

## Neotectonic and morphometric analysis of the Guañacos fold and thrust belt

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The Guañacos fold and thrust belt, located between 37° and 38° S in the eastern foothills of the Main Andes is characterized at its eastern border by a series of NE, NW and N- neotectonic faults associated with the Antiñir-Copahue Fault System (ACFS) (Folguera et al., 2004). This area has been object of study during the last years due to the existence of structures that affect Plio-Pleistocene rocks. In addition, this neotectonic belt concentrates an anomalous number of mass-wasting deposits, particularly rock avalanches, which highlights the particularity of this region (Penna et al., 2011). At these latitudes, the orogenic front of the Andes is represented by the ACFS, which constitutes the northern prolongation of the Liquiñe-Ofqui fault system into the retroarc zone.

In this study, we present and describe neotectonic structures that were not completely characterized in previous surveys and geomorphologic and morphometric analyses of the main fluvial valleys that drain from W to E the region. We made geomorphologic maps focused on each valley, identifying rock avalanches, deep-seated gravitational slope deformations, landslides and fluvial terraces developed upstream the main neotectonic structures. Additionally, we made slope maps of the basins and a SWATH profile that show the different base levels among them. We also calculated the hypsometric curve and integral and other morphometric parameters, such as area, perimeter, drainage density, and several shape indexes in order to characterize the basins.

The different longitudinal profiles of the channels show significant slope changes with convex sectors. We analyzed the concavity and Ksn indexes to identify possible knickpoints. Then we correlated the lasts with geological and structural observations as well as mass-wasting deposits, to determine their origin. Some knickpoints show a spatial relationship with the identified neotectonic structures, indicating that these alterations of the longitudinal river profile could correspond to recent tectonic activity. Morphometric and morphological analyses and identification of neotectonic deformations allowed determining that the drainage of the area was modified both by the processes of mass-wasting and by the quaternary tectonic activity, both processes intimately linked. This lack of equilibrium in the fluvial network of the hinterland zone is explained by a broad fan of out-of-sequence neotectonic thrusts that coincides with the late Pleistocene deglaciated area developed over the eastern Andean slope (Dixon et al., 1999). This linkage could be the response of a sub-critical condition of the fold and thrust belt achieved after the Pleistocene glaciations in the area.

Dixon et al. 1999. The geology of Nevados de Chillan volcano, Chile. *Revista Geológica de Chile* 26(2):227-253.

Folguera et al. 2004. Neotectonics in the foothills of the Southernmost Central Andes (37°-38°S). Evidence of the strike-slip displacement along the Antiñir-Copahue fault zone. *Tectonics* 23, TC5008.

Penna et al. 2011. Multiple slope failures associated with neotectonic activity in the Southern Central Andes (37°-37° 30' S), Patagonia, Argentina. *Geological Society of America, Bulletin* 123(9-10), 1880-1895.