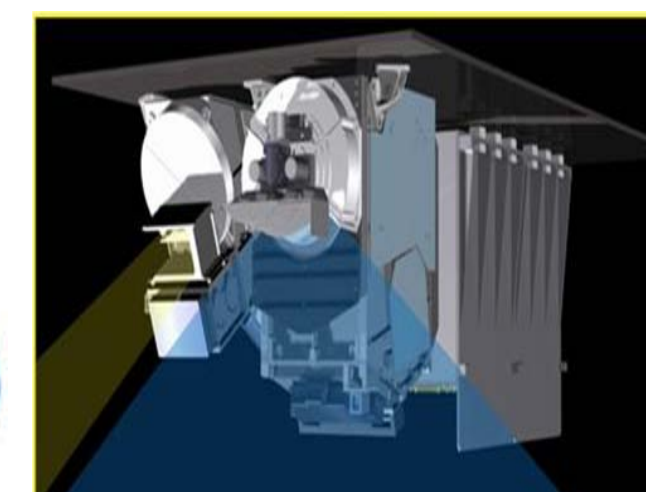


Overview of Suomi-NPP OMPS Sensor Data Records (SDRs)

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Introduction

The Ozone Mapping and Profiler Suite (OMPS) flying onboard the Suomi National Polar-orbiting Partnership (S-NPP) Project is an advanced suite of three hyper-spectral instruments -- the latest in a series of remote-sensing instruments flown by NOAA and NASA. Measurements from the nadir sensors are used to generate total column ozone and ozone profile estimates, while measurements from Limb are used to generate high-vertical-resolution ozone profile estimates. This presentation evaluates nadir sensors on-orbit performance in the first year after launch, and describes the current status of the Sensor Data Records. We also demonstrate that OMPS has made a successful transition from ground to orbit through examples of on-orbit sensor image analyses.

Scientific Advancements

- OMPS improves and extends the more than 30 year total-ozone and ozone-profile records. These records are used by scientists and policy makers to track the health of the ozone layer.
- OMPS represents significant technological and scientific advances in environmental monitoring and will help advance environmental, weather, climate with ozone study, cloud predictions, aerosol monitoring and better ultraviolet index forecasts.
- OMPS allows scientists and forecasters to monitor and predict ozone patterns with a better accuracy and is key for continuity of long-standing climate measurements, allowing study of long-term climate trends.
- Flexibility in the pixel binning and integration time give OMPS the capability to provide higher resolution spatial products.

SDR Performance

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	
Stray Light NM	≤ 2	average ~± 2%
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-Orbit 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%

