

A.7 ECOSTRESS SCIENCE AND APPLICATIONS TEAM

NOTICE: Amended April 24, 2019. Because of an IT issue NSPIRES was not available to some organizations yesterday, which was to have been the due date for A.7 ECOSTRESS ST. To allow submission from those organizations that were unable to connect to NSPIRES yesterday, the response structure has been kept open and the cut off for proposal submission for this program element will be 11:59 pm eastern time today, April 24, 2019.

Amended February 12, 2019. Because important ECOSTRESS data sets were not available during the partial government shutdown, the proposal due date for this program element has been delayed to April 23, 2019. NOIs are still requested by February 27, 2019.

Amended January 31, 2019. The proposal due dates for this program element were previously temporarily changed to "TBD" as a result of the partial government shutdown. This amendment releases new due dates for the effected program elements in Appendix A. For this program element, Notices of Intent are now requested by February 27, 2019, and ~~the due date for proposals is now March 29, 2019.~~

Amended on December 18, 2018. This amendment releases final text for this program element, which was previously TBD. ~~NOIs are requested by February 4, 2019, and proposals are due on March 19, 2019.~~

1. Scope of Program

NASA launched the ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS) instrument to the International Space Station (ISS) on June 29, 2018. This program element solicits proposals for membership on the ECOSTRESS Science and Applications Team. This team supports basic research and analysis activities as well as applications activities associated with the production, validation, and utilization of ECOSTRESS data products. Funding for research projects will come from the Research and Analysis Program of the NASA Earth Science Division while funding for applications projects will come from the Applied Sciences Program of the NASA Earth Science Division.

NASA selected the ECOSTRESS instrument through the Earth Venture Instrument-2 solicitation in July 2014. ECOSTRESS is a multispectral thermal radiometer acquiring coincident thermal infrared (TIR) emission measurements of the Earth's surface in five separate spectral bands, covering the 8 to 12.5 micron wavelength range. ECOSTRESS measures the brightness temperature of the Earth's surface at sensor with an accuracy of 1 Kelvin (K) and a precision of 0.3 K at 300 K. The mission acquires brightness temperatures at a ground sampling distance of approximately 40 m by 70 m over a continuous ground swath width of 360 km, from the 385 to 415 km ISS altitude range. The ISS precessing orbit (orbital inclination of 51.5 degrees) does not allow observations over high-latitude regions but does have the advantage of enabling measurements at different times of the diurnal cycle, with coverage of the contiguous

United States (CONUS) every few days depending on latitude. The planned ECOSTRESS mission lifetime is one year. Data collection plans include the entire CONUS, twelve 1,000 x1,000 km areas in key climate zones, and multiple Fluxnet sites.

The ECOSTRESS website at <https://ecostress.jpl.nasa.gov> provides additional information about the mission, including a map of ECOSTRESS data currently available through <https://ecostress.jpl.nasa.gov/gmap/>. To gain access to these data through the ECOSTRESS Early Adopters program, please go to https://ecostress.jpl.nasa.gov/applications/app_request and follow the steps requested.

A key ECOSTRESS measurement is evapotranspiration (ET), derived from the TIR brightness temperatures of plants. ET is a key climate and ecosystem variable, as it integrates life with the water, carbon, and energy cycles—incorporating elements of the sun, atmosphere, hydrosphere, and biosphere. ECOSTRESS’s diurnal sampling captures the shape of the daily ET cycling as plants open and close their stomata over the course of a day.

ECOSTRESS addresses scientific and management-oriented questions about plant-water dynamics and how ecosystems respond to climate variability and change. The ECOSTRESS science objectives are to:

1. Identify critical thresholds of water use and water stress in key climate-sensitive biomes;
2. Detect the timing, location, and predictive factors leading to plant-water uptake decline and/or cessation over the diurnal cycle; and,
3. Measure agricultural water consumptive use over CONUS at spatiotemporal scales applicable to improve drought estimation accuracy.

Existing ECOSTRESS data products are:

Level 0	Raw Collected Telemetry
Level 1	Calibrated Geolocated Radiances
Level 2	Surface Temperature and Emissivity
Level 3	Evapotranspiration
Level 4	Water Use Efficiency and Evaporative Stress Index

The listed, existing data products are being produced through direct funding to the ECOSTRESS Principal Investigator team.

