

Geological and chemical composition of pre-Aso volcanic rocks distributed in Minami-Aso village, Tateno district, Kyushu

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Abstract

Pre-Aso volcanic rocks are volcanic products of Aso-volcano erupted in pre-caldera stage. The appearance of them was limited because they were covered by pyroclastic flows and other deposits. However, the landslides caused by 2016 Kumamoto earthquake revealed several outcrops of pre-Aso volcanic rocks in Tateno area, Kyushu island. To understand the detail of volcanic activities in pre-caldera stage, we conducted the petrological observation and analyzed chemical composition of pre-Aso volcanic rocks.

Lava flows, tuff breccia and lapilli tuff are distributed in each landslide area. Lava flows do not only have massive part but also have platy part that can be confirmed upper part of it. Some lava flow-outcrops are seen that are characterized by onion-like weathering and that of core are hard. Tuff breccia are composed of sub-square gravel ~ sub-circle gravel and pale reddish matrix and the hardness of gravels has variation from hard to soft. On the other hand, lapilli tuff contains sub-square gravel that are hard and homogeneous. We found twelve lava flows and tuff breccia between them in continuous outcrops located northwest from Tateno Hospital.

All the collected samples are andesite which are divided into three types such as olivine-two pyroxene basaltic andesite (Type A), olivine-hornblende-two pyroxene andesite (Type B) and two pyroxene trachy andesite (Type C). Only one sample correspond to type C shows difference compared to other samples in aspect of K-rich composition. Each sample is abundant in plagioclase phenocrysts with a grain size of at most 2.0 mm. Type A and type B samples are seen dusty texture in plagioclase although type C has clear-phenocrysts. Grain size of clinopyroxene and orthopyroxene tends to be 0.5 mm at most, but some samples contain mega-phenocrysts with a grain size of 2.0 mm. Olivine phenocrysts that are contained in type A samples have iddingsite and reaction rim of clinopyroxene. Hornblende phenocrysts of type B have opacitic texture.

It is difficult to simply explain by fractional crystallization about compositional change from lower to upper in continuous outcrops. In addition to this, it is the evidence of magma mixing that olivine has reaction rim. It is indicated that source of type C lava is quite different from other types of magma, and it has possibility that at least two or more sources of different magma reservoir exist in pre-caldera stage.