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Early Cretaceous granitic rocks in the Kitakami Mountains, NE Japan has adakitic signatures and are regarded as products by melting of a subducted oceanic crust (Tsuchiya et al., 2007; Tsuchiya et al., 2015). Adakitic rocks from the Kitakami Mountains typically show the ε Nd values of 0 to +4, which are significantly lower than that of MORB. Thus mixing between subducting slab and sediments has been proposed for the origins of low ε Nd of Kitakami adakitic rocks (Tsuchiya et al., 2007). Tsuchiya et al. (2007) also pointed out possible assimilation of adakitic magma with lower crustal materials. Although petrogenesis of Kitakami granitic rocks have been discussed based only on whole rock chemistry and Sr-Nd-Hf isotope compositions in previous study, it is difficult to discuss of magma evolution from averaged chemical compositions and isotope ratios. Zircon grains ubiquitously contained in granitic rocks are useful tracer for the origin of granitic magma through the occurrence of detrital cores and their Hf isotopic compositions (Yang et al., 2007).

In this study, we performed in situ Hf-isotope analysis for zircons dated by Jahn et al. (2018) and we discuss about incorporation of crustal components to Kitakami granitic rocks. We performed in situ Hf isotope analysis for 10 granitic rocks (Miyako, Tanohata, Otanabe, Sakainokamidake, Himekami, Hinomiko, Oguni and Numabukuro) from the North Kitakami Belt and 5 granitic rocks (Tono, Hitokabe, Orikabe, Kesengawa, Hondera) from the South Kitakami Belt.

Miyako tonalite sample (KTKM-17) from the North Kitakami Belt shows typical signatures of the central facies of adakitic zoned pluton in the Kitakami Mountains and U-Pb ages of 116-126 Ma (Jahn et al., 2018). ε Hf values of zircons of this sample are in the small range of +9.4 to +5.3, yielding Hf model ages of 0.8 to 0.6 Ga. Zircon ε Hf values for Sakainokamidake (KTKM-09) and Hinomiko (KTKM-24) granodiorites showing adakite signatures in Sr/Y-Y diagram and non-adakitic Tanohata diorite (KTKM-01) and quartz monzodiorite (KTKM-06) and diorite (KTKM-07) from Himekami body, Otanabe granodiorite (KTKM-02) also concentrated in the similar range of the Miyako adakite. This evidence indicate that these Kitakami granitic rock could be derived from a similar source.

The Sakainokamidake zircon contain detrital zircon cores in the range of 131 Ma to 261 Ma in addition to early Cretaceous zircon domains. Most of the ε Hf values of these detrital cores are in the range of +9.7 to +5.7 and plotted along Hf evolution line of 0.6-0.8 Ga juvenile crust, which indicate the Sakainokamidake granodiorite was derived from melting of Neoproterozoic crustal material rather than slab melting. It's

worth noting that 0.6-0.8 Ga model ages coincide with those of Miyako adakite (KTKM-17) and many other early Cretaceous granitoids in the north Kitakami belt. These evidences indicate Neoproterozoic juvenile crust components are incorporated for genesis of early Cretaceous granitic rocks including adakites in the Kitakami Mountain.

Zircons from Tanohata monzogranite (KTKM-10) and Otanabe granodiorite (KTKM-02) show relatively low ε Hf values (+2.7 to -1.2), which indicate that older crustal components (Mesoproterozoic) is incorporated to these magma.

Numabukuro (KTKM-11) and Oguni (BJ-13-101) tonalitic rocks show higher ε Hf values (+14.4 to +7.9 and +12.6 to +8.0, respectively), yielding Hf model ages of 0.3 to 0.7 Ga. Thus these small bodies in the north of the North Kitakami Belt could be derived from younger crustal materials.

The ε Hf values of Early Cretaceous zircons in granitoids from Tono (KTKM-04), Hitokabe (KTKM-23), Orikabe (KTKM-26), Hondera (KTKM-05), Kesengawa (KTKM-21) of South Kitakami Belt also show the range from +13 to +5.4, which is consistent with the range of those from the North Kitakami Belt. Thus similar crustal components could be joined both the North and South Kitakami Belt.

As shown in this study, melting of various crustal materials could be incorporated in granite genesis in the Kitakami Mountains. Although, Early Cretaceous adakitic granites in the Kitakami Mountains have been mainly derived from slab melting, our results indicate that incorporation of crustal melting cannot be ignored.

キーワード：Hf、adakite、kitakami
Keywords: Hf, adakite, kitakami

