[EE] Evening Poster | U (Union) | Union

[U-02]Pacific-type orogeny: From ocean to mantle

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Pacific-type convergent margins (ocean - continent) and their related orogenic belts exist/form over subduction zones, which are the only ways to deliver surface materials to the deep mantle. Pacific-type orogens keep records of the evolution of paleo-oceans, formation and transformation of continental crust at their active margins, and generation of hydrous-carbonated plumes in the mantle transition zone (MTZ) and its related intra-plate magmatism. An approach linking paleo-oceans, active margins and plume magmatism stands on three "whales": the model of Ocean Plate Stratigraphy (OPS), the parameters of active convergent margins and the model of hydrous-carbonated plumes. The OPS model was created by many detailed studies of western Pacific, in particular Japanese, accretionary complexes; it allows recognizing different oceanic plates within one paleo-ocean and evaluating their sizes and ages. Pacific-type convergent margins are places of major continental growth by island-arc juvenile magmatism and accretion, but they are also places of strong plate interactions and crust destruction. There are two contrast types of those margins: accreting ones accompanied by the formation of accretionary complexes, and eroding ones accompanied by the tectonic and subduction erosion of accretionary wedge, fore-arc prism and volcanic arc. The materials of oceanic and continental crust, which are eroded at Pacific-type convergent margins, can accumulate in the MTZ and affect mantle conditions. All those processes, the subduction of hydrated and carbonated oceanic crust, the destruction of continental crust at eroding margins, and the accumulation of mafic and sialic materials in the MTZ can synergistically trigger the generation of hydrous-carbonated mantle plumes in the MTZ, mantle melting and upwelling, and intra-plate continental magmatism. We welcome papers on results from Pacific-type orogenic belts worldwide and from Archean to Cenozoic ages.

[U02-P05]Zircon Hf isotopic evidences for incorporation of crustal components in early Cretaceous adakitic plutonism in the Kitakami Mountains, NE Japan

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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 εNd 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 εNd 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). εHf 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 εHf 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 εHf 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 εHf 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 εHf 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 εHf 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.