

## Spectral longwave radiance simulations using PCRTM and five years of CERES data

Fred G. Rose, SSAI, Hampton, VA; and S. Kato, X. Liu, D. P. Kratz, and X. Huang (U. of Michigan)

The principal component radiative transfer model PCRTM (Xu 2006) simulates spectral longwave radiance at a  $0.5\text{cm}^{-1}$  resolution over the wavelengths ( $50\text{--}2760\text{cm}^{-1}$ ) using 280 principal components. The CERES product SSF containing CERES field-of-view (FOV) cloud properties based on MODIS pixel information are used as inputs. NASA GMAO (Global Modeling and Assimilation Office) Geos-4 temperature and humidity profiles, as well as SMOBA (Stratosphere Monitoring Ozone Blended Analysis) ozone profiles allow computations for five years (Jan2001-Dec2006) of FOV nadir spectral radiance. The approximately twice daily FOV PCRTM simulations along with CERES broadband measurements are time-space averaged to  $10^\circ$  zonal monthly data. Analysis of monthly seasonal and deseasonalized interannual variability in terms of brightness temperature are presented. Comparison of interannual variability in the portions of the spectrum seen by the AIRS instrument are shown. Comparisons of spectral integrated PCRTM simulations to CERES broadband longwave radiance measurements are made. In order to study the sensitivity of the spatially and temporally averaged TOA spectrum to various atmospheric properties, we perturbed atmospheric and surface temperatures, humidity, cloud height, cloud fraction, and particle size. The sensitivity of the spectrum to these properties depends on region and seasons. Month to month variability of the longwave spectra to these perturbations is 10 to 20% of the global monthly mean perturbation response. In addition, it depends on time period and size of the area used for averaging spectra. In this poster, the magnitude of sensitivity variability and how the sensitivity changes depending on temporal and spatial scale of averaging will be discussed.

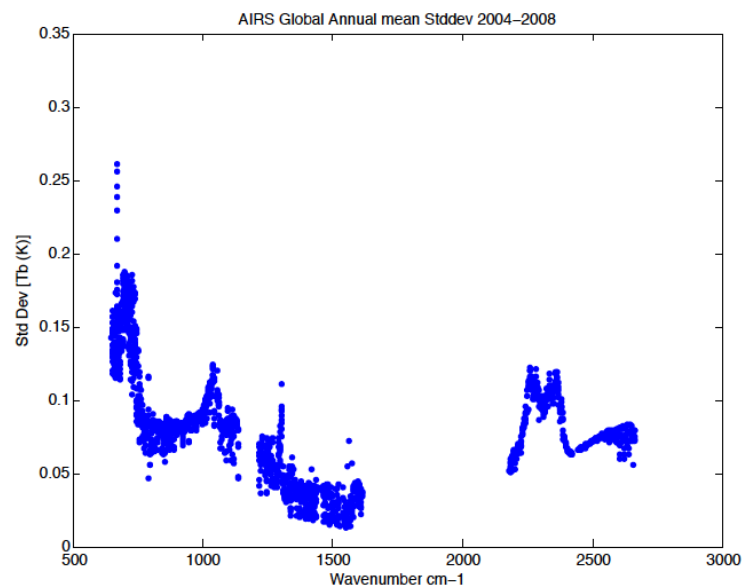


Figure1: Standard deviation of spectral radiances derived from AIRS data.