**Opportunity Title:** Volcano transient source processes constrained by InSAR and in situ observations
**Opportunity Reference Code:** 0138-NPP-NOV23-JPL-EarthSci

**Organization** National Aeronautics and Space Administration (NASA)

**Reference Code** 0138-NPP-NOV23-JPL-EarthSci

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

**Description** Our goal is to further improve our understanding of volcanoes temporal evolution through the use of space-based geodetic data sets (InSAR and GNSS) and lava lake observations. InSAR and GPS techniques allow to capture the movements of volcanic edifices caused by magma pressure fluctuations occurring within the crust, while the presence of persistent lava lake at volcanoes can provide valuable information as they are often recognized as a "direct window of observation" into the underlying magmatic plumbing system and lava lakes elevation fluctuate in response to magma motion at depth. Both geodetic and lava lake elevation time series help therefore further constraining magma pressure temporal evolution within magmatic plumbing systems caused by magma transport and storage. Kilauea volcano in Hawaii and Nyiragongo volcano in Republic Democratic of Congo are both similarly monitored by space-based geodesy as well as in situ and remote sensing lava lake observations. The remarkably long and continuous data sets available for these two volcanoes provide an unique opportunity to study, in a comparative manner, their decadal dynamical evolution and to understand the mechanisms causing the phases of successive pressure build up and pressure release leading up to their recent large eruptions that occurred in 2018 and 2021 for Kilauea and Nyiragongo respectively. Our focus will be on investigating their decadal dynamical behavior by combining geodetic and lava lake time series with the design and the study of models governing the interactions of few key variables such as magma pressure in reservoirs and magma flows in between them. To improve upon common models used to study the dynamics of volcanic systems, we will be investigating the role of inelastic deformation of the crust occurring as the magma fractures and damages the surrounding rocks, as well as magma transport characterized by varying flow resistance causing valve-like mechanisms enabling or preventing transient magma flows. In order to broaden the impact of our research, we also aim to compare our models results to behaviors observed at volcanoes that lie in the high priority to NASA, including volcanoes in the Galapagos, Iceland, Latin America, the western Pacific, in addition to Kilauea and Nyiragongo volcanoes.

**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);
- 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.