



## ESEG-4: Evolución tectónica del arco de Scotia en Sudamérica y la Península Antártica

### Scotia Plate Dynamics: insights from seismotectonics and numerical modeling

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The Scotia plate and surrounding areas is a beautiful and complex geodynamic system, which accommodates the westward motion of South-America with respect to the Antarctica plate. It comprises active and fossil oceanic spreading, arc-shaped orogenic belts at the periphery of the system, crustal strike-slips and transform fault zones, extensional basins, and subductions. A careful structural analysis of the larger Scotia area based on the ETOPO1 dataset, together with a seismotectonic synthesis including stress tensor inversion (CMT dataset), and finite element numerical modeling (Shell code), allow to better characterize the current strain and stress states of this complex system. Comparisons between the actual states of strain and stress provided by focal mechanism inversions of homogeneous sectors, and the states of strain and stress modeled using numerous test-configurations, led us to investigate both the kinematic conditions at the boundaries of the system and the role of rheological parameters. The overall current stress pattern is surprisingly coherent at the scale of the South-America / Antarctica plate limit. Indeed, the tectonic complexities of the Scotia plate's surroundings induce stress variation from pure compression to pure extension, with local transpression, transtension, and pure strike-slip. Nevertheless, except on the top of the Sandwich subduction where the stress pattern is controlled by slab dynamics, the overall stress field shows a relative stability in terms of  $Sh_{max}$  oriented E-W to NNE-SSW and  $Sh_{min}$  oriented NW-SE to NNW-SSE. This stable stress pattern reflects the overall left-lateral motion between Antarctica and South-America plate. This study provides a new regionalization and quantification of the stress variations in the larger Scotia plate system. It rises up the matter of regional evolution from compressional zones (Andes, Sandwich subduction front), to strike-slip (Nord and South Scotia ridges), and extensional areas (Bransfield basin, Sandwich subduction back-arc), and provides new constraints to discuss the related geodynamic processes.