

OMPS EV SDR Status Summary

Fred Wu, OMPS SDR Team

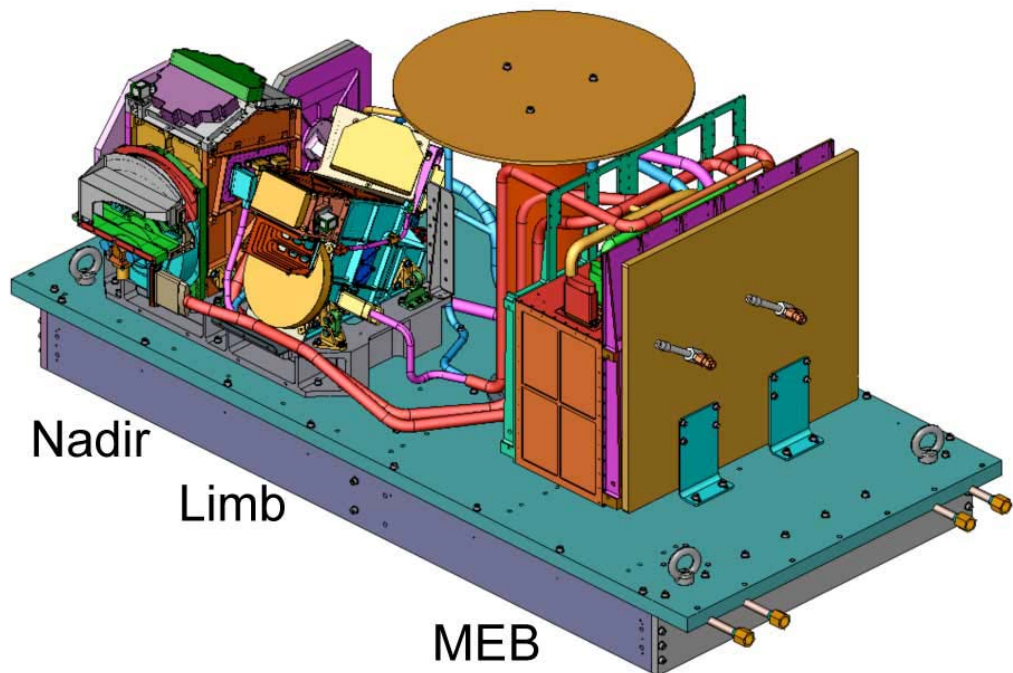
NOAA/NESDIS/STAR

January 17, 2013

OMPS Instrument

Ozone Mapper Profiler Suite

Global and daily monitoring of three dimensional distribution of ozone and other constituents



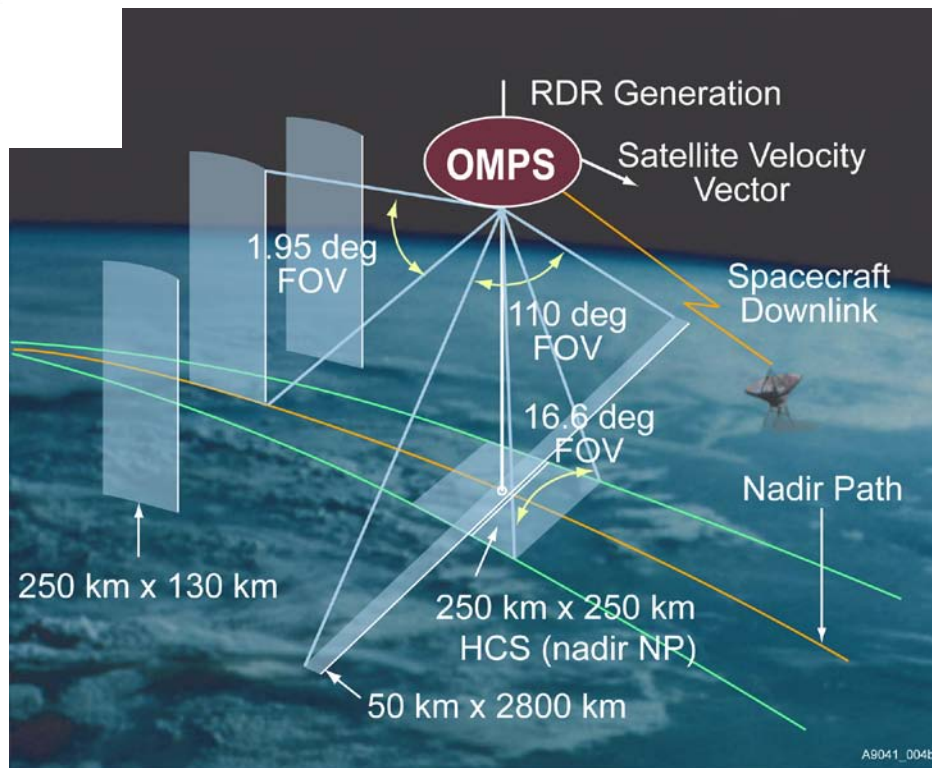
Nadir Mapper

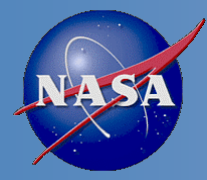
Grating spectrometer, 2-D CCD
 110 deg. cross track, 300 to 380 nm spectral, 1.1nm FWHM bandpass

Nadir Profiler

Grating spectrometer, 2-D CCD
 Nadir view, 250 km cross track, 270 to 310 nm spectral, 1.1 nm FWHM bandpass

Limb Profiler



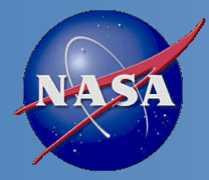


OMPS Products



IDPS produces 18 types of Data Record from OMPS nadir instruments:

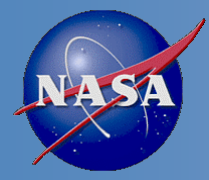
- 9 RDRs
- 6 SDRs
 - 2 Calibration SDR
 - 2 Calibration SDR GEO
 - 2 Earth View (Science) SDR – focus of the review
- 2 EDRs and 1 IP



Milestones



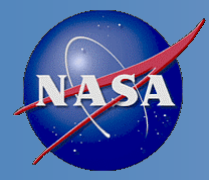
- 2011-10-28: Launch
- 2012-01-27: Door open, 1st image
- 2012-03-12: Beta status for EV SDR (45 days after door open)
- Provisional:
 - Planned for March 2013 (15 months after launch)
 - Reviewed in November 23-24, 2012
 - To be approved in January 2013.