2. Science and Applications Team for the ECOSTRESS Mission

This program element seeks proposals for membership on the ECOSTRESS Science and Applications Team under the leadership of the ECOSTRESS Principal Investigator. Proposals should focus on utilization of ECOSTRESS Level 2 (Surface Temperature and Emissivity), Level 3 (Evapotranspiration), and/or Level 4 (Water Use Efficiency and Evaporative Stress Index) data products for basic research of importance to Earth system science and applications relevant to management activities. The program element is also open to production of new higher-level (Levels 3 and 4) data products.

NASA particularly encourages proposals in the following areas:

- Efforts that advance the three ECOSTRESS science objectives;

- Evaluation and improvement of existing ECOSTRESS data products;
- New research and innovative analyses using ECOSTRESS data products alone or in combination with data products from other sensors (e.g., those from NASA, other U.S. entities, or international providers) that advance the understanding of the climate system, the water cycle, the carbon cycle, ecosystems and their biodiversity, and/or extreme weather events;
- Applications of ECOSTRESS products alone or in combination with data products from other sensors (e.g., those from NASA, other U.S. entities, or international providers) for agriculture, water management, disaster response and mitigation, public health, managing ecosystems for conservation and more sustainable resource use, and the forecasting of weather and extreme events; and
- Enhanced validation strategies, techniques, and data products.

Please note that any proposers responding to this program element who are currently members of the funded ECOSTRESS Principal Investigator team must explain in their proposal how the new proposed work goes beyond and is distinct from the work for which they are already funded.

3. Applications Proposals

Applications proposals to develop products for agriculture, water management, disaster response and mitigation, public health, managing ecosystems for conservation and more sustainable resource use, and forecasting of weather and extreme events have additional requirements. Applications proposals must:

1. Identify and describe clearly at least one specific management need to be addressed through the use of ECOSTRESS data;
2. Identify the end user(s) associated with the management need(s);
3. Include an individual from an end-user organization as a team member on the proposal;
4. Explain how ECOSTRESS-derived products will be incorporated in the end-user's decision-making activity;
5. Outline plans - including a schedule - for the transition of these products to the end-user organization(s) for deployment and long-term sustained use by no later than the final project year, and include an end-of-project event to announce results in this regard; and,
6. Contain an assessment of the Applications Readiness Level (ARL) at the time of the proposal for any method, tool, or product to be developed through a proposed project, as well as an expected end point ARL at the conclusion of the project. For information about NASA ARLs, please see <http://www.nasa.gov/sites/default/files/files/ExpandedARLDefinitions4813.pdf>.

In addition, applications proposals should consider as Principal Investigator (PI) someone who is very familiar with the needs of end-user (i.e., decision-making) organizations.

4. Science and Applications Team Meeting

All proposers should budget for one two-day annual Science and Applications Team Meeting to be held on the West Coast of the U.S. each year (for costing purposes, assume the meeting will take place in the Los Angeles, CA area). In consultation with the Headquarters program scientist for ECOSTRESS, the ECOSTRESS Principal Investigator will be responsible for calling and organizing science team meetings and related activities.

5. Summary of Key Information

Expected annual program budget for each year of new awards	\$1.1 M
Number of awards	~7 to 15
Maximum duration of awards	3 years
Due date for Notice of Intent	See Tables 2 and 3 of this ROSES NRA
Due date for proposals	See Tables 2 and 3 of this ROSES NRA
Planning date for start of investigation	Assume 6 months after receipt of proposals.
Page limit for the central Science-Technical-Management section of proposal	15 pages; see also Table 1 of ROSES and NASA Guidebook for Proposers .
Relevance to NASA	This program is relevant to the Earth science questions and goals in the NASA Science Plan. Proposals relevant to this program are, by definition, relevant to NASA.
General information and overview of this solicitation	See the ROSES Summary of Solicitation .
Detailed instructions for the preparation and submission of proposals	See ROSES Summary of Solicitation Order of Precedence and NASA Guidebook for Proposers .
Submission medium	Electronic proposal submission is required; no hard copy is permitted.
Web site for submission of proposal via NSPIRES	http://nspires.nasaprs.com/ (help desk available at nspires-help@nasaprs.com or (202) 479-9376).
Web site for submission of proposal via Grants.gov	http://grants.gov/ (help desk available at support@grants.gov or (800) 518-4726).
Funding opportunity number for downloading an application package from Grants.gov	NNH18ZDA001N-ESAT

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