

Origin of alkaline, post-orogenic granites in the western part of the Sul-riograndense Shield, southern Brazil.

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The origin of alkaline granites belonging to the same intrusive association is discussed in terms of their Sr-Nd-Pb isotopic geochemistry and trace-element behavior. Such granites have different degrees of alkalinity and represent the interaction of mantle and crust reservoirs, as shown by examples from the Ramada (over)Saturated Alkaline Association. This is a post-collisional association formed in the late stages of the Brasiliano Cycle in southern Brazil (580-540 Ma), and includes acid volcanics and related intrusions, mostly granitoids. Three granite types were identified: strongly alkaline metaluminous, weakly peralkaline and metaluminous. The first has an age of 580 Ma and a clear mantle signature, indicated by low values of $^{87}\text{Sr}/^{86}\text{Sr}_i$ and ϵNd values near those of primitive mantle. The second, including quartz-syenites, has a more diversified origin and a probable age of about 570 Ma. The metaluminous type is younger (560-540 Ma) and has significant and varied crustal contributions as evidenced by high negative values of ϵNd , high $^{87}\text{Sr}/^{86}\text{Sr}_i$ and low Pb isotopic ratios. Distinct genetic signatures of these alkaline granites reflect both regional contrasts in crust and mantle sources plus changes with time. The compositional variations of associated basic to intermediate rocks corroborated the regional domains in mantle reservoirs, although an enriched mantle such as EM1 is predominant. In addition, we also propose that contamination of parental basic magmas with different crustal rocks contributed to the isotopic variations of these granites.