

Petrogenesis of the ridge subduction-related granitoids from the Taitao Peninsula, Chile Triple Junction Area

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It is the essential to study the geochemical evolution of the solid earth to understand the growth and origin of granitic continental crust. The Taitao Peninsula is the youngest site of ridge subduction in the world, where a young oceanic plate subducts, possibly equivalent to an Archean subduction zone environment. It is proposed that granitic magmatism in the Taitao Peninsula is closely concerned with the subduction of young oceanic crust. This paper presents REE from whole rock analyses of the granitic rocks so that we obtain the detailed compositional characteristics of the granitic magmas. There is a triple-junction (Trench-Trench-Ridge) off the Taitao Peninsula, southern Chile. The compositions of the Taitao granitoids are tonalitic to granitic with SiO₂ ranging from 64% to 78%. Trace elements are characterized by low Sr (50-300 ppm) contents, moderately both high Y (10-45 ppm) and Yb contents (1-5 ppm) and low Sr/Y ratios (1-25). Chondrite-normalized REE patterns are characterized by moderately high [La/Yb]_N ratios (5-20). These chemical characteristics are similar to typical calc-alkaline arc magmas rather than adakitic granitoids. The characteristics suggest that the magma was generated by partial melting of amphibolite rather than eclogitic rocks. These geochemical compositions suggest that the granitic magma was generated under 10 km depth below the fore-arc region. Contrary to previous belief, our result suggests that Taitao granitoids, which possibly generated by partial melting of subducted oceanic-crust, have TTG composition in major element, but no HREE-depleted signature in trace elements.

Keywords: ridge-subduction, slab-melting, TTG, adakite, REE