

Geology and petrography of the pre-Aso volcanic rocks distributed in Tateno area, Minami-Aso village, Kyushu.

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The landslides caused by 2016 Kumamoto Earthquake revealed several outcrops of Pre-Aso volcanic rocks in Tateno area, Kyushu island. We found at least 20 lava flow units from 6 sections including a huge landslide site west of Aso Bridge. Continuous outcrop of 12 lava flow units northwest from Tateno Hospital. Each flow unit (3 to 15 m in thickness) is interbedded by red soil layers (1-20 m in thickness). At foot of the water reservoir, west of the study area (thickness of 70 m), tuff breccia with a thickness of at least 50 m (volcanic blocks in a matrix of weathered soil), and a lava flow unit forms the root of ridge. In the collapsed land of the Aso Bridge, we found six lava flow units and soil between them.

All the collected lava samples are andesite. Most samples are characterized by the phenocryst assemblage of olivine and/or hornblende in addition to clinopyroxene, orthopyroxene, plagioclase, and opaque mineral. We also confirmed the existence of latite, K-rich two pyroxene trachy andesite. All other samples are subalkaline rocks, showing a differentiation trend of the calc-alkali series with a small increase of FeO^*/MgO despite an increase of SiO_2 .

A series of 12 lava flow units from northwest of Tateno Hospital show a zig-zag pattern in the concentrations of SiO_2 and other elements against stratigraphy. Two units contain a pair of olivine and hornblende phenocrysts, and another two units contain only hornblende phenocryst. Phenocryst assemblage does not correlate with SiO_2 content. Clear plagioclase and dusty plagioclase both appear in the same thin section. It is difficult to explain these observations by a simple fractional crystallization model.

In summary, Pre-Aso volcanic rocks show a contrasting petrological feature against the products of the following caldera-forming stage. The former is dominated by andesite, partly characterized by a non-equilibrium assemblage of olivine and hornblende, whereas the latter is dominated by voluminous dacite pumice with a small input of basalt as indicated by scoria and banded pumice.

Keywords: Pre-Aso volcanic rocks, Aso volcano, 2016 Kumamoto earthquake