

Magmatic record of subduction, continental collision and tectonic collapse during Western Gondwana assembly at the Oriental Terrane of the Ribeira Belt (SE Brazil)

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The Central Segment of the Ribeira Belt, which runs along the South Atlantic Coast, is divided by the Central Tectonic Boundary into Occidental and Oriental terranes. We propose the following tectono-magmatic evolution of the Oriental Terrane plutonic rocks based on field mapping, petrography, litogeochemistry and detailed geochronology. The Rio Negro magmatic arc (634 ± 10 Ma, U/Pb zircon) is represented by hornblende-gabbro and tonalitic, trondhjemitic and dioritic gneisses. The geochemical and geological data-set is ambiguous. It can either be interpreted as indicative of immature Cordilleran or mature intra-oceanic arc. At ca. 600 Ma (599 ± 5 Ma; 588 ± 9 Ma, Pb/Pb zircon) the Rio Negro Arc collided with the Occidental Terrane passive margin, generating large volumes of crustal peraluminous magma. The late collisional magmatism is represented by the Serra dos Órgãos Batholith. Its granodiorite facies crystallized at 560 Ma (560 ± 4 Ma; 546 ± 12 Ma, U/Pb zircon) and the leucocratic peraluminous facies is slightly older (580 ± 17 Ma, Pb/Pb zircon). Thermal relaxation accompanied the end of the Serra dos Órgãos Batholith magmatism (525 ± 16 Ma, BSO Rb/Sr isochron). During its uplift the Oriental Terrane experienced extensional collapse with the development of NW-trending ductile-brittle shear zones. These structures controlled the transport and emplacement of granitic laccoliths and sills (501 ± 20 Ma; 490 ± 19 Ma, Rb/Sr isochron).