

Phengite geochronology of Sanbagawa and Shimanto belts in Tenryu district, central Japan

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The Tenryu area occupies the central part of the Sanbagawa metamorphic belt. Its metamorphic sequence has been divided into two units; the Tenryu and the Tatsuyama units (Goto, 1996) or the Shirakura and the Sejiri units (Tagiri et al., 2000). We carried out K-Ar analyses of phengite separates from the pelitic schists of the Tenryu and the Tatsuyama units. Our results show 64-74 Ma for the former and 48-56 Ma for the later one, indicating the former is significantly older than the latter. The chemistry data showed the phengite in the Tenryu unit has 3.30-3.45 pfu in Si values, which are significantly high in comparison with that (3.20-3.32 pfu) in the Tatsuyama unit. This suggests that the Tenryu unit was metamorphosed under the higher-pressure condition than the Tatsuyama unit as suggested from garnet and amphibole chemistry by Tagiri et al. (2000). We propose the Tenryu unit belongs to the Sanbagawa belt and the Tatsuyama unit, to the Northern Shimanto belt as Aoki et al (2007) revealed that the Oboke unit in the central Shikoku has the lithology different from the Sanbagawa lithology based on their geology and geochronology and that the unit belongs to the Northern Shimanto belt appearing as a tectonic window in the Sanbagawa belt.

K-Ar dating of phengites and XRD analyses of carbonaceous material have revealed that the Tenryu unit has a flat age-temperature relation but the Tatsuyama unit has a negative relation similar to that in the Sanbagawa sequence of Kanto Mts. There are the lowest grade pelitic schists somewhat older than those expected from the trend for both units. This is due to the detrital mica contamination during a series of K-Ar dating of phengite separates from the schists. We carried out EPMA analyses of the phengites in the schists. The results show that the detrital micas are poorer in Si content than the metamorphic ones in the Tenryu unit, in contrast, the Tatsuyama unit has a inverse relation. These results suggest that the detrital mica in the Tenryu unit was derived from the Ryoke belt and that in the Tatsuyama, from the Tenryu unit of the Sanbagawa belt.