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

Structure and tectonic evolution of the South Patagonian fold and thrust belt: pairing between subduction dynamics, climate and tectonic deformation

M. Ghiglione[1], V. Barberon[1], M.E. Ramos[1], J. Tobal[1], E. Garcia Morabito[2], R.J. Suarez[1], J. Martinod[3], C. Sue[4].
(1) Instituto de Estudios Andinos IDEAN (Universidad de Buenos Aires - CONICET), Buenos Aires, Argentina.
(2) IIDyPCa ,CONICET, Universidad Nacional de Río Negro, CP 8400 San Carlos de Bariloche, Argentina
(3) ISTerre, Université de Savoie Mont-Blanc, 73376 Le Bourget du Lac cedex, France
(4) Chrono-environnement, CNRS-UMR6249, Université de Franche-Comté, 16 route de Gray, 25030 Besançon cedex, France

We present an appraisal of structural domains in the SPA (Southern Patagonian Andes) between 46° and 52°S, recognizing a thick-skinned BD (Basement domain) and a hybrid thick- and thin-skinned systems in the FTB (fold and thrust belt).

Two major structural segments can be clearly defined north and south of 48°30´: (1) Northern segment: With a steady orogenic width of around 340-360km, is characterized by a well-developed basement domain, and a narrow FTB. The inner domain of the FTB is very narrow.

The comparison of our geometrical data with exhumation patterns from thermochronological studies evidences important correlations: (1) The wide basement in the northern sector coincides with exhumation ages younger than 3 Ma throughout this domain. It has been proposed that this sector was dominated by highly efficient alpine glacial erosion, producing this characteristic young exhumation pattern (Thomson 2010). In terms of the critical wedge theory, enhanced erosive exhumation in the highland of the retro wedge produces active tectonic uplift of the basement domain; while the basement is constantly subdued under the critical angle, the thrust front does not advance, and the FTB is underdeveloped, in agreement with our empirical observations. (2) The abrupt and steady increase in width and shortening of the FTB towards the southern sector coincides with older basement cooling ages which indicate much reduced late Cenozoic erosion despite dominantly glacial conditions here since the latest Miocene (Thomson et al., 2010). Although orogen width does seem to be around 25% wider between 48°30´and 50°SL, it shows a gradual decline towards the south. Older exhumation ages in the Basement domain coincides with a thicker sedimentary cover and erosion focused in the retroarc, as expected by the critical wedge theory, predicting the development of a wider FTB. Thomson, S.N. et al. 2010. Nature 467:313–317.