Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.17944

Mantle-Crust interactions and genesis of the high K-Mg lamprophyric stocks, dykes, and enclaves in I type Las Chacras batholith, Sierras Pampeanas (Argentina)

MRS. CARMEN IRENE MARTINEZ DOPICO, PHD[1], ENRICO RIBACKI[2], MONICA GRACIELA LOPEZ DE LUCHI[3], TERESITA MONTENEGRO[4], ROBERT B. TRUMBULL[5], ROLF ROMER[6], UWE ALTENBERGER[7] AND FLEURICE PARAT[8]

[1]CNRS Géosciences Montpellier, Université de Montpellier
[2]University of Potsdam, Institute of Geosciences
[3]Instituto de Geocronología y Geología Isotópica CONICET, Universidad de Buenos Aires
[4]Universidad de Buenos Aires-CONICET
[5]GFZ German Research Centre for Geosciences
[6]GFZ Potsdam
[7]University of Potsdam
[8]Géosciences Montpellier, University of Montpellier

Presenting Author: carmen.martinez-dopico@umontpellier.fr

Middle to late Devonian (393-377 Ma) I to A-type batholiths of the Sierras Pampeanas (López de Luchi et al. 2017, Dahlquist et al. 2021) are characterized by high-K calc-alkaline monzonite (MS) and granite suites (GS) and associated with minor intrusive vaugnerite stocks, syn-plutonic dykes and enclaves (monzonites and quartz monzonites). In Las Chacras batholith, the stocks and dykes contain ±Hb+Bio+Pl+Kfs+Ap+Qtz+Ttn+Op±Alln. They are metaluminous, with moderate SiO_2 (49–62%), MgO (2-5%) and K_2O (3.5-7%), low Cr and Ni (<20 ppm), high LILE (Sr>500, Ba>900 ppm), LREE and Sr/Y, variably low Th and Zr, $(La/Yb)_N$ and $(Tb/Yb)_N$, little or no europium anomaly (Eu/Eu*>0.9), and negative Nb and Ta anomalies suggesting a subduction-related enriched lithospheric mantle source. Enclaves are coarse grained and contain Bio±Hb+Kfs+Pl+Qtz+Ap+Ttn+Op. They are present in every GS facies. Nd and Sr isotope ratios of mafic microgranular enclaves ($50<SiO_2<62\%$, $2.1<MgO<4.7\%$ and $K_2O>3\%$; Eu/Eu*>0.73, $-1.9<\varepsilon Nd<-0.7$, ISr<0.704) and MS suite ($57<SiO_2<65\%$; $MgO<2.6\%$; $4<K_2O<6\%$, high Cr (50-140 ppm); εNd ≈-1.5, ISr <0.704) suggest a common source compatible with an enriched mantle. Moreover, Nd-T_{DM2} ages of 1.36-1.38 Ga are considerably younger than the mean 1.8-1.6 Ga Eastern Sierras Pampeanas basement crustal residence age. The host GS granites ($SiO_2>68\%$ $MgO<1\%$, $4<K_2O<5{,}6\%$) are slightly peraluminous and show variably high LILE contents ($100<Sr<900$, $30<Ba>1600$ ppm and negative Eu anomalies (Eu/Eu* 0.2 - 0.7). Whole-rock Sr and Nd isotope ratios for the stocks GS-hosting facies indicate a mafic source (ISr<0.705; εNd>-2.7). Conversely, data from the rest of the GS facies point towards a metasedimentary crustal source ($0.706<ISr<0.709$; εNd ≈ -3). The isotopic evidence suggests a Devonian episode of crustal growth by enriched mantle derived magmas with variable degrees of partial melting of crustal material. The heat source for this magmatism could have been upwelling due to foundering of a detached slab after collision of the Chilenia terrane (390 Ma) in the waning stages of the Achalian orogeny.

López de Luchi M.G. et al. 2017. *Lithos* 288-289,191–213. DOI:10.1016/j.lithos.2017.05.018

Dahlquist, J.A. et al. 2021. *Earth-Science Reviews* 22, 103781. DOI:10.1016/j.earscirev.2021.103781