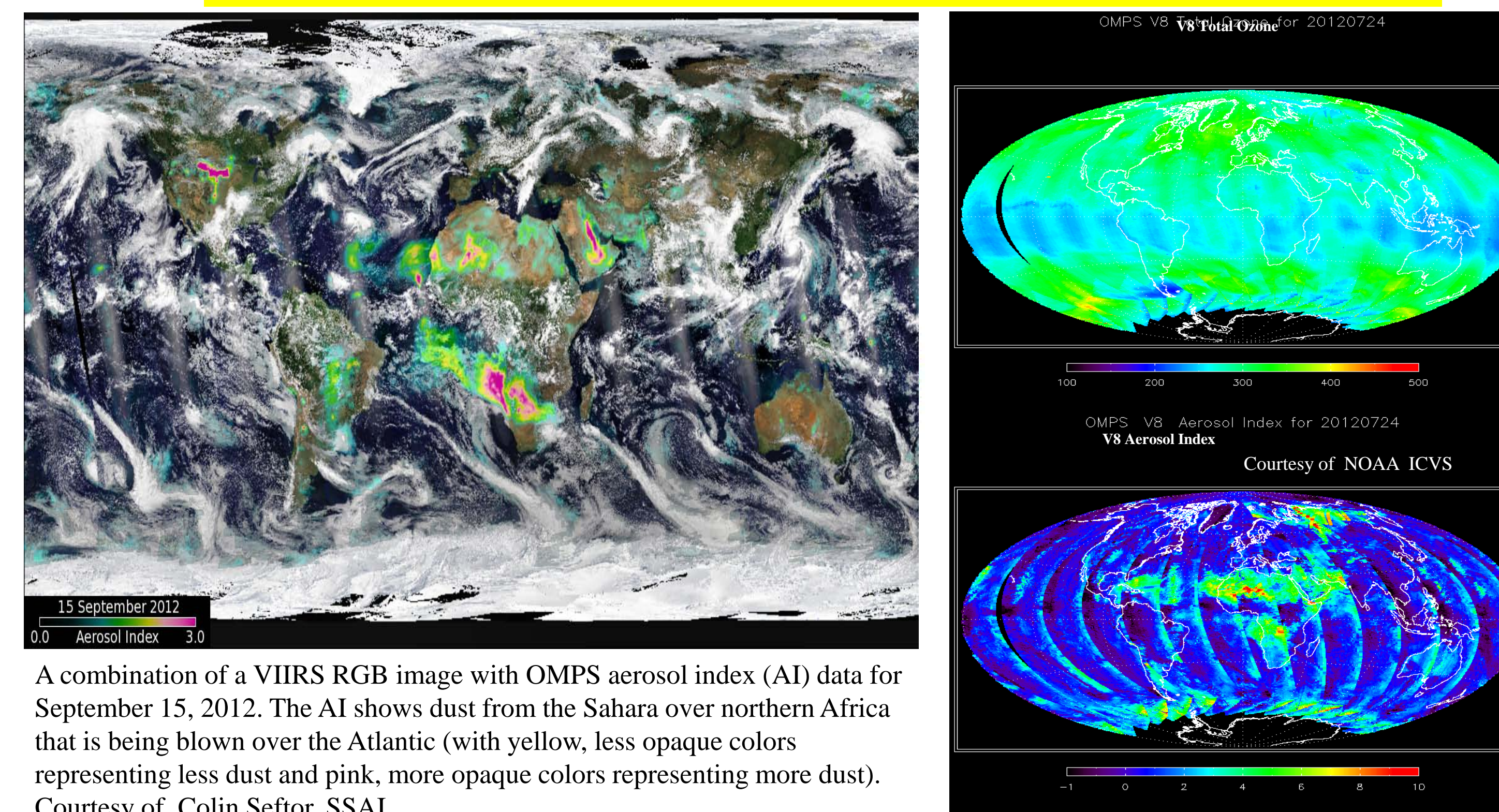
Summary

The OMPS sensors have completed the early orbit check phase and are currently in the intensive calibration and validation phase. The on-orbit calibration has been established and provides a baseline for sensor health, dark current, linearity and solar calibration trending. Early orbit results indicate that the performance of the key sensor key parameters have made smooth transitions from ground to orbit and are within the expected levels compared to the results determined from prelaunch calibration and characterization. The SDRs are expected to advance to provisional maturity status within the next two months. The SDR algorithms and parameter tables are undergoing improvement in dark current and stray light corrections, and wavelength scale and radiance calibration characterization in operations so that they will be able advance to the status for validated products.

