



27º Simpósio de
Geologia do Nordeste



TECTONIC ARCHITECTURES AND SOURCES OF MAGMATISM IN THE NORTHEASTERN PORTION OF THE BORBOREMA PROVINCE INFERRED FROM DEEP GEOPHYSICAL DATA

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Recent results from magnetotelluric (MT) and seismological investigations of the deep lithosphere underneath the Precambrian Borborema Province, that have been supported by several institutional programs (INCT-ET; Milênio, CTPetro), have yielded novel images of the deep thermal and physical properties of the province based on parametric models inverted from surface-collected data of electrical conductivity and elastic-acoustic determinations. In this presentation, we focus on research carried out in the northeastern corner of the province, covered by MT soundings deployed along four linear profiles crisscrossing the eastern side of the Rio Grande do Norte domain. The data were processed and modeled by a 3-D MT data inversion scheme using the full impedance tensor plus the vertical magnetic transfer function. The MT modeling reveals several sub vertical discontinuities, with significant lateral contrast in the overall geoelectric structure, down to upper mantle depths. The conspicuous distribution of these features in the crust and upper mantle suggests distinct lithologies with very heterogeneous properties in agreement with the abundance of deformed and metamorphosed igneous and metasedimentary sequences composing an Archean-Paleoproterozoic basement intruded by Neoproterozoic plutons. A major conductivity anomaly is recorded in the crust beneath the Neoproterozoic supracrustal Seridó Group, but this anomaly deepens to upper mantle depths northwestwards below the Paleoproterozoic Caicó Complex. It has been suggested that the former was originally initiated as a sedimentary basin developed upon a Paleoproterozoic basement during a Neoproterozoic extension event related to a collisional fore deep of a south-dipping subduction slab, contrary to our northwest-dipping conductivity vergence. In case of the latter, because of the petrogenesis of the Caicó orthogneisses that indicates partial melting of a metasomatically enriched spinel-to garnet-bearing lherzolite with adakitic features, a subduction zone environment is also proposed for its original magmatism. Considering the tenuous evidence indicating that the conductive anomaly could extend down into the upper mantle in this same region where teleseismic tomography registers an attenuation of P waves, it can be concluded that this zone could also be the source of the metasomatic fluids and minerals contained in the Mesozoic volcanic plugs and flows of the alkaline rocks and alkali basalts in the north-south Macau–Queimadas belt. In contrast to the general pattern seen in several parts of the province exhibiting a multitude of resistive and conductive zones marking the crust and upper mantle, probably as the result of subducting continental slab and collision, the lithosphere of São José do Campestre, in the oriental side, representing a previous fragment of a Archean terrane, can be interpreted as the remain of a craton partially destroyed as the result of metasomatism by fluids and melts derived from multiple sources. One apparent exception is an elongated resistive cratonic-like keel in the WSW-ENE direction, which is observed along the southeastern side of the study area.

PALAVRAS CHAVE: *MAGNETOTELLURIC; NE BORBOREMA; MAGMATISM.*