Opportunity Title: Earth Science: Data assimilation of atmospheric composition
Opportunity Reference Code: 0244-NPP-NOV23-JPL-EarthSci

Organization	National Aeronautics and Space Administration (NASA)
Reference Code	0244-NPP-NOV23-JPL-EarthSci
How to Apply	All applications must be submitted in **Zintellect**
Application Deadline	11/1/2023 6:00:59 PM Eastern Time Zone
Description	**Description:**

Long-term records of the tropospheric composition are important for understanding the changes in air pollution such as ozone and aerosols and their impact on human health and climate. Satellite measurements provide critical information about these changing global patterns, but the synthesis of these data to infer processes driving those patterns remains a challenge.

In order to provide comprehensive information on atmospheric composition variations and to characterize decadal changes in air pollutant emissions, we have been developing a new a state-of-the-art chemical data assimilation system, MOMO-Chem, that ingests a suite of multi-constituent retrievals from multiple NASA's satellites. We have used this system to generate the tropospheric chemistry reanalysis version 2, TCR-2, and to quantify emission changes and their impacts on ozone for the past decade.

This project will apply the multi-constituent chemical data assimilation to new multi-constituent data from the Aura, Terra, Aqua, Suomi-NPP, Sentinel-5P satellites and provide understanding of processes that form ozone and aerosols and attribute changes in their concentrations to short- and long-term variations in human and natural activity at both regional and global scales. By adding new satellite measurements to the existing assimilated measurements, we will be able to simultaneously optimize anthropogenic and biogenic emissions of NO_x, SO_2, CO, and NH_3 and to better represent the interactions between trace gases and aerosols. The project will provide enhanced understanding of multi-year changes in air pollutants and their response to changes in emission efficiency and human activity.

Combining with other NASA's datasets, such as aircraft measurements and carbon flux products, and advanced techniques such as machine learning, this project will provide crucial new understanding relevant to NASA's Atmospheric Composition Focus Area's science questions of "How is atmospheric composition changing?" and "What are the effects of global atmospheric composition and climate changes on regional air quality?" and to the Earth Science objectives in the 2020 NASA Science Strategy Plan.

Field of Science: Earth Science

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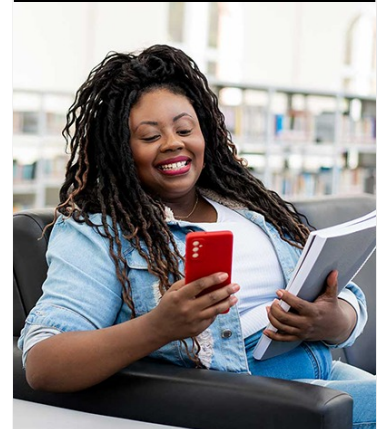
accepted at this time, unless they are Legal Permanent Residents of the United States. A complete list of Designated Countries can be found at: https://www.nasa.gov/oiir/export-control.

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

Qualifications   **Preferred Qualifications for the Ideal Applicant**

This project requires
- Basic knowledge of atmospheric physics and chemistry
- Experience with Earth science data analysis
- Experience with Fortran, IDL or Python
- Experience with Linux/Unix system
- Ability to communicate effectively orally and in writing

Eligibility Requirements
- **Degree:** Doctoral Degree.