2012 AGU Fall Meeting, Dec. 3-7, San Francisco

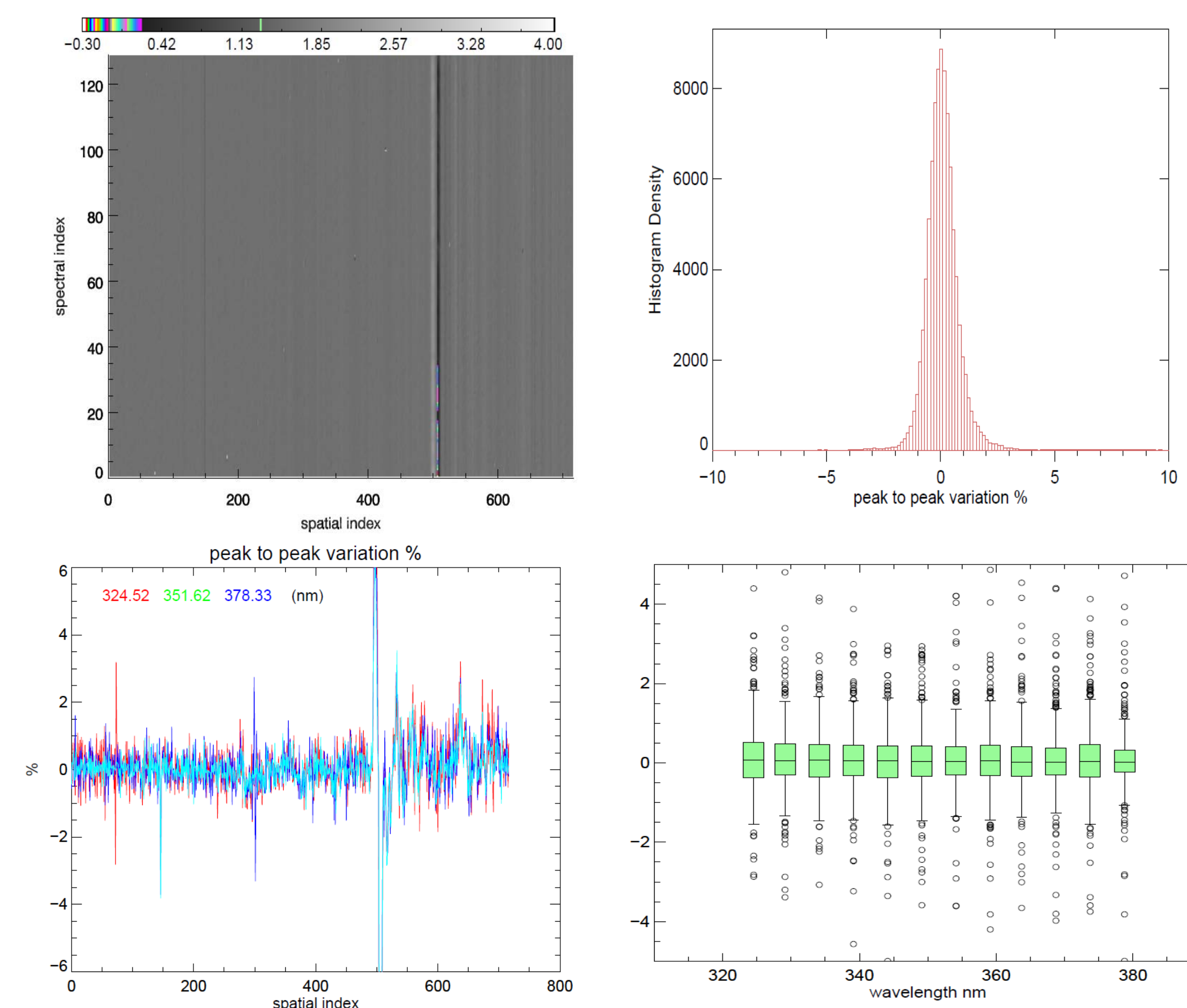
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Scientific Advancements

