FY23 AC4 Program Information Sheet

Program Name

Atmospheric Chemistry, Carbon Cycle and Climate (AC4) Program

Program Mission

AC4 is a competitive research program that incorporates research on atmospheric chemistry and the carbon cycle. In collaboration with the NOAA Laboratories and the academic community, the AC4 program supports research to determine the processes governing atmospheric concentrations of trace gases and aerosols in the context of the Earth System. The program aims to contribute a process-level understanding of the Earth System through observation, modeling, analysis, and field studies to support the development and improvement of models, and to inform carbon and air pollution management efforts.

Focus for FY23

Methane across scales

Funding for FY23

Most proposals should budget for no more than $750K total over 3 years (and on average about $250K per year), unless substantial field work is being proposed.

Competition Information

Methane is a trace gas whose significance in the atmosphere spans many time and spatial scales. For example, it affects air quality via its contribution to ozone production, and climate as a greenhouse gas and short-lived climate pollutant or forcer (SLCP or SLCF). Methane is the second most important greenhouse gas directly emitted by human activities. Methane sources vary from small-scale leaks from household stoves, oil and gas production and abandoned wells, microbial activity in inland waters, Arctic permafrost thawing, through large-scale agriculture, and natural wetlands. Each of these is associated with uncertainties.

NOAA has a long history of methane measurements – global monitoring, extensive measurements of methane leakages in the oil and gas production basins across the United States, quantifying urban methane, among others.

Current Administration's[1] priorities direct various agencies to measure and reduce methane emissions from landfill emissions, abandoned/orphaned oil and gas wells and other sources. There is also a need for foundational science improvements to our understanding of methane processes, as well as provision of methane information for stakeholder decision support. The U.S. Methane Emissions Reduction Action Plan states, “The emphasis on improving U.S. methane (and other greenhouse gases) measurement and monitoring efforts, for example, will facilitate more accurate global tracking of methane emissions around the world.” The urgency is

growing rapidly as global methane concentrations in 2021 rose to the highest level of NOAA's decades' long record, continuing the increasing trend.

While there are many needs for improved quantification and understanding of methane emissions and processes, AC4 solicitation aims to primarily build on NOAA strengths in fundamental understanding of carbon cycling, long-term monitoring of greenhouse gases and previous investments in urban measurements.

In FY23, the AC4 program invites proposals focused on one or more of the following:

- Explaining the trends and underlying drivers of those trends in global and regional methane concentrations
- Improvements in process modeling of methane at a regional and global scale
- Quantification of urban methane across the U.S., including through collaboration with local communities
- Understanding Arctic methane, particularly in the larger context of carbon cycling and climate-driven feedbacks
- Demonstration of utility of current and potential future measurements to support monitoring, reporting and verification of emissions and, importantly, changes in emissions over time

Collaboration with NOAA scientists is encouraged, particularly when using NOAA datasets or satellite data that can be entrained with NOAA models. This announcement is an opportunity for deploying instruments to NOAA's newly constructed Barrow Observatory facilities or other NOAA assets. Observing system design through Observation System Simulation Experiments (OSSEs) or prototype observation system development to improve future observing capabilities, especially for monitoring, reporting and verification, are welcome.

Contact:
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Data Archiving
Data Accessibility: The AC4 Program requires that public access to grant/contract-produced data be enabled in the following way: Funding recipients will establish their own data hosting capability (describe in proposal) Technical recommendations: There is no specific technical guidance; however, 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.

[1]: https://www.whitehouse.gov/wp-content/uploads/2021/11/US-Methane-Emissions-Reduction-Action-Plan-1.pdf