

Zircon U-Pb age of Momonoki Subgroup in the Koma Mountains: implication for the timing of Izu-Bonin-Mariana arc collision starting

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Momonoki Subgroup distributed in the western part of Yamanashi Prefecture, Japan has been considered to be trough-fill sediments deposited in a trough located in between Southwest Japan and Izu-Bonin-Mariana arc before their arc-arc type collision has started (Aoike, 1999). Depositional age and provenance of the Momonoki Subgroup will provide important constraint on the timing of the collision. Depositional ages of the Momonoki Subgroup were estimated to be 16-15 Ma (Koyama, 1993) or 15-13.5 Ma (Aoike, 1999) or 12 Ma (Amano, 1991) based on biostratigraphy and estimated cooling age of the intruded body (Kaikomagatake pluton: ~15 Ma (Sato *et al.*, 1989)). The provenance of sediment in the Momonoki Subgroup was mainly Honshu (Okuzawa and Hisada, 2008).

In this study, we have conducted geological survey of the Momonoki Subgroup and U-Pb age dating of detrital zircons sampled from the Momonoki Subgroup and Setogawa and Oigawa Groups, to reconsider the depositional age and provenance of trough-fill deposits in relationships with Eocene-Miocene accretionary complexes in SW Japan.

Momonoki subgroup is subdivided into the Lower, Middle and Upper Formations. The Lower Formation is composed of mudstone, conglomerates, and alternation of sandstone and mudstone, whereas the Middle Formation is dominated by mudstone with alternation of sandstone and mudstone. The Upper Formation is composed of conglomerates and alternation of sandstone and mudstone (Aoike, 1999; Kuroda, 2000, B.S.).

For U-Pb ages dating, zircon grains were handpicked from heavy fraction of constituent particles separated from samples by high voltage pulsed power selective fragmentation device (SELFRAG-Lab) and stamp mill. The measurement was carried out using LA-ICP-MS installed at the National Museum of Nature and Science. In the Momonoki Subgroup, sandstones in the Lower Formation show concordant ages ranging from 15.8 to 2364 Ma. Age distribution shows the largest peak at 60-70 Ma, following peaks at 100 Ma, 160-190 Ma, 200-250 Ma, 270-300 Ma, 1800-1900 Ma. Sandstone in the Middle Formation show the concordant ages ranging from 13 to 2184 Ma and 17 of 29 grains concentrated around 14.6 Ma. A conglomerate of volcanic rock separated from conglomerates of the Upper Formation shows concordant ages concentrated at 12.0 Ma.

Sandstones of Setogawa and Oigawa group show concordant ages ranging from 25.9 to 2269, 22.3 to 2588 Ma respectively. Age distribution of Setogawa Group shows the largest peak at 26-32 Ma, following peaks at 70 Ma and 100 Ma. While age spectrum of Oigawa group is very similar to the one of the sandstones in the Lower Formation of Momonoki subgroup, the one of Setogawa group is different from them.

The depositional age of the Momonoki Subgroup has been previously estimated as 16-15 Ma (Koyama, 1993) or 15-13.5 Ma (Aoike, 1999), but our new zircon U-Pb age revealed that the deposition of the Momonoki Subgroup continued at least 12 Ma.

The U-Pb age spectrums of detrital zircons between 100 and ~250 Ma show similar distributions compared to those of the Shimanto Belt (Tokiwa *et al.*, 2018). This similarity suggests that the detrital grains of the Momonoki Subgroup is originated from the Shimanto Belt with some influence from the Jurassic accretionary complex. The ratio of zircon grains younger than ~25 Ma increases from the Lower to the Upper Formations. This gradual change in the ratio suggests that the influence of the provenance with younger crustal age became dominant from the Lower to the Upper Formations. Since sandstones with

many young age zircon grains contain microcrystalline volcanic rock fragments, the additional provenance could be Miocene volcanics, possibly Izu-Bonin-Mariana arc. This suggests that the Izu-Bonin-Mariana arc had been gradually approaching to the trough during middle Miocene and that the sediment input from the Izu-Bonin-Mariana arc became evident from c.a. 12 Ma.

Keywords: zircon, U-Pb, Izu Collision Zone