

Paleomagnetic study of the Holocene volcanic rocks and tephra from post-caldera central cones of Aso Volcano

ABIRU, Takuya¹ ; SHIBUYA, Hidetoshi^{2*} ; MOCHIZUKI, Nobutatsu³ ; YATO, Takanori² ; MIYABUCHI, Yasuo⁴

¹Faculty of Science, Kumamoto University, ²Department of Earth and Environmental Sciences, Kumamoto University, ³Priority Organization for Innovation and Excellence, Kumamoto University, ⁴Faculty of Education, Kumamoto University

We have conducted a paleomagnetic study on Holocene volcanic rocks and tephra from post-caldera central cones of Aso Volcano. Paleomagnetic sampling was made at 25 sites of seven units. Nineteen out of 25 sites gave reliable mean paleomagnetic directions that had a 95% confidence circle of lower than 5 degree. Different sites from a few lavas, which had been treated as a single unit in the geological map of Aso Volcano (Ono and Watanabe, 1985), gave distinct mean directions at 95% confidence level. For Kishimadake lava, Ojodake lava, Nakadake young volcanic edifice, two different mean directions were obtained from multiple sites. These differences in mean directions indicate that multiple flows were extruded with a temporal gap of more than 10 or 100 years. We also found that Kamikomezuka scoria, two sites of Kishimadake lava, two sites of Ojodake lava gave identical mean directions at 95% confidence level. The concordance of the mean directions suggests that the multiple vents erupted simultaneously, in a time interval of the order of 10 years, and these lavas were extruded over a wide area of the post-caldera central cones. In this study, we also made paleomagnetic measurements on tephra layers in a section. Oriented samples were collected from 22 layers of a tephra section, 4km NNE of Nakadake volcano (Miyabuchi and Watanabe, 1997). Seventeen of the 22 layers gave mean paleomagnetic directions that had a 95% confidence circle of lower than 5 degree. Most of the N6 layer, and N5 and N4 layers give an identical direction, which suggests these layers were formed in a short period of several tens of years. A tephra layer record a same direction of a lava flow, which suggests a simultaneous formation of the tephra layer and lava flow.

Keywords: Aso Volcano, paleomagnetic direction, volcanic rock, tephra