

Renewal of lower crust of Japanese Island arcs as suggested from strontium isotope compositions of volcanic rocks

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Petrological knowledge of arc lower crust is very important for understanding the genesis of arc crust, formation of intra- and back-arc sedimentary basins, acid magma generation, and magma contamination. It is, however, not easy to get it besides the examination of xenoliths contained in volcanic rocks. Here we reviewed strontium isotope compositions of Quaternary volcanic rocks to suggest that the lower crust repeats an extensive renewal through extinction by erosion and basalt magmatism associated with diapiric mantle upwelling.

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Strontium isotopic compositions of volcanic rocks give information of crustal contamination of magma, recycling of continental material through slab subsidence from trenches and chemical characters of source mantle. They, however, are interpreted in any way of these, since there is no definite way of interpretation. Magmas erupted to the surface are more or less contaminated by the lower crust. Therefore the effect of it should be evaluated first.

The genesis of the Karatsu-Sasebo sedimentary basin and the subsequent Matsuura basalt volcanism are suggested to be the manifestation of mantle diapiric upwelling (Nakada et al., 1997). This is due to the loss of lower crust by erosion and subsequent lower crustal growth by basalt magmatism and hence is reflected on the strontium isotopic compositions of the basaltic volcanic rocks. Similarly, The regional variation of strontium isotopic compositions of Quaternary volcanic rocks in Japanese islands seems to be related to the formation of sedimentary basins in Miocene, suggesting the extensive erosion of the lower crust and the following lower crustal growth associated with the subsequent arc volcanism.