

Crustal Structure and tectonic deformation of the Southern Central Andes between 33°S and 38°S

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We deployed a temporary seismic network in the Southern Central Andes from November 2013 to April 2015. The dataset allowed us to investigate the 3D shear-wave structure of this part of volcanic arc and to shed light on the tectonic deformation of the Andean Cordillera after the M8.8 Maule earthquake.

In a first step we used ambient noise correlations to point out the distribution of shear-wave anomalies beneath the volcanic arc. This underpinned possible magmatic reservoirs feeding the volcanic systems of this region and highlighted crustal-scale geological structures. Next, we focussed on the region around the Nevados de Chillan (about 37°S) describing the effects of the M8.8 Maule earthquake on the tectonic deformation of this area. This Andean-transverse volcanic complex faces one of the regions that slipped the most during the M8.8 Maule earthquake. We compared the deformation of the geological records (assumed to be representative of inter-seismic periods) against the focal mechanisms of post-Maule moderate earthquakes that took place in the arc from 2010 to 2015. Our work suggests that the kinematics driving the growth of NW-striking volcanic systems in the Southern Central Andes are affected by both magmatic and tectonic processes, with the latter experiencing short-lived perturbations.