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# Sr-Nd-Pb-Hf isotopic variations of Cretaceous to Paleogene granitic rocks from northeast Japan

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The Japanese Islands represent a segment of a 500 Ma old subduction related orogen developed along the western Pacific convergent margin, and most tectonic units are composed of late Paleozoic to Cenozoic accretionary complexes and their high P/T metamorphic equivalents (e.g., Maruyama, 1997; Isozaki et al., 2010). Maruyama (1997) described the formation of the Japanese Islands has been taken as the standard model for an accretionary orogeny. He also stated that the most important cause of the orogeny is the subduction of an oceanic ridge, by which the continental mass increases through the transfer of granitic melt from the subducting oceanic crust to the orogenic belt. On the other hand, Jahn (2010) described that the subduction-accretion complexes consisting of granitic and sedimentary rocks in southwest Japan are composed mainly of recycled old continental crust. Kagami et al. (1999) described that the Honshu Arc can be divided into three groups based on their Sr-Nd isotope characteristics: the Kitakami, North (Abukuma belt), and South (Ashio/Mino belts) Zones, in order of increasing Sr isotopic enrichment, with Nd isotopic depletion from NE to SW. We present Sr-Nd-Pb-Hf isotopic ratios for granitic rocks in northeast Japan.

Sr-Nd-Pb-Hf isotopic study are made for granitic rocks from the Kitakami belts (Kitakami Mountains), the Abukuma belts (Shirakami Mountains, Obonai area, Taihei Mountain, Sekiryo Mountains, and Abukuma Mountains), and the Ashio/Mino belts (Okutone area, Tadami area, Okutadami area, Taisyaku Mountains, and Ashio Mountains). Newly isotopic data from these granitic rocks show increasing enrichment of crustal component in order of the Kitakami, Abukuma, and Ashio/Mino belts. Multi-isotope plots of these rocks indicate that the trend in variation could result from the mixing of depleted and enriched components. The depleted component is likely to originate from the magmatic flux related to the Lower Cretaceous ridge subduction. On the other hand, the mixing model of subducted sediments and depleted mantle cannot explain the variation of Nd-Hf isotopic compositions of granitic rocks. The enriched component requires existence of a reservoir with low Hf initial isotope ratio, which is considered to be zircon-rich sediment derived from old continental protolith (Chauvel et al., 2008). In addition, the granitic rocks in Kitakami zone shows rather different trend from the granitic rocks in other districts. It can be explained by the hypothesis that the granitic rocks in the Kitakami zone were derived from the mixing of mantle component with enriched end menber of lower Hf initial isotope ratio. This model is consistent with the fact that the Kitakami zone is characterized by the occurrence of adakitic rocks related to Lower Cretaceous ridge subduction.

Keywords: Northeast Japan, granite, Sr-Nd-Pb-Hf isotope, petrochemistry