# B, Sr, Nd and Pb isotope variations in El Salvador arc lavas: insights into subarc mantle modifications

S. TONARINI[1] , S. AGOSTINI[1] , C. DOGLIONI[2],
F. INNOCENTI[1,3] AND P. MANETTI[1]

[1] Istituto di Geoscienze e Georisorse, CNR, Pisa, Italy; s.tonarini@igg.cnr.it; s.agostini@igg.cnr.it; manetti@igg.cnr.it
[2] Dept. Scienze della Terra, University of Roma "La Sapienza" Italy; doglioni@uniroma1.it
[3] Dept. Scienze della Terra, University of Pisa, Italy; innocen@dst.unipi.it

Boron and radiogenic isotope (Sr, Nd and Pb) data on basaltic to dacitic rocks from El Salvador, an active segment of the Central American Volcanic Front, are presented. Central America is affected by the subduction of the Cocos plate underneath the continental lithosphere of the Caribbean and North American plates. Samples were taken all along the volcanic front: the western and eastern edges of the segment (Ahuachapan and Berlin areas) were investigated in more detail. The samples show variations in fluid mobile/fluid immobile element ratios, with high B/Nb (0.6 to 12.7) and B/La (0.38 to 2.6) similar to those observed in eastern Pacific arcs. $\delta^{11}B$ varies within a wide range (-2.5 to +6.2 ‰), with greater heterogeneity in the western part of the arc segment. $\delta^{11}B$ is positively correlated with B/Nb and the $^{87}Sr/^{86}Sr$ ratios (ranging between 0.7035 and 0.7039), and negatively correlated with the $^{206}Pb/^{207}Pb$ isotope ratio (18.527 to 18.651). Furthermore, systematic variations in $\delta^{11}B$ with the degree of partial melting (as indicated by the Nb/Yb ratio) in the most primitive rocks suggest a close relationship between the $H_2O$-rich fluxing from the slab and the $^{11}B$ enrichment of the lavas.

Considering the observed positive correlations of $\delta^{11}B$ with B/Nb and $^{87}Sr/^{86}Sr$ it is very likely that the positive $\delta^{11}B$ values are produced by slab-derived fluids: downgoing altered oceanic crust is a possible candidate for the generation of heavy boron. At least two processes can, however, be invoked to explain the geochemical variations: a) a progressive $^{11}B$ depletion in the fluids with the increase in slab depth; b) the transfer of "shallow hydrated mantle" enriched in $^{11}B$ to greater depth and consequent breakdown of the hydrous phases.

The lower $\delta^{11}B$ (close to mantle-like values) found in some basalts seems to be inherited from a mantle wedge that has not yet been modified by $^{11}B$-enriched fluids, despite the fact that the radiogenic isotope composition and trace element distribution of the basalts differ from MORB-like mantle products.