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Reworking of an ancient lithospheric anisotropy during the Permo-Triassic extension in southwestern South America

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The prolonged history of convergence of oceanic crust against the Pacific edge of southern South America resulted in several episodes of deformation during Paleozoic to Cenozoic times. Overprinting relationships between different structures in a sector of the Andes between 32º and 34º South latitude, preserve evidence for at least four deformational events occurred since the Early Paleozoic: (1) an Early Paleozoic collisional event; (2) a Late Paleozoic compressional orogeny; (3) a Permo-Triassic extension; and (4) the Miocene to present Andean orogeny. The Late Paleozoic orogenic belt has a NNW trend and its location coincides, at these latitudes, with the inferred Early Paleozoic suture zone between the Cuyania and Chilenia exotic terranes. The Permo-Triassic evolution of southwestern South America was characterized by the development of a great amount of volcanism under extensional conditions. This extensional regime continued during the Triassic time and led to the formation of a series of rift systems, with overall NNW trend, formed along the western margin of the continent. One of these basins, the Cuyo basin, corresponds to a NNW-trending narrow basin parallel to the inferred suture zone and the Late Paleozoic orogenic belt.

Detailed geological mapping and kinematic analysis of faults developed coetaneously with this volcanism, indicates that Permo-Triassic volcanic rocks are affected by NW-trending sinistral oblique-slip normal faults and WNW-trending normal faults. The fault slip analysis allows us to infer a N23ºE stretching direction, suggesting that the NW- and WNW-trending structures are the result of an oblique sinistral extensional regime. The remarkable consistency between the NW- and WNW-trending orienta-

tions and their associated stretching direction permits us to consider that these extensional structures were newly created faults which orientations were determined by the regional stress-field.

N-S to NE-SW trending pervasive fabrics, related to schistosity of lower Paleozoic rocks, and N-S to NE-SW trending discrete fabrics, marked by upper Paleozoic faults and fault-related folds, suggest that the development of the WNW- to NW- trending Permo-Triassic structures was not influenced by the upper crust fabric. Instead, the parallelism between the NNW-trending Early Paleozoic inferred suture zone, the Late Paleozoic orogenic belt and the Permo-Triassic rifting suggests the presence of a long-live lithospheric weakness zone, which induces strain localization and guided lithospheric reworking during subsequent deformational events. In the tectonic model presented here we propose that this lithospheric anisotropy accounts for the generation of an oblique extensional regime during Permo-Triassic times and the presence of permeable structures which favoured magma ascent.