

Climate Variability and Predictability Program
Competition Information Sheet: *Implementation of the Tropical Pacific Observing System (TPOS) Equatorial Pacific Experiment (TEPEX-East) Field Component*

Program Name

Climate Variability and Predictability Program

Program Mission

The Climate Variability and Predictability (CVP) Program supports research that enhances our process-level understanding of the climate system through observation, modeling, analysis, and field studies. This vital knowledge is needed to improve climate models and predictions so that scientists and society can better anticipate the impacts of future climate variability and change. The CVP Program is part of the Earth System Science and Modeling (ESSM) Division of the NOAA Office of Oceanic and Atmospheric Research (OAR) Climate Program Office (CPO; see <http://cpo.noaa.gov/CVP>). CVP is a critical component of the integrated research enterprise at CPO and maintains important connections to the other CPO program areas as well as OAR Laboratories and Programs and NOAA line office organizations.

To achieve CPO's mission, the CVP Program supports research carried out at NOAA and other federal laboratories, NOAA Cooperative Institutes, and academic institutions. The Program also coordinates its sponsored projects with major national and international scientific bodies including the World Climate Research Programme (WCRP), the International and U.S. Climate Variability and Predictability (CLIVAR/US CLIVAR) Program, and the U.S. Global Change Research Program (USGCRP).

Focus for FY25

Implementation of the *Tropical Pacific Observing System (TPOS) Equatorial Pacific Experiment-East (TEPEX-E) Field Campaign*

In FY25, CVP is soliciting studies focused on observing, understanding, and modeling that advance the implementation of TEPEX-E - the central focus is to understand and constrain how the coupled Cold Tongue system regulates momentum, heat, and moisture across the Pacific, and vertically. Results will guide the next generation of observing networks, enable more accurate predictions of ENSO, and the Pacific's global impact on future weather and climate. Details are described in the Science Plan¹. This effort is in support of NOAA's Precipitation Prediction Grand Challenge Strategy (PPGC)² and the World Climate Research Program's Global Precipitation Experiment (GPEX)³.

¹ [TEPEX Science Plan](#)

² [NOAA Precipitation Prediction Grand Challenge](#) (Objectives 3 - 6)

³ [Science Plan of WCRP Global Precipitation Experiment \(GPEX\)](#)

Funding for FY25

Pending the availability of funds, it is anticipated that there will be \$3,000,000 available in FY25 for this competition. This competition may be funded with additional outyear funds in FY26, FY27, or FY28 depending on facility requests and scheduling. Three-year awards will range between \$525,000 and \$750,000 total. Other amounts may be considered with justification. See Competition Information.

Competition Information

Background Motivation:

The Tropical Pacific region has a significant role in driving regional climate and weather events across the United States as well as global events across the world. Given the region's importance, NOAA, with partners, maintains the Tropical Pacific Observing System (TPOS)⁴ to observe and monitor the transport of moisture and heat, and scale-interactions across ocean, atmosphere, and hemispheres. Society experiences the impact of these Tropical Pacific processes as downstream floods, droughts, wildfires, heat waves, tornados, tropical cyclones, and more. These observation and monitoring activities (TPOS) feed into NOAA's suite of models that provide predictions on subseasonal to interannual to decadal timescales to mitigate damages from these extremes through emergency preparedness and adaptive planning.

A 7-year International Tropical Pacific Observing System 2020 (TPOS 2020) project⁵ outlined a comprehensive strategy to improve global prediction skill, inclusive of sustained observations, intensive field campaigns, and modeling needs. Since FY20, NOAA and the U.S. science community with international collaborators have advanced multiple components of the strategy:

- National Weather Service (NWS)/National Data Buoy Center continues to maintain and update the TPOS array⁶,
- Oceanic and Atmospheric Research (OAR)/Global Ocean Monitoring Observing (GOMO) program advanced new technology pilots⁷ for observing the region,
- OAR/Climate Program Office/CVP program supported pre-field campaign modeling simulations⁸ with scientific co-leadership from the US. science community and cross-OAR lab interactions (Physical Science Laboratory, Pacific Marine Environmental Laboratory, and Geophysical Fluid Dynamics laboratory) and with contributions from

⁴ TPOS array: <https://tropicalpacific.org/>

⁵ Kessler, W.S., S. Cravatte and Lead Authors, 2021: Final Report of TPOS 2020. GOOS-268, 83 pp. [Available online at <https://tropicalpacific.org/tpos2020-project-archive/reports/>]

⁶ [Enhancements schematic for TPOS array](#)

⁷ [Technology Pilot Projects](#)

⁸ CVP-funded prefield campaign modeling projects ([2017 - 2020](#); [2022-2025](#))

other labs and centers (NWS/Climate Prediction Center, Chemical Sciences Laboratory, Atlantic Oceanic and Meteorological Lab),

- US CLIVAR community convened workshops^{9,10} and reports - e.g. the US CLIVAR Air-Sea Transition Zone Study Report¹¹.

