Opportunity Title: Relating satellite microwave observations of precipitation and the large-scale environment to improve the understanding and predicting of tropical cyclones
Opportunity Reference Code: 0261-NPP-NOV23-JPL-EarthSci

Organization National Aeronautics and Space Administration (NASA)

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How to Apply All applications must be submitted in Zintellect

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

Description

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Tropical Cyclones (TCs) are the product of complex multi-scale processes and interactions. The role of the environment has long been recognized. However, recent advances in analyzing and predicting the evolution of TCs suggest that the distribution and intensity of convective activity in the storm have an important role in determining the storm's evolution, intensity and size. Yet, understanding of these processes and non-linear interactions is still lacking. The research community foresees that future progress will come with properly accounting for the observations *of the environment* and of *the inner-core processes* which themselves are influenced by the environment (e.g. moisture, shear, etc.). This brings to the forefront the need to investigate the important role of the convective organization, particularly with respect to the dynamically-significant vortex structure and environmental shear.

Forecasting TC evolution today is very often focused on analyzes of the cloud patterns in IR geostationary data. However, IR observations are mostly sensitive to the cloud shield and cannot properly reveal the details in the dynamically-significant organization of the deep and intense convection that grows under this cloud shield. Observations from low-Earth-orbit (LEO) microwave radiometers, readily available today, can provide the missing information. The challenge to understanding the role convection plays in TC evolution is in relating the IR data to the convective organization revealed by the passive microwave observations, to improve the analysis of these storms (amount, intensity and organization of convection in relation to different IR-detected cloud patterns). Establishing relationships between the large-scale environment and the storm-scale organization of convection will help improve the predictability of TC evolution in the near term.

The successful candidate will collect a comprehensive set of satellite observations of named Tropical Storms and tropical depressions from 1999 – 2022. The dataset will include: geostationary IR data; passive microwave observations from LEO satellites; concurrent reanalysis fields. She/he will develop analyses tools and metrics to test several hypotheses presented in the literatures and then develop new hypotheses, if needed. He/she will join a group of scientists working on similar research and will collaborate with them. He/she will prepare journal papers and participate in the development of new proposals.

References:

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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

Eligibility Requirements

- **Degree:** Doctoral Degree.