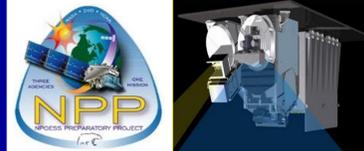




ON THE PROVISIONAL S-NPP OZONE MAPPING AND PROFILER SUITE PERFORMANCE

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INTRODUCTION

The Ozone Mapping Profiler Suite (OMPS) was launched aboard the Suomi National Polar-orbiting Partnership (S-NPP) spacecraft on October 28, 2011. A successful thorough Early Orbit Checkout (EOC) and the current Intensive Calibration and Validation enabled the provisional SDR mature level. Our results demonstrate that the OMPS orbital characterizations of detector performance show that the sensors' electronic bias, detector gain, dark smear, dark current rate, and linearity remain within 0.2% of the prelaunch values with significant margin below sensor requirements. Sensor signal-to-noise ratio meets the system requirement. Detector gain and bias performance trends are generally stable. System linearity performance exhibits excellent stability and is highly consistent with the prelaunch values.

PROVISIONAL SDR PERFORMANCE

Requirement Summary	Specification/predicted Value	Orbit Performance
Non-linearity	<2% full well	<0.46%
Non-linearity Knowledge	<0.5%	0.1%
On-orbit Wavelength Calibration	<0.01 nm	NM: average ~ 0.01 nm RMS
Stray Light NM Out-of-Band+ Out-of-Field Response	For NM ≤ 2	average ~ ± 2%
Intra-Orbit Wavelength Stability	Allocation (flow down from EDR error budget) = 0.02 nm	<0.013 nm
SNR	1000	> 1000 from SV and EV
Inter-Orbit Thermal Wavelength Shift	Allocation (flow down from EDR error budget) = 0.02 nm	0.013 nm
Read Noise	60 -e RMS	<25 -e RMS
Detector Gain	43 (for NP)	45 (for NP)
	46 (for NM)	42 (for NM)
Absolute Irradiance Calibration Accuracy	<7%	5% (for NM)
		1-10% (for NP)
Absolute Radiance Calibration Accuracy	<8%	<5%

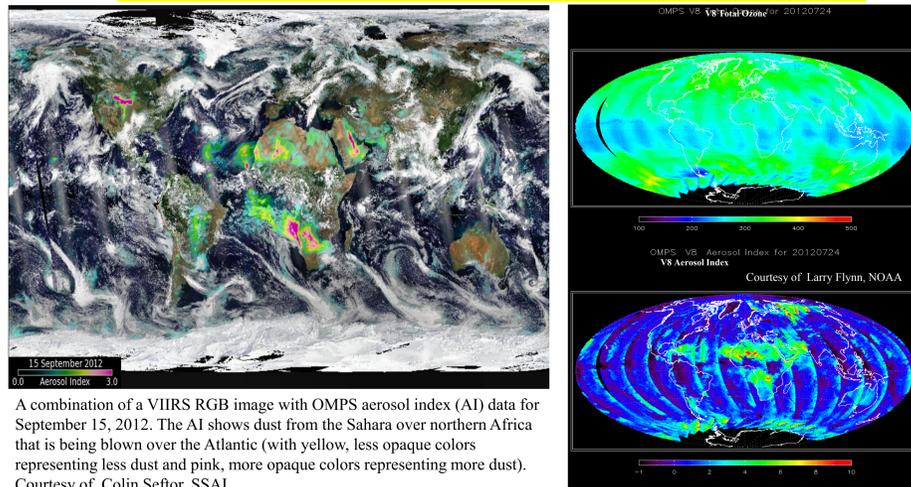
- On-orbit calibration sequences have been modified to meet system requirement.
 - Newly established dark calibration captures and removes transients.
 - Multiple-orbit solar measurements are now used to provide higher SNRs.
- OMPS has been initially calibrated and the calibration has been evaluated
 - Dark calibration has been evaluated via. SAA and hot pixels impact
 - Hot pixels cause a constant increase in the dark signal, impacting SDRs and EDRs
 - NM: weekly on average 0.1% SDR error and 0.03% O3 error.
 - NP: weekly 0.2-2% SDR error is wavelength dependent, 0.1-0.5% O3 error (1-2% at high latitude)
- The associated algorithms and system integration necessary to produce science data has been intensively tested, evaluated and modified.
 - Numbers of DRs have been identified, opened and closed.
- Corrections of stray light, smear and dark are under going.
- The SDRs has reached the Provisional maturity level in March, 2013. We encourage OMPS users to participate in the QA as well as validation of the products.

