

MANTLE HETEROGENEITY  
IN THE NORTH ATLANTIC  
— EVIDENCE FROM OCEANIC ISLANDS

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ABSTRACT

Geochemical domains in the North Atlantic have been based upon major element composition of island basalts such as the K/Na-ratio with potassic islands such as São Miguel (Azores) distinguished from highly sodic provinces (Madeira group) (Schmincke, 1973) :

- ocean floor basalt glasses from the Mid-Atlantic Ridge with Ti-rich and K-poor provinces, south of ca. 32° N, distinguished from areas richer in K (north of ca. 32° N) (Melson, Dimitriev, 1979) ;
- highly incompatible elements such as Th and La which show characteristic ratios for several ocean floor provinces in the northern North Atlantic (Tarney, Treuil, Wood, 1979).

New major and trace element and  $^{87}\text{Sr}/^{86}\text{Sr}$ -data at hand and presently obtained from the Azores, Madeira and Canary Island groups show that

- 1) ratios of incompatible elements are more highly dispersed in island than in sea floor basalts ;
- 2) neighbouring oceanic islands of the same group can each show characteristic trace element ratios that do not overlap between adjacent islands.
- 3) Higher K/Na-ratios are also reflected in higher incompatible element contents and higher  $^{87}\text{Sr}/^{86}\text{Sr}$ -ratios.
- 4) Island groups close to major tectonic boundaries such as triple junctions and fracture zones are chemically more diverse than those away from major tectonic boundaries.
- 5) The mantle beneath the North Atlantic north of about  $35^\circ\text{N}$  appears chemically more heterogeneous than that south of ca.  $35^\circ\text{N}$ , possibly reflecting a more complex subduction — related history resulting from formation of the Protoatlantic.

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