Geophysical Research Abstracts
Vol. 12, EGU2010-7589-2, 2010
EGU General Assembly 2010

Subduction of the Chile Ridge and Generation of Granite Magmas

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The Late Miocene Taitao ophiolite (5.7 to 5.2 Ma) exposed at approximately 50 km southeast from the present day Chile triple junction and accompanied granite intrusions with various compositions. Five intrusive bodies of the Taitao granites have U-Pb ages ranging from 5.7 Ma (Tres Montes pluton in southeast) to 3.9 Ma (Cabo Raper pluton in southwest). Three intrusions that fringe eastern margin of the ophiolite have U-Pb ages ranging from 5.2 Ma to 4.9 Ma. Recycled zircon cores are common only in the Tres Montes pluton. Our data indicates that the generation of the granitic melts started in the Tres Montes area when a short segment of the Chile ridge system started to subduct ca. 6 Ma ago. This magmatism involved contamination with sediments/basement rocks. A part of the subducting ridge center was emplaced to form the present Taitao ophiolite at $\sim$ 5.6 Ma. Generation of granitic melts continued as the spreading center of the same ridge segment subducted, due perhaps to partial melting of the ophiolite and/or oceanic crust enhanced by heat from upwelling mantle beneath the ridge. Sr and Nd isotopic data also support this model. Granitic magmas with various compositions developed during subduction of the ridge. Emplacement of the ophiolite and formation of continental crust took place almost simultaneously.