Aura-TES L2 Products: Beta Release Quality Description

TES L1B Product Status Summary for L2 Data Quality Description

At present, TES L1B data products have systematic errors that need to be resolved and/or mitigated. These errors are both target scene dependent and frequency dependent, especially across the 4 TES focal planes that measure different frequency ranges. The TES L1B nadir radiances have an estimated error of around 2% due to systematic errors. Comparisons between TES L1B radiance spectra and those from Aqua-AIRS show that they agree to less than 1K in brightness temperature.

A full description of the TES L1B data product quality is available.

TES L2 Product Status

The current TES L2 data products are considered a "beta" release as of July 6, 2005. The nadir products should be upgraded to "provisional" later in 2005.

The TES L2 nadir products have undergone an initial set of quality control and validation. The effort to validate the TES L2 products is in the process of being expanded and will provide more comprehensive comparisons in the near future. Improved nadir products and initial limb retrievals should be available late in 2005.

Currently, the TES L2 products that are ready for scientific use are the nadir retrievals of ozone, carbon monoxide, temperature and water **for ocean target scenes. Land scenes are reported but are not reliable due to a known processing issue that will be corrected in the next release.** In order to compare TES profile data with other measurements, vertical smoothing and sensitivity must be accounted for by applying the appropriate averaging kernels (such as those supplied with the TES data products). The error estimates included in the L2 data products are meaningful based on the current validation analysis. As a means of accounting for systematic errors in L1B radiances, current L2 profiles include the retrieval of a calibration scaling parameter.

TES Retrievals in the Presence of Clouds

We model radiance contributions of clouds using a frequency-dependent set of cloud optical depth parameters and a cloud height parameter. The cloud parameters are retrieved from TES spectral radiances jointly with surface temperature, emissivity, atmospheric temperature, and the trace gases. We have shown both theoretically and using simulated data that this approach is applicable to multiple scattering and heterogeneous cloud distributions, and is robust for low water clouds or high ice clouds over a wide range of optical depths.

TES Nadir Ozone Retrievals:

TES ozone profiles have been compared to both ozonesonde measurements and model results. These comparisons show a consistent bias toward larger ozone concentrations in the upper troposphere measured by TES even after applying the TES averaging kernels. The source of this systematic error is currently under investigation.

TES Nadir Temperature and Water Retrievals:

TES total column water vapor is 10% drier than AMSR-E and AIRS. Comparison of the water vapor profiles from TES and AIRS show that most of the difference in the column is accounted for by the 700-900mb layer.

Initial comparisons of AIRS and TES temperature profiles show that the temperature profiles agree to within 2K, The vertical structure of the difference between TES and AIRS profiles is consistent from day to day.

TES Carbon Monoxide Retrievals:

Initial comparisons have been carried out between TES carbon monoxide retrievals and that from Terra-MOPITT. The results show that for pressure layers where both instruments are most sensitive, the retrievals agree to within roughly 10%. Comparisons to the aircraft instruments show agreement within the estimated TES retrieval errors.