

Characterization of Aura-TES (Tropospheric Emission Spectrometer) Nadir and Limb Retrievals

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Abstract

The TES Level 2 algorithm retrieves vertical profiles of atmospheric temperature and trace gases from radiometrically calibrated measured spectra. The retrieval is based on minimizing the difference between a measured spectrum and a model spectrum, which is calculated for the estimated atmospheric state. This minimization is subject to smoothness constraints imposed on the atmospheric profiles being retrieved and is applied iteratively using a non-linear least squares solver.

Algorithm descriptions and results from a “single orbit test” are presented. Simulations of the data acquired by TES along an orbit track (73 different target scenes) were generated in order to test the TES nadir and limb retrieval algorithms for different spatial and temporal (seasonal and day/night) regimes. Retrieval results, including error analysis and expected vertical resolution, are shown for both the nadir and limb viewing modes of TES.