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"Volatile Chemistry of Arc Volcanoes"

Personal History and Career Goals

The personal aspect of my talk will focus on how I became interested in science, how I almost lost that interest due to unmotivated teachers, and how my interest was regained and fueled by amazing mentors. I was recently awarded the L'Oréal USA Fellowships for Women in Science and will highlight their efforts in supporting women in science. I view this fellowship not only as recognition of my scientific achievements, but also as a call to be an active role model and mentor to young women. Throughout my education only a handful of my science professors have been women. Yet my interactions with women professors have been some of the most influential and important in my career, encouraging me to realize my full potential and to obtain my goals.

Scientific Research

The atmosphere makes up a miniscule proportion of our planet by mass, yet is crucial to climate and life itself. Over long timescales, the composition of our atmosphere is controlled by transfer to and from the Earth's mantle. Transfer to the mantle occurs via subduction zones and return to the atmosphere occurs at mid-ocean ridges and volcanoes. Return to the atmosphere can be violent, in the form of explosive volcanism, which is caused by release of highly pressurized volatile gases. Gas emissions during such eruptions can exceed several millions of tons and the aerosols that form when gases interact with the atmosphere have influenced global climate for several years following eruptions. Although the violent nature of volcanoes receives much attention, gases are constantly being emitted from quiescent volcanoes between eruptions. Studying the chemistry of these emissions provides a means to investigate geological processes occurring deep in the Earth as well as shallow level processes that may give clues to when the next eruption may occur.

After water and CO_2, chlorine (Cl) is tied for the third most abundant volatile transferred into the mantle and erupted from volcanoes. Yet the fate of this subducted component is poorly known. How much of it sinks deep into the mantle or returns via volcanism is unclear. The main purpose of my work is to trace Cl through subduction zones- from subducted material (inputs), through the fluids and melts produced at depth to volcanic material released at the surface (outputs)- through the use of stable isotopes.