SUMMARY

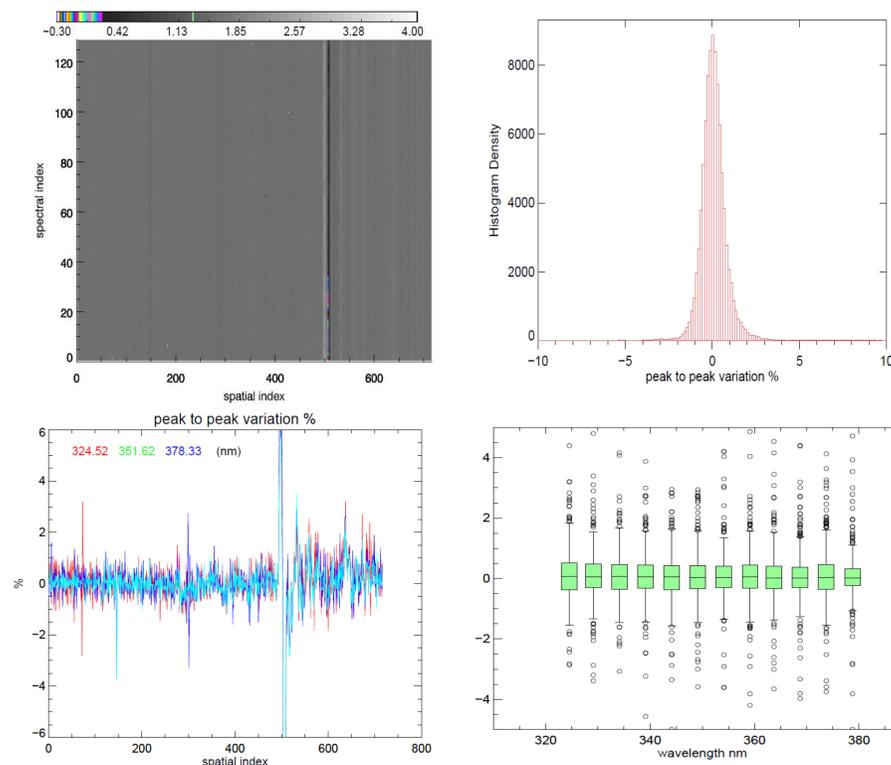
- Instrument performance is stable and meet system requirement.
- While the calibration is still being finalized, the data products are consistent with that from SBUV/2 instruments on NOAA 17, 18, and 19.
- IDPS SDR data processing and its algorithm discrepancies are the major challenge and MX7 will be in operations on April 2013 with significant improvement in data quality.
- Our near future goal is to finalize sensor orbital calibration and prompt SDRs from provisional level to validate state.
- The successful demonstration of higher resolution data taken by S-NPP NM has prompted us to update the current FOV requirement for the J1-OMPS Nadir to obtain data at a new level of detail.

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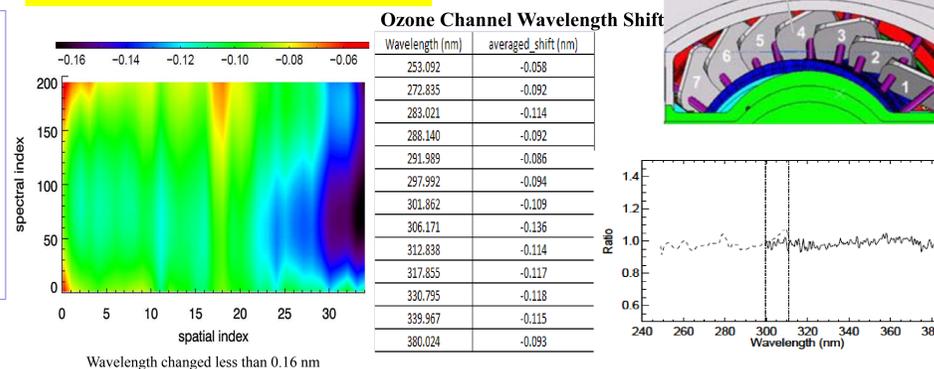
Scientific Advancements



