

**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

**Advisors:**

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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/oijr/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.