

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. The basement of Gassan volcano is Neogene-System. It is cut by faults, which are northern part of the Tanakura tectonic line. Because of these faults, the western side of basement is about 600m lower than that of the eastern side.

Activity of Gassan volcano can be divided into two. During the older activities, dacite lava was swelled out, as filling the eastern side of lower basement, and formed Amamori peak and Mt. Yudono. During the newer activities, andesite lava was swelled out and mainly formed Mt. Gassan and Mt. Ubagatake. A horse shoe shaped caldera caused by the collapse of the western part of Gassan can be observed.

In this study, we will report more detailed petrological characteristics of rocks in the newer activities. The eruptive products of the newer activities are divided into nine units, which are Nigorisawa lava, Tamugisawa lava, Gassan southern lava, Gassan northern lava, Gassan peak lava, Ubagatake lava, Ubasawa lava and Ubagatake peak lava and 1688m lava dome in the ascending order.

Nigorisawa lava does not preserve any geomorphologic feature of lavas, whereas Tamugisawa lava preserve geomorphologic feature of lava flow. These two units are distributed in the western part of Gassan. Gassan southern lava, Gassan northern lava and Gassan peak lava preserve geomorphologic feature of lava flow. There is about 400m difference at an altitude between the western part and the eastern part of the topographic features. This means the faults were still active after the newer activities. Ubagatake lava is distributed in the southern part of Gassan and form base of Mt. Ubagatake. Ubasawa lava covers Ubagatake lava and preserve geomorphologic feature of lava flow. Ubagatake peak lava and 1688m lava dome formed Mt. Ubagatake and 1688m peak respectively.

Rocks from the newer activities are medium-K andesite and some are high-K andesite. Most of the rocks contains Opx, Cpx and Pl phenocrysts. Nigorisawa lava ($\text{SiO}_2=60.2-62.4\text{wt.}\%$) rarely contains Ol phenocrysts. Tamugisawa lava ($\text{SiO}_2=61.3-62.9\text{wt.}\%$) contains Hbl phenocrysts. Gassan southern lava ($\text{SiO}_2=57.8-60.9\text{wt.}\%$) contains Hbl phenocrysts. Gassan northern lava ($\text{SiO}_2=56.0-62.1\text{wt.}\%$) contains Ol phenocrysts. Gassan peak lava ($\text{SiO}_2=59.6-61.1\text{wt.}\%$) lack of both Hbl and Ol phenocrysts. Ubagatake lava ($\text{SiO}_2=61.5-63.2\text{wt.}\%$) contains Hbl, Ol (rarely), Bt (very rarely) and Qtz (very rarely) phenocrysts. Ubasawa lava ($\text{SiO}_2=57.1-59.3\text{wt.}\%$) rarely contains Ol phenocrysts. Ubagatake peak lava ($\text{SiO}_2=60.5-60.8\text{wt.}\%$) rarely contains Ol phenocrysts. 1688m lava dome ($\text{SiO}_2=59.6-60.8\text{wt.}\%$) contains Hbl, Ol (rarely) and Qtz (very rarely) phenocrysts. All units show linear trends in Harker diagram. Units of the western part of Gassan show higher trends than those of the eastern and the southern part of Gassan in FeO^* , Na_2O , P_2O_5 and shows lower trends in K_2O , Ba, Cu, Rb. Range of SiO_2 contents of Gassan southern lava is narrower than that of Gassan northern lava, and that of Gassan peak lava is narrowest among these three units. SiO_2 content is high in Ubagatake lava, low in Ubasawa lava and middle value in Ubagatake peak lava and 1688m lava dome.