

[7] **Aura SPACECRAFT** orbits at a height of 705 km, with an orbital period of 98.8 min. It is a Sun-synchronous, polar-orbiting satellite, crossing the equator at 1345 local time on its ascending node [Levelt et al., 2006; Waters et al., 2006]. The Ozone Monitoring Instrument (**OMI INSTRUMENT**) was designed to measure ozone and other trace gases, with a small footprint and daily global coverage. **OMI INSTRUMENT** 's nadir pointing telescope has a 13 km by 28 km footprint, and swath width of each scan is 2600 km [Levelt et al., 2006]. Data examined in this study use the Total Ozone Mapping Spectrometer (TOMSv8) retrieval algorithm. On average, the OMI-TOMS (hereafter referred to as **OMI INSTRUMENT**) retrievals of total column ozone agree better than 1% [McPeters et al., 2008; Balis et al., 2007] with ground-based Brewer and Dobson spectrometers.

[8] The **Microwave Limb Sounder INSTRUMENT** (**MLS INSTRUMENT**) scans in the plane of orbital motion, retrieving individual profiles every 165 km along its track. The vertical resolution is 3 km, and approximate horizontal resolution is 300 km in the upper troposphere/lower stratosphere (UT/LS) region. Precision ranges from 20% at the 215 hPa level to 3–5% in the stratosphere [Froidevaux et al., 2008; Boyd et al., 2007]. Of the methods described in Table 1, we consider two products that use data from **OMI INSTRUMENT** and **MLS INSTRUMENT** .

2.1.2. Aura-Derived Troposphere Products

[9] The first product examined is the Trajectory-enhanced Tropospheric Ozone Residual (TTOR). The version (1.6) of the TTOR product used in this study uses 2-day isentropic backward and forward trajectories from GEOS-4 [Bloom et al., 2005] to map **MLS INSTRUMENT** measurements over the Earth's surface, followed by interpolation of these values to a 1.25° — 1° grid. This differs from the version described by Schoeberl et al. [2007], which used 6 day isentropic forward

trajectories. Stratospheric column ozone is calculated from the mapped and interpolated **MLS INSTRUMENT** measurements, and then is subtracted from interpolated **OMI INSTRUMENT** total column ozone. The results of this calculation are daily global estimates of tropospheric ozone.