

PIÊN-MANDIRITUBA GRANITE BELT: ONE OF SEVERAL NEOPROTEROZOIC MAGMATIC ARCS FROM SOUTHERN BRASIL

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RESUMO: The Piên-Mandirituba Granite Belt is one of the important neoproterozoic granite belts (Cunhaporanga, Três Córregos, Paranaguá-Francisco do Sul and Florianópolis-Pelotas) that exposed in the south-eastern and southern Brazil and emplaced between 620 and 595 Ma. The Piên-Mandirituba Granite Belt trending N45-50E, is emplaced between two Neo-Archean/Paleoproterozoic terranes, the Luiz Alves Terrane to south and the Atuba Terrane to north. Detailed geological mapping led to the identification of three high K calc-alkaline I-type granite suites that form the Piên-Mandirituba Granite Belt. The older granite suite emplaced between 620 and 610 Ma (U-Pb zircon ages) is constituted by magmatic epidote-free deformed and mylonitic quartz monzodiorites and granodiorites and by deformed cumulate diorite/quartz diorite. The younger granite suite emplaced between 605-595 Ma (U-Pb zircon and titanite ages) is constituted by magmatic epidote-bearing deformed and mylonitic quartz monzodiorites, granodiorites and leuco-granodiorites. The third granite suite, emplaced at 595 Ma is constituted by epidote-free deformed monzogranites. The K-Ar (biotite) ages between 605 and 595 Ma of all granite suites indicate the deformation and cooling period of the Piên-Mandirituba Granite Belt. The epidote-free granite suite presents mafic (biotite and amphibole) and accessory minerals (titanite, zircon, allanite) contents higher than the epidote-bearing granite suite. Both granite suites are high K calc-alkaline, mainly meta-aluminous to rarely slightly peraluminous, with similar high Ba and Sr and low Rb contents. The epidote-free granite suite is less expanded ($\text{SiO}_2 = 60-70\%$) and present slightly higher K_2O , TiO_2 , MgO, Zr, Hf, Th, Y, Cr, Ni, Sc, V, LREE, and HREE contents than the more expanded ($\text{SiO}_2 = 60-75\%$) epidote-bearing granite suite, which present higher Na₂O and Al₂O₃ contents. Trace element contents (Rb, Sr, Ba, Nb, Ta, Th, Zr, Y) of the epidote-free and epidote-bearing granite suites are compatible with lithochemical signatures of granites formed in continental magmatic arc. Stable ($\delta^{18}\text{O}$ on zircons) and radiogenic (Nd and Sr) isotopic data show clear different signatures where the epidote-free granite suite (-18, 0.706-0.707 and 6.0-6.5‰) presents more negative $\epsilon\text{Nd(T)}$, higher $\text{Sr}_{87}/\text{Sr}_{86(\text{T})}$ and $\delta^{18}\text{O}(\text{Zrc})$ values than the epidote-bearing granite suite (-15, 0.705-0.706 and 5.5-5.6‰). The ($\delta^{18}\text{O}$ and Nd isotopic data, TDM ages and lithochemical signatures suggest, for the origin of Piên-Mandirituba Granite Belt: a differentiation from mantle-derived mafic sources (diorites, gabbros, amphibolites, basalts) more (epidote-free) or less (epidote-bearing) contaminated by infra-crustal igneous paleoproterozoic component during the independent crystallization courses of epidote-free and epidote-bearing granite suites or; melting of archean/paleoproterozoic mafic gneisses and granulites of Atuba and Luiz Alves terranes. The Piên-Mandirituba Granite Belt is interpreted as NW ward subduction-related magmatic arc formed between 620 and 595 Ma. As a consequence of oceanic crust consuming and the continental collision between Luiz Alves Terrane and Atuba Terrane, the Piên-Mandirituba Granite Belt and the Piên Mafic-Ultramafic Suite was deformed and Piên SSZ-type ophiolite obducted between 605 and 595 Ma, giving rise to the Piên-Tijucas Suture Zone. The adjacent Palermo, Rio Negro and Agudos do Sul A/PA-type granites formed between 595 and 585 Ma, were emplaced in late to post-collisional extensional setting. Acknowledgements-FAPESP (Grants: 97/10964-2, 98/2310-5 and 02/10568-0) and CPGeo-IGC-USP.

PALAVRAS-CHAVE: NEOPROTEROZOIC; MAGMATIC ARCS; PIÊN-MANDIRITUBA GRANITE BELT.