ATS/CIRA Colloquium

Christina Williamson

Visiting ATS from the NOAA Earth System Research Laboratory, Boulder and the Cooperative Institute for Research in Environmental Sciences

In-Situ Measurements of the Global Distribution of Aerosol Particles

Hosted by Jeff Pierce

Friday, Nov. 17, 2017

ATS room 101
Discussion will begin at 11:15 a.m.
Refreshments will be served at 10:45 a.m. in the weather lab

Atmospheric aerosols affect climate by direct scattering of solar radiation and by altering cloud properties. Current uncertainties in anthropogenic aerosol forcing are one of the largest factors in total uncertainties in predicting climate change. In situ measurements of the properties, origins and climatic relevance of aerosols are needed to constrain global climate models, validate satellite measurements and better understand aerosol sources and processing in the atmosphere. In-situ measurements of aerosol in the remote free troposphere have hitherto been particularly sparse.

The Atmospheric Tomography Mission (ATom) is a unique set of measurements characterizing the remote free troposphere. ATom uses the NASA DC-8 as a flying lab, equipped with gas phase and aerosol measurements, flying over both Pacific and Atlantic Ocean basins, with near pole-to-pole coverage, constantly scanning between 0.2 and 13km altitude. Measurements are conducted in all four seasons to capture seasonal variations. So far three out of four deployments have been completed.

We describe the measurement of aerosol size distributions from 3 to 3000nm diameter on ATom, and how these measurements inform our understanding of transport of aerosol from primary emissions (e.g. biomass burning, desert dust, sea salt) to the remote atmosphere, the formation of particles by nucleation from the gas phase and mechanisms by which these particles influence climate. We compare our data from ATom with the GEOS-Chem global chemical-transport model (www.geos-chem.org) with online TOMAS aerosol microphysics.

Link to colloquia page: https://www.atmos.colostate.edu/colloquia/