

Opportunity Title: Earth Science: Insights into Land Surface and Atmospheric Hydrologic Cycle from Satellites, In Situ Observations and Isotope-Enabled GCMs
Opportunity Reference Code: 0004-NPP-NOV23-GISS-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 The advent of water isotope-enabled atmospheric circulation models and the ongoing retrieval of atmospheric water isotopes by the Tropospheric Emission Spectrometer (TES) on Aura, means that there is an unprecedented opportunity to integrate this new hydrologic tracer into more traditional studies of water cycling in the atmosphere. This work exploits the key feature that the water vapor isotope ratio (HDO/H₂O) is sensitive to the history of moist processes acting during transport from the source region to the observation point and is therefore complimentary to traditional water metrics. Specifically, water budgets using isotopic information in addition are likely to be substantially more constrained since the different sources of water vapor (evaporation, advection, precipitation etc.) have very specific isotopic compositions. Our objective is to use TES observations of tropospheric water vapor and its isotopes along with atmospheric general circulation models that include isotopic physics to help constrain atmospheric water budgets. We aim to establish which components of the water budgets are most influential to tropospheric moisture variability caused by the El Niño-Southern Oscillation (ENSO), the intra-seasonal Madden Julian Oscillation (MJO) and tropical cyclones (TCs). There are clear isotopic differences that result from shifts in the patterns of moist convection, water vapor convergence, precipitation, and surface evaporative fluxes. Comparisons to models will serve to evaluate the model physics, suggest improvements, validate the isotope retrievals and provide quantitative measures of changes in water vapor budgets in the subtropics and tropics.

Location:

Goddard Institute for Space Studies
New York City, New York

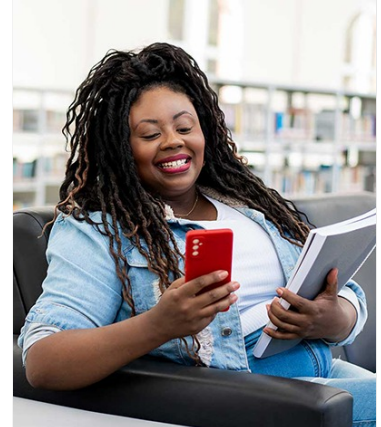
Field of Science:Earth Science

Advisors:

Allegra LeGrande
Allegra.N.LeGrande@nasa.gov
212-678-5556

Gavin Schmidt
Gavin.A.Schmidt@nasa.gov
212-678-5627

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



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at: <https://www.nasa.gov/oiiir/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.