

Temporal variation of petrological characteristics of rocks from Gassan volcano, northeast Japan arc

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Gassan volcano is a Quaternary stratovolcano, which belongs to the Chokai volcanic zone in northeast Japan arc. Activity of Gassan volcano can be classified into the earlier and later stages. During the earlier stage, dacitic lavas were swelled out in the western side of Gassan volcano and formed Amamoriyama and Yudonosan edifices. During the later stage, andesitic lavas were swelled out and formed Gassan and Ubagatake edifices. A horse shoe shaped caldera caused by the collapse of the central part of Gassan volcano can be observed. In this study, we will report more detailed petrologic characteristics of rocks of the later stage.

The eruptive products of the later stage can be divided into nine units. Nigorisawa lava (NGL) does not preserve any geomorphologic features of lava, however Tamugisawa lava (TML) preserves them. These two units are distributed in the western part of Gassan volcano. Gassan southern lava (GSL), Gassan northern lava (GNL) and Gassan peak lava (GPL) are distributed mainly in the eastern part, and these preserves geomorphologic features of lava flows. These eruptive products swelled out astride the fault zone. But there is a difference in an altitude of the western and eastern part of Gassan volcano with the fault in between. This means the faults were still active after the later stage activities. Ubagatake lava (UBL) forms the base of Ubagatake edifice. Ubasawa lava (USL) covers UBL and preserves geomorphologic features of lava flow. Ubagatake peak lava (UPL) and 1688m lava dome (1688L) forms Ubagatake and 1688m edifices respectively.

Rocks of the later stage are medium-K andesite and some are high-K andesite. All rocks contain Opx, Cpx and Pl phenocrysts. NGL rarely contains Ol, and TML contains Hbl phenocrysts. GSL contains Hbl, and GNL contains Ol phenocrysts. GPL lacks both Hbl and Ol phenocrysts. UBL contains Hbl, Ol (+/-), Bt (+/-) and Qtz (+/-) phenocrysts. USL and UPL rarely contains Ol phenocrysts. 1688L contains Hbl, Ol (+/-) and Qtz (+/-) phenocrysts. In most SiO₂ variation diagrams of major and trace elements, two linear trends can be defined. Rocks of the western part of Gassan volcano (NGL, TML) defines higher trend in FeO*, Na₂O and P₂O₅, and these defines lower trend in K₂O, Ba, Cu and Rb than rocks of Gassan and Ubagatake edifices. Range of SiO₂ content of GPL is relatively narrow among rocks of Gassan edifice. In Ubagatake edifice, UBL shows high, USL shows low, and UPL and 1688L shows medium value in SiO₂ contents.

Late Quaternary variation of ligninphenols in Core MD01-2421 off central Japan, NW Pacific

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A giant piston core MD01-2421 (45.82m long) was taken from off coast of the central Japan (36°02'N, 141°47'E, 2246 meter deep) during IMAGES VII-WEPAMA Leg 2 in 2001. We have generated the record of ligninphenols during the last 145,000 years, in order to understand the responses of terrestrial vegetation to global climate changes. TMAH (tetramethylanmonium hydroxide)-pyrolysis-gas chromatography-mass spectrometry was conducted for the analysis of ligninphenols.

The Σ8 (concentration of total eight ligninphenols) changed from 0.014 to 0.089 mg/10g-dry sediment, with an average of 0.048 mg/10g. The variation of Σ8 shows a precessional cycle from MIS-1 to MIS-5c. The maxima lagged behind the minima of summer insolation of the Northern Hemisphere by about 3-4 kyrs. The Σ8 was significantly low in early MIS-1 and MIS-5e, possibly reflecting the limited influx of terrigenous organic matter due to high sea-level stand. The variation of Σ8 was likely controlled by changes both in precession-controlled terrestrial climate and paleogeography of the hinterland, the Kanto Plain.

The average fractions of syringyl (S)-, vanillyl (V)- and cinnamyl (C)-phenols in total eight ligninphenols (total S, V and C) was 64%, 18% and 19%, respectively. This indicates that gymnosperms are the major sources. The ratio of S to V, which reflects the contribution of angiosperms against gymnosperms, was lower in MIS-2, MIS-4 and MIS-6. From MIS-5a to MIS-5d, the variation shows a precessional cycle. The low S/V ratio (high gymnosperm contribution) corresponds to high abundance of Japanese cedar pollens (Igarashi, in prep.).

A negative correlation between the fraction of cinnamyl-phenols (C%) and the ratio of acid to aldehyde of vanillyl-phenols [(Ad/Al)_v] means that alteration decreased C%. Nevertheless, the C%, which is an indicator of grass vegetation, was significantly high in late MIS-2 and MIS-6 prior to deglaciations. This suggests a dry climate of the Kanto Plain in those periods.