Opportunity Title: Volcano physical modeling of multi-source systems
Opportunity Reference Code: 0160-NPP-NOV23-JPL-EarthSci

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0160-NPP-NOV23-JPL-EarthSci

Application Deadline 11/1/2023 6:00:59 PM Eastern Time Zone

Description Currently, models for volcano deformation have focused on the plumbing system at shallow depth. However, extensive geophysical and geochemical data reveal that several magma reservoirs are active simultaneously at different levels in the crust beneath volcanoes. Thus, one expects a complex behavior of the system due the depth dependent properties of crustal materials: viscous flow allows for large reservoirs in the lower crust while elastic stress build up in the upper crust. The interplay between the two will be reflected in the eruptive and deformations patterns. The main goals of this project are: 1) To develop theoretical analysis of a multi-level plumbing system 2) Run numerical simulations that account for complex rheologies, topographical loads, and thermodynamic properties of the magmas 3) Use thermal/optical imagery to obtain mass fluxes (instantaneous and averaged), GPS/InSAR to measure the deformation patterns 4) Invert the data to constrain properties such as the geometry of the plumbing system, pressure and fluxes variations at depth. In particular, the project will involve the processing and analysis of InSAR data from Italian Space Agency (ASI) COSMO-Skymed, European Space Agency (ESA) Sentinel-1, Japanese Aerospace Exploration Agency (JAXA) ALOS-2, and German Aerospace Center (DLR) TerraSAR-X and TanDEM-X data. Models will be benchmarked against well studied volcanoes and should prove useful to improve our understanding both eruptive dynamics and the long term evolution of magmatic systems.

Location:
Jet Propulsion Laboratory
Pasadena, California

Field of Science: Earth Science

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Applications with citizens from Designated Countries will not be accepted at this time, unless they are Legal Permanent Residents of the United States. A complete list of Designated Countries can be found at: https://www.nasa.gov/oiir/export-control.

Eligibility is currently open to:

- U.S. Citizens;
- U.S. Lawful Permanent Residents (LPR);

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- Foreign Nationals eligible for an Exchange Visitor J-1 visa status; and,
- Applicants for LPR, asylees, or refugees in the U.S. at the time of application with 1) a valid EAD card and 2) I-485 or I-589 forms in pending status

Eligibility Requirements

- **Degree:** Doctoral Degree.