Relation between Be isotopic ratios and U-series radioactive diseqilibria in Izu arc

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The volcanic rocks from island-arc often have high Beryllium isotopic ratio (^{10}Be/^{9}Be) compared with non-island arc volcanic rocks, such as Mid-Ocean Ridge Basalt. The arc volcanic rocks with high Be isotopic ratio is considered to be a direct evidence of contribution of subducting marine sediments with ^{10}Be in slab to arc magmas. Although trace amount of ^{10}Be generated by cosmic rays in upper atmosphere exists on earth's surface, ^{10}Be, with a half-life of 1.5 million years, trapped during the formation of the earth had already decayed and now extinct. Hence, ^{10}Be is a useful tracer to understand the elements transfer during the magma generation processes in the subduction zone. In this study, we analyzed Be isotopic ratio in the volcanic rocks from the Izu arc and examined across-arc or along-arc variations. Additionally, we investigated the correlations between Be isotopic ratios and the abundances ratios of between fluid-mobile/fluid-immobile elements, including the extent of U-series radioactive disequilibria.

The samples used in this study were the volcanic rocks that were mainly basalt and andesite from the Izu arc (Oshima, Miyake-jima, Niijima, Kozushima, Hachijojima and Aogashima). After the samples were treated with acid leaching and dissolved by HF, HNO_3 and $HClO_4$, Be were separated and purified from major components of the volcanic rocks. ^{10}Be abundances were analyzed with an Accelerator Mass Spectrometry (AMS) at Micro Analysis Laboratory, Tandem accelerator, The University of Tokyo. ^{9}Be concentrations were determined using Q-ICP-MS at ERI, The University of Tokyo.

^{10}Be abundances and ^{10}Be/^{9}Be ratios obtained in this study were (0.55-1.6 x 10^{6} atms/g) and (2.2-7.0 x 10^{-11}) respectively. Be isotopic ratios from the Izu arc were relatively low compared with the rocks from other island arcs and consistent with the previously reported data for this area. ^{10}Be/^{9}Be ratios show a small across-arc decrease according to the subduction and they tend to decrease toward the south in along-arc. Furthermore, ^{10}Be/^{9}Be ratios generally correlate with other abundance ratios between fluid-mobile/fluid-immobile elements, such as Ba/Th ratio and the (^{238}U/^{230}Th). These facts indicate that the fluids derived from the subducting slab play a major role in element transfer such as Be and U during magma formation. It is suggested that radioactive disequilibria between ^{238}U and ^{230}Th is caused by the fractionation during the element transfer by fluids. No clear relation was observed between ^{10}Be/^{9}Be ratios and (^{226}Ra/^{230}Th). In the presentation, we will report a new data including the various age of Fuji samples.