

K-Ar ages of volcanic rocks around the Daimontoge area: Timing of rhyolitic volcanism in the Yatsugatake-Chushin Highland Area

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In the Yatsugatake-Chushin Highland Area, enormous quantities of volcanic rocks such as the Enrei volcanic rocks (Makimoto et al, 1996), Yabashira volcanic products (Nishiki et al, 2007) and others were formed after the Early Pleistocene. These volcanic rocks are made up mostly of basalt to andesite, but accompanied with rhyolitic lavas including Wadatoge rhyolite (Yamazaki et al., 1976). Ages of these rhyolitic volcanic rocks are already reported (e.g. Kaneoka and Suzuki, 1970), but not sufficient yet. So, the temporal relation of rhyolitic and basaltic to andesitic volcanism is not defined yet. Additionally, in the Yatsugatake-Chushin Highland Area, most of the rhyolitic volcanic rocks are typically distributed inside the Oiwake volcanic basin (Kawachi, 1974) and its extension area. Kawachi (1974) suggested some kind of relationship between the rhyolitic volcanism and formation of the basin. Oikawa and Nishiki (2005) showed that this basin formed mainly at ca. 0.85 Ma, but temporal relation of formation of the Oiwake volcanic basin and the rhyolitic volcanism is not clarified yet. Therefore, the authors will report geology around the Daimontoge pass area and K-Ar ages of the volcanic rocks. Based on the newly obtained ages and volcanostratigraphic data, we examine the volcanism of Daimontoge area and duration of the rhyolitic volcanism in the Yatsugatake-Chushin Highland Area.

The argon isotope was analyzed by isotope dilution at AIST. The analyses and the age determination were based on the method described by Uto et al. (1995). Samples were crushed and sieved to obtain 0.25 mm to 0.50 mm fractions. Phenocrysts were removed from the fractions using a hand magnet and an isodynamic separator. The concentration of potassium was determined by flame spectrometric analysis, and the method was described by Matsumoto (1989).

From the volcanostratigraphic data and the newly obtained ages, it is clarified that the rhyolitic volcanism occurred at least twice ca. 1 Ma and ca. 0.25 Ma in the Daimontoge area. The rhyolite occurred at ca. 0.25 Ma covered Takayama fault (Kawachi, 1974) that was relation of formation of the Oiwake volcanic basin. The duration of rhyolitic volcanism in other area, the Wadatoge rhyolite and the others lie to the west of Daimontoge area were reported ca. 1.2 to 0.6 Ma (e.g. Kaneoka and Suzuki, 1970). In contrast, the rhyolitic volcanism of Inagodake lavas (Kawachi, 1974) and the others lie to the east of Daimontoge area were reported ca. 0.26 Ma (Kawachi, 1998). We summarize that the duration of the rhyolitic volcanism in the Yatsugatake-Chushin Highland Area can be divided into ca. 1.2 to 0.6 Ma and ca. 0.25 Ma. The rhyolitic volcanic rocks were distributed inside of the Oiwake volcanic basin, and also on its extensions, both eastern and western. Duration of this volcanism is mainly spreading period of the basin. After period of the basin formation, only limited volcanism occurred. Therefore, it is clarified that temporal and spatial relation of the rhyolitic volcanism in the Yatsugatake-Chushin Highland Area. Furthermore, in this area, though the enormous quantities of basaltic to andesitic magmas were erupted after 1.6 Ma, the rhyolitic magma was formed within a short time range.

[Reference] Kaneoka and Suzuki(1970) *Jour. Geol. Soc. Japan*, 76, 309-313, Kawachi(1974) *Geology of the Tateshinayama District, Scale 1:50000*, Kawachi(1998) *Jour. Fac. Edu. Shinshu Univ.*, 93, 149-160, Makimoto et al.(1996) *Geology of the Takato District, Scale 1:50000*, Matsumoto(1989) *Bull. Geol. Surv. Japan*, 40, 65-70, Nishiki et al.(2007) *Jour. Geol. Soc. Japan*, 113, 193-211, Oikawa and Nishiki(2005) *Bull. Volcanol. Soc. Japan*, 50, 143-148, Uto et al.(1995) *Bull. Geol. Surv. Japan*, 46, 239-249, Yamazaki et al.(1976) *Jour. Geol. Soc. Japan*, 82, 127-137.