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Opportunity Title: Multiphysical modeling of silicic volcanoes with InSAR geodesy
Opportunity Reference Code: 0169-NPP-MAR26-JPL-EarthSci

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0169-NPP-MAR26-JPL-EarthSci

How to Apply All applications must be submitted in Zintellect

Please visit the NASA Postdoctoral Program website for application instructions and requirements: How to Apply | NASA Postdoctoral Program (orau.org)

A complete application to the NASA Postdoctoral Program includes:

1. Research proposal
2. Three letters of recommendation
3. Official doctoral transcript documents

Application Deadline 4/2/2026 6:00:59 PM Eastern Time Zone

Description **About the NASA Postdoctoral Program**

The NASA Postdoctoral Program (NPP) offers unique research opportunities to highly-talented scientists to engage in ongoing NASA research projects at a NASA Center, NASA Headquarters, or at a NASA-affiliated research institute. These one- to three-year fellowships are competitive and are designed to advance NASA's missions in space science, Earth science, aeronautics, space operations, exploration systems, and astrobiology.

Description:

Since the advent of satellite geodesy there has been widespread evidence that large scale silicic systems undergo transient periods of ground uplift followed by periods of either quiescence or slight ground subsidence. These signals have been interpreted as being produced by either magma intrusion, volatile exsolution, variations in shallow hydrothermal systems or a combination of all these mechanisms. If these uplift events are in turn produced by magma injection, how many injections and of what magnitude are required to actually trigger an eruption? The main tasks of this project are: 1) Analyze multiplatform InSAR data (COSMO-SkyMED, Sentinel, ALOS-2) to measure ground deformation at large scale silicic systems. 2) Run multiphysics numerical simulations that account for complex rheologies, thermodynamic properties of the magmas and non-linear mass fluxes to discriminate among several unrest mechanisms. 3) Invert time series data that shows cyclic and time dependent signals to constrain properties such as the geometry of the plumbing system, pressure and fluxes variations at depth. Such models will be benchmarked against well studied systems like Long Valley and Yellowstone and should prove useful to improve our understanding on both potential eruptive dynamics and the long-term evolution of magmatic systems.

References:

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Anderson, K., and P. Segall (2011), Physics-based models of ground deformation and extrusion rate at effusively erupting volcanoes. J. Geophys. Res. Solid Earth, 116, B07204, doi:10.1029/2010JB007939. Lundgren, P., S. Usai, E. Sansosti, R. Lanari, M. Tesauro, G, Fornaro, and P. Berardino (2001), Modeling surface deformation observed with synthetic aperture radar interferometry at Campi Flegrei caldera, J. Geophys. Res., 106,19,355-19,366. Lundgren, P., S. V. Samsonov, C. M. López Velez, and M. Ordoñez (2015a), Deep source model for Nevado del Ruiz Volcano, Colombia, constrained by interferometric synthetic aperture radar observations, Geophys. Res. Lett., 42, 4816-4823, doi:10.1002/2015GL063858. Pinel, V., and C. Jaupart (2003), Magma chamber behavior beneath a volcanic edifice, J. Geophys. Res., 108(B2), 2072, doi:10.1029/2002JB001751. Pinel, V., M. P. Poland, and A. Hooper (2014), Volcanology: Lessons learned from Synthetic Aperture Radar interferometry, J. Volcanol. Geotherm. Res., 289, 31-113, doi: 10.1016/jvolgeores.2014.10.010. Pritchard, M. E., M. Simons (2002) A satellite geodetic survey of large-scale deformation of volcanic centres in the central Andes. Nature 418, 167-171. Rubin, A. M. (1995), Tensile fracture of rock at high confining pressure: Implications for dike propagation, J. Geophys. Res., 98(B9), 15,919-15,935. Wicks, C., W. Thatcher, and D. Dzurisin (1998), Migration of fluids beneath Yellowstone Caldera inferred from satellite radar interferometry, Science, 282, 458-462.

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

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Questions about this opportunity? Please email npp@orau.org

Point of Contact Mikeala

Eligibility Requirements

- **Degree:** Doctoral Degree.