Instrument Performance – NM



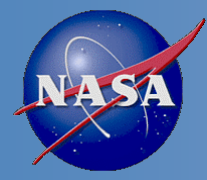
Requirement	Specification/Prediction Value	On-Orbit Performance
Non-linearity	< 2% full well	< 0.46%
Non-linearity Knowledge	< 0.5%	~0.1%
On-orbit Wavelength Calibration	< 0.01 nm	average ~0.01 nm RMS
Stray Light NM Out-of-Band + Out-of-Field Response	≤ 2	average ~± 2%
Intra-Orbit Wavelength Stability	<0.02 nm	< 0.013 nm
SNR	>1000	> 1000 from SV and EV
Inter-Orbital Thermal Wavelength Shift	<0.02 nm	<0.013 nm
CCD Read Noise	<60 –e RMS	< 25 –e RMS
Detector Gain	>46	~42
Absolute Irradiance Calibration Accuracy	< 7%	5%
Absolute Radiance Calibration Accuracy	< 8%	< 5%



Instrument Performance – NP



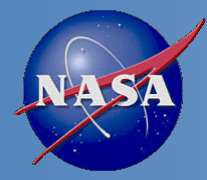
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Out-of-Band + Out-of-Field Response		
Intra-Orbit Wavelength Stability	<0.02 nm	< 0.013 nm
SNR	>1000	> 1000 from SV and EV
Inter-Orbital Thermal Wavelength Shift	<0.02 nm	<0.013 nm
CCD Read Noise	<60 –e RMS	< 25 –e RMS
Detector Gain	>43	~45
Absolute Irradiance Calibration Accuracy	< 7%	1~10% , average: ~7%
Absolute Radiance Calibration Accuracy	< 8%	< 5%



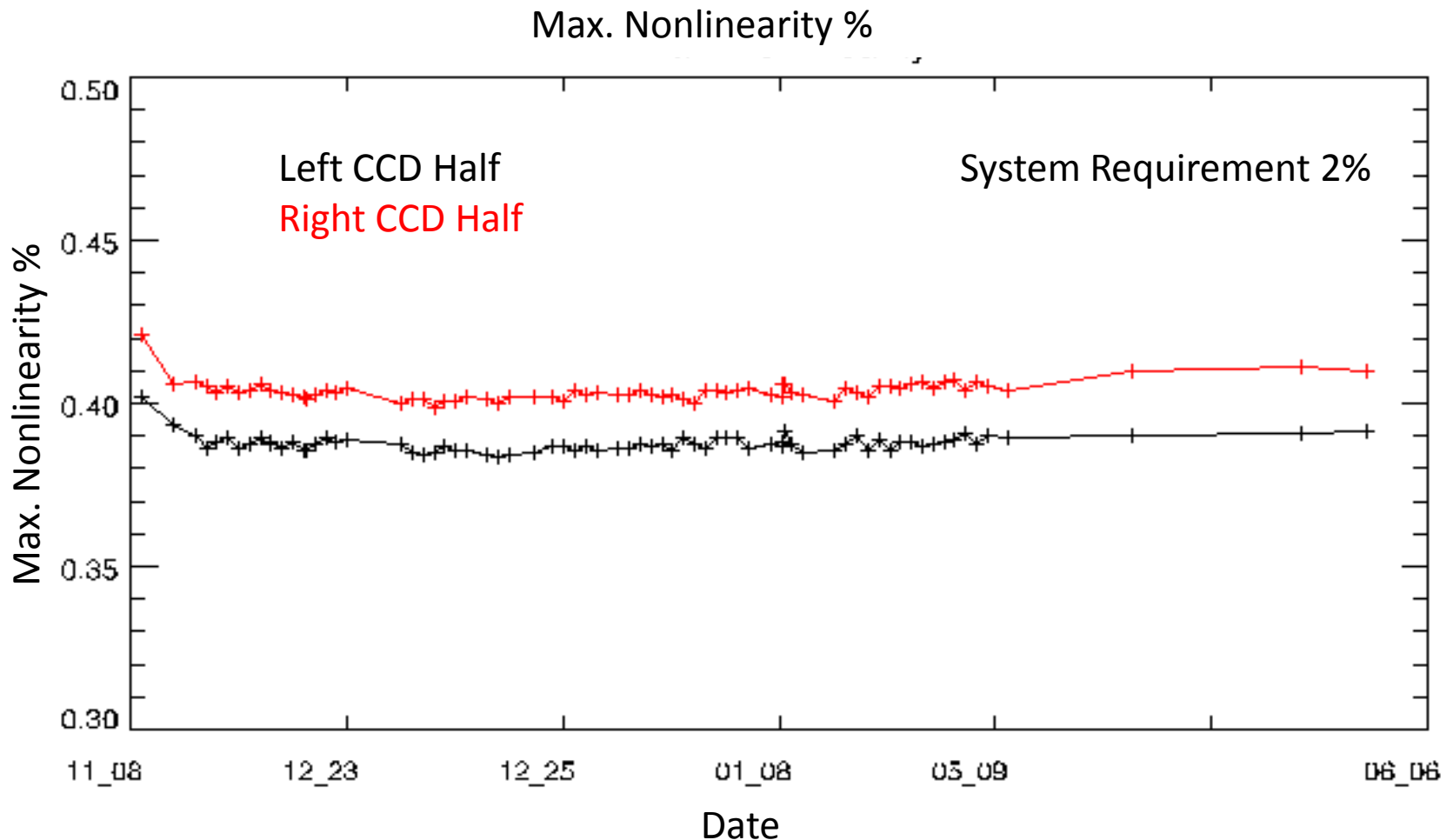
Version Track and Baseline



- Software version follows IDPS Build number (currently Mx6.3).
- One code change was implemented successfully without impact on data
 - Mx6.3, Aug 2012, severe CAL and EV SDR.
- Two calibration updates were implemented successfully with the expected impacts on data
 - Day 1 solar, May 2012
 - Wavelength scale, June 2012
- Operational status is tracked at the Satellite Operation Center (SOC, <http://ozoneaq.gsfc.nasa.gov/omps>).



On-orbit Linearity Performance

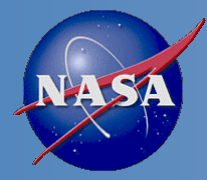


Measurement GMT changed 3 times: Nov. 08 – Mar. 09; May 29 – June 06; July 4-current
OMPS linearity is **exceptionally** stable

