Aircraft Field Experiments

The Atmospheric Chemistry and Dynamics Branch provides stratospheric meteorological support for certain high-altitude aircraft missions.

It is one thing to observe changes in the earth's ozone layer; a number of satellite and ground-based instruments have done so over the years. But to explain why those changes occur requires detailed measurements of many other chemical species besides ozone. Atmospheric scientists compare these measurements to the predictions of theories; they can then discard those theories which fail to predict the measured chemical concentrations and keep those theories which succeed. Flying specially instrumented aircraft into the regions of interest has proven to be an excellent way to obtain these measurements.

Aircraft missions dealing with the ozone layer are staged by NASA, using the resources of several NASA centers in conjunction with the National Oceanic and Atmospheric Administration (NOAA) and various universities. They are run as field experiments using NASA Ames Research Center aircraft, such as the ER-2 high-altitude research aircraft and the DC-8 flying laboratory equipped with special instruments to look into the stratosphere.

The Atmospheric Chemistry and Dynamics Branch here at NASA GSFC has participated in these missions:

Past Missions:

- *Airborne Antarctic Ozone Experiment (AAOE)*
- *Airborne Arctic Stratospheric Expedition (AASE)*
- *Airborne Arctic Stratospheric Expedition II (AASE II)*
- *Stratospheric measurements of Photochemistry, Aerosols, and Dynamics Experiment (SPADE)*
- *Airborne Southern Hemisphere Ozone Experiment/Measurements for Assessing the Effects of Stratospheric Aircraft (ASHOE/MAESA)*
- *Tropical Ozone Transport Experiment/Vortex Ozone Transport Experiment (TOTE/VOTE)*
- *Stratospheric Tracers of Atmospheric Transport (STRAT)*
- *Photochemistry of Ozone Loss in the Arctic Region in Summer (POLARIS)*
- *SASS Ozone and Nitrogen Experiment (SONEX)*

- ***Atmospheric Chemistry of Combustion Emissions Near the Tropopause (ACCENT)***
- ***SAGE III Ozone Loss and Validation Experiment (SOLVE) Homepage***

Current and Future Missions

- ***Cirrus Regional Study of Tropical Anvils and Cirrus Layers - Florida Area Cirrus Experiment (CRYSTAL-FACE) Homepage***

(Photos and video from these missions are accessible from their individual pages.)

What does our branch do on these missions? We provide data from the National Meteorological Center's Climate Analysis Center, as well as from the Goddard Data Assimilation Office to provide mission scientists with the stratospheric context in which flights are to be flown.

In addition, we provide a flight proposer program, which allows flight paths for the aircraft to be designed interactively to take best advantage of the current meteorological situation (i.e., to fly through "interesting" air).

We also provide exchange files of our meteorological analyses to the other investigators in the mission.

And, finally, we join the other mission participants in analyzing the data gathered during these missions, publishing our results in the scientific literature.

Back to the Code 916 Public page

Last Updated: 2002-05-01
Web Curator: Leslie R. Lait (SSAI) (lrlait@ertel.gsfc.nasa.gov)
Responsible NASA organization/official: Dr. P. K. Bhartia, Atmospheric Chemistry and Dynamics Branch/Head