SF	MARGINS: Oxygen Isotope Studies of the Central American Arc	
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The oxygen isotope compositions of olivine and plagioclase phenocrysts in basalts and basaltic andesites from the Central American arc vary systematically with location in the arc, from minimum $\delta^{18}O$ olivine values of 4.6—below the range typical of terrestrial basalts—in Nicaragua, to maximum $\delta^{18}O$ olivine values of 5.6—above the typical range—in Guatemala and El Salvador. These oxygen isotope variations are correlated with major and trace-element abundances and with Sr and Nd isotope compositions of host lavas, defining trends that suggest variations in $\delta^{18}O$ reflect slab contributions to the mantle sources of these lavas. These trends can be explained by a model in which both a low-$\delta^{18}O$, water-rich component and a high-$\delta^{18}O$, water-poor component are extracted from the subducting Cocos slab and flux melting in the overlying mantle wedge. The first of these components dominates slab fluxes beneath the center of the arc, the second dominates slab fluxes beneath the northwestern margin of the arc, and fluxes of both components are small or negligible beneath the southeastern margin of the arc. We suggest the low-$\delta^{18}O$ component is a solute-rich aqueous fluid produced by dehydration of hydrothermally altered rocks deep within the Cocos slab (perhaps serpentinites produced in deep normal faults off-shore of Nicaragua), and that the high-$\delta^{18}O$ component is a partial melt of subducted sediment on top of the plate.

Publications and Presentations

Eiler, J.M., Carr, M.J., Reagan, M.K., 2002, Do recycled serpentinites contribute to subduction zone volcanism? A vote from oxygen isotope compositions of Central American Arc lavas. EOS, v. 83, T51E-12