MARGINS: Oxygen Isotope Studies of the Central American Arc

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Abstract

In this proposed study the PI and collaborators (Mark Reagan, Iowa; Mike Carr, Rutgers) propose to measure the oxygen isotope values (d18O) in Central America Volcanic Arc (CAVA) lavas in order to distinguish mantle wedge processes involving subducted upper crustal materials, from assimilation/contamination of rising magmas with in situ upper crustal materials. In the former case, one would expect a correlation between d18O and proxies of the extent of melting (e.g. U/Th, Na6) and/or mantle source tracers (e.g. 87Sr/86Sr. In the latter, one would expect correlation of d18O with proxies of contamination, assimilation, and differentiation (like MgO or Mg#). A pilot study of ~30 samples from CAVA show very surprising results- there are correlations between d18O and indices of melting, however large extents of melting and radiogenic 87Sr/86Sr are associated with low d18O, not high d18O as expected for common sources of slab-derived metasomatizing agents. The PIs propose to collect more d18O data for more well-characterized samples in order to try to understand the puzzling results of the pilot study.

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