

Origin of northern backarc magmas of the Southern Volcanic Zone, Andes

P. M. HOLM^{1*}, M. ALFASTSEN¹, G.W. BERTOTTO²
AND N. SØAGER³

¹University of Copenhagen, Øster Voldgade 10, DK-1350
Copenhagen, Denmark,

(*correspondence: paulmh@ign.ku.dk

²National University of La Pampa, Argentina

³G EOMAR, D- 24148 Kiel, Germany

The northern backarc of Payenia (34-35°S) east of the Andean Southern Volcanic Zone (SVZ) is dominated by alkali basalts erupted from small volcanic centres during the last 1 Ma contemporaneously with the arc front volcanoes. In the northern backarc, incompatible element enrichment patterns are much like in the arc but with less enrichment of LILEs. They contrast with the OIB-type enrichment further south in Payenia. In detail, their trace element enrichment and Sr-Nd-Pb isotopic compositions are distinct from SVZ arc magmas. They overlap with the adjacent backarc Nevado Volcanic Field but extend to greater enrichment in Th (higher Th/La) but also LREEs (higher La/Nb) relative to HFSEs. In addition to metasomatism by subduction-related fluids both sources show enrichment by subducted continental crust, the proportion of which increases northward. Variation of incompatible element ratios within volcanic centres indicates source inhomogeneity on a scale of few km. The pre-metasomatic SVZ mantle defined by Zr-Nb-Sm is more depleted than the northern backarc mantle. The northern backarc volcanoes are situated 150-180 km above the east dipping Nazca plate. The melts were extracted just below the LAB around depths of 75 km and derived by small to moderate degrees of mantle melting. This mantle is expected to flow westward and either this must have been enriched previously when a Miocene flat slab translated subduction east, or the melts originated deeper from the descending mantle wedge enriched from the subduction channel.