

# Geochemical characteristics and variations of the Ryoke granitoids, southwest Japan: petrogenetic implications for the plutonic rocks of a magmatic arc

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Southwest Japan constitutes a segment of the Cretaceous to Paleogene batholithic belt of Pacific Asia before the opening of the Japan Sea. These batholithic granitoids are the products of continental-margin arc magmatism. The Ryoke granitoids represent its magmatic front, emplaced within the high T/low P Ryoke metamorphic rocks over an interval of 100-70 Ma. The constituent rocks of the plutons range from quartz diorite, through tonalite and granodiorite to granite. They are classified into the Older and Younger groups: the Older Ryoke granitoids are of syn- and late-tectonic, whereas the Younger ones are of post-tectonic plutons. The majority are I-type and the minority have S-type affinities. They belong to the ilmenite series.

Fifty samples of the representative Ryoke granitoids in the Kinki district were analyzed for major and trace elements, including REE. They are calcic (alkali-lime index  $\sim 65$ ), metaluminous and peraluminous ( $A/CNK = 0.9 \sim 1.1$ ), and low in  $Fe^{+3}/Fe^{+2}$  ratio. They are plotted along the boundary between I and S-types in the ACF-diagram. Trace element geochemistry indicates their designation to the volcanic-arc granites of Pearce et al. (1984). Rb (mostly  $< 100$  ppm) and actinoid contents are low and constant.

The trace element variations and REE patterns indicate the presence of garnet or hornblende in the residue after partial melting of the source rocks. The partial fusion of amphibolite, at 1.0 GPa and higher pressures, yielded the magmas of the I-type Ryoke granitoids. The presence of old continental-crustal mafic rocks, candidates of protoliths, is known beneath the Ryoke Belt.