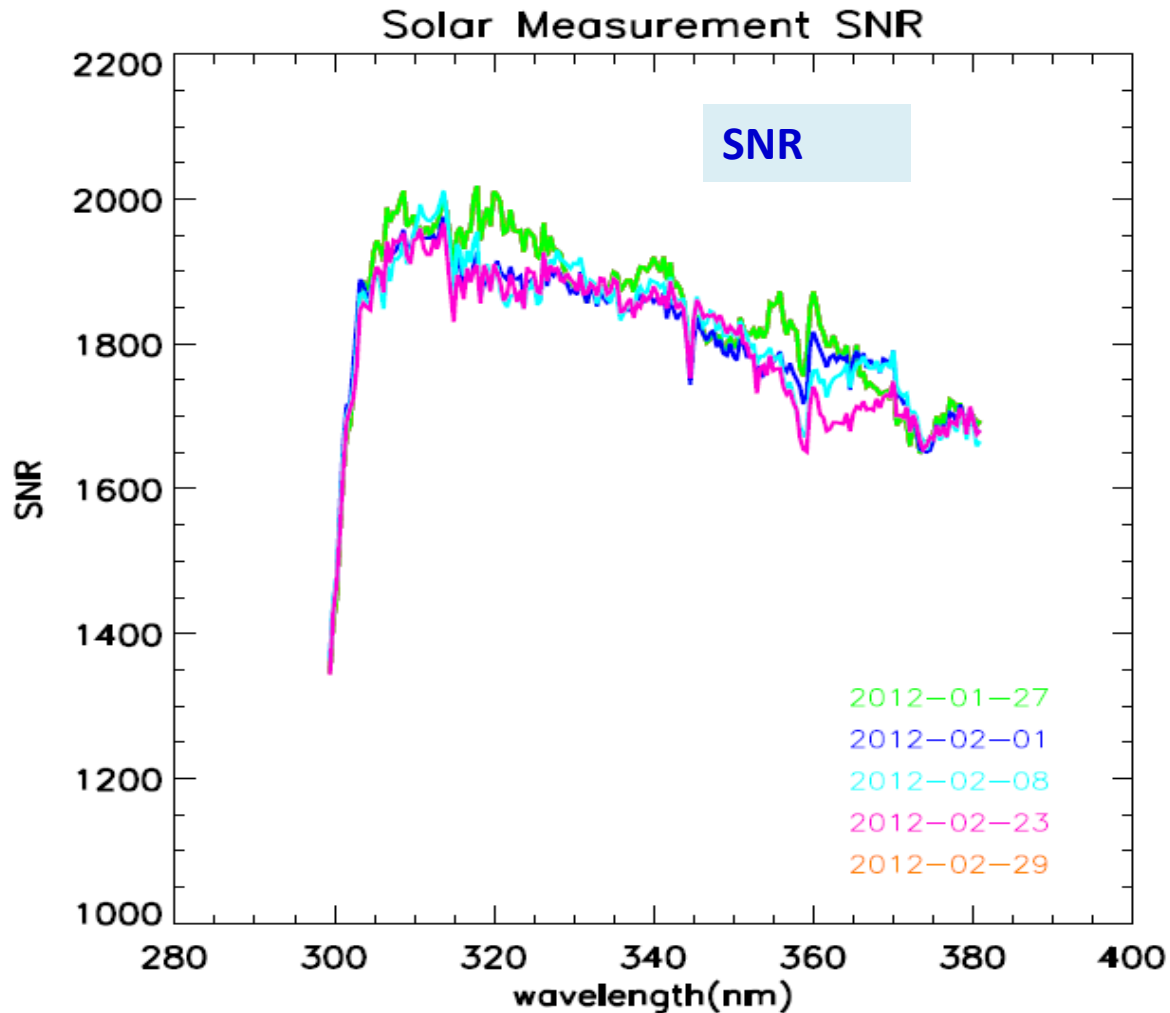
17 January 2013

NCWCP

C. Pan



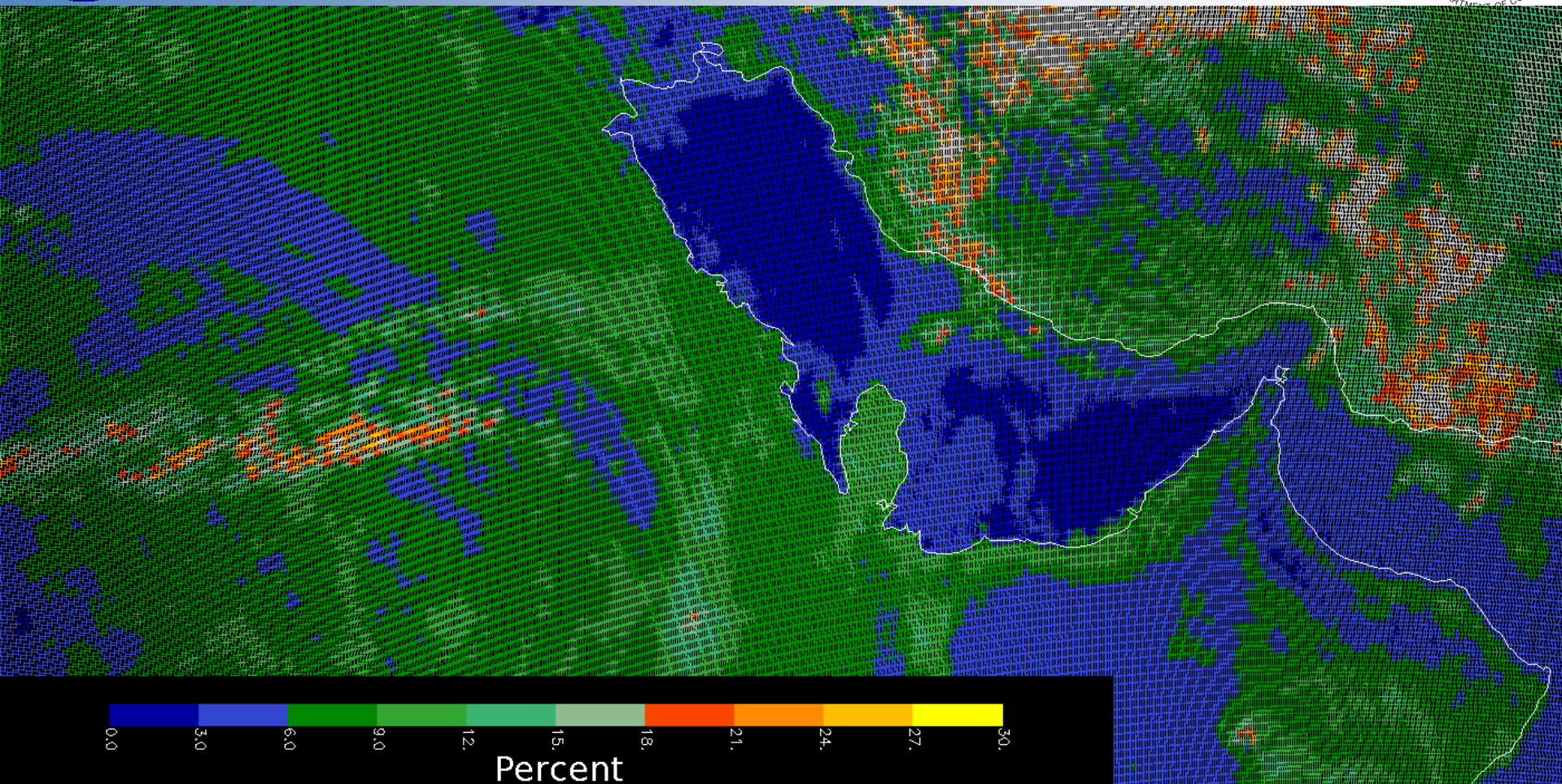
OMPS SNR Verification



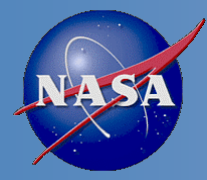
Solar measurement SNR meets the system requirement of 1000



