

Geochemical variations in Quaternary magmas along the volcanic front of Kyushu, Japan

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The Quaternary magma genesis of central Kyushu, Japan, was investigated by geochemical lateral variations. This area is underlain by the Philippine Sea Plate including the older Kikai Basin segment (60-40 My old) and the younger Shikoku Basin segment (26-15My old) divided by the Palau-Kyushu Ridge. Sr/Y ratios of the Quaternary lavas of the Quaternary lavas decrease from north to south along the volcanic front of the Kyushu arc. All analyzed Sr-Nd-Pb isotope compositions plot close to or along mixing curves between MORB-type mantle wedge and Philippine Sea Plate sediments, or between Shikoku Basin basalts and the Shikoku Basin sediments on the plate. ⁸⁷Sr/⁸⁶Sr ratios negatively co-vary with the Sr/Y ratios and increase from north to south. These geochemical characteristics suggest that Quaternary magmatism in central Kyushu was controlled by various contributions of the materials from the Philippine Sea Plate slab. The negative correlations between Sr/Y and Sr isotope ratios suggest that extent of addition of the partial melts derived from the subducting slab is the prime control of the spatial variations. These observations also suggest that the high Sr/Y slab component in the north would have been derived from the partial melts from the hot and young Shikoku Basin slab, whereas the low Sr/Y flux in the south may have derived from slab fluids from the older Kikai Basin slab.

Keywords: adakite, Philippine Sea plate, volcanic front, trace elements, Sr-Nd-Pb isotopic compositions