

# FY25 AC4 Program Information Sheet: Urban Atmosphere and the Impacts of Climate and Air Quality Mitigation Strategies

## Program Name

Atmospheric Chemistry, Carbon Cycle and Climate (AC4) Program

## Program Mission

AC4 is a competitive research program, managed as 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 <https://cpo.noaa.gov/ac4>). Focussed on atmospheric chemistry and the carbon cycle, AC4 collaborates with NOAA Laboratories and the academic community to support research that investigates 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 FY25

**Urban Atmosphere and the Impacts of Climate and Air Quality Mitigation Strategies**

## Funding for FY25

Proposals should budget for no more than \$750K total over 3 years.

## Competition Information

Cities are striving towards carbon neutrality in 2050. Over the past decade, many have developed ambitious climate action plans aimed at reducing greenhouse gas emissions (for example, the [2019 City of Boston Climate Action plan](#)) and improving air quality (for example, the [2015 City of San Diego Climate Action Plan](#)). Meanwhile, various city-level measurement efforts point to remaining air quality challenges at a hyper-local scale, including air quality issues that are expected to worsen with climate change (including through extreme heat or increasing wildfire influence). As a result, the connections between climate change and air quality, including environmental justice issues, as well as the co-benefits from more holistic mitigation strategies, need to be explored. NOAA has been encouraged through its recent [Science Advisory Board report](#) to continue exploring the air quality and climate connection.

While scientists have been working to understand urban atmospheric composition across all timescales - from the shortest-lived air pollutants to long-lived greenhouse gases (GHG), a recent increase in measurements offers an opportunity to address these topics more thoroughly and with more coordination between carbon and chemistry communities. NOAA scientists and collaborators have been involved in many ground-based and airborne efforts in

measuring urban air composition across the U.S., for example [FAST-LVOS](#), [AEROMMA](#), [USOS](#), as well as using satellite data in preparation for [GeoXO's ACX](#).

With many climate action plans to reduce GHG emissions in place for a few years now, there might also be an opportunity for atmospheric measurements and modeling-based verification of the efficacy of such actions, thus affirming whether progress has been made on emissions reductions and how (e.g. through which sources). New measurements at all scales - satellite remote sensing (e.g. from TEMPO instrument), ongoing research-grade monitoring efforts and low-cost sensors - could also be employed to address environmental justice concerns more broadly.

To further both the understanding of urban atmospheric composition, including the effects of city-level actions to reduce greenhouse gas emissions and improve air quality, and the effects of climate change on atmospheric composition, in FY25, AC4 solicits proposals focused on the following priorities:

- Prototypes of urban GHG and air quality monitoring to evaluate the impact of climate action plans and other mitigation actions, including streamlining and coordination of ongoing efforts
- Quantifying sources and sinks of urban trace gases and aerosols, especially ammonia (NH<sub>3</sub>), methane (CH<sub>4</sub>) and Secondary Organic Aerosols (SOA)
- Improved understanding of compounding effects of heat, fire and other hazards on air quality and GHG concentrations
- Data analysis and modeling of urban measurements associated with NOAA field campaigns, e.g. [AEROMMA](#)
- Understanding interactions between boundary layer processes, and trace gas and aerosol chemistry and transport
- Measurements from various observing platforms and modeling that help validate and show the utility of satellite data in urban areas
- Urban monitoring in collaboration with local communities at increased risk of health impacts due to poor air quality, especially those identified in EPA's [EJScreen](#) tool
- Understanding urban vegetation's role in urban air composition, including its changes with changing climate
- Urban-relevant measurements that are aligned with NOAA's [AiRMAPS](#) field campaign

Principal investigators (PIs) are encouraged, as appropriate, to include local stakeholders and decision makers who could either partner in the execution of the project or would directly benefit from the project outcomes, e.g. through more informed mitigation action. Support for community involvement is possible as well. Each proposal should budget for travel to an in-person stakeholder workshop in year 3 of the project.

Data analysis, data collection and (limited regional) modeling (including Machine Learning and AI) can be supported through this competition. PIs planning to join the NOAA-led [AiRMAPS](#) field campaign, must submit a support letter from the NOAA Chemical Sciences Laboratory at the time of their proposal. For those planning to collaborate with other relevant NOAA scientists (e.g. from Air Resources Laboratory) support letters are encouraged but not required.

Connections to other CPO-funded projects featuring community engagement are welcome.

**Contact:**

Competition managers: Monika Kopacz ([monika.kopacz@noaa.gov](mailto:monika.kopacz@noaa.gov), 301-734-1208), Shiv Das ([shiv.das@noaa.gov](mailto:shiv.das@noaa.gov), 302-564-9570)

**General Guidelines for FY 2025 AC4 proposal submission:**

- Investigators are strongly encouraged to submit an LOI using the FY25 AC4 [Letter of Intent submission form](#). Investigators unable to submit via the (Google) form should email their LOI to [oar.cpo.ac4@noaa.gov](mailto:oar.cpo.ac4@noaa.gov).
- Investigators are strongly encouraged to attend an information webinar that will cover new submission requirements and guidelines (see [AC4 website](#) for details).

**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.