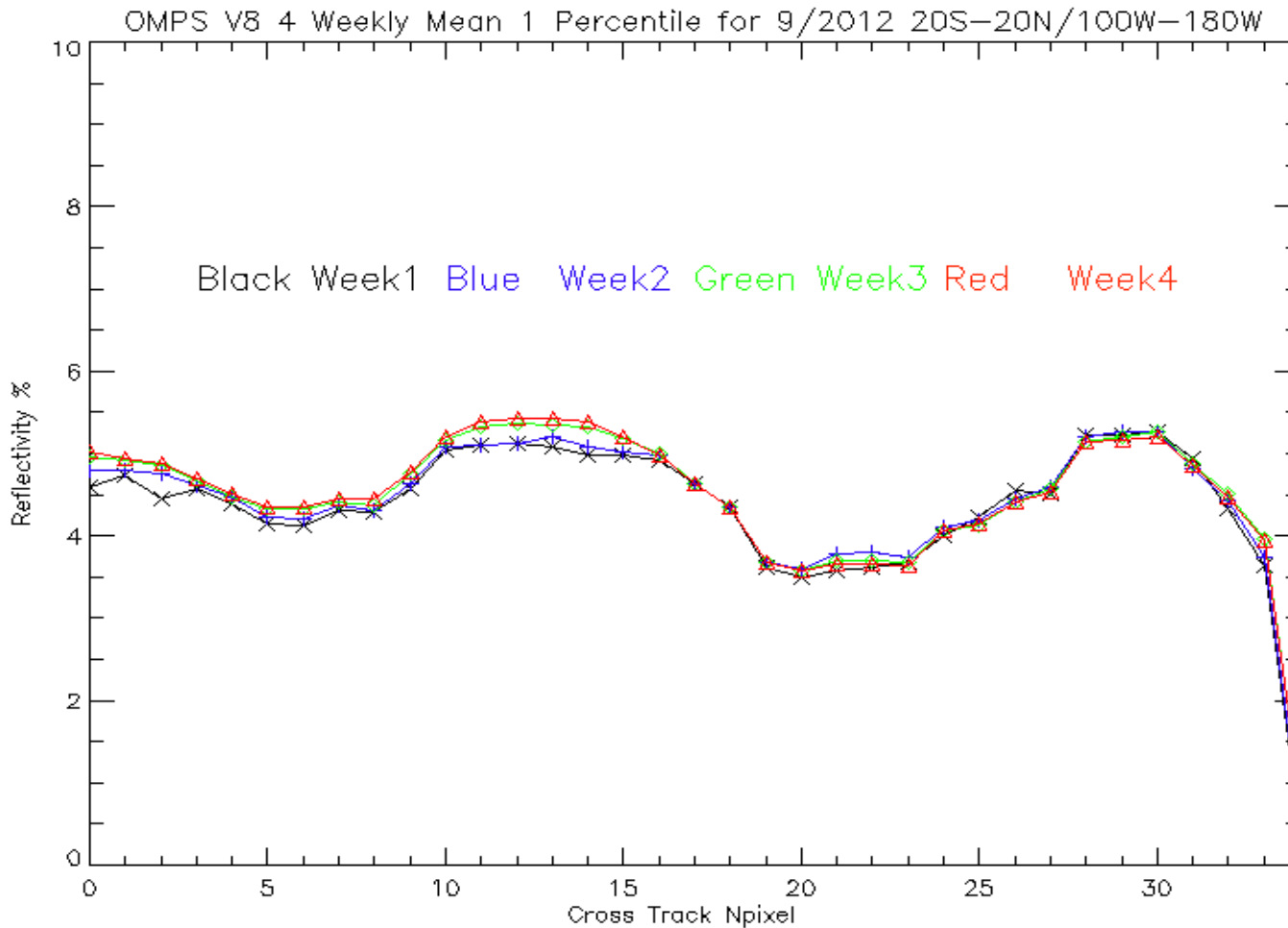
OMPS Geolocation

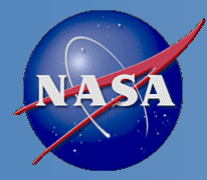


This image shows the effective reflectivity for the 380-nm Channel for part of an orbit of small Field-of-View (5 KM X 10 KM at Nadir) made by the OMPS Nadir Mapper in a special diagnostic mode. The Qatar peninsula sticking into the Persian Gulf in the middle of the picture lies along the nadir view of the orbital track and gives a preliminary assurance of the geolocation at better the 5 KM.



OMPS Products are stable

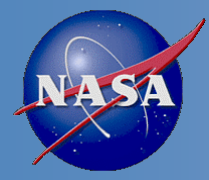




Known Issues with Provisional Products



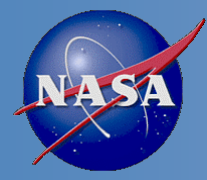
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2. Weekly update of dark
3. Day-1 spectral solar irradiance
4. Wavelength
5. SAA
6. NM stray light
7. NP stray light
8. Large amount of fill values
9. Smear
10. NM geo-location



