

## A.9 PHYSICAL OCEANOGRAPHY

### 1. Scope of Program

NASA's Physical Oceanography program supports basic research and analysis activities that enable development of NASA's current and future physical oceanography satellite missions and the scientific interpretation of data from them. The primary centers of support for the Physical Oceanography program are the NASA Jet Propulsion Laboratory Earth Science Directorate and the external (non-NASA) scientific community. This announcement serves as the vehicle for participation in the Physical Oceanography program for all institutions.

The primary scientific thrust for physical oceanography at NASA is toward understanding the ocean's role in climate variability and its prediction. Since the general ocean circulation plays a critical role in the global heat balance and materially changes atmospheric properties through air-sea exchange, understanding and modeling the state of the coupled ocean-atmosphere system are fundamental to climate studies. NASA utilizes the unique vantage point of space to enable rapid collection of global ocean data sets and intends to contribute significantly to the World Climate Research Program's Climate Variability and Predictability (CLIVAR) Program (<http://www.usclivar.org>).

The Physical Oceanography Program encompasses science teams supporting satellite altimetry (Ocean Surface Topography Science Team), ocean surface salinity via radiometry (Ocean Surface Salinity Team), sea surface temperature (Sea Surface Temperature Science Team), and ocean vector winds (Ocean Vector Winds Science Team). Proposals focused on one of these variables are better submitted to those competitions. In this program element, NASA is looking for work that cuts across multiple variables and focuses on the ocean's role in climate.

While NASA's focus remains global in nature, it is recognized that many of the practical problems with respect to human interaction with the ocean lie within the coastal seas. Compelling proposals that address the physical oceanographic characteristics of coastal seas in a global context are, therefore, welcome. Three research themes are identified in the Physical Oceanography program and represent priority areas for proposals solicited through this announcement:

1. Analysis and interpretation of the ocean circulation using satellite and *in situ* data, data-derived products, and NASA ocean state estimates (e.g. ECCO - Estimating the Circulation and Climate of the Oceans). Tailoring such proposals to support the objectives and priorities the U.S. CLIVAR Program is encouraged. NASA recommends that proposals focused on a single variable (e.g., sea level, ocean vector winds, salinity) that is already supported by a dedicated science team be submitted to those science team elements in ROSES.
2. Development of novel remote sensing techniques for physical oceanography. NASA has successfully developed remote sensing techniques for ocean surface winds, sea level, sea surface temperature, and sea surface salinity. Each of these variables has a science team and dedicated research activity. NASA will support modest proposals that explore new concepts for remote sensing of interest to

physical oceanography. This opportunity is NOT for technology or instrument development, but for concept articulation and exploration.

3. The intensity and location of mixing in the ocean remains an area of active research. The third priority area for this year's announcement is seeking proposals that expand our spatial and temporal estimates of ocean mixing through the use of remote sensing and likely the joint analysis of satellite data sets with *in situ* ocean mixing (microstructure) data.

## 2. Programmatic Information

Total funds available for work selected under this solicitation are approximately \$1.5M per year for three years.

Proposers are encouraged to include travel funding for one domestic trip per year to support participation in a relevant NASA Physical Oceanography Program workshop or scientific meeting (e.g. a U.S. CLIVAR workshop, a workshop on technology developments, or a workshop of investigators working on ocean mixing).

Programmatic priority will be given to those proposals making the strongest links to analysis of satellite data and addressing oceanographic problems at basin or global scale. Modeling of the Earth system, including physical oceanography aspects, is ably covered but not annually by NASA's Modeling, Analysis and Prediction Program (the most recent active solicitation was as program element A.15 of ROSES-2017) and thus proposers should articulate special circumstances or situations where modeling-dominated proposals should be considered for Physical Oceanography Program funding.

Based on the quality of proposals received, awards will be distributed across the three research themes identified in Section 1. Proposals outside these research themes may be considered but must be highly meritorious.

## 3. Summary of Key Information

Expected program budget for first year of new awards	~ \$1.5M
Number of new awards pending adequate proposals of merit	~ 6-10
Maximum duration of awards	3 years
Due date for Notice of Intent to propose (NOI)	See Tables <a href="#">2</a> and <a href="#">3</a> of this ROSES NRA.
Due date for proposals	See Tables <a href="#">2</a> and <a href="#">3</a> of this ROSES NRA.
Planning date for start of investigation	January 1, 2019
Page limit for the central Science/Technical/Management section of proposal	15 pp; see also Table 1 of ROSES and the <i>NASA Guidebook for Proposers</i> .

Relevance to NASA	This program is relevant to the Earth Science questions and goals in the NASA Science Plan. Proposals that are relevant to this program are, by definition, relevant to NASA.
General information and overview of this solicitation	See the <i>ROSES Summary of Solicitation</i> .
Detailed instructions for the preparation and submission of proposals	Please see <i>ROSES Summary of Solicitation</i> Section I(g) Order of Precedence and the <i>NASA Guidebook for Proposers</i> .
Submission medium	Electronic proposal submission is required; no hard copy is required or permitted.
Web site for submission of proposal via NSPIRES	<a href="http://nspires.nasaprs.com/">http://nspires.nasaprs.com/</a> (help desk available at <a href="mailto:nspires-help@nasaprs.com">nspires-help@nasaprs.com</a> or (202) 479-9376)
Web site for submission of proposal via Grants.gov	<a href="http://grants.gov/">http://grants.gov/</a> (help desk available at <a href="mailto:support@grants.gov">support@grants.gov</a> or (800) 518-4726)
Funding opportunity number for downloading an application package from Grants.gov	NNH18ZDA001N-PO
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