EV Flat Field



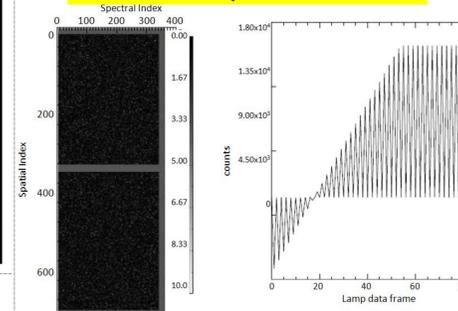
Solar Observation



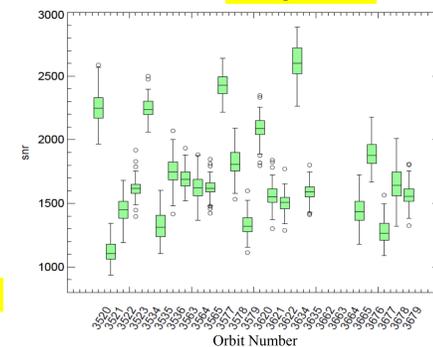
OMPS Instrument Overview

- Resolution**
 - Provides Total Column ozone data with 50x50 km resolution at nadir
 - Provides ozone profiles in a single ground pixel of 250x250 km at nadir
- Configuration**
 - Push-broom 110 deg. cross-track FOV telescope
 - Two grating spectrometers
 - Total Column covers 300 nm to 380 nm
 - Nadir Profiler covers 250 nm to 310 nm
 - CCD optical detector for each spectrometer
- Onboard Calibrators**
 - Light-emitting diode (LED) provides linearity calibration
 - Reflective solar diffuser maintains calibration stability
- Products**
 - Provide globe maps every 24 hours of amount of ozone and volumetric concentration in a vertical column of atmosphere with a 4- days revisit

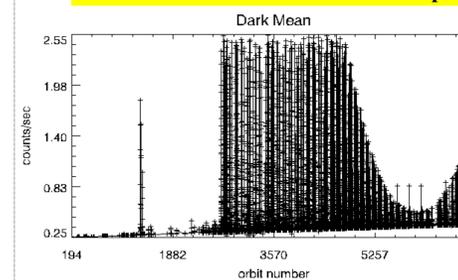
Dark and Linearity Data are Verified



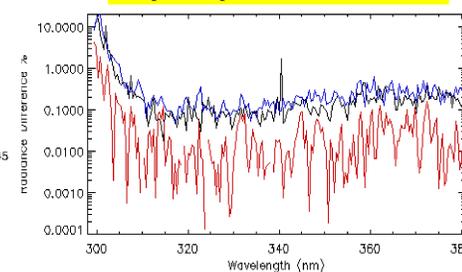
EV Signal Noise



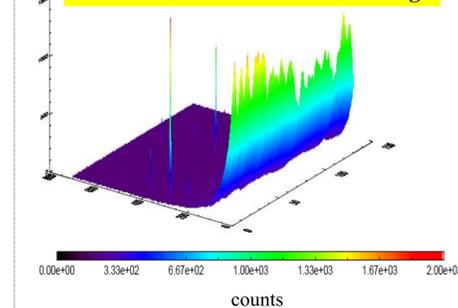
NP Dark Current and Transient Impact



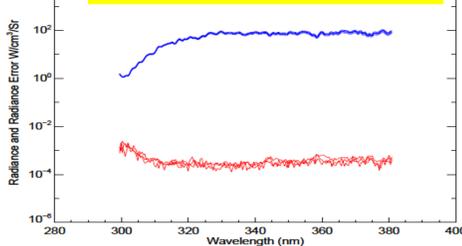
Hot pixel impact on EV SDR radiance



Transients observed from EV Image



EV SDR Radiance and Radiance Error



Ozone Products show consistency

