



Aura-TES L2 Products: Version 2 Quality Description

Version 2 of the TES L2 nadir data products (V002) is a significant improvement over the version 1 (V001) data. The version 2 TES L1B data products have been improved by resolving the systematic errors seen in previous the previous version. Based on our validation with AIRS and our L2 retrievals, we estimate our systematic errors to be less than 0.5 K in brightness temperature.

A full description of the [TES V002 L1B data product quality](#) is available.

TES L2 Product Status

The TES L2 nadir products have undergone extensive quality control and validation analyses. The validation results have shown that the V002 nadir data products for ozone, carbon monoxide, temperature and water are of sufficient quality to be used in scientific studies. TES methane products should not be used at this time.

TES V002 data products contain the first limb data retrievals for ozone, nitric acid and temperature. These data are a "beta" release with scientifically viable data only in the stratosphere. These data have undergone only preliminary validation analyses. A more extensively validated data set that will include upper tropospheric retrievals will be available in early 2007.

TES V002 L2 data products contain a master "flag" that allows for a determination of the quality of a given retrieval. The data products also contain extensive supplementary quality control information that allows a user to screen data using different criteria.

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.

More information on the quality control information and discussion of the proper way to use TES data is provided in the [TES Data User's Guide](#) (PDF).

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 ozonesonde and lidar measurements. The results of these comparisons show that the bias toward larger ozone concentrations in the upper troposphere seen in V001 data has been mostly resolved. TES V002 data compares well to other methods for profiling ozone in the troposphere. Work is currently underway to determine statistics on differences between TES observations and ozonesondes or lidar measurements.

TES Nadir Temperature and Water Retrievals:

Preliminary comparisons of TES V002 temperature data with sondes and aircraft measurements show improvements over V001. In particular the bias in upper troposphere with TES seeing higher temperatures has been mostly resolved. Further analysis with sonde, aircraft and AIRS data is currently underway.

A full validation analysis of the TES V002 water vapor retrievals is currently underway. In particular, a determination of the bias between TES water retrievals and data from aircraft and the AIRS instrument is being performed.

TES Carbon Monoxide Retrievals:

Comparisons have been carried out between TES V002 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%. Global CO patterns from TES show similar qualitative features as those seen by MOPITT.

Comparisons to the aircraft instruments show agreement within the estimated TES retrieval errors. Comparison of TES CO products to data from MOZAIC, MLS, ACE and the AIRS instrument are currently underway.

In early December 2005, an adjustment was made to the optical bench temperature that improved the quality of the TES CO product. Data taken after December 6, 2005 are of better precision and have better vertical resolution.

