Opportunity Title: Studying the Carbon Cycle using Remote-sensing Observations and Models
Opportunity Reference Code: 0067-NPP-NOV23-ARC-EarthSci

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0067-NPP-NOV23-ARC-EarthSci

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

Description Greenhouse gas (GHG) mixing ratios, due to human influence, have increased over the past decades and are directly linked to rising global surface temperatures. In addition to anthropogenic emissions, the processes involved in the exchange of carbon between the atmosphere and terrestrial/aquatic ecosystems are major factors controlling atmospheric mixing ratios of carbon dioxide (CO_2) and methane (CH_4). This research opportunity (RO) focuses on the investigation of how in situ measurements and satellite remote-sensing data, when applied with chemical transport models (CTMs), can lead to the better understanding of natural (e.g., terrestrial/aquatic ecosystems, biomass burning, etc.) sources and sinks of CO_2 and CH_4. This RO is designed to build off current research efforts of the advisor‘s group applying “bottom-up“ and “top-down“ inverse model simulations to study biospheric CO_2 fluxes and inland aquatic system (e.g., wetlands, lakes, and reservoirs) emissions of CH_4. However, any proposed studies with similar methods/objectives are welcome.

This RO emphasizes the application of the global and regional in situ measurement networks of CO_2 and CH_4 (e.g., NOAA‘s Global Greenhouse Gas Reference Network) and satellite products measuring these GHGs (e.g., Orbiting Carbon Observatory-2 (OCO-2) and OCO-3, TROPOspheric Monitoring Instrument (TROPOMI)). These observations will be applied with CTMs with adjoint capability (e.g., GEOS-Chem, TM5-based models) or Lagrangian frameworks (e.g., WRF-STILT, CarbonTracker-Langrange) to evaluate CO_2 and CH_4 emission inventories and estimate top-down fluxes of these species. Proposed research to this RO should emphasize how in situ and remote-sensing data can improve the ability to constrain GHG emission estimates. The research should include topics such as, but not limited to, 1) investigating the interactions between the atmosphere and terrestrial/aquatic ecosystems controlling natural fluxes of CO_2 and CH_4, 2) quantifying errors/uncertainties in flux estimates and model predictions of atmospheric GHG mixing ratios, 3) evaluating/quantifying regional GHG fluxes using remote-sensing data, and 4) source attribution of GHG emissions in bottom-up and top-down model simulations.

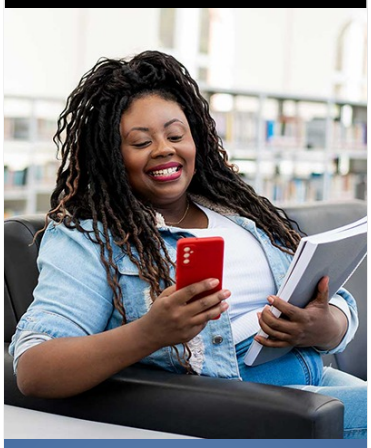
Position Requirements:

PhD in an Earth Science related field.
Experience with running and developing 3D atmospheric chemical transport models or Lagrangian model frameworks.
Strong analytical skills and computer programming ability: Matlab, Python, R, GIS, Fortran, C++
Strong written and verbal communication skills.

Location:

NPP NASA Postdoctoral Program

ORAU Pathfinder



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Ames Research Center
Moffet Field, California

Field of Science: Earth Science

Advisors:
Matthew Stephen Johnson
matthew.s.johnson@nasa.gov
650-604-5420

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.