



Magmatism and crustal deformation during subduction and tearing of a ridge-transform system

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Chile ridge subducts underneath South American plate at latitude 46S, forming a ridge-trench-trench type triple junction that migrated to the north along the Pacific coast. At ~ 6 Ma, a short segment of the Chile ridge system collided and subducted in the south of the present triple junction. This ridge subduction event resulted in emplacement of the Taitao ophiolite (5.7 to 5.2 Ma) and contemporaneous granite intrusions (5.7 to 4.9 Ma) and rapid crustal uplift (partly emerged after 4.9 Ma) in the trench-side, and adakitic volcanisms (dating in progress), subsidence and > 1 km thick basin-fill sedimentation behind the ophiolite. Recent acoustic survey by JAMSTEC R/V Mirai revealed that a graben is still developing in this area. Gabbro and ultramafic sections were folded due to high-T deformation. Gabbro structures restored using paleomagnetic data indicate that it was eastern part of the ridge center that was obducted. Presence of ~ 5 Ma mafic and dacitic volcanism along the eastern margin of the ophiolite (Chile Margin Unit) with higher Sr isotopic ratios suggests perhaps that a transform fault subducted prior to the ridge segments started opening as the subducted ridge torn away by slab-pull.