



AWSFL008-DS3

NSF Award Abstract
- #9902919

**Volatiles in the Central American Volcanic Arc:
Constraints on Subduction
Processes From I-129, C, N and Noble Gas
Determinations**

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Investigator Udo Fehn

fehn@earth.rochester.edu
(Principal Investigator current)
Robert J. Poreda (Co-Principal
Investigator current)

Sponsor University of Rochester
517 Hylan Bldg.
Rochester, NY 14627
585/275-4031

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Abstract

9902919 Fehn The subduction of oceanic crust and sediments at convergent plate boundaries gives rise to a variety of geologic processes including the accumulation of new continental crust, the development of volcanic arc systems and the formation of ore deposits. Although agreement exists on the general outline of the subduction process, important questions such as the extent of sediment recycling, the origin of fluids in volcanic systems and the interaction between continental crust, oceanic crust and mantle at these locations are only poorly understood. In order to address these questions, we plan to study volcanic fluids using an isotopic systems, iodine-129, which carries a time signal, partitions into the fluid phase and has a strong association with marine sediments. These determinations will be linked to an investigation of the gas systematics in the same settings, in particular of He, N₂, CO₂ and CH₄ concentrations and isotopic characteristics. The combination of these systems provides a powerful tool to determine type and age of source formations for volcanic fluids. The setting chosen for this study is the southern Central American Volcanic Arc, a well studied and accessible example of an active subduction zone. We plan to focus the study on three volcanic centers, one each in Costa Rica, Nicaragua and El Salvador, with samples taken predominantly from geothermal wells and associated hot springs and fumaroles. The goal of this investigation is to determine the amount of sediment recycling in these settings, the age of the

sediments present, and the influence of continental crust, oceanic crust and mantle on volcanic fluids. The results will give important information on principal processes associated with the formation of continental crust, the recycling of oceanic crust and sediments and the mechanics of active arc volcanism.

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