

THE RIO DE LA PLATA CRATON EASTERN BOUNDARY IN URUGUAY AND ITS BRITTLE STRUCTURE: GEOPHYSICAL EVIDENCE

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ABSTRACT: The southern portion of the South American Platform in Uruguay, known as the "Uruguayan Shield", includes the Río de la Plata Craton (CRP), consolidated until the end of the Mesoproterozoic, and a group of eastern terranes, whose structure has evolved since then, in an orogenic to peri-orogenic environment, up to the Ediacaran - Cambrian. These terranes conform a structural arrangement of blocks, folded belts and Neoproterozoic intrusive granitoids (630-580 Ma), called Dom Feliciano Belt (DFB). The main works establish the Sarandí del Yí ductile shear zone as the eastern boundary of the RPC. Meanwhile, the contiguous eastern portion of the RPC, limited eastwards by the Sierra Ballena shear zone and, to the West by the Sarandí del Yí shear zone, was interpreted as a single tectono-stratigraphic terrane called "Nico Pérez" (NPT), despite its multiple internal divisions. This terrane presents folded belts of the DFB, in various erosive relicts of low-grade metamorphic volcano-sedimentary Neoproterozoic sequences, superimposed on different minor blocks of granite-gneissic Paleoproterozoic-Archean basement that include the "Valentines Block". Its dysfunctionality results from an excessive simplification in its definition. Not only does it involve a confuse plate scheme and a speculative paleo-geodynamic evolution, but it also does not reflect its current configuration because of: (i) orogenic collapse and intracontinental tectonic-block reconfiguration, (ii) its extensional reactivation during the Meso -Cenozoic. The recent acquisition by the Uruguayan State of a regional aerogeophysical survey (magnetism and radiometry), and new fieldwork carried out by us, allows to rethink the structure of the cratonic boundary and the penetrativeness of the deformation within the RPC. It was possible to characterize the orientation, width and length of the discontinuities between tectonic blocks, distribution and orientation of faults, mafic dykes, continuity of highly radioactive or magnetic rocks (eg, granites, mafic rocks), as well as the superposition of tectonic structures (shear zones, faults), allowing to confirm or rethink existing geological maps. The results showed that the "Sarandí del Yí" ductile shear zone has a width of 6 km of non-reworked N-S mylonites, correlated in several segments. Its western edge is confirmed by the dextral ductile drag of the N70E° Paleoproterozoic "Piedra Alta" microgabbro dyke swarm. This N-S shear zone is reactivated as brittle fault and cut transversely by faults parallel to the NW-SE Mesozoic mafic dyke swarm, with kilometric sinistral displacements. These faults disrupt kilometrical-length mylonite segments. The radiometric image shows that the Valentines Block is imbricated as a big wedge between the NPT and the RPC. The Sierra de Sosa shear zone has a leading role in the control of Neoproterozoic late-collisional ductile-brittle imbrication. Finally, another brittle imbrication is observed that affects the boundary of the RPC, up to 20km from the margin towards its interior, by conjugate faults NW and NE. We conclude that the Uruguayan Shield, in its present configuration, consists of four large tectonic blocks: (i) RPC, (ii) Valentines, (iii) Western DFB, (iv) Eastern DFB.

Keywords: BRITTLE FAULTS, RIO DE LA PLATA CRATON, GEOPHYSICS