Building on these efforts, in FY25 the NOAA Climate Program Office's Climate Variability Predictability program is advancing a subset of the TPOS 2020 priorities through TEPEX - the TPOS Equatorial Pacific EXperiment - focusing on field campaigns in the Central and Eastern Tropical Pacific. Addressing critical knowledge gaps in the Tropical Pacific and its relationship to prediction of U.S. climate and weather, as is the focus of TEPEX, is an essential component of NOAA's Precipitation Prediction Grand Challenge Strategy¹² and provides an opportunity to build international science collaboration and partnership under the World Climate Research Program's Lighthouse Activity - Global Precipitation EXperiment (GPEX)¹³.

The TEPEX field component is envisioned to run from 2025-2028 with future rounds of projects focused on analysis, modeling, and research transitions to model and observing array improvements through 2035. **A guiding principle of TEPEX is that, throughout these phases, observing and modeling teams should continuously work together in all elements to ensure translation of field campaign results into NOAA modeling and/or TPOS improvements.** The TEPEX Science Plan continues to be shared - gathering feedback, and growing the TEPEX community, nationally and internationally, through multiple outlets: TPOS Science Advisory Committee, US CLIVAR, WCRP/GEWEX, AGU 2023¹⁴, AMS 2024, Ocean Sciences Meeting 2024¹⁵, International GEWEX Meeting.

NOAA cannot implement TPOS 2020 or TEPEX alone. NOAA has a large stake in the TEPEX Science Plan and has many capabilities - from the scientific expertise within OAR programs and laboratories, to observing and operational expertise in NWS and National Environmental Satellite, Data, and Information Service (NESDIS) centers, to platform and logistics expertise in Office of Marine and Aviation Operations - that it can bring to bear for TEPEX. Successful implementation from the field to modeling components of the plan requires collaboration through both cross-NOAA line office engagement, and NOAA-external science community collaboration. The TEPEX Science Plan encourages applicants to seek funding not just from NOAA through this announcement, but from diverse types of national and international organizations as well.

TEPEX-E Competition Details:

⁹ [Bridging Sustained Observations and Data Assimilations \(2020\)](#)

¹⁰ [Atmospheric Convection and Air-Sea Interactions over the Tropical Oceans \(2019\)](#)

¹¹ [Clayson, C. A., C. A. DeMott, S. P. de Szoeke, P. Chang, G. R. Foltz, R. Krishnamurthy, T. Lee, A. Molod, D. G. Ortiz-Suslow, J. Pullen, D. H. Richter, H. Seo, P. C. Taylor, E. Thompson, B. V. Bôas, C. J. Zappa, and P. Zuidema. 2023: A New Paradigm for Observing and Modeling of Air-Sea Interactions to Advance Earth System Prediction. A US CLIVAR Report, US CLIVAR Project Office, 86 pp., doi: 10.5065/24j7-w583](#)

¹² [NOAA Precipitation Prediction Grand Challenge](#) (Objectives 3 - 6)

¹³ [Science Plan of WCRP Global Precipitation Experiment \(GPEX\)](#)

¹⁴ [AGU 2023 TEPEX Townhall](#)

¹⁵ [Ocean Sciences Meeting 2024 TEPEX Townhall](#) and [Session](#)

In FY25, CVP is interested in studies focused on observing, understanding, and modeling that advance the scientific questions A - D laid out in the TEPEX-E section of the Science Plan¹. The central focus is to understand and constrain how the coupled Cold Tongue system regulates momentum, heat, and moisture across the Pacific, and vertically to guide the next generation of observing networks and enable more accurate predictions of El Nino Southern Oscillation (ENSO) and its global impact on future weather and climate. Proposals that include modeling work should be focused on providing direct guidance to the observational field campaign component, or enabling observation-model integration to benefit the field campaign.

