NSF Award Abstract - #0405262

MARGINS Post-doctoral Fellowship - Jennifer Garrison: Time-scales and mechanisms of differentiation of mafic parents to rhyodacite in Central America

NSF Org	OCE
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Abstract

Abstract (0425262) - Reagan The project goal is to perform geochemical analyses on silicic igneous rocks, primarily rhyolites and rhyodacites, from young volcanic complexes (less than 20,000 years old) in El Salvador and Nicaragua to determine how the voluminous magmas capable of caldera-producing eruptions are generated and over what time-scales they evolve. Ilopango, Apoyo, and Apoyeque calderas were chosen for this study based on age and range of volumes to provide a better understanding of emplacement times for subduction zone-related magmas in the area. These sites are within the Central America focus site of the NSF-funded MARGINS Seismogenic Zone and Subduction Factory initiatives, whose purposes are to answer questions about the growth and evolution of the lithosphere and provide information to evaluate and perhaps mitigate hazards associated with subduction zone volcanism. The focused attention of these and other institutional initiatives on the Central American volcanic arc has led to a number of ongoing and complementary petrological and volcanological investigations. Whole rock samples and mineral separates from these volcanic complexes will be analyzed for U, Th, and Ra nuclide abundances, Sr-Nd-Pb-Hf and O isotopes, with the intent of determining quantitatively the time-scales of rhyodacite production and accumulation. To help constrain source ages, zircons from the lavas will be analyzed on the CAMECA ion probe at UCLA. Data from the study will then be combined with major and trace element data from another

laboratory and published data for more mafic volcanic rocks from the area to understand timescales and differentiation of magmas in subduction zone-related volcanic systems Broader impacts of this work include support of a promising female scientist and training her in the set-up and use of clean lab and mass spectrometry facilities, use of an NSF-funded shared-user ion probe facility at UCLA, and enabling collaboration between institutions that do not normally work together (University of Iowa, Woods Hole Oceanographic Institute, US Geological Survey, and Michigan State). Societal implications include expanding our knowledge of volcanic eruption timing and caldera formation, which may ultimately help devise strategies for volcanic hazard prediction and mitigation.
