
**Submission code: PGZQBYXZL5**

See this and other abstracts on our website: https://home.sbgf.org.br/Pages/resumos.php

# 3D Electrical Resistivity and Multigeophysical Constraints on the Lithospheric Architecture of Southeastern Brazil: Implications for the Gondwana Supercontinent Assembly

**Adevilson Alves (Observatório Nacional), Antonio Padilha (Instituto Nacional de pesquisas espaciais), Emanuele Francesco La Terra (Observatório Nacional), Sergio Fontes (National Observatory (Brazil)), Artur Benevides (Observatório Nacional), Carlos Chaves (universidade São Paulo), Andrea Santos-Matos (Instituto Nacional de Pesquisas Espaciais)**

# 3D Electrical Resistivity and Multigeophysical Constraints on the Lithospheric Architecture of Southeastern Brazil: Implications for the Gondwana Supercontinent Assembly



This study investigates the complex tectonic architecture of southeastern Brazil in the context of crustal block assembly and amalgamation during the construction of the Gondwana supercontinent. Conducted within the framework of the Petronas Petróleo Brasil Multiphysics Project, the research integrates long-period magnetotelluric (MT) data with multiple geophysical datasets to characterize deep lithospheric structures and tectonic processes associated with Gondwana evolution. MT data were acquired at 100 stations distributed over an area of approximately 500 × 400 km², arranged along five NW–SE-oriented profiles with spacing between 15 and 25 km. The three-dimensional electrical resistivity model was generated using the ModEM-ON inversion package, incorporating full impedance tensors and Tipper functions derived from the MT data. The multidisciplinary integration of this model with gravity, seismic tomography, geothermal, and magnetic data enabled the identification of key lithospheric structures and the development of a coherent tectonic evolution model for the region. Under the São Francisco Craton, a prominent conductive anomaly spatially correlated with high seismic velocities and low geothermal flux, along with a well-defined lithosphere-asthenosphere boundary, suggests post-collisional crustal rejuvenation processes. In the Ribeira Orogen, well-defined suture zones were identified in both the geoelectrical model and the seismic tomography, documenting subduction and collision events that occurred during the Neoproterozoic. The most remarkable feature in the central portion of the orogen is an extensive resistive body, spatially coincident with high seismic velocities and reduced heat flow, interpreted as unequivocal evidence for the presence of a microcontinent (the Paraíba do Sul Microcontinent) incorporated during the amalgamation of Gondwana. Additionally, anomalous conductive zones at the boundary between the Ribeira Orogen and the Cabo Frio Terrane, associated with outcrops of oceanic magmatic arc rocks, support a Cambrian accretionary scenario. These results provide robust evidence that refutes previous models suggesting an intracontinental evolution for southeastern Brazil, instead highlighting the fundamental role of Neoproterozoic–Cambrian accretionary processes, including magmatic arc formation, ocean closure, and continental block collisions.