

DETRITAL ZIRCON (U-PB) AND SM-ND ISOTOPE CONSTRAINTS ON THE SEDIMENTARY PROVENANCE AND EVOLUTION OF THE RIACHO DO PONTAL OROGEN, NE BRAZIL.

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The Riacho do Pontal Orogen (RPO) borders the northern São Francisco Craton margin in northeastern Brazil, separating it from the Borborema Province further north. The external zone of the RPO is composed of a sequence of low- to medium- grade south-verging stacked nappe system, consisting of the Barra Bonita (quartzite, schist, marble) and Mandacaru (metagraywacke, garnet-mica schist) formations. The Monte Orebe Complex (metabasalts, metaexhalites, fine-grained metasedimentary rocks) outcrops in the central portion of the RPO and contains remnants of a Neoproterozoic oceanic crust. The detrital zircon U-Pb age spectrum of a quartzite sample from the Barra Bonita Formation suggests a relatively simple sedimentary provenance, with peaks at 1.62, 1.74 and 2.11 Ga. A quartzite sample from the lowermost Monte Orebe Complex shows a main 1.9-2.1 Ga peak, with minor Archean and a few ca. 1.75 Ga zircon grains. Sm-Nd T_{DM} model ages are between 1.7 and 2.4 Ga for samples of both units, while $\epsilon Nd_{(600\text{ Ma})}$ is between -3.0 and -17.7. The overlying Mandacaru Formation, on the other hand, shows a very distinct provenance pattern, with major Cryogenian (650 Ma) and Tonian (1.0 Ga) peaks, T_{DM} between 1.2 and 2.0 Ga and $\epsilon Nd_{(600\text{ Ma})}$ between -0.2 and -9.2. Similarly, samples from the topmost Monte Orebe Complex yield distinct 1.0 Ga and Cryogenian peaks. A simple provenance pattern can be suggested for the Barra Bonita Formation and the lowermost Monte Orebe Complex, with the São Francisco Craton basement and Proterozoic covers as the main source areas. Marble lenses of the Barra Bonita Formation show values of $\delta^{13}C$ from -0.2 to +3.0 ‰ and $^{87}Sr/^{86}Sr$ around 0.7076, very similar to those of the Una Group carbonates in the Chapada Diamantina, immediately south of the RPO. The detrital zircon age spectra are also very similar for both the Barra Bonita and Una units. A possible paleogeographic scenario for the northern São Francisco Craton margin is the formation of a broad passive margin in the Neoproterozoic, represented by the Una Group in the cratonic region and the Barra Bonita Formation as its northward continuation within the continental platform, which grades further North to the deep oceanic basin represented by the lower Monte Orebe Complex. The metagraywackes of the Mandacaru Formation, on the other hand, are incompatible with a sedimentary provenance exclusively from the cratonic region, and thus must include source areas towards north, such as the Cariris Velhos Belt (1.0 Ga) and the ca. 650-630 Ma granites of the Borborema Province. The later have been recently proposed as part of a Cryogenian/Ediacaran magmatic arc. The presence of ca. 1.0 Ga and Cryogenian zircons in the topmost Monte Orebe Complex is indicative of the mélange character of this unit. Thus, a very important provenance shift and change in tectonic setting is characterized within the RPO, with a passive margin setting (Barra Bonita) superseded by a syn-orogenic sequence (Mandacaru) during the orogenic evolution. FAPEMIG and Vale supported this project through grant number CRA-RDP-00120-10.

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