An Early Paleozoic subduction regime at the western margin of Gondwana: a view from the post-collisional granites

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Growth of the continental crust by accretion of mantle derived magmas in Sierras Pampeanas (Argentina) occured at the end of a first order convergence cycle (Famatinian Cycle 500-360 Ma) as the result of the emplacement of post-collisional Devonian–Early Carboniferous batholiths associated with mantle-derived MgK monzonitic rocks and lamprophyres. Different (La/Yb)n ratios indicate different melting percentage coupled with a progressive shallowing of the source. Lamprophyre magmas would be in equilibrium with a phlogopite?garnet bearing lherzolithic mantle whereas MgK monzonitic precursors would be in equilibrium with the same mantle at shallower depth since Ho/Yb is lower. Post collisional uplift could favour decompressional paths which control reactions like: Phlogopite +clinopyroxene +orthopyroxene= Krichterite+garnet+olivine+H2O that takes place at P6-7GPa or 180-210 km. Further uplift (lithosphere thinning) in turn favours the reaction: Olivine+garnet=spinel+orthopyroxene that is produced around 100 km and these could be the phases in equilibrium with the MgK melts. A subduction enriched lherzolithic mantle that underwent decompressional melting as a result of the orogenic collapse is a plausible source for the lamprophyres and the basic precursors. Underplating of these magmas could in turn promote melting of the crust that would be source for the high K calc-alkaline magmas with which they interacted to generate the whole spectrum of rocks that constitute the batholiths.