

Cordierite-bearing granitic rocks in South America: contrasting sources and conditions of formation

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Ediacaran, Ordovician, and Early Jurassic cordierite-bearing granitoids, respectively from Brazil, Argentina and Chile, were formed from distinct source rocks at different P-T conditions as revealed by their mineralogy, geochemistry and isotopic features. Syn-collisional Lower to Middle Ordovician, and post-collisional Upper Devonian granitoids ($\epsilon\text{Nd} = -5.0$ to -7.6 ; initial $^{87}\text{Sr}/^{86}\text{Sr} = 0.70944$ - 0.71943 ; $\delta^{18}\text{O}(\text{Zc})$ ‰VSMOW = $6.6 - 7.8$; 9.5 ; bulk magnetic susceptibility (MS) values = 0.1 to 0.2×10^{-3} SI) in the Pampean Ranges, Argentina, intruded greenschist- to amphibolites-facies metasedimentary rocks, and melting conditions were 3.6 - 4 kb; 670 - 700°C . In the Araçuaí Belt, Brazil, monzogranites ($\epsilon\text{Nd} = -6.62$ to -7.29 ; $\delta^{18}\text{O}(\text{Zc}) = 10$ - 11.8 ‰VSMOW; MS = 0.03 - 0.25×10^{-3} SI) of the Nanuque suite intruded mid-crust upper amphibolite to granulite facies gneisses/migmatites; with melting conditions $P = 5.0$ - 5.2 kb, $T = 720$ - 740°C . The Los Tilos pluton (216 Ma, $\epsilon\text{Nd} = -4.0$; initial $^{87}\text{Sr}/^{86}\text{Sr} = 0.71450$; $\delta^{18}\text{O}(\text{Zc}) = 5.9$ - 7.6 ‰, MS of 1.4 - 2.5×10^{-3} SI) in the Chilean Andes, part of the High Andes Belt, was emplaced at shallow level into early Permian plutons; melting $P = 3$ kb, $T = 670^\circ\text{C}$. The overall data of the granites from Argentina and Brazil suggest a major crustal aluminous metasedimentary source, while data for the Los Tilos pluton are compatible with a more primitive source, possibly remelting of metaluminous granitic rock.