

Compositional variation of Holocene volcanic products
from the northwestern part of Aso central cones

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We described the petrography of Holocene volcanic products from the northwestern part of Aso central cones and compared their bulk rock compositions with the result of paleomagnetic study. We examined their genetic relationship by fractional crystallization model.

Holocene volcanic products of this area gradually changes to more unfractionated magma type, from Kishimadake to Ojodake, Komezuka, with time. Paleomagnetic directions determined by Yato et al. (2013) showed that the simultaneous eruptions occurred at different volcanoes. They also showed that the three volcanoes repeatedly erupted after intervals of quiescence. Tamai (2015MS) divided lavas of Kishimadake, Ojodake and Komezuka into 5 stages using magneto-stratigraphy. Kishimadake lava of stage 3 is different from that of stage 1. One is similar to Komezuka lava and has an intergranular texture. The other has an intersertal texture. Mineral assemblage is the same. Ojodake and Komezuka lava show little change in composition, mineral assemblage and texture throughout all stages.

All of the three range from 1.7 to 2.3 in FeO^*/MgO ratio with 51.0-53.5 wt.% SiO_2 . Ojodake and Komezuka lavas differ in FeO^*/MgO ratio even though they have the same SiO_2 content. It suggests that steady-state recharge and eruption occurred in the magma supply system for several hundred years. In addition, coeval lavas from different volcanoes, of different chemical compositions, indicate multiple magma chambers were present. Because the Rayleigh fractional crystallization model did not reveal parent-daughter pairs, simple fractional crystallization of the observed phenocryst assemblage do not account for compositional variation of Holocene volcanic products.

Keywords: Aso, central cones, post-caldera volcanism, Holocene, paleomagnetic directions, chemical compositions