Measuring Tropospheric Ozone with MLS and OMI

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Maps of tropospheric column ozone during the month of largest amounts in the Northern Hemisphere (July) and Southern Hemisphere (October).

Where does all this tropospheric ozone in mid-latitudes come from?

Answer: STE, lightning, pollution, and biomass burning.
Hohenpeissenberg 47.8,11.0  NMIN=3

OMI/MLS Minus Sonde = -1.8 DU

Diff RMS = 3.63 DU

Nairobi -1.3,36.8  NMIN=3

OMI/MLS Minus Sonde = 0.52 DU

Diff RMS = 2.03 DU

Samoa -14.2,170.5  NMIN=3

OMI/MLS Minus Sonde = -0.84 DU

Diff RMS = 2.24 DU
Comparisons to OMPS Nadir Mapper-Limb Profiler Tropospheric Ozone
OMPS NM-LP: Tropospheric Ozone Anomalies During the 2015-2016 El Nino

OMPS NM-LP

OMI - MLS
A significant trend!
3 or 4 Possibilities:

1) OMI is drifting and/or
2) MLS is drifting

OR

The change is real
On cloud-off cloud method
OMI Minus MLS  Deseas SCO  15S-15N, 120W-120E

Stratospheric columns

< 1 DU/decade

Dobson Units

Year


< 1 DU/decade
So we believe the trend is predominately real.

OMI is drifting by a small amount

Work in progress

(work will be corrected in V9 processing)

What do we have to offer the climate community?

- 60N-60S tropospheric ozone maps (weekly/monthly)
- 25N-25S tropospheric ozone maps (daily)
- Long-term tropospheric ozone trends
  2004-present with MLS/OMI and 1979-2003 with cloud slicing method (on-cloud/off-cloud) from mappers for 15N-15S only.
- Will use OMPS when AURA ends
DATA: First and last 5-year periods from October 2004 through May 2016

- Good agreement
- Very small mean offset of ~2 DU
- No measurable drift
Deseasonalized Column Ozone

- OMI/MLS Tropo Column Ozone
- GMI CTM Tropo Column Ozone (fixed emissions)

Year:

Dobson Units:
-3 -2 -1 0 1 2 3