Developing terrestrial-, marine-, and ice-atmosphere boundary layer datasets through collaborations between observation and modeling communities.

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<th>Program Name</th>
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<td>Climate Observations and Monitoring Program</td>
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<th>Program Mission</th>
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<td>Observations are a foundational element of the climate research and services enterprise. NOAA and its national and international partners invest significantly in the development of a global climate observing system to address the needs of the research, forecasting, and assessment communities, as well as enable stakeholders and decision-makers to monitor and respond to changes in the Earth system. While observing systems routinely provide data and related metadata, raw data alone are often insufficient to realize the full value of these observations due to inherent variability, measurement uncertainty, or coverage gaps(^1,2) as well as the suboptimal integration of the observational and modeling communities(^1). However, the unprecedented increase in data availability coupled with the rate of global change calls for advancements in the use, analysis, and integration of data with models to overcome these challenges and advance monitoring, detection, and prediction of the earth system for societal applications central to NOAA’s mission(^3,4). Carefully developed and tailored value-added climate products based on these data, and coordination between the observational and modeling communities, can improve the connection between observations and their application within the broader climate enterprise(^1).</td>
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The Climate Observations and Monitoring (COM) 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). The COM program works collaboratively with NOAA and other federal laboratories, NOAA cooperative institutes, and academic institutions to competitively leverage existing observational assets and develop value-added products, diagnostics, and indices that have a strong scientific foundation, and are publicly accessible. Data products advance understanding and improve modeling of climate variability through exploitation of observations to ultimately detect and forecast changes in the earth system.

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3 Gil et al. 2019. A Research Agenda for Intelligent Systems that will result in fundamental new capabilities for understanding the Earth system. Communications of the ACM. 62 (1):76-84.

### Focus of FY2020

For FY20, the COM program is holding a competition under this Federal Funding Opportunity: Developing terrestrial-, marine-, and ice-atmosphere boundary layer datasets through collaborations between observation and modeling communities.

### Funding for FY20

It is anticipated that there will be $1,000,000 available in FY20 for the COM competition. It is anticipated that most awards will be at a funding level of between $100,000 and $150,000 per year for 2-3 years, depending on the availability of funding.

### Competition Information

Developing terrestrial-, marine-, and ice-atmosphere boundary layer datasets through collaborations between observation and modeling communities.

In FY20, the COM program is soliciting proposals that develop, or significantly improve upon, oceanic, atmospheric, sea-ice, and/or terrestrial, physical or biogeochemical datasets from existing observations that will advance modeling efforts of the terrestrial-, marine-, or sea ice-atmosphere boundary layer (BL). Significant observations for monitoring and process-understanding, as well as model intercomparison project efforts, and dataset assessment, have been undertaken by international\(^5\) organizations and U.S. government agencies\(^6,7\) to advance understanding of BL processes on multiple scales. NOAA has invested significantly in a wide variety of ocean-, and land-atmosphere observations and process studies\(^8\) in areas or conditions previously understudied. These observations provide opportunities to complement on-going work\(^5-8\) and address BL knowledge gaps (e.g., analysis of time-series of multi-platform observations for climatological features, blending and repackaging of disparate datasets for model use\(^9\)) through targeted dataset development and analysis for climate model improvement. To advance NOAA’s climate prediction capacity in priority climate risk areas through improved BL understanding and representation in models, projects should promote

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\(^5\) Global Energy and Water Cycle Exchanges (GEWEX): https://www.gewex.org/about/


\(^7\) e.g. Interagency effort on Observations for Model Intercomparison Projects (Obs4MIPs): https://esgf.llnl.gov/

\(^8\) e.g. NOAA Lab Projects: Earth System Research Laboratory (ESRL) Chemical Sciences Division, https://www.esrl.noaa.gov/csd/field.html, Physical Sciences Division - https://www.esrl.noaa.gov/psd/staff/bl.html, Global Monitoring Division https://www.esrl.noaa.gov/gmd/about/aboutgmd.html; Air Resources Laboratory - https://www.arl.noaa.gov/research/boundary-layer/

collaboration and coordination between the observation and modeling communities and include at least one named collaborator with modeling expertise.

