OMPS Nadir Ozone Profile Release, Provisional Data Quality
Recommended Cautions for Data Users
Last Updated 4/8/2013

The JPSS Algorithm Engineering Review Board has reviewed the OMPS Nadir Profiler Ozone Profile Data Record product (OMPS-NP-IP/IMOPO) and set the Data Quality attribute to Provisional as of March 1st, 2013. Provisional quality is defined as:
- The product quality may not be optimal.
- Incremental product improvements are still occurring.
- The general research community is encouraged to participate in QA and validation of products but need to be aware that product validation and QA are ongoing.
- Users are urged to consult the EDR product status document prior to the use of the data in publications.
- The product is ready for operational evaluation

Because of inter-channel calibration inaccuracies, many error flag conditions are currently met. The recommendation is that all non-fill ozone values in INCTO except the following flagged cases may be used for Provisional evaluation purposes:
1. SAA Flags 1-8 and
2. Eclipse Flag set to 1.
3. Quality Flag set to 20

The Board recommends that users be aware of certain specific data product characteristics. The product caveats for OMPS Nadir Profiler Ozone Profile product at this time are:
1. Day One Solar needs a definitive spectrum. (Preliminary update in August 2012 – DR #4797, #CCR 0458)
2. Profile and total ozone error flags are switched in the output. (Parent PCR 27740 – Expected correction mid-2013 in Mx7.0)
3. Snow/Ice data is all zeroes (DR #4802)
4. Error Flags are incorrectly set to 20 (bad input) and no retrievals are made for all terrain pressures greater than 1.001 atmospheres. (DR #4860 CCR #595 reset this to > 1.07 atmospheres; corrected starting with Mx6.6 on 2/28/2013). Since the Provisional release starts with Mx6.6 on March 1, 2013, this is only an issue for the earlier, Beta release portion of the record.
5. Radiance Coefficients are for stray light corrected data but a correction has not been implemented. Correction subroutine and definitive estimates of coefficients are under development (DR #4823). We hope to implement this correction in Mx8.0.
6. Wavelength Scale and adjustments need to be included. Working on definitive Day 1 and adjustments for intra-orbit scale drift
7. The 252 nm channel is not currently used in the retrieval algorithm. While this channel is normally used for operational product because it provides ozone profile information at the top of the atmosphere, its use can be problematic as it is also the most sensitive channel for stray light and instrument throughput degradation. We are proceeding with a study of when the measurement quality is good enough to turn this channel on in DR #7013.
8. The OMPS NM and NP SDR processing was designed to automatically generate updates to the dark current estimates. We have begun providing weekly updates to the characterizations from direct analysis by a human-in-the-loop as of February 14, 2013 (with

CCR #839). This is being done in a less timely manner than originally planned – with weekly updates arriving in the system four to eight days after measurements are made. Since the dark current is changing, this will introduce minor inaccuracies.

Further as the ozone products are derived from the OMPS SDR products, the Board recommends that users be aware of certain specific data product characteristics. The product caveats for OMPS Nadir Mapper and Nadir Profiler SDR products at this time are:

1. The OMPS NM and NP SDR processing was designed to automatically generate dark current estimates. We have begun providing weekly updates to the characterizations from direct analysis by a human-in-the-loop as of February 14, 2013. This is being done in a less timely manner than originally planned – with weekly updates arriving in the system four to eight days after measurements are made. Since the dark current is changing, this will introduce minor inaccuracies.

2. The Solar spectra originally provided in the OMPS NM and NP Earth View SDRs are synthetic proxies created from high-resolution reference solar spectra convolved with prelaunch bandpass measurements. The OMPS NM solar spectra were replaced with on-orbit OMPS-measured spectra, from preliminary analysis, on June 11, 2012; DR #4616 - CCR #411. The OMPS NP solar spectrum was replaced with on-orbit OMPS-measured spectra, from preliminary analysis, on July 17, 2012 time frame; DR #4797 -CCR #458.. More accurate Day One solar spectra will be provided at a later date.

3. The wavelength scale for the OMPS NM and NP for both Earth and Solar spectra were based on pre-launch measurements. After studying spectral features (e.g., Fraunhofer lines) to verify/characterize the on-orbit behavior adjustments to the wavelength scales at the Ångstrom level were implemented. These took place on May 7, 2012; CCR #389 - DR # 4686.

4. While the OMPS NP South Atlantic Anomaly (SAA) flag is working well in identifying regions with higher frequency of charged particles, the system was designed to use a set of dark current corrections covering the range of SAA-effect exposure expressed as a percent. We now believe that the global dark corrections will perform well and are switching to use them everywhere. This change will enter the system in mid-2013. Before then, data flagged at 20% effects for the SAA will have poor dark corrections applied. Other SAA conditions already use the global dark corrections.

5. Out-of-band stray light is present in the OMPS NP measurements at the units percent level. The stray light was characterized on the ground. We are designing and testing stray light corrections with the in-orbit data for implementation under Mx8.0 in DR #4823.

6. The CCD smear corrections can be affected by charged particles. This has been observed to create a bias, albeit infrequently, in the smear corrections for an individual row. We are developing corrections and screening to handle this complication under DR 4615.

7. The non-linearity corrections for both the OMPS NP and OMPS NM used in the SDR processing are derived from the prelaunch characterization. In-orbit measurements show negligible changes, so updates to these tables are low priority.

8. OMPS NM SDR product dimensions allow for a future change in the horizontal resolution to much smaller FOVs. Most of the parameters in an HDF granule have spatial dimensions of 105 cross-track by 15 along-track. Currently, with the nadir FOV size set at 50×50 KM^2, only the first 35 cross-track by 5 along-track cells are used to store actual measurements, so eight ninths of the values will be zeros or fill values for a normal case. The OMPS NP SDR products allow for a future change in the horizontal resolution as well, from one 250×250 KM^2 FOV to twenty-five 50×50KM^2 FOVs. Currently only the first cross-track by first along-track cell contains an actual measurement, so twenty-four twenty-fifths of the cells contain zeroes or fill values.

9. The NP ascending/descending flag in error – The current flag is a place holder and flags ascending orbit as descending. The changes to correct this situation are in development under DR #5046 with an expected implementation in Mx8.0.

DR – Discrepancy Report
CCR – Configuration Control Request

Timeline of major changes in OMPS Nadir Products
• Problem with wavelength scale in NM February 212
• Problem with wavelength scale in NP February 2012 (DOY error) Data are not at CLASS.
• May 7, 2012 – New OMPS NM and OMPS NP Wavelength Scales CCR #389
• June 11, 2012 – New OMPS NM Day 1 Solar Irradiance CCR #411
• July 17, 2012 – New OMPS NP Day 1 Solar Irradiance CCR #458
• August 10, 2012 – New NM RT LUT CCR #343 (Mx6.1)
• August 10, 2012 – CTP to UV for INCTO CCR #385 (Mx6.2)
• October 15, 2012 – OMPS NM E/S distance CCR #481 (Mx6.3)
• October 15, 2012 – Partial cloud and VIIRS CF CCR #419 (Mx6.3)
• TLE in use for Ephemeris Mx6.3 – Mx6.4
• Updates to VIIRS Snow/Ice Tiles xxx
• February 2013 – IMOPO Surface Pressure limit too restrictive CCR #595 (Mx6.6)
Future
• June 2013 – CTP for OOTCO CCR #736 (Mx7.0)
• June 2013 – Profile and TOZ flags switched in IMOPO PCR (Mx7.0)