EARLY PARTIAL MELTING AND METASOMATISM N MANTLE XENOLITHS FROM NORTH VICTORIA LAND (ANTARCTICA): EVIDENCE FROM MAJOR AND TRACE ELEMENT OF SILICIC GLASSES AND PYROXENES

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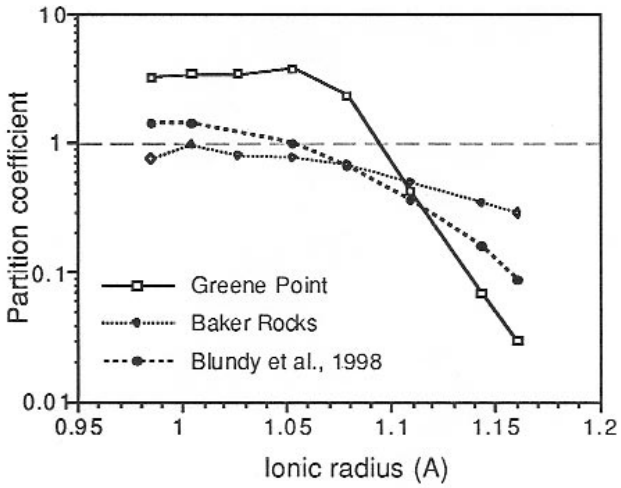
ABSTRACT

Cenozoic alkali basaltic magmas from Greene Point and Baker Rocks (Victoria Land, Antarctica) carry abundant ultramafic xenoliths of spinel harzburgite, spinel lherzolite and some composite xenoliths.

In many harzburgitic xenoliths whole rock and trace element patterns reveal the occurrence of cryptic metasomatic enrichments in incompatible elements; pyroxenite veins are also thought to be linked to metasomatic effects (Perinelli et al., 1998). Melt pods are widespread in these material and reveal complex relation with metasomatic events and in situ partial melting. Clinopyroxenes and glasses of these rocks have been analyzed by electron microprobe for major elements and by Secondary Ion Mass Spectrometry for a set of 21 trace elements; 40 trace elements on whole rocks were determined by Inductively Coupled Mass Spectrometry to try to define the nature of metasomatism and unravel the origin of glasses.

Glass compositions are silica rich (SiO_2 59-70 wt%), exhibit high Mg# (0.53-0.69) and are Q-normative; in Greene point harzburgite glass pods are crystal free, while at Baker Rocks compositions of mineral coexisting with acidic glasses are in strong contrast with the host paragenesis: their olivine is Fo-rich (~0.92) while clinopyroxene has higher Al, Ca, Cr and Ti contents respect to the host rock. REE chondrite-normalized patterns of glasses in Greene Point harzburgite are characterized by LREE enrichment and show unfractionated HREE abundance, by contrast glasses in Baker Rocks harzburgite show weakly REE fractionated pattern. In coexisting clinopyroxene/glass pairs Nerst distribution coefficients were determined: at Greene Point $^{Cpx/liq}D_{HREE}$ result to be ≥ 1 suggesting a that unfractionated HREE of glass are linked to very low degree of partial melting of host lherzolite in accordance with experimental observation of Blundy et al. (1998). At Baker Rocks in situ partial melting is to be excluded on account of textural relations and different $^{Cpx/liq}D_{HREE}$ calculated between glass and their clinopyroxene. On basis of glass and associated clinopyroxenes chemistry, the silicate melts of Baker Rocks are interpreted as product of metasomatic event in which carbonate rich melt reacted with xenolith mineralogy.



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