

THE CORDILHEIRA INTRUSIVE SUITE: NEOPROTEROZOIC PERALUMINOUS GRANITIC MAGMATISM IN TRANSCURRENT SHEAR ZONES, SOUTHERN BRAZIL

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The high silica peraluminous magmatism of the Cordilheira Intrusive Suite is represented by two mica-garnet-tourmaline leucogranites, about 630-617 Ma. This magmatism is associated with a transcurrent tectonic regime in an intracontinental environment. Tholeiitic basic dykes, intruded within deep shear zones extended into the mantle, are suggested to be the primary heat source for the crustal melts. Two groups of granites, high- and low-MgO, respectively north and south of the Camaquã river, are recognized in the Cordilheira Intrusive Suite. The high-MgO group is characterized by the high Al₂O₃, TiO₂, Na₂O, Fe₂O₃/FeO, P₂O₅, Rb, Li, Zn, B, and Sn values, and low Sr, Ba, and Zr, when compared to the low-MgO group. Samples that have the highest CaO and the most regularly fractionated K₂O values in the low-MgO group may correspond to the highest degree of crustal melting in the granitic suite. The high-MgO group is comprised by muscovite-garnet-tourmaline rich granites that gradually concentrate Mg during differentiation processes. The mineral assemblage in the more evolved granites suggests crystallization in medium- to low-water activity. This tendency is also indicated by the lower values of K₂O with progressive differentiation. The two groups have a depleted and low fractionated REE pattern, particularly the most evolved granites, with variations indicating distinct melt conditions in the quartzo-feldspathic sources. Negative ϵ_{Nd} values, and strongly variable ¹⁴³Nd/¹⁴⁴Nd and ⁸⁷Sr/⁸⁶Sr ratios indicate different crustal sources with isotopic compositions different from the leucogranites. Tin mineralization and pervasive hydrothermal alteration are chiefly associated with the high-MgO group in the Cordilheira Intrusive Suite.