Sr, Nd, Pb, and Hf isotopic composition of the Cretaceous to Paleogene plutonic rocks from the Asahi, Ashio, and Abukuma Belts, southern part of the NE Japan Arc

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The Cretaceous to Paleogene plutonic rocks are widely distributed of the NE Japan Arc. The igneous activity in the subduction zone of a NE Japan Arc, in order to solve the origin and evolution of magma, it is necessary to consider participation of a basement rock. Kagami (2005) arranged Sr and Nd isotopic compositions of the granitic rocks in the NE Japan Arc, and performed isotope zone division as compared with the isotope feature of the granitic rocks of the SW Japan Arc. The North zone (N-zone) is the lower crust to upper mantle origin, which is low epsilon Sr and high epsilon Nd values. The South zone (S-zone) is differ from N-zone isotope character and the partly mixing of early to middle Proterozoic and sedimentary rocks. The Trasitional zone (T-zone) has N-zone, S-zone, and intermediate isotope character. The Sado zone is a unique value of the epsilon Nd value (-6 -7) neighborhood on a mantle array. This study aims at the isotope data acquisition, verification of isotope zone division, and the elucidation of the origin of plutonic rocks.

Southern NE Japan Arc is classified into the Asahi, Ashio, and Abukuma Belts by a geotectonic division. The Abukuma and the partly Ashio Belt are N-zone, the southern Ashio Belt is S- and T-zones, the northern Ashio Belt is Sado-zone or unclassified, and the Asahi Belt is unclassified. Plutonic rocks of the Asahi Belt are composed of gabbro (Gb), quartz diorite (Qd), granodiorite (Gd), and granite (Gr). The Abukuma Belt is mainly composed of Qd and Gd. The Ashio Belt is mainly composed of Gr and Gd. Although all of the rock chemical composition shows similar, the Ashio Belt have tendency of high SiO2 and K2O values compared with the Abukuma Belt. Each of the REE patterns has settled comparatively. The Ashio Belt have clearly Eu negative anomaly compared with the Abukuma Belt, because degree of magmatic differentiation is probably different. The new isotopic data was plotted to the epsilon diagram. The Abukuma belt is plotted together with the N-zone, the Ashio Belt has widely composition range which is plotted to Sado- and T-zones, and the Asahi Belt is S- and T-zones. The northern Ashio belt has the special isotope feature that clearly also from the new data in this study.

On the other hand, considering the crust contamination to Quaternary volcanic rock magma, the present value of the granitic crust becomes the key. In an epsilon Nd-Sr (0Ma) diagram, the domain of the Abukuma Belt and the Ashio Belt is distinguished clearly. Although the composition range as an Ashio Belt is wide, regionality is recognized to some extent. The epsilon Hf-Nd diagram shows the narrow extent, and are distinguished more clearly. About some samples of Ashio belt that is classified into N-zone, it turned out that epsilon Hf value differs from the Abukuma Belt. Thus, the reclassification of isotope zone division by Hf isotope composition is possible.