

Arm Fourier-Transform-Spectrometer Data-Analysis Tools

Smith, William L.
University of Wisconsin
1225 W. Dayton Street
Cooperative Institute for Meteorological
Satellite Studies (CIMSS)
University of Wisconsin

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1225 W. Dayton Street
Madison, WI 53706

KEYWORDS:

OBJECTIVE: To develop and test radiative-transfer models through the analysis of the spectral-radiance and solar-absorption data.

APPROACH: radiative-transfer algorithms will be developed and tested to derive atmospheric-state parameters from FTIR observations. Through the comparison of FTIR observations and theoretical calculations (with the use of FASCODE and the HITRAN data base), techniques will be developed for inferring atmospheric temperature and moisture profiles, trace-gas information, and cloud radiative properties from data acquired with the AERI, AERI-X, and SORTI.

RESULTS TO DATE: Data from the Atmospheric Emitted Radiance Interferometer (AERI) has been analyzed for the ARM Fourier Transform Data Analysis Tools science team project. The AERI data consists of observations of the downwelling infrared emission (0.5 cm^{-1} spectral resolution) at the surface from gaseous atmospheric constituents and from cloud and particulate aerosols over the spectral range from 500 to 3000 cm^{-1} . Observations from the Southern Great Plains CART site have been analyzed from an AERI prototype since March 1993.

These CART observations, combined with data collected during other field experiments, have been used to develop analysis techniques based on the infrared spectra. The science objectives of this data analysis include addressing issues in radiative transfer modeling, inferring cloud emissivity and reflectivity, modeling cloud microphysical properties, spectral classification, and the retrieval of boundary layer vertical profiles of atmospheric temperature and water.

DELIVERABLES: Data-analysis tools specifically tailored to retrieve various atmospheric parameters (including cloud optical properties) and temperature and moisture profiles from observational data.

COLLABORATIONS:

OTHER: