

Correlation between petrology and magneto-stratigraphy of Holocene volcanic products from Aso central cones

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We collected samples from 25 sites where Yato et al. (2013) and Miyabuchi et al. (2012) reported magneto-stratigraphy of six different lava flows distributed in the northwestern region of Aso central cones. We conducted petrographic descriptions and chemical analyses of these samples and correlated them with paleomagnetic directions and stratigraphy of Miyabuchi (2009) based on radiocarbon dating.

Kijimadake lava is divided into two lava flow units with different paleomagnetic directions suggesting interval of at least several hundreds of years. They show the same mineral assemblage, but different groundmass texture, modal composition and whole-rock chemical composition. The upper lava flow unit has the same petrological characteristics as Kishimadake scoria, whose estimation age was 4000 y.b.p. from the radiocarbon dating.

Possibility of multiple eruptions has been suggested for Ojodake lava flows, because they are intercalated by soil, and show different paleomagnetic directions. However, no distinction was made in petrographic descriptions and chemical compositions between these lava flows.

Six different lava flows younger than Akahoya tephra have similar appearance and similar petrographic characteristics, however they are distinguishable by chemical compositions. Lava flow units with possible simultaneous eruptions (e.g. old Kijimadake lava and Nakadake younger stage lava, Kamikomezuka scoria and old Ojodake lava) show about 1% difference in SiO₂ content. A series of Holocene lava flows in Aso central cones are possibly derived from a common magma supply system with different conduits.

Keywords: post-caldera central cones of Aso volcano, volcanic products, Holocene, paleomagnetic directions, petrography, chemical compositions