



Measuring Solar Spectral Irradiance during the 2006 Gulf of Mexico Atmospheric Composition and Climate Study

During the 2006 Gulf of Mexico Atmospheric Composition and Climate Study (GoMACCS) field campaign the Solar Spectral Flux Radiometer (SSFR) team from NASA Ames Research Center and the University of Colorado deployed a SSFR system on the CIRPAS Twin Otter to measure the spectrally resolved net solar irradiance over Texas and the Gulf of Mexico. A second SSFR system was also deployed on the NOAA Ship *Ron Brown* to measure the solar spectral irradiance and radiance at the surface.



GoMACCS was a NOAA-led multi-institutional intensive field program to characterize marine/continental chemical and meteorological processes to improve the simulation of the radiative forcing of climate change by lower-atmosphere ozone and aerosols. In addition to clear-sky radiative effects, GoMACCS also investigated the influence of aerosols on cloud properties and the role of clouds in chemical transformation.



CIRPAS Twin Otter

The Solar Spectral Flux Radiometer is a moderate resolution flux (irradiance) spectrometer covering the wavelength range from 300 to 2200 nm.

The SSFR team uses the radiometric observations to:

- quantify the solar spectral radiative energy budget in regions under the influence of industrial/urban pollutants;
- determine the solar spectral absorption in atmospheric layers;
- relate our findings to the chemical and physical properties of the aerosols;
- compare findings to other in situ and remote sensing methods of measuring absorption;
- aid in quantifying the effect of aerosols on cloud radiative properties by retrieving cloud effective radius and cloud water path from the spectral measurements and by identifying aerosol influence on cloud spectral reflectance.



NOAA Ship Ron Brown

The long-term goal of this research is to improve our knowledge of aerosol radiative processes and their influence on climate and to facilitate the remote sensing of aerosol radiative properties from space to achieve global coverage.

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Zenith light collector



CIRPAS Twin Otter



Nadir light collector



SSFR system

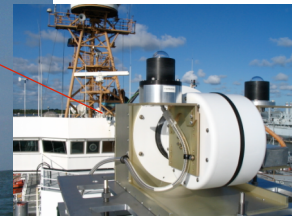
The CIRPAS Twin Otter SSFR system measured upwelling and downwelling solar spectral irradiance above and below aerosol layers and above cloud systems. It was operational during 22 flights from 21 Aug 2006 to 15 Sep 2006. It acquired a total of 405,100 spectra (856 Mbytes) from these flights.



SSFR system



NOAA ship Ron Brown



Light collectors on the stabilizing system

The *Ron Brown* SSFR system measured downwelling solar spectral irradiance and radiance. This system was implemented with a stabilizing system to constantly maintain the two light collectors in the vertical pointing orientation to within +/- 1 degree. The SSFR system operated successfully from 2 Aug 2006 to 11 Sep 2006. It operated from early morning to almost sunset. It acquired close to 1.5 million spectra (3.2 Gbytes) from the cruise.

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