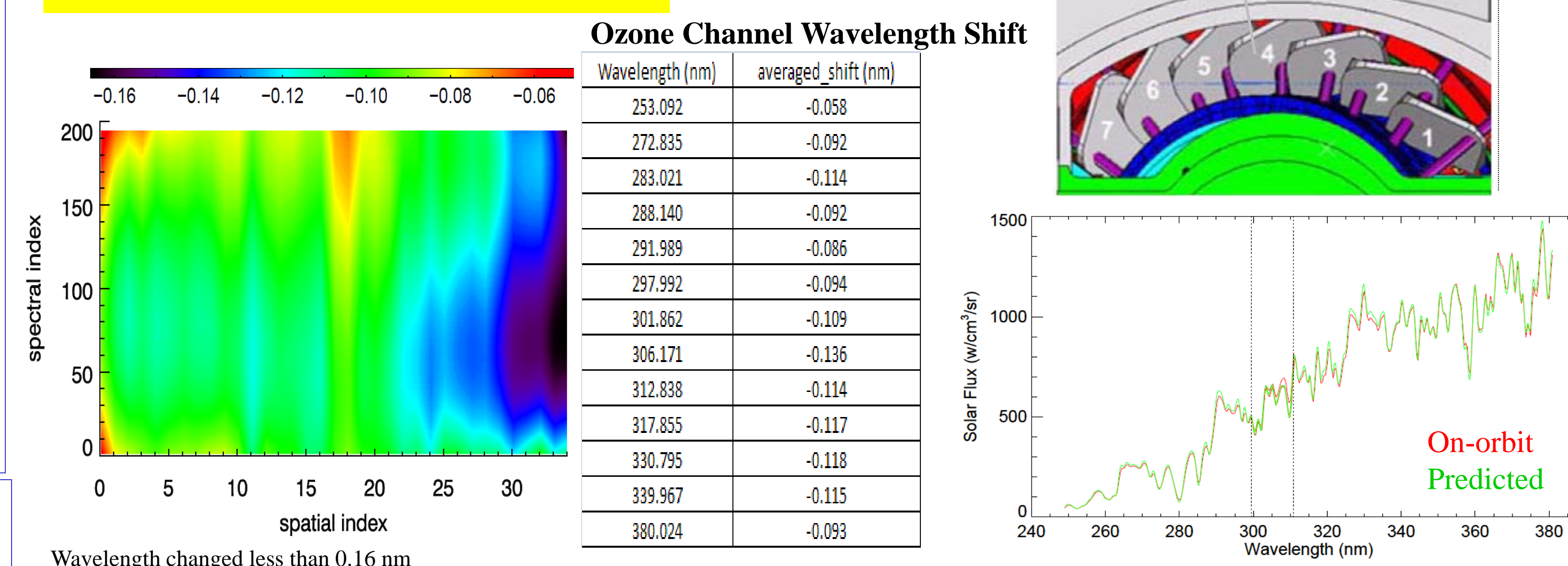


A combination of a VIIRS RGB image with OMPS aerosol index (AI) data for September 15, 2012. The AI shows dust from the Sahara over northern Africa that is being blown over the Atlantic (with yellow, less opaque colors representing less dust and pink, more opaque colors representing more dust). Courtesy of Colin Seftor, SSAI.