Projects should focus on the development and analysis of high-quality, climate-relevant datasets that will be readily utilized by the earth system/climate modeling community for model development, assessment, and/or performance evaluation. Proposed dataset development should have high potential to meet the critical need of reducing error and minimizing uncertainty of boundary layer processes in models, and therefore advance our foundational understanding of the earth system, and improve our ability to detect and forecast a changing climate for societal application. Priority areas for dataset development and analysis focus on key challenges related to integrating observations with models, and include those that have persisted over the last decade\(^1\) and were highlighted as recent opportunities for BL observation-model integration\(^9\). Proposed dataset development should focus on at least one of the priority areas:

- Explore and apply state-of-art techniques to upscale surface-based network data and point data for model use.
- Integrate observations from different platforms for model use (e.g., in-situ, satellite).
- Enable implementation of new metrics, such as process-based model diagnostics\(^10\),\(^11\),\(^12\).

Projects should be developed and implemented in consultation with the modeling community over the lifecycle of the project. Proposals should explicitly identify an existing gap that the dataset will address for the climate modeling community (e.g. *What will the new dataset enable modelers to do that they could not do before? What new types of information will be learned from dataset analysis and use of the dataset in models?*). Proposals should identify research stakeholders and users in the modeling community and discuss how these stakeholders/users will be involved in the process by which the data products will be developed, shared, accessed, and readily utilized.

COM encourages projects to capitalize on the large volume of existing NOAA observations. We recommend collaborations across NOAA cooperative institutes, labs, and the broader external community.

This solicitation is intended to use existing data sources for developing and/or analyzing integrated dataset(s) within the duration of the award and does not support the collection of new observations or development of new models. The creation or revision of reanalysis products and the sustained support of operational data assimilation products are beyond the scope of this solicitation.

https://doi.org/10.1175/BAMS-D-18-0042.1

\(^11\) Model Diagnostics Task Force (MDTF) Diagnostics Package
http://www.cesm.ucar.edu/working_groups/Atmosphere/mdtf-diagnostics-package/

\(^12\) Santanello et al. 2018. Land-Atmosphere Interactions: The LoCo Perspective. *BAMS,*
https://doi.org/10.1175/BAMS-D-17-0001.1
Proposals must include a Data Management Plan of up to two pages aligned with the following Data Management Guidance.

**Responsible NOAA Official:** For questions regarding this guidance and for verifying accessibility of data produced by funding recipients: Virginia Selz (virginia.selz@noaa.gov, 301-734-1265)

**Data Accessibility:** COM requires that public access to grant/contract-produced data be enabled in one of the following ways:
- Funding recipients may submit data to NOAA National Centers for Environmental Information (NCEI), which will provide public access and permanent archiving13. Proposers seeking to utilize this option should contact NCEI in advance of submission (ncei.archive@noaa.gov).
- Data can be submitted to a public data repository appropriate to this scientific domain (describe in proposal).
- Funding recipients can establish their own data hosting capability (describe in proposal).

**Technical recommendations:** The Program is not offering specific technical guidance. Proposals are to describe their proposed approach. Use of open-standard formats and methods is encouraged.

**Resources:** Proposals are permitted to include the costs of data sharing or archiving in their budgets.

**General Guidelines for FY2020 COM competition proposal submission:** Principal Investigators submitting a proposal in response to this COM announcement are required to follow the Letters of Intent and Proposal preparation and submission guidelines described in the Climate Program Office FY2020 Federal Funding Opportunity announcement. Investigators are strongly encouraged to submit a Letter of Intent prior to developing and submitting a full proposal. Letters of Intent should be sent via email directly to the Competition Manager, Virginia Selz (virginia.selz@noaa.gov).

Administrative questions regarding the Federal Funding Opportunity (e.g. proposal formatting or submission guidelines) should be directed to Diane Brown (diane.brown@noaa.gov). Questions regarding details of the solicitation should be directed to Virginia Selz (virginia.selz@noaa.gov).

**Point of Contact**
**Virginia (Ginny) Selz, PhD**
Competition Manager, Climate Observations and Monitoring Program
Earth System Science Division

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13 NCEI supports the creation of adequate metadata and data transfer 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).