

**Atmospheric Chemistry, Carbon Cycle, and Climate (AC4):  
Observational Constraints on Sources and Sinks of Aerosols and Greenhouse Gases  
FY 2014 Information Sheet**

At the core of climate forcing calculations are accurate estimates of greenhouse gases and aerosols. Source and sink processes equally control their atmospheric concentrations and are instrumental in climate change and its mitigation. Meanwhile, estimates of both anthropogenic and natural emissions, such as those of biogenic aerosol precursors, remain uncertain. Recent increases in emissions from oil and gas extraction are becoming significant, and additional observations are needed to improve emission inventories for this source sector. Moreover, deposition processes, while equally important, are not adequately studied or constrained. NOAA has conducted several field campaigns to study regions critical in addressing source-sink uncertainties (e.g. CalNex, INFLUX, SENEX). In particular, the SENEX field campaign, conducted in the Southeast U.S. in 2013, has among its research objectives to (1) assess the decrease in emissions of several pollutants in the last decade, (2) constrain anthropogenic and biogenic emissions in the region of highest biogenic emissions in the country, (3) determine which deposition processes are critical for determining atmospheric concentrations of aerosols and greenhouse gases, and (4) measure emissions from oil and gas extraction. These and complementary measurements, along with targeted analysis and modeling, can help improve both the emission inventories and our understanding of factors controlling climate change. Measurements of emissions from oil and gas extraction can also inform future energy choices.

In FY 2014, Atmospheric Chemistry, Carbon Cycle, and Climate (AC4) will focus on research that aims to put observational constraints on sources and/or sinks of greenhouse gases and aerosols. Particularly encouraged are proposals focused on quantifying one or more of the following:

1. Greenhouse gas emissions from oil and gas extraction
2. Emissions of aerosols, greenhouse gases, and their precursors in the Southeast region of US, with a potential connection to similar anthropogenic-biogenic emission intense regions
3. Deposition processes controlling atmospheric concentrations of aerosols and greenhouse gases

Projects that quantify sources and sinks via new measurements and/or modeling and analysis of existing NOAA and related data (particularly the Southeast Atmosphere Study) are encouraged.

**Program Contact information:**

Earth System Science (ESS) Program Lead:

James Todd (james.todd@noaa.gov, 301-734-1258)

For additional program announcement information, investigators should contact the following AC4 Competition Managers:

Monika Kopacz (Monika.Kopacz@noaa.gov, 301-734-1208)  
Kenneth Mooney (Kenneth.Mooney@noaa.gov, 301-734-1242)

Letters of Intent should be submitted directly to the Competition Managers of the competition of interest.