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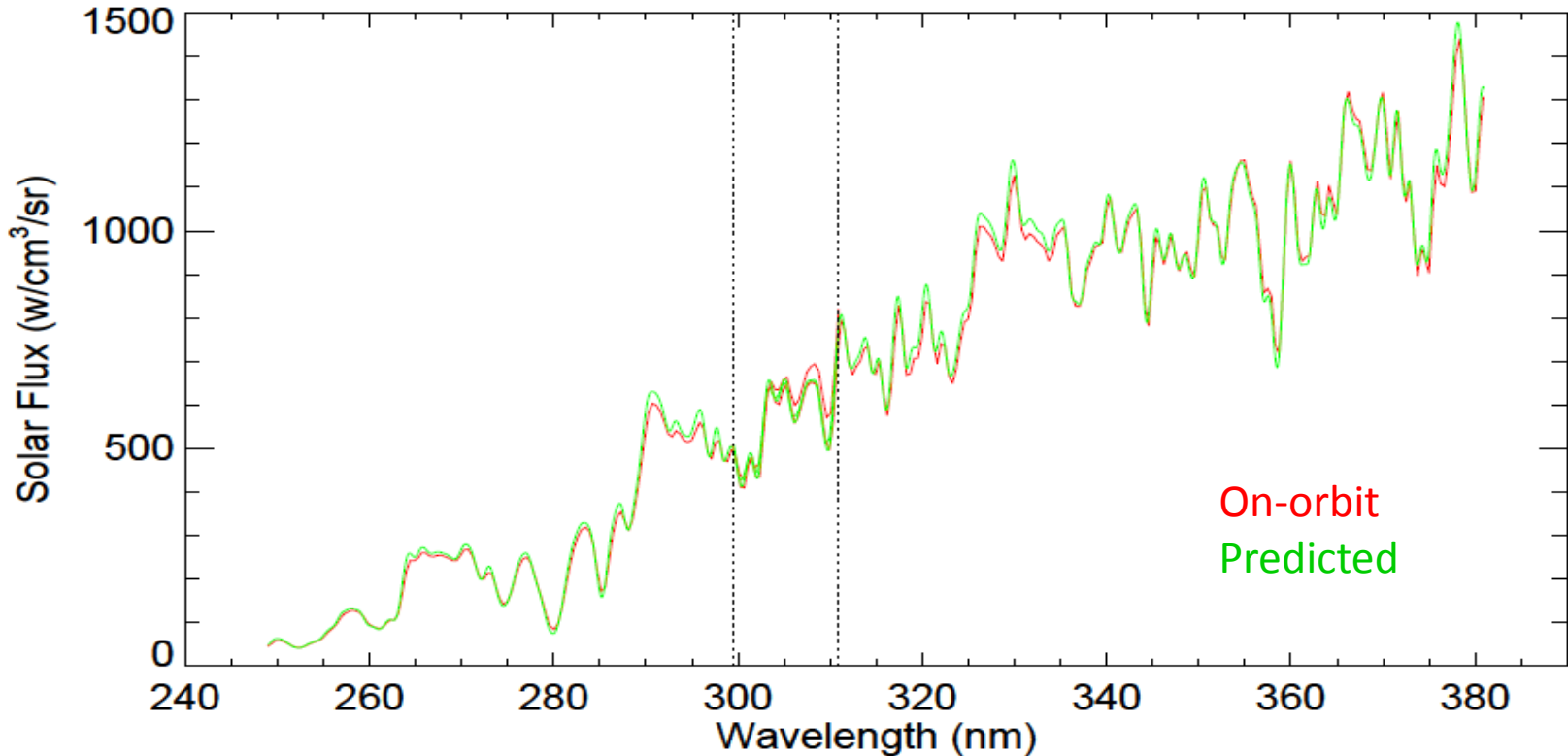
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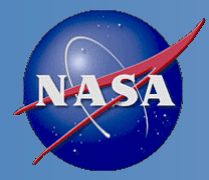
Day-1 spectral solar irradiance



Solar Irradiance @OMPS Nadir Resolution



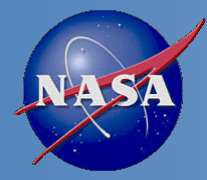
Observed solar irradiance is within ~2% of predicted synthetic solar spectra.
Will be finalized before Validated.



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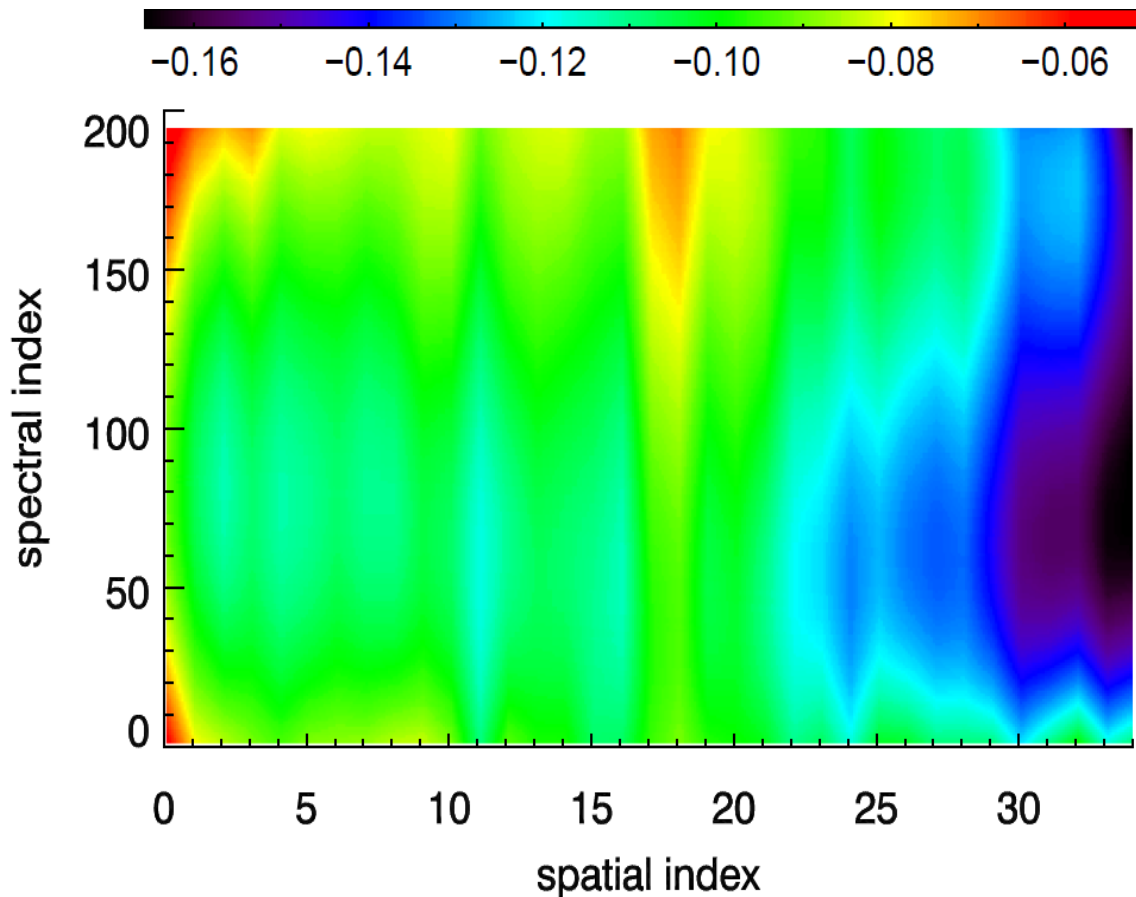
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Wavelength Shifts from Ground to Orbit

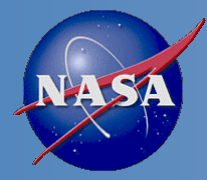


Ozone Channel Wavelength Shift



Wavelength (nm)	averaged_shift (nm)
253.092	-0.058
272.835	-0.092
283.021	-0.114
288.140	-0.092
291.989	-0.086
297.992	-0.094
301.862	-0.109
306.171	-0.136
312.838	-0.114
317.855	-0.117
330.795	-0.118
339.967	-0.115
380.024	-0.093

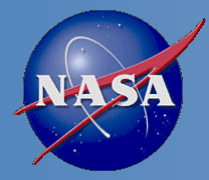
Wavelength changed less than 0.16 nm from ground to orbit.
Slightly larger than pre-launch prediction. Being monitored.



