

## **CREATION, MODIFICATION AND DESTRUCTION OF CONTINENTAL LITHOSPHERE IN THE CENTRAL ANDES**

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The Central Andes is a major site of creation, modification and destruction of continental lithosphere. The chemistry and distribution of the erupted magmas record dramatic changes linked to changes in Benioff zone geometry since the Early Miocene. Major addition occurs by intrusion of mantle-generated arc magmas whereas loss occurs by removal of basal continental lithosphere above flat segments of the subducting slab, delamination of thickened eclogite-facies continental crust and tectonic forearc erosion. Shallowing of the slab under the modern flatslab since 18 Ma induced up to ~70% loss of the continental lithosphere in a 400 km E-W transect near 30°S. The process must be more mechanical than thermal as loss is associated with a cooling mantle and a thickening crust. Dramatic changes also occurred further north over an intermediately dipping slab where about 50 km of eastward arc front migration can be linked with backarc delamination of overthickened eclogitic-facies crust and underlying mantle lithosphere. Chemical signatures of arc lavas reflect mixing of mantle-derived arc magmas with underlying garnet granulite/eclogitic crust or with tectonically removed basal arc and forearc crust that was subducted into the mantle. Other lithospheric modification and crustal differentiation is associated with steepening of the slab beneath the Andean high plateau as reflected by giant Neogene ignimbrite eruptions, crustal thickening and plateau uplift. These processes reflect more than a local story as substantial amounts of continental lithosphere has passed through Andean-like crucibles. The magnitude of continental lithospheric loss and gain has implications for crustal and mantle recycling.