Investigation of reproducibility and accuracy of Be-10 and Be-9 analysis in volcanic rocks

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The volcanic rocks from subduction zone have high Be isotopic ratio (10Be/9Be) compared with non-island arc volcanic rocks, such as Mid-Ocean Ridge Basalt. The high 10Be/9Be isotopic ratio is considered to be an evidence of contribution of subducted marine sediments (10Be included) from subducting slab to arc magmas. 10Be generated by cosmic rays in upper atmosphere exists in trace amount on earth's surface. However, 10Be, with a half life of 1.5 million years, inside the earth trapped during the formation of the earth had already decayed and now extinct. Hence, 10Be is a useful tracer to understand the process of magma generation in subduction zone. In this study, we invesitgated across-arc variation of Be isotopic ratios, 10Be and 9Be concentrations in volcanic rocks from Izu arc. Additionally, we investigate the correlation between Be isotopic ratios and abundances of fluid-mobile elements in the area. To carry out the study, we considered the possibility of improving the methods of separation and purification of Be.

We used the volcanic rocks from Oshima, Miyakejima, Niijima and Kouzushima, in Izu arc. After the samples were treated with acid leaching, about 3-5 g ware dissolved by HF, HNO3 and HClO4, Be were separated and purified from major component of volcanic rocks. 10Be abundance were analyzed with an Accelerator Mass Spectrometry (AMS) using Tandem Accelerator at the school of engineering in the University of Tokyo. Abundances of 9Be were analyzed with a Q-ICP-MS at ERI in the University of Tokyo.

The results indicate relatively low 10Be concentration in the range of subduction-related volcanic rocks. 10Be abundances obtained in this study are 0.63-1.96 (atoms/g), which is almost equal to 0.8-1.4 (atoms/g) reported by the previous study of the volcanic rocks in this area. Although we observed higher Be isotopic ratios in Oshima sample, Be isotopic ratios were no difference between Miyakejima and Niijima. While Ba/Th, an abundance ratio between fluid-mobile/fluid-immobile elements, shows a clear decrease depending on the depth the slab, Be isotopic ratio shows a gradual decrease curve. This different behavior may result from the larger partition coefficient between mineral-fluid of Be than that of Ba. In the presentation, we will report reproducibility and accuracy of 10Be measurements.