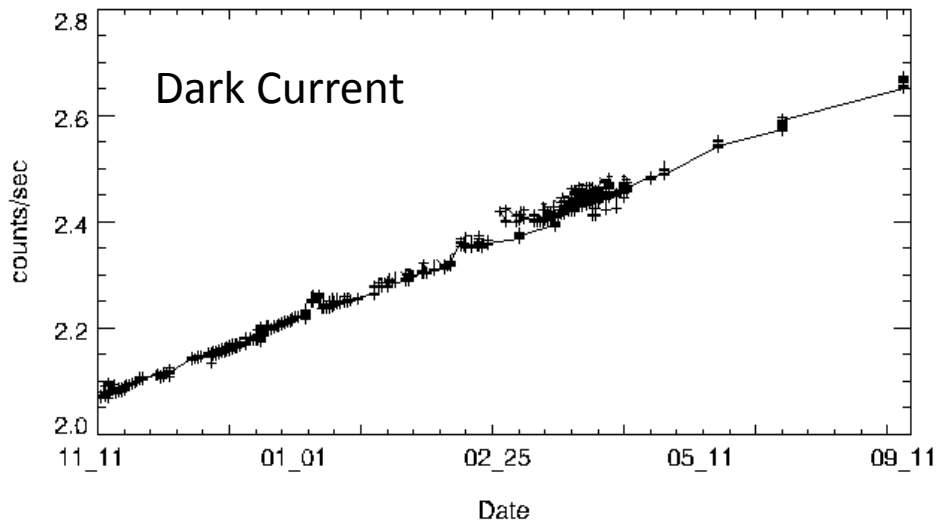
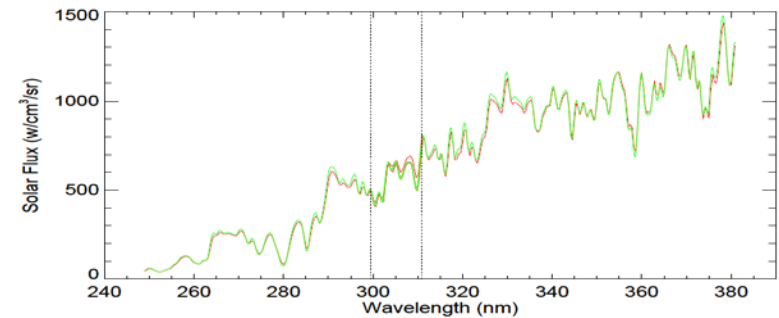
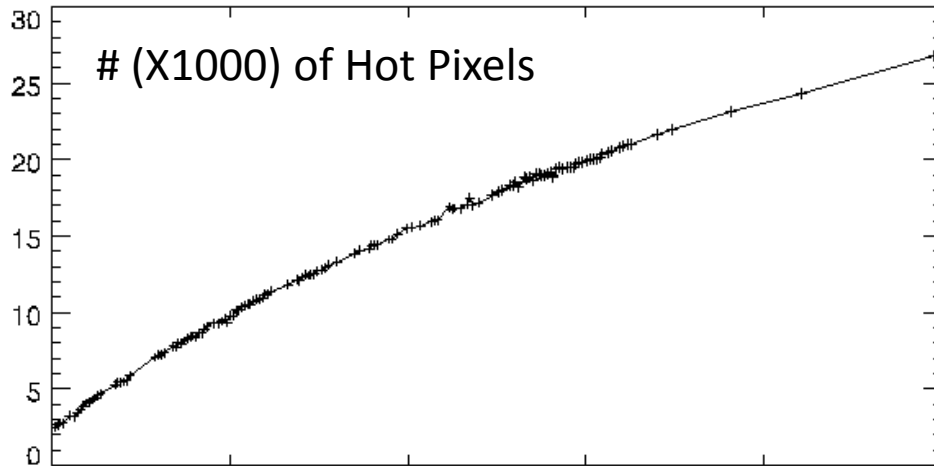
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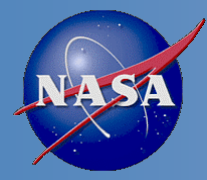
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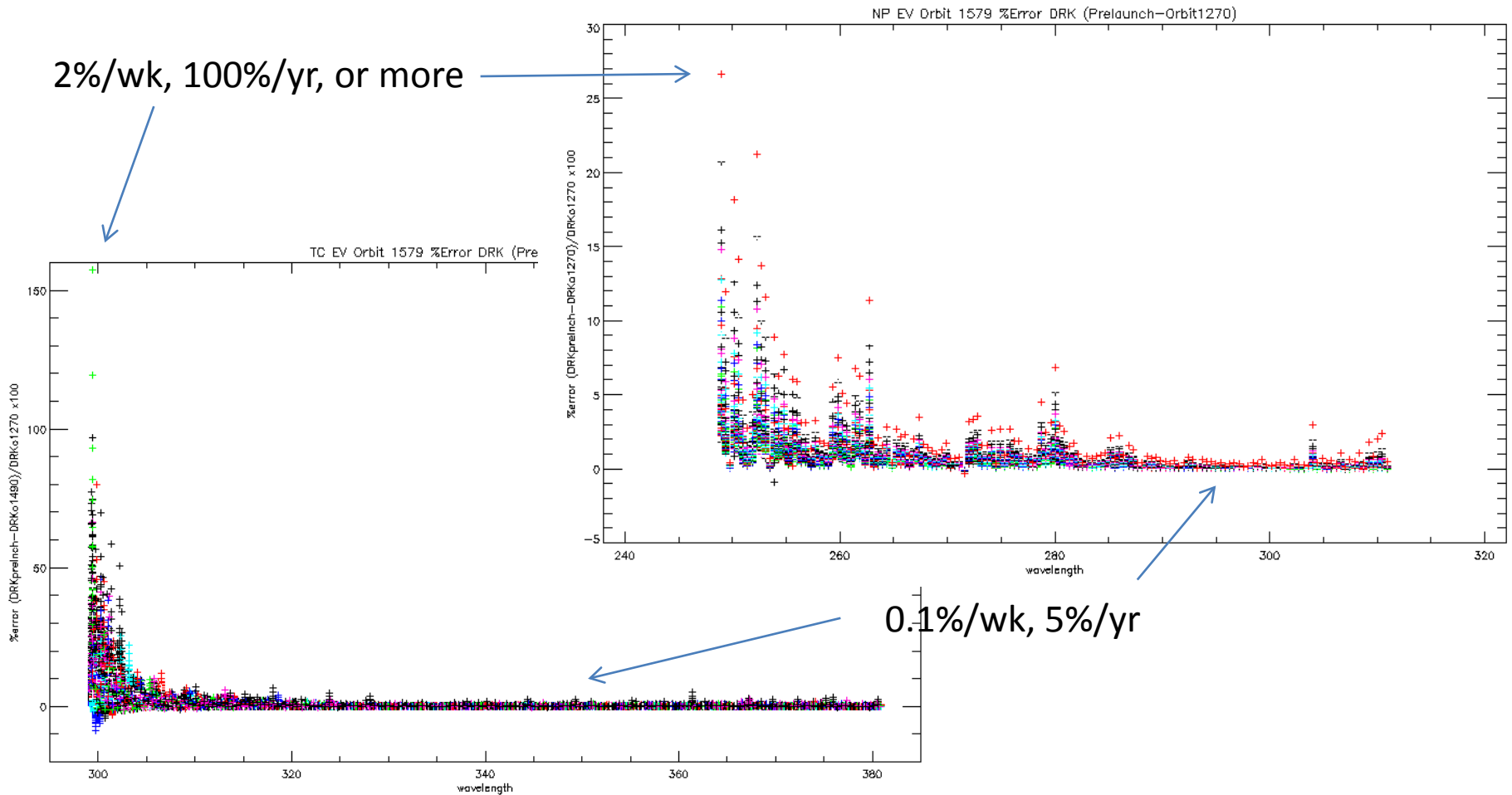
On-orbit Dark Current Performance

