Geophysical Research Abstracts, Vol. 8, 02509, 2006
SRef-ID: 1607-7962/gra/EGU06-A-02509
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Adakitic rocks from Sunda Arc, Indonesia

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We present the first reported evidence of adakitic rocks from the Sunda Arc, Indonesia. Such peculiar igneous rocks have never been reported from this long-live (65 My) history of the Sunda subduction zone. New evidence is revealed from a compilation study of 705 petrochemical data of Cenozoic volcanic rocks from Java island, the main part of Sunda Arc. Data consist of major and trace element analysis (only few contain rare earth elements). From first order sorting on data quality and numbers of measured elements, finally only 386 records are qualified for further analysis. High Sr/Y rocks (threshold parameters: $Sr/Y > 20$; $Y < 19$ ppm; $SiO_2 > 56\%$) consist of a very small fraction of dataset (24 records or only 6%). Only five rocks show strong evidence of adakite (i.e., $Sr/Y > 40$), while most others have Sr/Y values between 30 and 40. The ages of high Sr/Y rocks range from middle Tertiary to Quaternary. A typical Quaternary high Sr/Y volcano is the Ngebel Lake caldera of the Wilis volcanic complex, east Java. It has the lowest $^{87}Sr/^{86}Sr$ radioisotope values so far in Java (0.70388-0.70437) compared to other volcanoes (e.g., Merapi volcano, 0.70501-0.70583). The $^{143}Nd/^{144}Nd$ radioisotope data from the Ngebel Lake caldera (0.51288-0.51290) are also relatively higher than those of Merapi (0.51267-0.51280). As a result, the high Sr/Y Ngebel Lake caldera has the closest radioisotope signatures to those of Indian Ocean crust ($^{87}Sr/^{86}Sr$ = 0.70289 and $^{143}Nd/^{144}Nd$ = 0.51310) among all Java volcanoes.

The overall subtle signatures of adakitic magmas from Sunda Arc compared to other island arcs may be attributed by older ages of currently subducted crusts (i.e., Cretaceous and older), deeper sources of magmas (i.e., depths of slab are 110-220 km underneath the Sunda arc volcanoes) and thickness of crust (i.e., 25-30 km). However,

mapping the Sr/Y ratios of volcanic rocks in Java can still improve the understanding of tectonic setting of arc magmatism. The distribution of high Sr/Y that is exclusive in the eastern half of the island is coincident with the contrasting compositions of crust (i.e., continental in west Java vs. oceanic in east Java). Considering the long history of subduction in this region, high Sr/Y districts may also be indicator for the location of extinct hot MORB being subducted along the trench. Furthermore, the observed spatial relationships between high Sr/Y districts with domination of porphyry-style Cu-base metals deposits in east Java, and low Sr/Y districts with domination of epithermal Au-Ag deposits in west Java suggest that mapping the Sr/Y ratio can be a guideline for mineral prospecting.