

Derivation of Mesozoic volcanic rocks in the Southeast China continent and relationship to crust-mantle interaction

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There is a 2000km long and 300~400km wide Mesozoic volcanic belt in the Southeast China continent, covering an area of about 15000km². Volcanic rocks are most frequently acid (rhyolitic-rhyodacitic) (>90%) and only a few intermediate-basic in composition. They all are belong to high-K calc-alkaline series. Rhyolites have (⁸⁷Sr/⁸⁶Sr)_i ratios of 0.7057~0.7145, εNd(t) values of -11~-1.9, and basalts have (⁸⁷Sr/⁸⁶Sr)_i ratios of 0.7055~0.7106, εNd(t) values of -10.6~+3.9.

Typical bimodal associations are present in Early Jurassic, especially in Early Cretaceous volcanic sequences, which are becoming useful "probe" to study the origin of extensive Mesozoic rocks. They consist of basalts and rhyolites, in which rhyolites account for more than 90% in volume. Petrographic evidences prove that the two end members took place magmatic mixings. One of their features is that basalts have high (⁸⁷Sr/⁸⁶Sr)_i ratios (generally >0.707) very close to those of rhyolites, and have anomalous Sr contents (generally 700~1600ppm) far higher than both rhyolites (generally 50~300ppm) and crust (<100ppm). Besides, εNd(t) values (generally <-5) of basalts can be lower than those (generally >-4) of rhyolites, thus crustal contamination is not an important factor to alter Sr, Nd isotopes of basalts.

Rhyolites generated from remelting of crust. Basalts derived from upper mantle enriched by fluid metasomatism, their notably high Sr contents prevent their Sr isotopes from influences of crustal contamination or mixing with rhyolitic magmas. Mixing calculations show relatively low (less than 9%) mixing degrees between the two end members, which explains why there exist only sparse andesites formed by mixing.