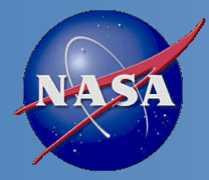


- 0.01 cnt/sec per week, or 0.5 cnt/sec per year, relative to baseline of ~ 2 cnt/sec
- Radiance error is small in general.
- Can be large in extreme cases, but most of those are not used



On-orbit Dark Current Performance





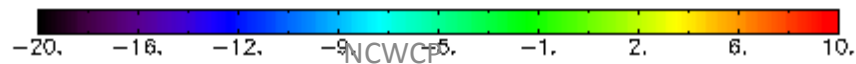
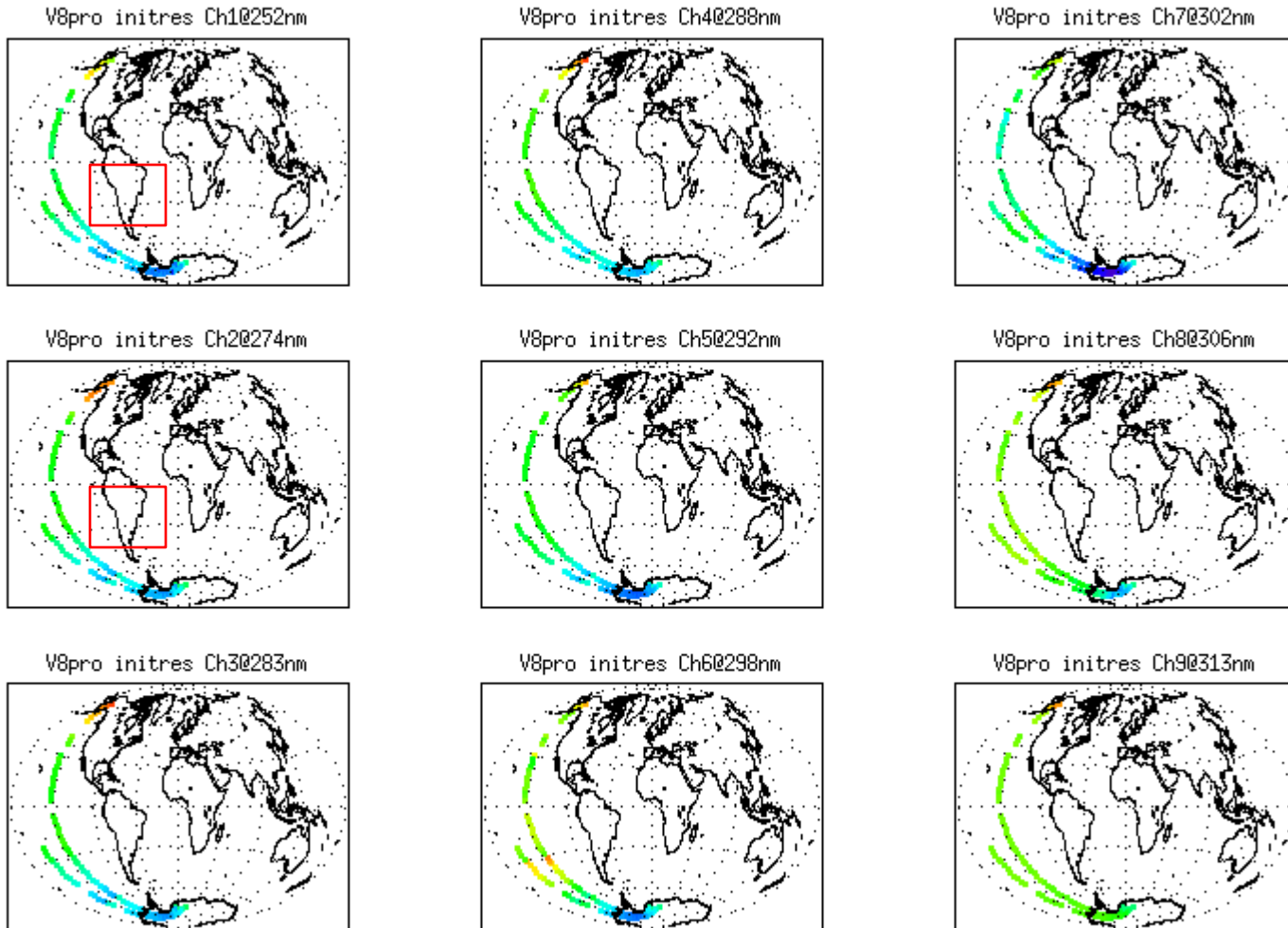
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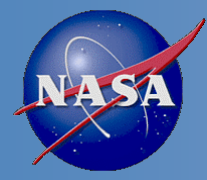


