

Program Information Sheet

Program Name

Climate Variability and Predictability (CVP) 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 sits within the Earth System Science and Modeling (ESSM) Division of the NOAA Office of Oceanic and Atmospheric Research (OAR) Climate Program Office (CPO). CVP is a critical component of the integrated research enterprise at CPO and maintains important connections to the other CPO program areas, such as Ocean Observations and Monitoring Division (OOMB) and MAPP (Modeling, Analysis, Predictions and Projections).

To achieve its 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). The CVP program sits within NOAA's Climate Program Office (<http://cpo.noaa.gov/CVP>).

Focus for FY19

In FY19, CVP is interested in Climate Process Team (CPT) proposals with a traditional focus on model diagnostics and process representation improvements to ocean and/or atmospheric models. Please see the information sheet for a description of candidate processes. Project teams must include collaborations with one of the NOAA global coupled modeling centers. The NOAA Climate Variability and Predictability (CVP) Program will consider support for the private-sector and/or academic research community, scientists at NOAA labs, and/or NOAA OAR Cooperative Institutes.

Competition 3: CVP - Climate Process Teams - Translating Ocean and/or Atmospheric Process Understanding to Improve Climate Models

[Note, there is an additional CPT call through the MAPP Program called "MAPP - Climate Process Teams - Translating Land Process Understanding to Improve Climate Models". Please see the MAPP Information Sheet for additional details.]

Individual proposals should target only one CVP competition, which must be clearly identified in the proposal summary. Details regarding one (CVP - Climate Process Teams) of the three competitions for the CVP Program FY 2019 are given below.

Funding for FY19

Competition 3: It is anticipated that there will be \$2M available in FY19 for **Competition 3: CVP - Climate Process Teams**. It is anticipated that most awards for Climate Process Team proposals (the combined budgets of all collaborators comprising the team) will be at a funding level between \$600K to \$1M/year. Awards will be made for up to three years with a possibility of a two-year extension for teams that have met their second year milestones and are performing satisfactorily toward their third year milestones. It is anticipated that 1 or 2 teams will be funded by the CVP Program. Awards may be funded in partnership with other agencies participating in US-CLIVAR and/or the U.S. Global Change Research Program. Successful applicants may be required to also submit their proposals to partnering agencies to receive funding.

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

Competition Information

Competition 3: Climate Process Teams - CVP - Translating Ocean and/or Atmospheric Process Understanding to Improve Climate Models

Climate models are used for a variety of practical applications, including forecasting meteorological conditions from weeks to years out and projecting long-term changes; they are the basis for information on the likelihood of future extremes such as droughts, heat waves and coastal flooding. Climate models' information broadly supports climate related activities across the Federal government, states and private entities. For example, such models support the National Climate Assessment and U.S. participation in the Intergovernmental Panel for Climate Change (IPCC). Increasing the usefulness of climate model information crucially depends on our ability to reduce model errors by improving the realism in the simulation of climate system processes.

To address this need, US CLIVAR Climate Process Teams (CPTs) were formed as groups of observationalists, theoreticians, process modelers, and model developers working closely together to improve parameterizations of a particular process in one or more IPCC-class models. Over the past decade, several CPTs have been supported by Federal agencies participating in the US Global Change Research Program (USGCRP) and US CLIVAR. Based on this past work, there is strong recognition from the community¹ that bringing process experts together with climate modelers via CPTs is a useful means of improving representation of physical processes in large-scale IPCC-class models. CPTs improve the fidelity of coupled climate models by facilitating the transfer of knowledge from observational and process-oriented research to the development of physical process representation in global climate models.

The Office of Oceanic and Atmospheric Research (OAR) Climate Program Office Climate Variability and Predictability (CVP) Program and Modeling, Analysis, Predictions and

¹ Based on the input from modeling centers and participants from the October 2015 "Translating Process Understanding to Improve Climate Models " Workshop. <https://usclivar.org/meetings/translating-process-understanding-improve-climate-models>

Projections (MAPP) Program have previously funded Climate Process Teams, together with other Federal agencies. In FY 2019, the CVP and MAPP programs are coordinating to invest in a new set of Climate Process Teams, in partnership with other Federal agencies participating in the USGCRP and USCLIVAR.

In FY 2019, the CVP Program is soliciting proposals for Climate Process Team(s) focusing on accelerating the realism in the modeling of oceanic and/or atmospheric processes as part of the Earth's climate system. (See the related FY 2019 MAPP program announcement for additional Climate Process Teams opportunities).

Proposed CPT(s) will adhere to the US CLIVAR definition:

A CPT is funded multi-institutional project that assembles observation-oriented experimentalists, process modelers, process diagnosticians, theoreticians, and climate model developers from two or more modeling centers into a single project that focuses on a specific process or set of processes to assess model sensitivities to process uncertainties, establish observation and model metrics, and develop, test, and implement parameterization improvements.

Proposed CPTs must include collaborations with NOAA OAR laboratories, involve external academic and/or private-sector research scientists and demonstrate the usefulness to improving NOAA climate models and those at other major modeling centers. Applicants must consider key findings and best practices based on past CPTs listed on the US CLIVAR webpage for CPTs (<https://usclivar.org/climate-process-teams>).

