

Mantle lithosphere heterogeneity in South America as recorded by clinopyroxene from mantle xenoliths

BARBIERI, M.A.¹, GIRARDI, V.A.V.², RIVALENTI, G.¹,
ZANETTI, A.³, MAZZUCHELLI, M.¹, CINGOLANI, C.⁴,
LAURORA, A.¹

¹Dipart. di Sc. della Terra, Univ. Modena, Italy. Dep. Min. e Geotec.,
Inst. Geoc. U.S. P, Brazil. ³CNR-CSCC and Dipart. di Sc. della Terra,
Univ. di Pavia, Italy. ⁴C.I.G., Univ. Nac. de La Plata, Argentina.

Compositions and processes of the South America mantle lithosphere has been constrained by studying mantle xenoliths in alkali basalt from different geodynamic environments: hotspot related (Fernando de Noronha, Brazil), continental rifting (Pico Cabuji, Brazil and Nemby, Paraguay); Andean back-arc (North Patagonia, Meseta Las Vizcachas, Gobernador Gregores, Pali Aike).

Mantle xenoliths are in general spinel (only at Pali Aike garnet peridotites occur) recording melting and melt extraction processes. The most depleted localities are North Patagonia and Gobernador Gregores and the most fertile is Pali Aike.

Trace element geochemistry and isotope compositions indicate that various metasomatic agents were involved in the different localities and within the same localities. The metasomatic components are: CO₂-bearing fluids and/or melts (Paraguay, Gobernador Gregores, North Patagonia); silicate melts similar in composition to the OIB basalts hosting xenoliths (North Patagonia, Meseta Las Vizcachas, Pali Aike); subducted Nazca sediments and Pacific MORB (at Pali Aike); carbonatitic component in Paraguay, component plume components, EMI-like at Pico Cabuji and EMII-like at Fernando de Noronha.