EV Flat Field



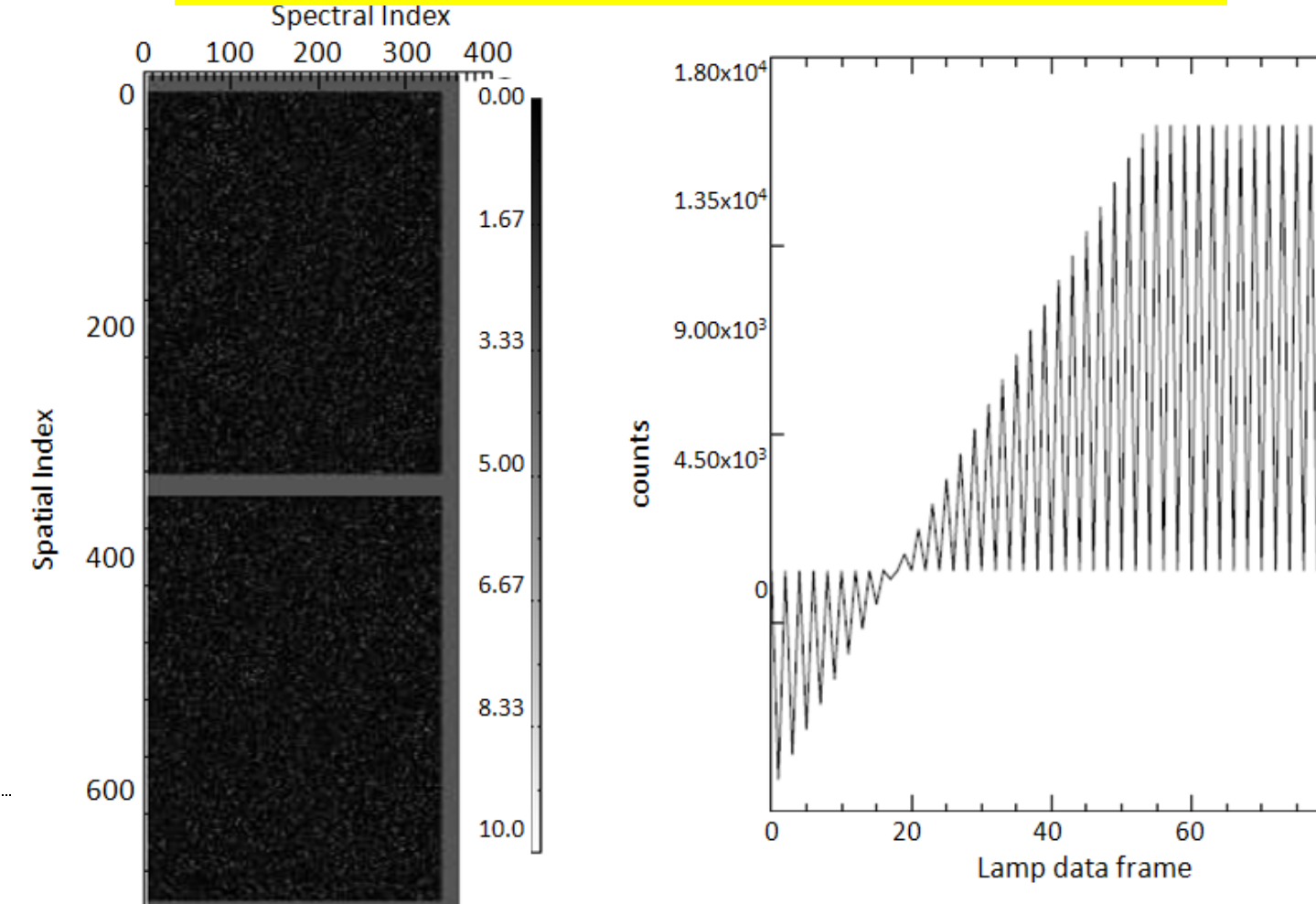
Solar Observation



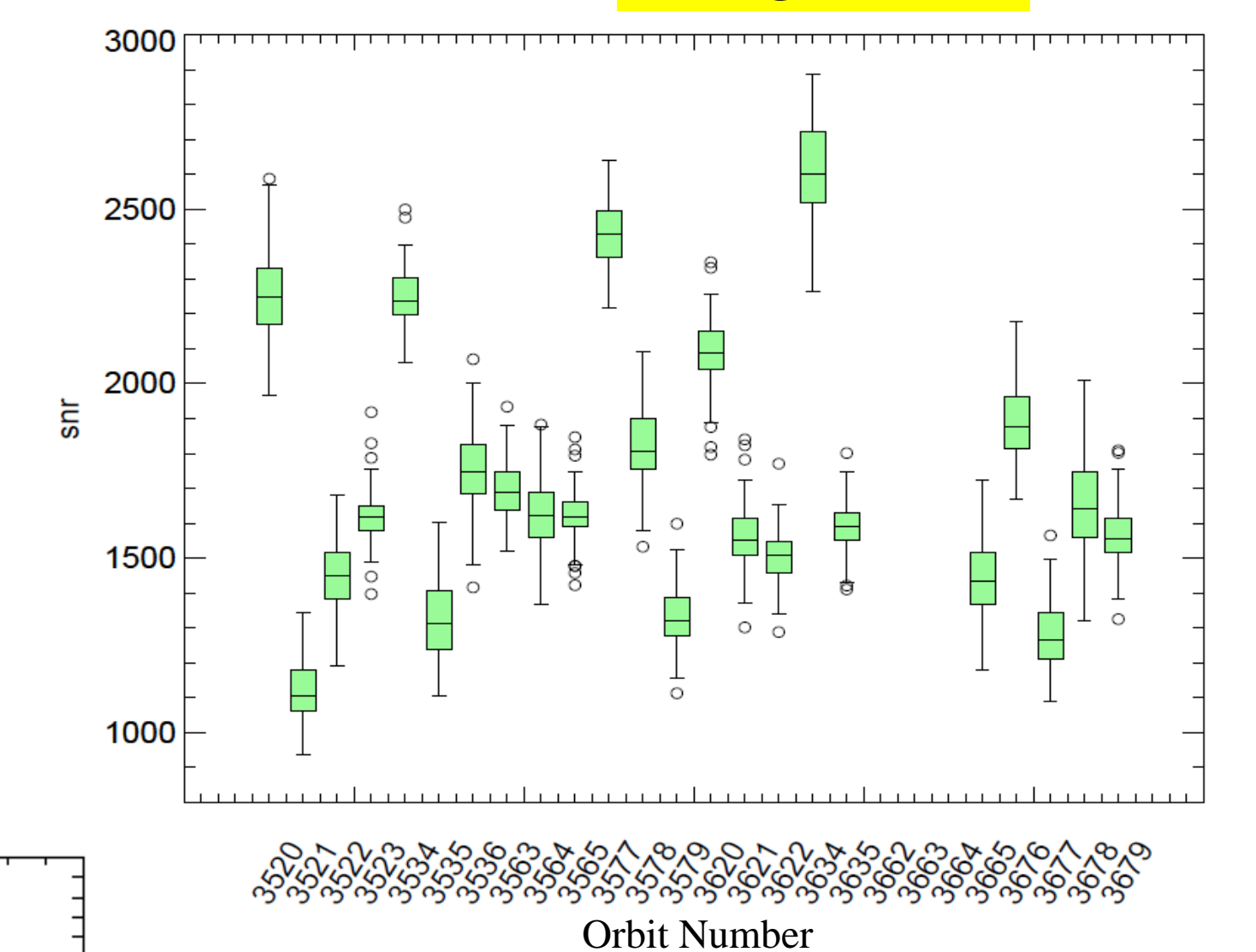
OMPS Instrument Overview

- **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
- **Onboard Calibrators**
 - Light-emitting diode (LED) provides linearity calibration
 - Reflective solar diffuser maintains calibration stability
- **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
- **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

