



The Taitao Granites: I-type granites formed by subduction of the Chile Ridge and its implication in growth of continental crusts

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Late Miocene to Early Pliocene granite plutons are exposed at the tip of the Taitao peninsula, the westernmost promontory of the Chilean coast, together with a contemporaneous ophiolite with a Penrose-type stratigraphy. Namely, the Taitao granites and the Taitao ophiolite, respectively, are located at ~30 km southeast of the Chile triple junction, where a spreading center of the Chile ridge system is subducting underneath the South America plate. This unique tectonic setting provides an excellent opportunity to study the generation processes of granitic magmas at a ridge subduction environment, and the complex magmatic interactions between the subducting ridge, overlying crust and sediments, and mantle. This paper reviews previous studies on the Taitao ophiolite/granite complex and use geochemical data and U-Pb age distributions of zircons separated from igneous and sedimentary rocks from the area to discuss the mechanism that formed juvenile magma of calc-alkaline I-type granites during ridge subduction. Our model implies that the magmas of the Taitao granites formed mainly due to partial melting of hot oceanic crust adjacent to the subducting mid-oceanic ridge that has been under influence of deep crustal contamination and/or metasomatized sub-arc mantle through slab window. The partial melting took place under garnet-free-amphibolite conditions. The juvenile magmas then incorporated a different amount of subducted sediments to form the I-type granites with various compositions. The Taitao granites provide an ideal case study field that shows the processes to develop continental crusts out of oceanic crusts through ridge subduction.