

## NEOPROTEROZOIC TO EARLY PALEOZOIC CRUSTAL DISCONTINUITIES IN CENTRAL ARGENTINA IMAGED BY 3-D MAGNETOTELLURICS

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**ABSTRACT:** Magnetotelluric (MT) method is an indirect way to unravel complex crustal structures. The interpretation of 2-D MT data could be enhanced applying a three-dimensional (3-D) processing. This procedure generates more realistic images of the crust beneath than MT analysis assuming a 2-D structure. We have reprocessed MT data using 3-D inversion methods incorporating profiles that cut across the central region of Argentina from 60.00°W and 67.00°W two E-W transects at 31.7°S and 29.5°S latitude and NW-SE, NE-SW around the north of San Luis province (>44 stations). We analyzed vertical E-W slices (600 km length, 100 km depth) from the city of Santa Fé to Ulapes town (south of La Rioja Province). These slices start at 31.7°S latitude and are separated from each other by 50 km until Ceres town, 200 km towards north. 3-D modelling of MT data shows significant lateral and vertical heterogeneities in the lithospheric structure of central Argentina. From east to west a high resistive anomaly (R<sub>1</sub>; Rio de la Plata Craton) that is covered by a supracrustal conductor (C<sub>1</sub>; <10 km depth) that coincides with Chaco-Pampean peneplain was recognized. Towards west the C<sub>1</sub> pinches out beneath another important and complex high resistivity block (R<sub>2</sub>; Eastern Sierras Pampeanas or Pampia Terrane). The eastern border of the R<sub>2</sub> crustal unit extends in the surface from 63.3°W in the northernmost line (a few km to the east of Sierra Norte de Córdoba) and 64.0°W in the south (next to Córdoba city). The western border of R<sub>2</sub> is ca 70 km to the west of Ulapes town, where it sharply meets a strong and thin conductive anomaly (C<sub>2</sub>; Western Sierras Pampeanas, Famatina Terrane or MARA terrane) that extends to the WNW, outside the limits of our interest. Within R<sub>2</sub> a conductive circular anomaly is depicted within the Sierras de Córdoba, more precisely in the northwestern tip where igneous and metamorphic rocks, such as banded schists (i.e., Tuclame schists), San Carlos migmatites, etc, appear. These rocks are different from those of the rest of the Eastern Sierras Pampeanas. Up north the anomaly expands laterally in a quasi 2D geometry. The continuation to the south of this anomaly coincides with the Guacha Corral shear zone, that basically divides rocks affected by the Pampean orogeny from those affected by (515-490 Ma) post-Pampean processes. Most of the detected resistivity anomalies represent first and second order lithospheric discontinuities, and clearly coincide with already proposed and suspected terranes boundaries.

**KEYWORDS:** CRUSTAL STRUCTURE, MAGNETOTELLURICS, SOUTH AMERICA.