Opportunity Title: Improving the Global Ocean Winds Climate Data Record Using New Data and Theoretical Modeling
Opportunity Reference Code: 0143-NPP-NOV23-JPL-EarthSci

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Organization	National Aeronautics and Space Administration (NASA)
Reference Code	0143-NPP-NOV23-JPL-EarthSci
Application Deadline	11/1/2023 6:00:59 PM Eastern Time Zone
Description	Space-based scatterometers are active instruments designed to measure ocean surface vector winds. Observations from several spaceborne scatterometer missions have been collected over the past 25 years, including the C-band European Space Agency (ESA) ERS-1/2 and ASCAT sensors beginning in 1991 to current, the Ku-band NASA's NSCAT QuikSCAT, SeaWinds, and ISS-RapidScat scatterometers, and the Ku-band ISRO's OceanSat-2. There is concurrently a large set of passive microwave radiometric windspeed data from sensors such as AMSR-E, WindSat, TRMM, GPM and recently L-band (~1 GHz) from Aquarius. In late 2016, the OceanSat-2 follow-on (ScatSat) will be deployed into a similar orbital plane and crossing time as ASCAT, providing for the first time continuous joint C/Ku-band observations.

Scatterometers measure radar backscatter induced from Bragg scattering off gravity-capillary waves, generated by wind forcing. For speeds below 5 m/s, winds generate waves by breaking the surface tension. For winds above 5 m/s, wave breaking will start to occur. Owing to the complex, frequency-dependent and geometry-dependent physical relationships between the measurements and the wind-induced ocean surface properties, scatterometer wind products are commonly estimated from empirically derived geophysical model functions (GMF).

The scatterometer-derived ocean surface wind vector data have proved to be very useful for studies of ocean air-sea interaction, ocean circulation, and are widely used by operational numerical weather prediction forecast centers. However, recent studies have found that the wind estimates from the different scatterometers compared differently to the model winds. These discrepancies have geographical patterns that suggest differences in the estimated large-scale atmospheric circulation and differences in the estimated forcing of the ocean. Further progress in using scatterometer winds to drive ocean models and to understand the climate system and its trends requires a better understanding of, and accounting for, the sources of the differences in the instrument-specific wind estimates.

This opportunity will address the challenge of combining this diverse set of space-based ocean surface wind observations and employing theoretical models to: (a) improve the understanding of the wind-driven ocean surface wave spectrum that drives the relationship between the ocean wind and the radar backscatter; (b) to use the physical properties of the ocean surface to understand the differences amongst various sensor-specific GMFs; (c) to understand the frequency-specific atmospheric modulation of the wind-induced surface backscatter. This atmospheric modulation includes effects of rain in the atmosphere, as well as the effects of rain impinging on the ocean surface. (d) to interpret these findings in such a way to improve the merger and intercalibration of wind retrievals from the many sensors, to
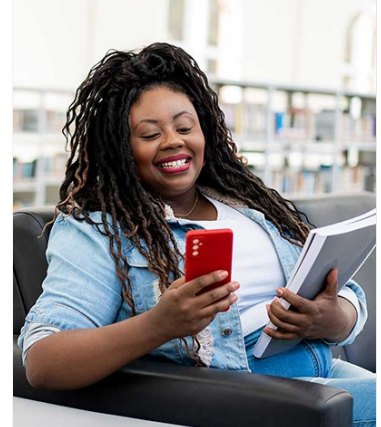
assemble a self-consistent climate data record of global winds.

Location:
Jet Propulsion Laboratory
Pasadena, California

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.