



Trend Quality Ozone from the Version 2 Processing of OMPS Nadir Mapper and Nadir Profiler Data



by
Richard McPeters¹, and Colin Seftor²
1) NASA GSFC, and 2) Science Systems Applications Inc.

OMPS Ozone Mapper Profiler Suite

OMPS consists of 3 instruments:
1) NM – Nadir Mapper (similar to TOMS & OMI)
2) NP – Nadir Profiler (similar to SBUV)
3) LP – Limb Profiler measures ozone profile via light scattered from the Earth's limb

Abstract. The version 2 reprocessing of data from the two OMPS nadir ozone instruments on Suomi NPP, the nadir mapper and the nadir profiler, has produced accurate, high quality ozone consistent with data in our long term Merged Ozone Data (MOD) record. Instrument and calibration artifacts have been corrected in this processing and a calibration consistent with the SBUV v8.6 processing has been applied. Total column ozone from the OMPS nadir mapper is very consistent with ozone from the NOAA 19 SBUV/2 with a near zero offset. Total column ozone data from the OMPS nadir profiler now agree with data from the SBUV/2 instrument on NOAA 19 to better than 1%. The ozone profiles agree mostly to within 5% throughout the stratosphere.

OMPS Total Column Ozone Comparisons

Version 1 versus Version 2

NPP OMPS nadir mapper

For 60°S - 60°N average ozone from the OMPS mapper the average bias was reduced to -0.84% bias in the version 2 processing. There is a very small time dependent change relative to the MOD long term data.

NPP OMPS nadir profiler

A similar plot for the OMPS nadir profiler shows the large bias in the released v1 data is reduced to half a percent in the v2 processing.

Conclusions

- Mapper and profiler total column ozone bias relative to MOD / NOAA 19 less than one percent
- No significant long term time dependent change for nadir mapper or profiler
- Ozone profiles mostly within $\pm 5\%$ of NOAA 19 profiles
- No significant latitude dependence (less than 1%)

The OMPS Version 2 Processing

- refined "hard" calibration
 - found error in pre-launch calibration near 300 nm
- new soft calibration (use ice reflectivity to set long wavelength calibration)
- improved scattered light correction
- revised L1b product
- revised L2 product using v8.6 algorithm
 - uses Brion / Daumont / Malicet ozone cross sections

MOD Ozone: Reference for Comparison

Merged Ozone Data: monthly-mean zonal ozone time series was constructed by merging individual v8.6 SBUV & SBUV/2 data sets

Latitude Dependence

In version 2 the average latitude dependence (September, 2012-2015) is small relative to MOD.

OMPS Ozone Profile Comparisons

OMPS Ozone Anomaly

The nadir profiler ozone anomaly (% difference from NOAA 19 SBUV/2) shows little change over 4 years of overlap. OMPS profiles are systematically a bit higher in the upper stratosphere and a bit lower in the lower stratosphere (see profile plot at left).