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Sr isotopic ratios of volcanic rocks from Nekodake in Aso area, Central Kyushu

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Nekodake is located in eastern side of Aso central volcanic cones in Aso caldera, and consists of volcanic products. Its volcanic products are lava, agglutinates, pyroclastic rocks and dykes. Nekodake is a volcano, because dykes radiating from center of Nekodake and each unit of lava flows distribute in parallel with the slopes. Although Nekodake was recognize as one part of Aso central volcanic cones, it was defined as an older volcanic body, because the characteristics of bulk major elements are different and it is covered Aso-3 pyroclastic deposites (Ono and Watanabe, 1985). K-Ar datings show 0.15-0.14 Ma and 0.11-0.09 Ma of Nekodake volcanic rocks (Itaya *et al.*, 1984 and Matsumoto *et al.*, 1991, respectively). These ages were between Aso-2 and Aso-4, but Shinmura *et al.* (2010) reported that bulk rock Sr isotopic ratios and REE contents of Nekodake volcanic rocks were clearly different of volcanic products in caldera forming and inter caldera stages.

In this study, volcanic rocks were sampled at Nekodake widely and bulk rock chemical and isotopic data were determined. Range of SiO_2 content was 53-60 wt. % and of $^{87}Sr/^{86}Sr$ was 0.7041-0.7047. Sr isotopic ratios of Nekodake was higher than those of Aso pyroclastic deposites (0.7040-0.7042) (Hunter, 1998), and was higher than those of volcanic rocks of post caldera and pre caldera (Shinmura et al., 2010). Crustal xenoliths consists of quartz and feldspar are included in volcanic rocks of Nekodake. Sr isotopic ratios of these xenoliths were 0.7046-0.7055 and higher than those of Nekodake volcanic rocks. One of the xenolith shows inter-finger structure with magma, and this is an evidence of magma process assimilating of crustal material.

Star mark in Fig 1 shows the data that is the most lower Sr isotopic ratio, is basalt which was lower defferentiated. Most of the data distribute along the line from the star mark to the area of higher Sr ratios as xenolith's (0.7046-0.7055). This shows that the original magma which component was as star mark assimilated crustal material, and the variety of Sr isotopic ratios were depend on the assimilation process.

References:

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Matsumoto A., Uto K., Ono K. and Watanabe K. (1991): K-Ar age determinations for Aso volcanic rocks : concordance with volcanostratigraphy and application to pyroclastic flows. summary of Volcanological Society of Japan 1991 meeting. 73.

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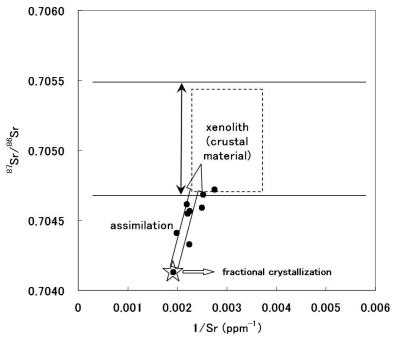

Fig 1. 1/Sr vs. $^{87}Sr/^{86}Sr$ diagram for the Nekodake volcanic rocks.

Keywords: Nekodake, Aso, Sr isotopic ratio, mixing of crustal materials, xenolith