

From Delamination to Underplating: a Plausible Basin-Forming Process for the Jaibaras Trough (Northeast Brazil)

Diógenes Custódio de Oliveira Petrobras/E&P-RNCE
E-mail: dcoliveira@ep-rnce.petrobras.com.br

Jaibaras Trough (JT), the most important, prominent and extensive exposure of Early Paleozoic sedimentary sequences in a wide Brasiliano-age area, including Borborema Province and Nigerian Shield, is an example of intraplate province for which both origin of magmatism and basin-forming mechanisms are coeval. Thus, intrusives units (Coreaú Dike Swarm, Meruoca and Mucambo plutons, sills and dikes of Parapuí Suite) demonstrate a closed spatial and stratigraphical interactions with the JT infill. The silicic and intermediate suites represent the surface expression of shoshonite to high-K series of magmas derived from partial melting of evolved lower continental crust with contribution of lithospheric mantle. Otherwise mafic rocks were generated at the expense of adiabatic decompression processes driving by lithospheric extension. In terms of tectono-magmatic source, this apparent incompatibility is satisfactorily explained by modelling thermo-mechanically the JT generation as a coupled process from lithospheric decoupling followed by mafic underplating. This evolution is clearly corroborated by geological features in the study area such as: a) The onset of mafic to intermediate magmatism, originally hybrid in origin (crust/mantle), represented by the Coreaú Dike Swarm; b) The closed coincidence between lithospheric mantle-derived (Parapuí Suite) coupled with shoshonite magmatism (Mucambo and Meruoca plutons) and extensional deformation regime (JT); c) The progressive but definitive changing in regional stress system to simple extension, represented by the nucleation and development of a strong rift structure; d) The occurrence of a widespread uplift with subsequent preservation of extensional structures.