SF **(MARGINS-related)**	Volatiles in the Central American Volcanic Arc: Constraints on Subduction Processes from I-129, C, N, and Noble Gas Determinations	
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- First application of ^{129}I for the tracing of volatiles in subduction zones.
- Results demonstrate the presence of marine sediments under the main volcanic zone.
- Combination of ^{129}I and gas systematics allows the quantification of fluxes of volatiles in subduction zones.
- Chemical and isotopic compositions of gases indicate the influence of subduction angle and slab temperatures.
- Systematic changes in the isotopic composition of C and He along the arc are related to changes in geophysical parameters.
- Derivation of global fluxes for He, CO_2 and N_2.
- N_2 and ^{129}I results demonstrate the influence of old (> 65 Ma) organic sources in Nicaragua.
- Associated pilot projects in New Zealand and Japan.
- International collaboration with researchers from Costa Rica (G. Alvarado; E. Sanchez, ICE), Nicaragua (K. Miranda, ENEL) and El Salvador (J.T. Mejia, GESAL).
- Educational involvement: Post-doctoral, graduate (one Ph.D. Thesis) and undergraduate students (two Senior Theses).

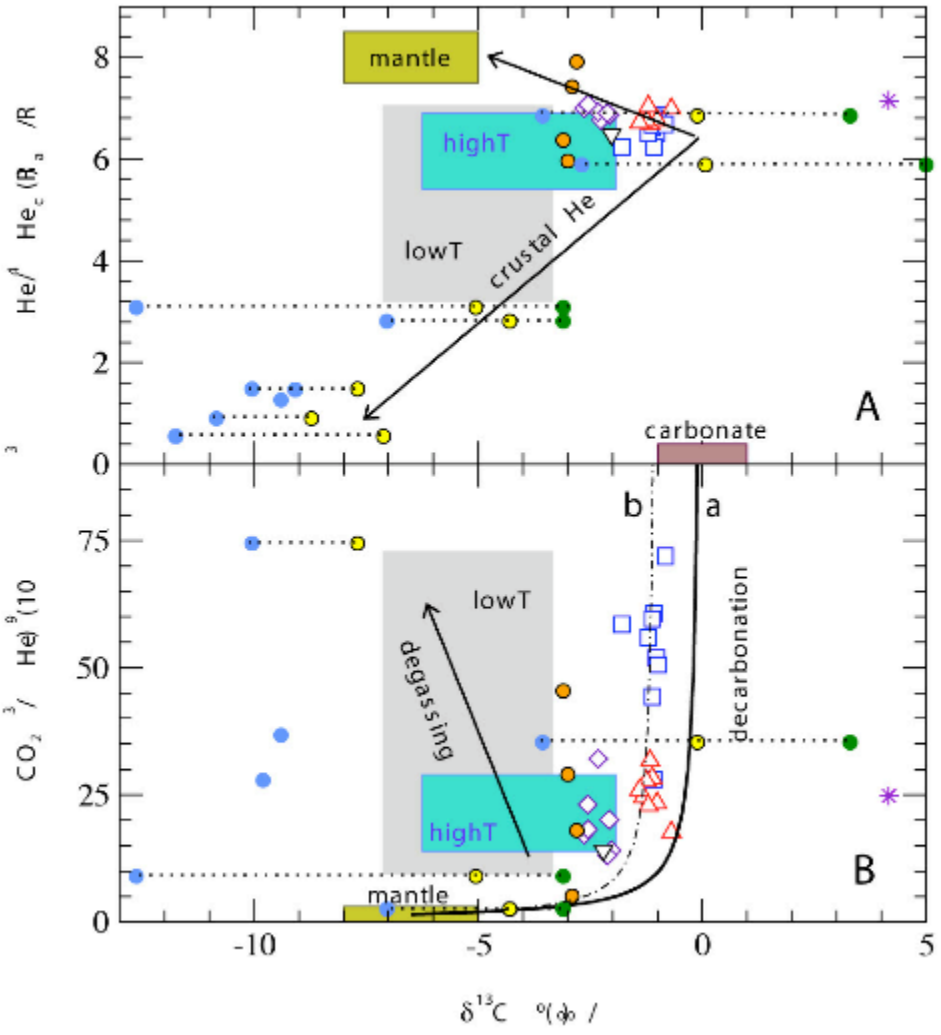

Figure 1: Both carbon dioxide and helium in geothermal systems are influenced by addition of mantle and recycled subducted components. (A) Mantle, high temperature, and low temperature fields indicate interquartile ranges for global island arc systems. Central American geothermal samples (blue squares=Miravalles geothermal in Costa Rica, red triangles=Momotombo geothermal in Nicaragua, orange circles=Guatemalan fumaroles, purple diamonds=Ahuachapán geothermal in El Salvador) show helium ratios and $\delta^{13}C$-values typical of high temperature fumaroles. In contrast, hotspring samples collected behind the volcanic front in Honduras (yellow circles) as well as the associated gas (blue circles) and travertine (green circles) show additions of crustal ^{4}He and significant fractionation in the stable carbon system. (B) Carbon dioxide in these systems is predominantly derived from subducted carbonates. The subducted signature is greatest in geothermal samples from Costa Rica, and is probably a product both of increased subducted carbonate input as well as higher heat-flow associated with the subducted slab. Rather than mixing with a carbonate where $\delta^{13}C=0$ (trajectory a), the slab carbon appears to have a somewhat lighter isotopic composition ($\delta^{13}C$ = -1,

trajectory b). Deviations from the mixing curve, seen in the samples from El Salvador, Guatemala, and Honduras, show both carbon fractionation and preferential loss of helium associated with shallow degassing (from Snyder *et al*., 2001).