The CVP Program solicits CPT proposals with the aim to speed development of global coupled climate models by bringing together theoreticians, observationalists, process modelers and the large modeling centers to concentrate on the leading problems facing models. Each CPT will comprise a number of PIs and institutions proposing as a collaborative group.

It is the objective of the CPTs to bridge the gaps among the field and remote sensing observation programs, process models, and global modelers by building communities, in which those with observational expertise and data, those with highly detailed process models, and those building global models work together to address systematically the critical issues that limit progress in improving global climate models. The CPT is envisioned to support collaborations that will accelerate progress in climate model development. Such support should include visiting scientist programs, post-doctoral programs that give incentives for modelers and field scientists to interact, workshops or meetings for the teams to interact regularly, and computational resources to test and assess new parameterizations.

CPTs should focus on a specific climate process or on an interaction among climate processes with the expectation that significant progress can be made, over the duration of the project, in improving its representation in global climate models. Such processes should meet the following criteria:

- **Relevance:** The process should be one that is currently poorly represented in climate models, but where improvement in representation could lead to better and more credible climate simulations.
- **Readiness:** The process should be one where recent theoretical developments,

- process modeling, and observations are readily transferable into climate models.
- Focus: The topic needs to be focused and well defined so as to lead to concrete results within the duration of the project.
- Model independence: The process should be of interest developers of more than one climate model.

In FY19, CVP is interested in CPT projects with a traditional focus on model diagnostics and process representation improvements to ocean and/or atmospheric models. Project teams must include collaborations with one of the NOAA global coupled modeling centers. The NOAA Climate Variability and Predictability (CVP) Program will consider support for the private-sector and/or academic research community, scientists at NOAA labs, NOAA centers, and/or NOAA OAR Cooperative Institutes.

Candidate processes to be addressed by CPTs include processes identified in the [Translating Process Understanding to Improve Climate Models Workshop White Paper](#). However, the CVP program will give priority to the following candidate processes (listed alphabetically):

- Atmospheric and oceanic boundary layers/air-sea interaction
- Atmospheric moist convection
- Eastern boundary upwelling
- Equatorial ocean mixing
- Glacier/ice shelf - ocean interaction
- Gravity wave drag (atmosphere)
- Ocean eddy life cycle and energetics
- Shelf-open ocean exchange
- Snow on sea ice
- Swell and Langmuir turbulence
- Topographic wave drag (ocean)
- Western boundary currents

The CPT project management will be the joint responsibility of the lead PI and the management of the collaborating modeling institutions. The responsibilities include coordination of the collaborating PIs and institutions, serving as a focal point for the sponsoring agencies, meeting science milestones and model development goals, and reporting progress and results as required.

Use of observations from recent NOAA-funded projects such as EPIC, PACS, VOCALS, DYNAMO, YMC and/or NMME is encouraged but not required. Projects will start either in FY18 or FY19, depending on the needs of the project and the availability of funding.

Data Archiving

Data Management Guidance

The Responsible NOAA Official for questions regarding this guidance and for verifying accessibility of data produced by funding recipients: Sandy Lucas, sandy.lucas@noaa.gov

Data Accessibility: The CVP Program requires that public access to grant/contract-produced

data be enabled in one of the following ways (select one):

- Funding recipients are planning to submit data to NOAA National Centers for Environmental Information (NCEI), which will provide public access and permanent archiving². Point of Contact for NCEI is Nancy Ritchey (Nancy.Ritchey@noaa.gov)
- Data are to be submitted to an International Council for Science (ICSU) World Data System facility: <https://www.icsu-wds.org/community/membership/regular-members>
- An existing publicly accessible online data server at the funded institution is to be used to host these data (describe in proposal).
- Data are to be submitted to a public data repository appropriate to this scientific domain (describe in proposal).
- Proposal may request permission not to make data publicly accessible (proposal to explain rationale for lack of public access, and if funded approval to be obtained from Responsible NOAA Official listed above).
- Archival of data at an established Cloud Computing facility, if cost effective and reliable

Technical recommendations:

The CVP Program requires the following data format(s), data access method(s), or other technical guidance:

- Data must be made available in a common machine-readable non-proprietary format with appropriate metadata and clear labels and descriptors. Use of netCDF is encouraged.
- Data should be available via public and discoverable data portals, as described above.
- At a minimum, investigators should plan to archive and make available modeling data used in producing any figures in publications from research supported by their grants, as well as data that support conclusions reached in papers or stated publicly. Only those data which are necessary for demonstrating reproducibility of published results need be archived and made public unless otherwise required as part of the solicitation.
- In situ observational data collected during the field campaign should be made freely available to the public either 2 years after collection and validation or at the time of publication, whichever is sooner.
- Model data should be made available for at least 3 years after it is initially published or made otherwise publicly available.

Resources: 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.

Program Contact information:

For additional program announcement information, investigators should contact the following CVP Competition Manager: Sandy Lucas (Sandy.Lucas@noaa.gov, 301-734-1253)

Letters of Intent should be submitted directly to the Competition Manager.

² NCEI supports the creation of adequate metadata and data ingest into long term repository holdings using tools such as Send2NCEI (www.nodc.noaa.gov/s2n, for small volume, one-time only data collections) and Advanced Tracking and Resource tool for Archive Collections or ATRAC (www.ncdc.noaa.gov/atrac, for recurring and/or large volume data collections).