Applicants are strongly encouraged to read the *TEPEX Science Plan* in its entirety.

Interactions, partnerships, or collaborations with NOAA laboratories, cooperative institutes, and centers are encouraged but not required.

CVP emphasizes the below aspects of the Science Plan and encourages applicants to articulate these in their proposals:

- How the project will treat, or will be able to integrate with other projects once funded, through observation, data analysis, or modeling experiments, the upper ocean, air-sea interface, and Marine Atmospheric Boundary Layer (MABL) as one entity - the Air-Sea Transition Zone (ASTZ).
- Applicants are strongly encouraged to pursue collaborations across community expertise domains (observationalists, modelers, etc.) throughout the duration of the field campaign to ensure resulting datasets and process-understanding are translatable to NOAA model development and improvement or improvements to the future design of the TPOS array. Projects should articulate their value-add to observing and modeling improvements, but do not need to include model development or improvement in the proposed activities.

For instance:

- *How could proposed observed processes enhance parameterizations or representation in NOAA's experimental or operational models?; And/OR*
- *How could proposed observed processes inform enhancements or improvements to TPOS?*

Additional Information

Applicants may only submit one proposal as a lead PI to one CVP competition (either TEPEX-E or TEPEX-C, not both).

The feasibility and success of a proposal should not be dependent on the success of other specific proposals. Proposals are encouraged to describe how their proposed work fits into the ASTZ context as noted above. Applicants can describe how their work would benefit from or add value to other measurements or modeling work, and/or is complementary to other submitted proposals; however, it should be clear how the proposal is feasible and stands on its own.

Facility Requests:

- NOAA OAR Physical Sciences Laboratory (PSL) is leading the facility request to secure NOAA ship resources. You can read more about NOAA's ship resources here - *Ronald H. Brown*¹⁶. *Oceanographer* is a new vessel and is anticipated to have capabilities similar to that of the *Ronald H. Brown*.
- Applicants that intend to conduct research from/deploy instruments from other countries or other US agency platforms are also eligible to apply. Strong letters of support are encouraged in this case.

Timeline and Contingencies

- TEPEX-E field deployment is anticipated to have three cruises, 6 months apart, starting in Fall 2026 (140°W, 2°S-5°N).
- The Science Plan lays out an ideal timeline; however, the field component may be delayed due to a number of factors.

Budget

- It is anticipated that TEPEX-E awardees will receive first-year funds in September 2025 or later in 2026.
- Awarded PIs will be expected to participate in monthly virtual planning and coordination meetings, and at least two annual PI meetings over the duration of the award. Attendance at these in person meetings should be included in the proposal budget.

Data Information and Sharing Plan

Data Management Guidance The Responsible NOAA Official for questions regarding this guidance and for verifying accessibility of data produced by funding recipients: Virginia Selz virginia.selz@noaa.gov

Proposal data management plans should be consistent with *TEPEX Science Plan: Data Management*.

Proposals are permitted to include the costs of data sharing and/or archiving in their budgets within solicitation specified proposal cost limit. Proposed methods and approaches should use reasonable means to minimize data management costs.

CVP program is supporting a core investment in TEPEX data management at NOAA Pacific Marine Environmental Laboratory for the field data component. This core component does not include related satellite or modeling data management or archiving. In addition to the applicant's proposal data management plan, awarded PIs will be expected to work with the TEPEX data

¹⁶ [Ronald H. Brown](#)

management team to determine best strategies for temporary and long-term data storage that is conducive to data sharing across TEPEX PIs and with the broader science community. This may include adapting the proposed data management plan.

Other Considerations

LOI submissions: Applicants should follow the instructions for LOI submission that are described in the NOFO. Applicants should submit their LOIs through this google form: <https://forms.gle/rsU2Xey929p9RAqt6>.

Program Contact information: For additional program announcement information, investigators should contact the following CVP Competition Manager: Virginia Selz (Virginia.Selz@noaa.gov)

Webinar information: The program intends to participate in two webinars shortly after the release of the NOFO and Competition. Please check the website or contact virginia.selz@noaa.gov and jose.algarin@noaa.gov for more details.

- General NOFO/How to Apply questions will be presented jointly with other ESSM programs
 - To be scheduled. Check back for details one website.
- Program specific competition information/topical questions
 - August 27th: 12:00 - 1:00PM EST. [Register here.](#)