

Final Report: DE-AI02-04ER63766**PI: Peter Pilewskie, NASA Ames Research Center**

During the 1-year duration of this project a new Shortwave Spectrometer (SWS) was designed and developed for deployment at the Southern Great Plains Central Facility to measure zenith solar spectral radiance. The SWS is comprised of two Zeiss miniature monolithic spectrometers (MMS-1 and MMS-NIR) for visible and near-infrared detection in the wavelength range between 350 and 2250 nm. Spectral resolution is 8 nm for the MMS-1 and 12 nm for the MMS-NIR. The light collector is a narrow field of view ($\pm 1.5^\circ$) collimator at the front end of a high-grade custom-made fiber optic bundle. The data acquisition and control system is a 933 MHz Pentium based PC in a PC104 format with a USB interface between the computer and the spectrometers. Spectral sampling rate is approximately 1 Hz.

A prototype SWS was deployed at SGP in November and December 2004 and it collected zenith-sky solar spectra at 1 Hz continuously over a 29 day period. Prior to deployment it was calibrated and characterized at the NASA Ames Airborne Sensor Facility (ASF) using a 30 inch Integrating Sphere. The SWS was also calibrated using a portable 12 inch integrating sphere at the Central Facility. The testing and calibration procedures were developed during this implementation. The planning and scheduling for permanent installation of the new SWS as well as data processing, calibration, archiving, and distribution was conducted.

Presentations

Pommier, J., P. Pilewskie, and W. Gore, A new Shortwave Spectrometer for SGP, DOE ARM Science Team Meeting, Daytona Beach, FL, March 2005.

Harder, J., J. Fontenla, G. Kopp, G. Rottman, E. Richard, and P. Pilewskie, Measuring Solar Irradiance from Space: The SOLar Radiation and Climate Experiment, DOE ARM Science Team Meeting, Daytona Beach, FL, March 2005.

Pilewskie, P., Overview of the Radiation Budget in the Lower Atmosphere, Earth's Radiative Energy Budget Related to SORCE, San Juan Islands, Washington, September 20-22, 2006

Pilewskie, P., J. Harder and J. M. Fontenla, A new solar irradiance reference spectrum, 12th Conference on Atmospheric Radiation, Madison, WI, July 10-14, 2006.

O. Hofmann, P. Pilewskie, B. Kindel, W. Gore, P. Russell, J. Livingston, J. Redemann, R. Bergstrom, S. Platnick, J. Daniel, and T. Garrett, Cloud Properties Derived from Visible and Near Infrared Reflectance in the Presence of Aerosols

Pilewskie, P., J. Harder and J. M. Fontenla, A new solar irradiance reference spectrum, Proceedings of the Sixteenth Atmospheric Radiation Measurement (ARM) Science Team Meeting, Albuquerque, New Mexico, March, 2006