Medium- to high-K tholeiitic post-collisional magmatism: sources and crustal contamination

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Medium- to high-K tholeiitic magmatism has been recognized in Paleo- and Neoproterozic post-collisional settings in Southern Brazil and Africa. The mantle sources of such post-collisional basic magmas in southern Brazil are frequently OIB-type, with Sr_i ratios c. 0.705 and values of εNd_t about 0. Tholeiitic post-collisional magmatism can produce A2-type more differentiated liquids when crustal contamination is relatively small. When assimilation of crustal melts is higher it may result in subalkaline, calcalkaline-like liquids, which are usually mistaken for the true calcalkaline magmas produced during active subduction. Highly contaminated tholeiitic magmas are predominant in the early post-collisional magmatism within transcurrent shear zones, whilst less contaminated melts predominate in the late stages or outside the shear zones, where extensional tectonic becomes predominant. Crustal assimilation leads to decrease in HFSE, REE, alkalies and FeOt/MgO ratios, whilst Al_2O_3 increases, thus obliterating the tholeiitic signature. The transition of arc- to post-collisional magmatism is frequently marked by a change of mantle sources, from mantle wedge metasomatized by subducted materials in the pre-collisional stages to predominantly OIB-EM1 sources in the post-collisional period. Mostly during the early phases of the post-collisional stage, crustal melting is extensive and can promote mixing of mantle- and crustally-derived magmas, producing calcalkaline-like granitoids, as referred to in some Pan-African and Brasiliano post-collisional settings.