Long term geochemical monitoring of volcanic gases in active volcanoes in Hokkaido, Japan

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Hokkaido (northern part of Japan) is volcanic regions that has more than 20 active volcanoes. The volcanoes of Hokkaido belong accordingly to 3 different areas. 1) Western region representing the southwestern end of the Kuril Arc (e.g. Meakan-dake, Rausu-dake), 2) Central region in the arc-arc collision zone (e.g. Tokachi-dake), 3) Eastern region in the Northeast Japan Arc (e.g. Tarumai, Usu). Some of these volcanoes have also continued volcanic activity during 20-21 century. Geological Survey of Hokkaido (GSH) has monitored several volcanoes in Hokkaido for more than 30 years to detect changes in their volcanic activity. In this poster, we will report monitoring results that have observed volcanic gases and thermal waters in Meakan-dake, Tokachi-dake and Tarumai.

- Meakan-dake-

Meakan-dake volcano has been monitored since 1986. During monitoring period, small phreatic steam eruptions occurred on 1988, 1996-1998 and 2006-2008. Before and after eruptions occurred, we couldn't obvious detect geochemical signals in volcanic gasses. On the other hand, Cl and SO_4 components in some of thermal waters (Nonakaspa and Onneto spa) at the summit craters and foot of the mountain slightly increased before eruptions (Murayama et al., 2010).

- Tokachi-dake-

Tokachi-dake volcano has been monitored since 1986. During monitoring period, magmatic eruption occurred 1988-1989. Before eruption, the temperatures and HCl, H_2S, SO_2 and CO_2 components in volcanic gasses were high value compared with those of the after. In other hands, NaCl-type thermal water entered the thermal waters (Fukiage spa) during the increase in volcanic activity associated with the 1988–1989 eruption, thus leading to a clear increase in Cl concentrations and temperature. After the eruption, the supply of the NaCl-type thermal water was halted, and the Cl concentrations of the thermal waters decreased (Takahashi et al., 2015).

Recently, theses chemical compositions have slightly increased again associated with the increase of the volcanic activity.

- Tarumai-

Tarumai volcano has been monitored since 1991. During monitoring period, Tarumai did not cause any eruptions. During this period, outlet temperature of fumarolic gases are continuously high (>500ºC). In contrast, chemical concentrations (Cl, SO_4, Total-S) of thermal waters and fumarolic gases have decreased (Ogino et al., 2016).

References

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