

Opportunity Title: The Impact of Asian Pollution on the Stratosphere

Opportunity Reference Code: 0026-NPP-NOV23-LRC-EarthSci

Organization National Aeronautics and Space Administration (NASA)

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

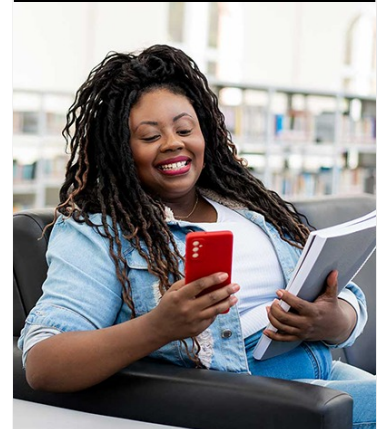
Description Rapid economic growth in Asia since the last three (3) decades has had profound societal and environmental impacts. Air quality has reached catastrophic levels leaving millions of people exposed to dangerous life-threatening pollutants often causing premature death for the most vulnerable. During the Summer Asian Monsoon, pollutants are redistributed throughout the atmosphere and can in turn affect monsoon precipitation from which 1/3 of the world population relies on.

Through space-borne satellite observations, in situ airborne measurements and numerical simulations, our group studies how Asian pollution is transported into the stratosphere during the Summer Asian Monsoon.

The Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO) and the Stratospheric Aerosol and Gas Experiments (SAGE) provided unique sets of space-based observations since more than three (3) decades to study the impacts of Asian pollution on aerosol distribution in the upper troposphere and lower stratosphere. They revealed the presence of a recurrent summertime aerosol layer named the Asian Tropopause Aerosol Layer coincident with enhanced pollution markers such as Carbon Monoxide (CO) and Hydrogen Cyanide (HCN). Satellite observations have been validated through a series of balloon campaigns organized since 2014 in India and Saudi Arabia. The Balloon measurement campaigns of the ATAL (BATAL) provides a unique set of in situ measurements to assess the optical, physical and chemical properties of ATAL and understand its nature, origin and impacts. The BATAL project is under an International Agreement between two major space organizations, the Indian Space Research Organisation (ISRO) and NASA.

The origin of air masses sampled during the BATAL campaigns are studied with a combined approach using trajectory calculations and observations of deep convective clouds using geostationary satellites. Finally, numerical simulations with the state-of-the-art GEOS-chem model are analyzed to assess the contribution of Asian countries on the aerosol budget in the upper troposphere and lower stratosphere and the role of anthropogenic versus natural emissions.

The successful candidate will study the distribution of aerosols and trace gases in the Upper Troposphere and Lower Stratosphere during the Summer Asian Monsoon using satellite and in situ balloon measurements. He will deploy in Asia for several weeks per year to prepare and deploy scientific payloads to measure the optical, physical and chemical properties of the ATAL and associated trace gases onboard small and large plastic balloons reaching the stratosphere. The candidate will collaborate with Scientists from NASA Langley to understand the origin of air masses with trajectory analysis and satellite observations as well as analyze runs from the GEOS-Chem model to understand the processes involved in the



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formation of the ATAL.

Location:

Langley Research Center

Hampton, Virginia

Field of Science:Earth Science

Advisors:

Jean-Paul Vernier

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757-759-0835

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.