



AWSFL008-DS3

**NSF Award Abstract**  
**- #0229100**

**Tracing Volatiles Across Volcanic Arcs: I-129, He,  
N<sub>2</sub>, CH<sub>4</sub> and CO<sub>2</sub> in Fluids  
From New Zealand and Japan**

**NSF Org** EAR

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**Program Manager** Thomas P. Wagner  
EAR DIVISION OF EARTH  
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## **Abstract**

Fehn EAR-0229100

The project will compare volatile fluxes across three arc systems using a newly developed approach that combines the  $^{129}\text{I}$  system with gas concentrations and isotopic systematics. The results are important for understanding subduction processes that form volcanic arcs and affect the element budget of the oceans. The approach was first applied in a recently finished project on fluids from the main volcanic zone in the Central American volcanic arc, where it was demonstrated that marine sediments are a major source of volatiles in the main arc, but that volatiles in the fore arc have a considerably different history. The purpose of the current project is to test these observations on three different arcs: North Island of New Zealand, southern Japan, and northern Japan. These locations were chosen because they allow sampling from a fore arc, main arc, and back arc; are relatively uncomplicated; and cover a large age range of subducting plates (Nankai Trough, Japan: 20 Ma; Hikurangi Trench, New Zealand: 90 Ma; Japan Trench: 130 Ma). Concentrations and isotopic compositions of He, N<sub>2</sub>, CH<sub>4</sub> and CO<sub>2</sub> will be determined together with  $^{129}\text{I}/\text{I}$  ratios and halogen concentrations. Results will give insights into element fluxes in volcanic arcs, their dependence on age and make-up of subducting sediments and crust, and will improve our understanding of mobilization and recycling of organic material from subducted sediments. The study is planned for three years, and will be carried out in collaboration with experts from Japan and

New Zealand.

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