

NEOPROTEROZOIC TO CAMBRIAN PERI-GONDWANA ARC-RELATED BASINS IN NORTHERN PATAGONIA

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ABSTRACT: The Early Cambrian Tardugno Orthogneiss (528-522 Ma) is a low to moderate peraluminous high-K calc-alkalic magnesian granodiorite-monzogranite (68- 73wt%) that crops out in Nahuel Niyeu area, NE Patagonia. Rocks are variably mylonitized under high strain and low-T conditions; No enclaves were observed. Sr, Nd and Hf data suggest a Mesoproterozoic metasedimentary-type source (Nd and Hf T_{DM-2S} model ages *ca* 1.5 Ga). Random correlations between ASI, alkalis, P₂O₃ vs SiO₂ are observed. In turn, mafic phase chemical contents (*i.e.* FeO + MgO) exhibit positive linear trends against SiO₂, K₂O and Ba. Moderate REE slopes and low Sr/Y suggest plagioclase retention in the source whereas, biotite seemed to have remained as restitic entrained phases in magma. Maximum depositional ages for metaclastic Nahuel Niyeu, El Jagüelito, Mina Gonzalito rocks in the NE and Colo Niyeu Fm. in central northern Patagonia span between 535 and 515 Ma. Even though the younger age is not significant in the Patagonian framework, detrital zircon grains aged between 520 and 510 Ma are frequent. K-S statistical parameter of likeness among detrital populations does not allow separating in origin these depocenters. WR geochemical analysis and detrital ages cumulative functions indicate intra arc to forearc environments extended for more than 300 km (at present) from Atlantic coast to the west. The most conservative depositional age for the depocenters is bracketed between 520 and 480 Ma. Combined detrital spectra (N> 500) indicates highly concordant clusters around Paleoproterozoic (1.8-2.2 Ga Transamazonian orogeny) and late Mesoproterozoic to early Neoproterozoic (0.9-1.2 Ga Grenville Orogeny) whereas the largest group has late Neoproterozoic to mid-Cambrian ages (0.7-0.5 Ma Brasiliano-Pampean orogenies). Comparison of WR geochemistry of the metasedimentary rocks of north Patagonia prevents considering early Cambrian granites (540-525 Ma) from the Eastern Sierras Pampeanas and Río de la Plata Craton as sources for the Patagonian basins. In turn, a local supply from Tardugno Orthogneiss and mid-Cambrian volcanic arcs (520-510 Ma) in Río de la Plata and Saldanha belt in South Africa are envisaged as the main source based on Nd, Hf- isotope correlation and REE-patterns. Recent datings in leucocratic differentiates within the Early Cambrian metaclastics yielded *ca* 515 Ma. Evidence across Northern Patagonia suggest an active contractional convergent tectonic setting in which Tardugno magmatism (Arc) was active until *ca* 522 Ma. Arc building produced a first stage of subsidence (intra-arc basins). After *ca* 515 Ma, extension and decompression in intra-arc and fore-arc domains would have produced a erosion of Tardugno, an increase in the subsidence rate and evolution into backarc basins, such as Mina Gonzalito, and the generation of younger peraluminous melts (<500 Ma). A regional metamorphic episode (M1) is pinpointed after 515 Ma and before the intrusion of Punta Sierra and Valcheta granitoids. This Magmatism restarted after 475 Ma, with the development of a thermal metamorphism (M2) restricted to Mina Gonzalito rocks at 472 Ma. In Valcheta area, Nahuel Niyeu rocks suffered a second metamorphic event (M2') that is not necessarily linked with M2 but deformed by a D2 phase is older than 260 Ma.

KEYWORDS: NORTHERN PATAGONIA, CAMBRIAN, GONDWANA.