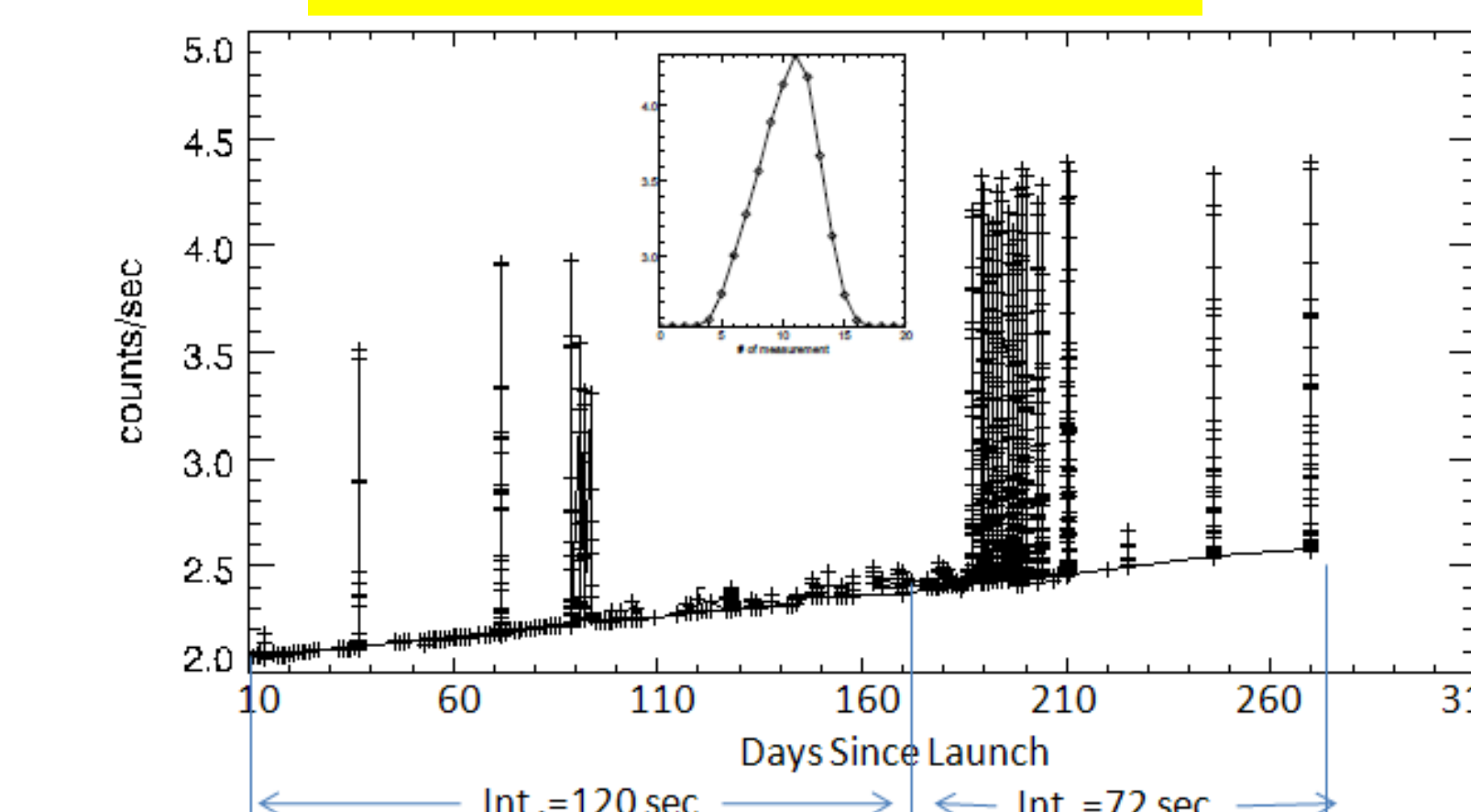
Dark and Linearity Data are Verified



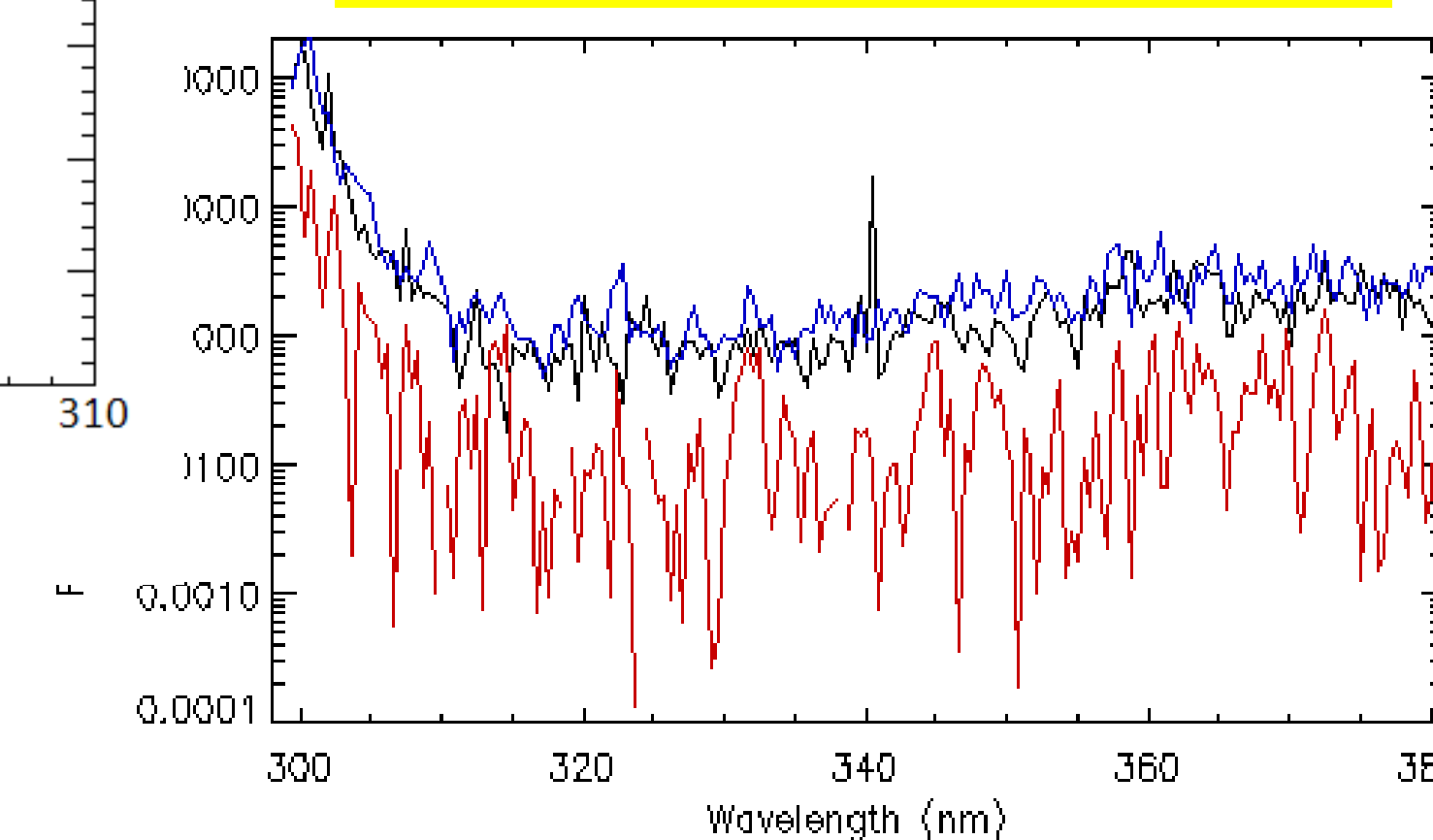