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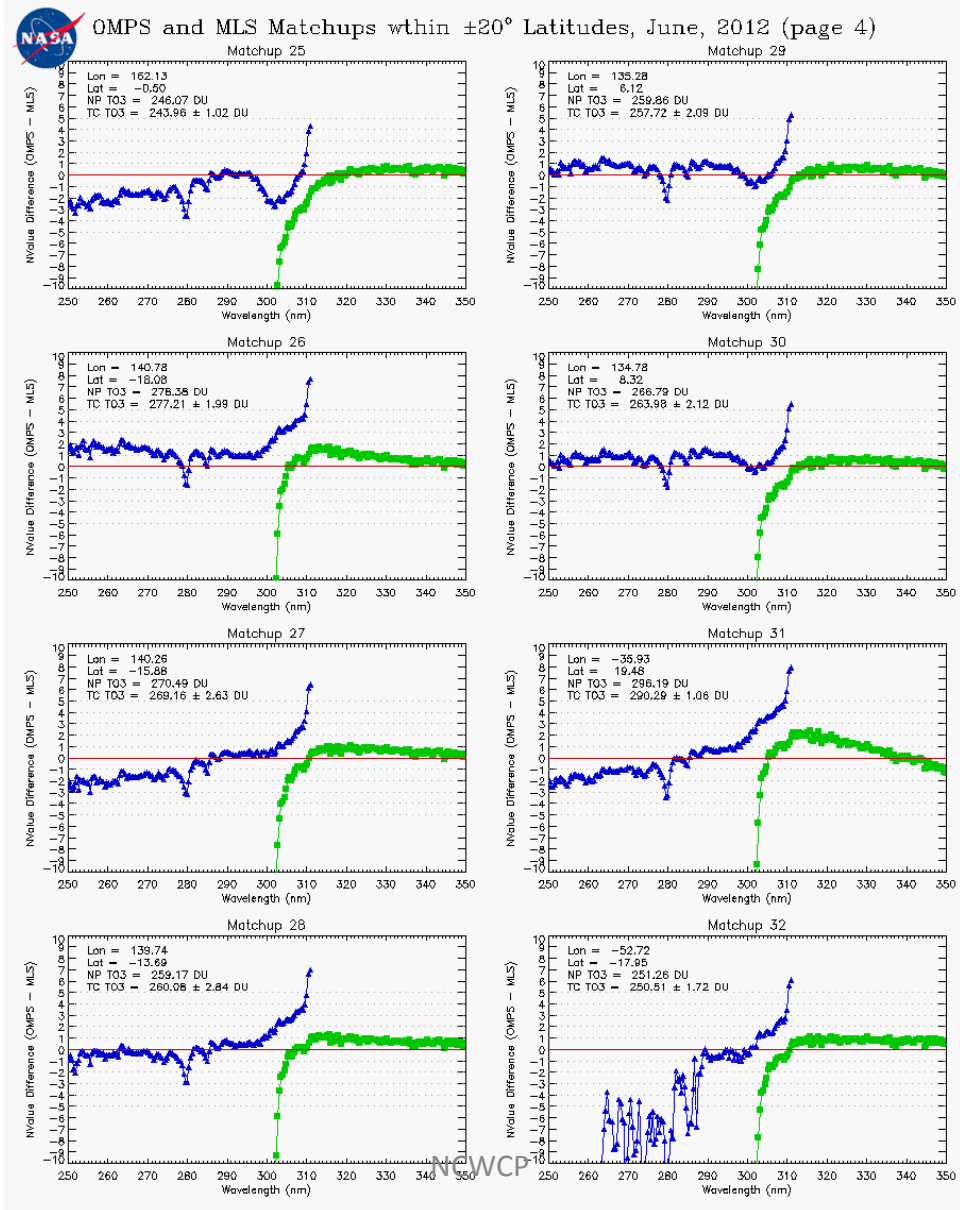
South Atlantic Anomaly (SAA) Impact

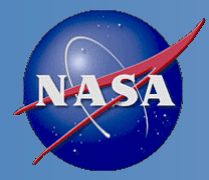
OMPS NP V8PRO initres on :2012/01/26





South Atlantic Anomaly (SAA) Impact

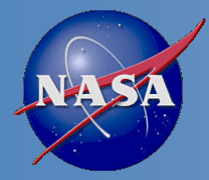




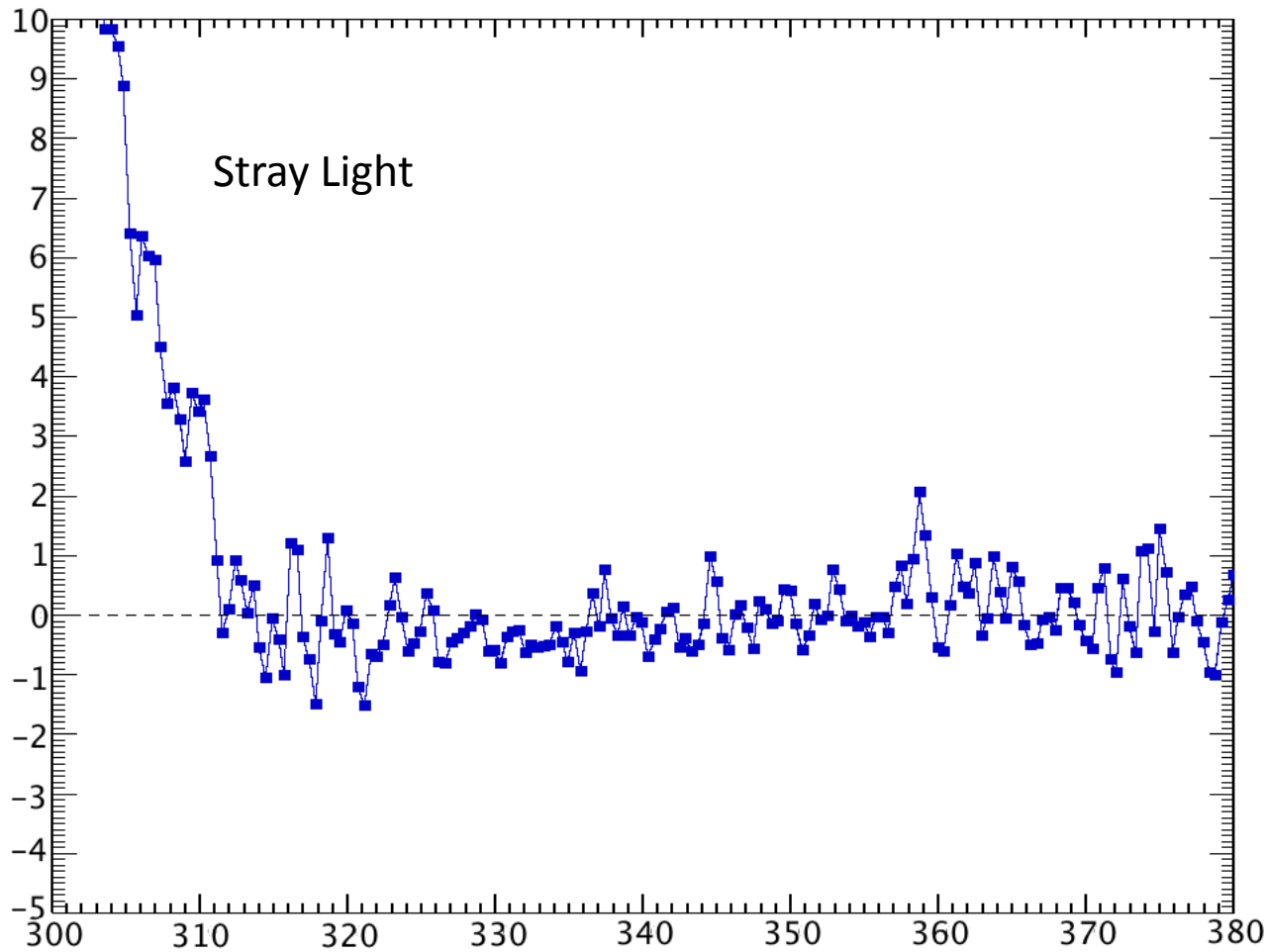
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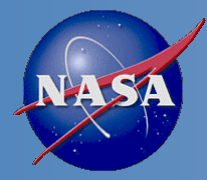


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Example of Stray Light

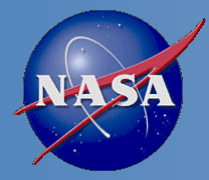




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Current Focus – Long Term – Non-Issue