

$^{40}\text{Ar}/^{39}\text{Ar}$ dating for the youngest lava flow from Hakusan volcano, Central Japan

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Hakusan volcano is an active volcano located in the central part of Ryohaku Mountains, central Japan. The volcanic activity began around 420 ka in the northeast region, and the last documented eruption occurred in the summit area in 1659. For the youngest lavas in the summit area, previous studies reported K-Ar ages of ca. 40-10 ka. However, half of the samples were younger than the applicable limit of the conventional K-Ar method and yielded negative K-Ar ages (Kitahara et al., 2000). A Thermoluminescence (TL) age of ca. 11 ka was also reported for a lava flow from the summit of Mt. Gozengamine (Hasebe et al., 2016).

We present the first direct dating results using $^{40}\text{Ar}/^{39}\text{Ar}$ for the youngest lava flow (Shiramizunotaki) that flowed over 7 km to the east from the Gozengamine summit area. The age for this lava flow is estimated to be 2200 yBP based on ^{14}C age of charcoal contained within a pyroclastic flow deposit beneath the lava flow (Kitahara et al., 2000). We conducted incremental heating experiments of groundmass concentration for the youngest lava flow. We applied the initial $^{40}\text{Ar}/^{36}\text{Ar}$ ratio from the inverse isochron back into the age equation instead of the assumed $^{40}\text{Ar}/^{36}\text{Ar}$ ratio of atmospheric argon of 295.5. This resulted in a new form the age spectrum (plateau ages were generated). These groundmass analyses yielded negative ages where the inverse isochron suggested a lower initial $^{40}\text{Ar}/^{36}\text{Ar}$ ratio of 287.9-288.9. The stacked initial-corrected plateau ages of two measurements yielded a combined age of 10.9 ± 1.6 ka. Although this age is older than the estimated eruption age from ^{14}C measurement, it agrees well with the TL age for the lava flow from the summit of Mt. Gozengamine. Further geological mapping and geochronology analyses will be needed to better reconstruct the youngest volcanic activity from the summit area of Hakusan volcano.

Keywords: Hakusan Volcano, $^{40}\text{Ar}/^{39}\text{Ar}$ dating