



Geophysical trends from 12+ years of AIRS radiance trends

Sergio DeSouza-Machado, Larrabee Strow, Andrew Tangborn, Chris Hepplewhite, Howard Motteler, Paul Schou, and Steve Buczowski

University of Maryland Baltimore County, Baltimore, United States

NASA's Atmospheric Infrared Sounder has daily been providing low noise, stable top-of-the atmosphere hyper-spectral radiances since 2002. Here we present analysis from 12 year linear radiance trends obtained from two AIRS radiance subsets : (1) clear-sky scenes over ocean and (2) all-sky scenes along the nadir track, which are used to retrieve a geophysical trends using an optimal estimation approach. The retrieved clear sky trends compare favorably with ERA and MERRA re-analysis trends, and in-situ trends for the minor gases. Analysis of all-sky trends show they agree better with ERA than either MERRA or the AIRS Level-2 retrievals. The radiance trends provide highly accurate measurements of atmospheric variability with easily understood error characteristics, unlike typical Level 2 retrievals. These approaches should provide highly accurate measurements of a variety of climate trends (temperature and humidity profiles, land surface temperature, cloud radiative forcing) as the AIRS (or AIRS + JPSS/CrIS + IASI) instrument time-series extends to 15+ years.