional tectonic strike. The shallow part of the resistivity structure was well estimated by using the two dimensional modeling technique. The inner part of the edifice is electrically conductive(several ohm-m). This characteristic can be explained by the existence of the fluid and/or the alternation minerals in rock.

The early stage of this study, the spatial distribution of the SP field in and around the summit crater were measured in 1988 and 1989 (Michiwaki et al., 1995). The positive SP anomaly amounting to nearly 600 mV was observed around the 1929 crater. The anomaly suggests that the hydrothermal circulation system exists beneath the summit crater. Next, the repeated observations were also done in 1998 and 1999 around the summit crater zone. The temporal change in amplitude related with the 1996 and 1998 eruptions was recognized by the comparison between these results (Tanimoto and Nishida, 2000). Furthermore, the additional mapping observation was made in 2000 and 2001. The observation area of this measurement covers almost entire body of the volcano. By using this SP mapping result and the electrical resistivity structure obtained by the AMT survey, the quantitative SP model generated by the conceivable hydrothermal circulation system can be constructed.

To obtain the more detailed temporal variation, we started the continuous measurement on the summit crater after the 1998 eruption. The continuous measurement revealed the monotonous decrease of the anomaly. It can be considered that this decrease delineates the recovering process of the hydrothermal system activated by the eruption. However, ordinary seasonal change, that is independent from the volcanic activity, is another interpretation. To solve this problem, the measurement is still continued to obtain the data which covers longer than five years. We will present the latest result at the meeting.