

## Preliminary report of U-Pb zircon ages of granitoids in the Aoyama area, Ryoke belt, SW Japan

\*Fumiko Higashino<sup>1</sup>, Tetsuo Kawakami<sup>1</sup>, Shuhei Sakata<sup>2</sup>

1. Graduate School of Science, Kyoto University, 2. The University of Tokyo

The Ryoke belt shows an elongated distribution over 800 km in Southwest Japan, which is mainly composed of Late Cretaceous high-*T*/low-*P* type metamorphic rocks and plutonic rocks. Whereas the early geochronological studies report eastward younging of Rb-Sr whole rock ages of granitic rocks [e.g., 1], some U-Pb zircon ages and chemical Th-U-total Pb isochron method (CHIME) monazite ages of granitoids are not consistent with the trend [e.g., 2, 3]. The Aoyama area is one of the well-studied areas in the Ryoke belt, where high-grade pelitic and psammitic metamorphic rocks and granitoids are widely exposed [e.g., 4, 5, 6].

Granitoids in the Aoyama area have been classified based on their lithology and intrusive relationships [4]. In the Aoyama area, the "Younger Ryoke granites" and metamorphic rocks are widely distributed in the northern part, whereas the "Older Ryoke granites" with gneissose structures dominate to the south of the Ryoke metamorphic rocks [4, 7]. The "Younger Ryoke granites" intrude discordantly to the foliation and gneissose structure of the metamorphic rocks and the "Older Ryoke granites" [4].

Geochronological studies of the Ryoke granitoids in Kinki district are limited. Ishizaka [8] reported the U-Pb age of zircon determined by the conventional method. Using the data in Ishizaka [8], Kawakami & Suzuki [9] recalculated the  $^{206}\text{Pb}/^{238}\text{U}$  ages of the Joryu tonalite and the Kimigano granodiorite to be  $87 \pm 2$  Ma and  $93 \pm 2$  Ma, respectively. Tagami et al. [10] performed fission track dating of zircon from the Joryu tonalite and the Misugi tonalite, resulting in  $56.4 \pm 3.1$  Ma and  $63.7 \pm 2.5$  Ma, respectively. Kabuto granodiorite gives  $79.2 \pm 10.2$  Ma of Rb-Sr whole-rock isochron age [11]. The Ao granite gives an unequivocal age of  $79.8 \pm 3.9$  Ma by CHIME monazite dating [9]. It is apparent that the U-Pb zircon ages of granitoids are not sufficiently available to understand the spatiotemporal evolution of magmatism and regional metamorphism in the Aoyama area.

We obtained zircon U-Pb ages from the "Older Ryoke granites" (the Joryu tonalite and the Kimigano granodiorite) and the "Younger Ryoke granites" (the Kabuto granodiorite, the Misugi tonalite, and the Ao granite) using LA-ICPMS. The naming of these granitoids are based on the geological map of Hayama et al. [4]. The results of LA-ICPMS U-Pb zircon dating are given below as weighted mean  $^{238}\text{U}$ - $^{206}\text{Pb}$  ages ( $\pm 2\sigma$  error). Only analyses with concordance between 97-103 % are used for calculating the weighted mean ages. In terms of the "Younger Ryoke granites", the Kabuto granodiorite and the Misugi tonalite gave  $78.1 \pm 1.2$  Ma and  $74.5 \pm 1.3$  Ma, respectively. Two Ao granite samples gave  $71.5 \pm 1.2$  Ma and  $74.1 \pm 1.4$  Ma. These ages are interpreted to represent the timing of solidification of the granitoids. The zircon U-Pb age of the Ao granite is younger than the CHIME monazite age ( $79.8 \pm 3.9$  Ma). As for the "Older Ryoke granites", on the other hand, the Joryu tonalite gave  $87.5 \pm 0.7$  Ma. In the Kimigano granodiorite, zircon grains commonly show oscillatory zoning and rare replacement rim or faintly zoned rim also exists. The oscillatory zoned domain gave  $103.9 \pm 2.6$  Ma, and the replacement and faintly zoned rims gave  $89.7 \pm 0.6$  Ma. The Th/U ratio of the younger rim tends to be lower than the oscillatory zoned domain. Although the geological meaning of the younger rim is still unclear, we interpret the timing of solidification of the Kimigano granodiorite to be ca. 104 Ma. This is much older than other granitoids in the Aoyama area, and corresponds to the age of the oldest granitoids in the Iwakuni-Yanai area [cf. 12]. Although intrusive relationship between the Joryu tonalite and the Kimigano granodiorite are unknown [4], this study reveals that the Joryu tonalite was younger than the Kimigano granodiorite. Except for the two granitoids, the zircon U-Pb ages were consistent with the intrusion history reported in Hayama et al. [4].

## References

[1] Nakajima et al. (1990) CMP. [2] Suzuki & Adachi (1998) JMG. [3] Takatsuka et al. (2018) Island Arc. [4] Hayama et al. (1982) J. of the Geological Society of Japan. [5] Kawakami (2001) JMG. [6] Takahashi & Nishioka (1994) J. of Mineralogy, Petrology and Economic Geology. [7] Yoshizawa et al. (1966) Memoirs of the College of Science, University of Kyoto. Series B. [8] Ishizaka (1969) J. of Japanese Association of Mineralogist, Petrologists and Economic Geologists. [9] Kawakami & Suzuki (2011) Island Arc. [10] Tagami et al. (1988) JGR. [11] Tainosho et al. (1999) The memoirs of the Geological Society of Japan. [12] Skrzypek et al. (2016) Lithos.

Keywords: Ryoke belt, U-Pb zircon dating, LA-ICPMS