

Cretaceous orogeny, arc shifting and foreland dynamic subsidence linked to the Nalé flat-subduction event in Southern South America

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We synthesize the Andean evolution between 35°30'S to 48°S intending to highlight early orogenic stages and to analyze their potential driving mechanisms. We review early tectonic stages of the different fold-thrust belts that compose this Andean segment. Additionally, we examined the spatio-temporal magmatic arc evolution as a proxy of dynamic changes in subduction (Coney and Reynolds, 1977). Contrary to previous hypothesis invoking several individual segments undergoing shallow subduction (e.g. Folguera and Ramos, 2011), we propose a hypothesis associated with the existence of a continuous large-scale flat subduction setting in Cretaceous times. Notably, this configuration may have had a similar size to the Peruvian Flat-slab, the present-largest flat-slab setting on earth (Gutscher et al., 2000). This process initiated diachronically in the late Early Cretaceous achieving its full development in Late Cretaceous to earliest Paleocene times, constructing a series of fold-thrust belts from 35°30'S to 48°S. Furthermore, we assess major paleogeographic changes that took place during flat-slab full development in Maastrichtian-Danian times. At this moment, an enigmatic Atlantic-derived marine flooding covered the Patagonian foreland reaching as far as the Andean foothills (del Río et al., 2014). Based on flexural and dynamic topography analyses, we suggest that focused dynamic subsidence at the edge of the flat-slab may explain sudden marine ingression previously linked to continental tilting and orogenic loading during a high sea level global stage.

Folguera, A., Ramos, V.A., 2011. Repeated eastward shifts of arc magmatism in the Southern Andes: a revision to the long-term, pattern of Andean uplift and magmatism. *J. South Am. Earth Sci.* doi:10.1016/j.jsames.2011.04.003.

Coney, P.J., Reynolds, S.J., 1977. Cordilleran benioff zones. *Nature*, 270(5636), 403.

del Río, C.J., Martínez, S.A., 2015. Paleobiogeography of the Danian molluscan assemblages of Patagonia (Argentina). *Palaeog. Palaeoc. Palaeoec.* 417, 274-292.

Gutscher, M.A., Spakman, W., Bijwaard, H., Engdahl, E.R., 2000. Geodynamic of flat subduction: seismicity and tomographic constraints from the Andean margin. *Tectonics*, 19, 814-833