EV Signal Noise



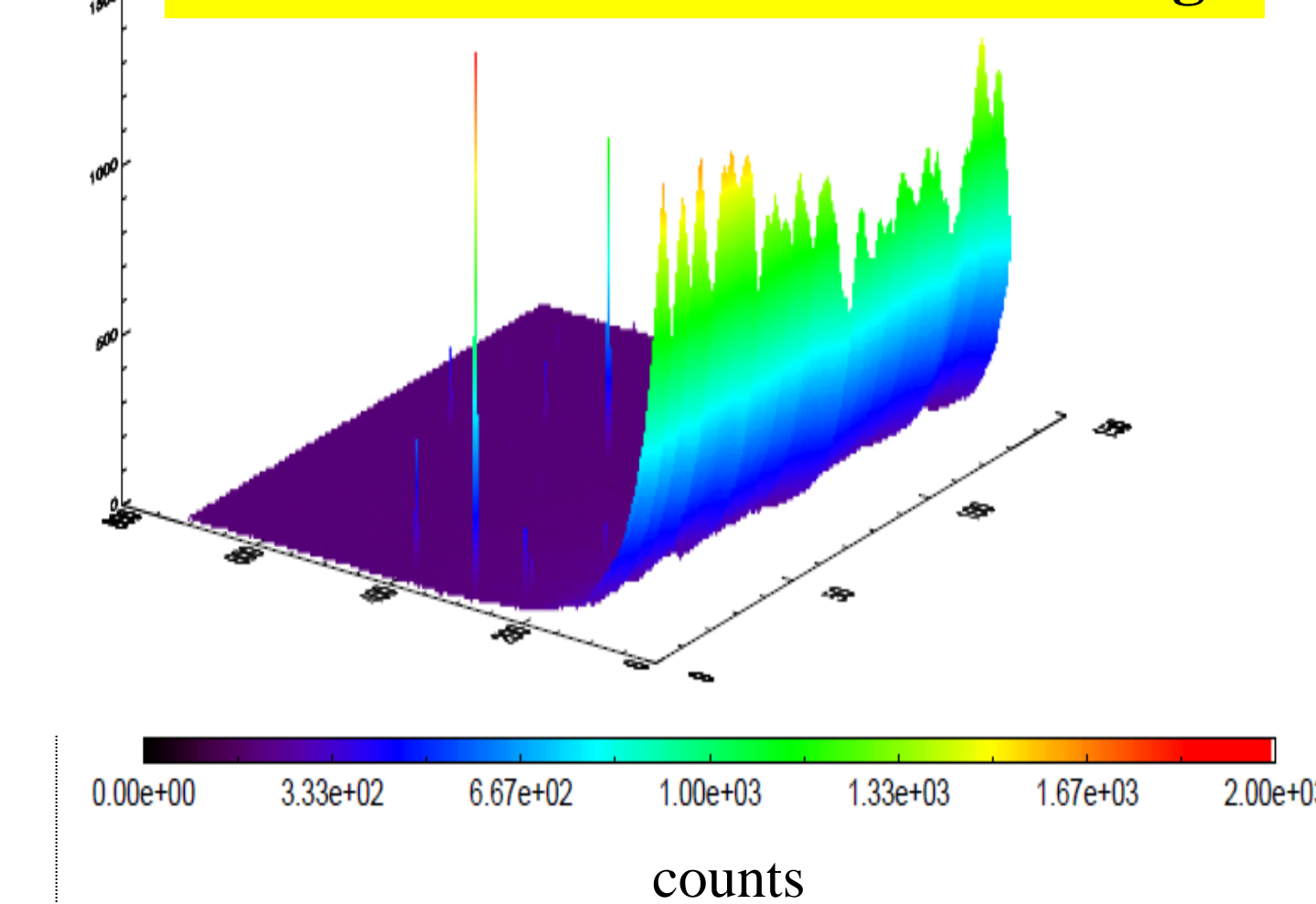
Dark Current and Hot Pixels



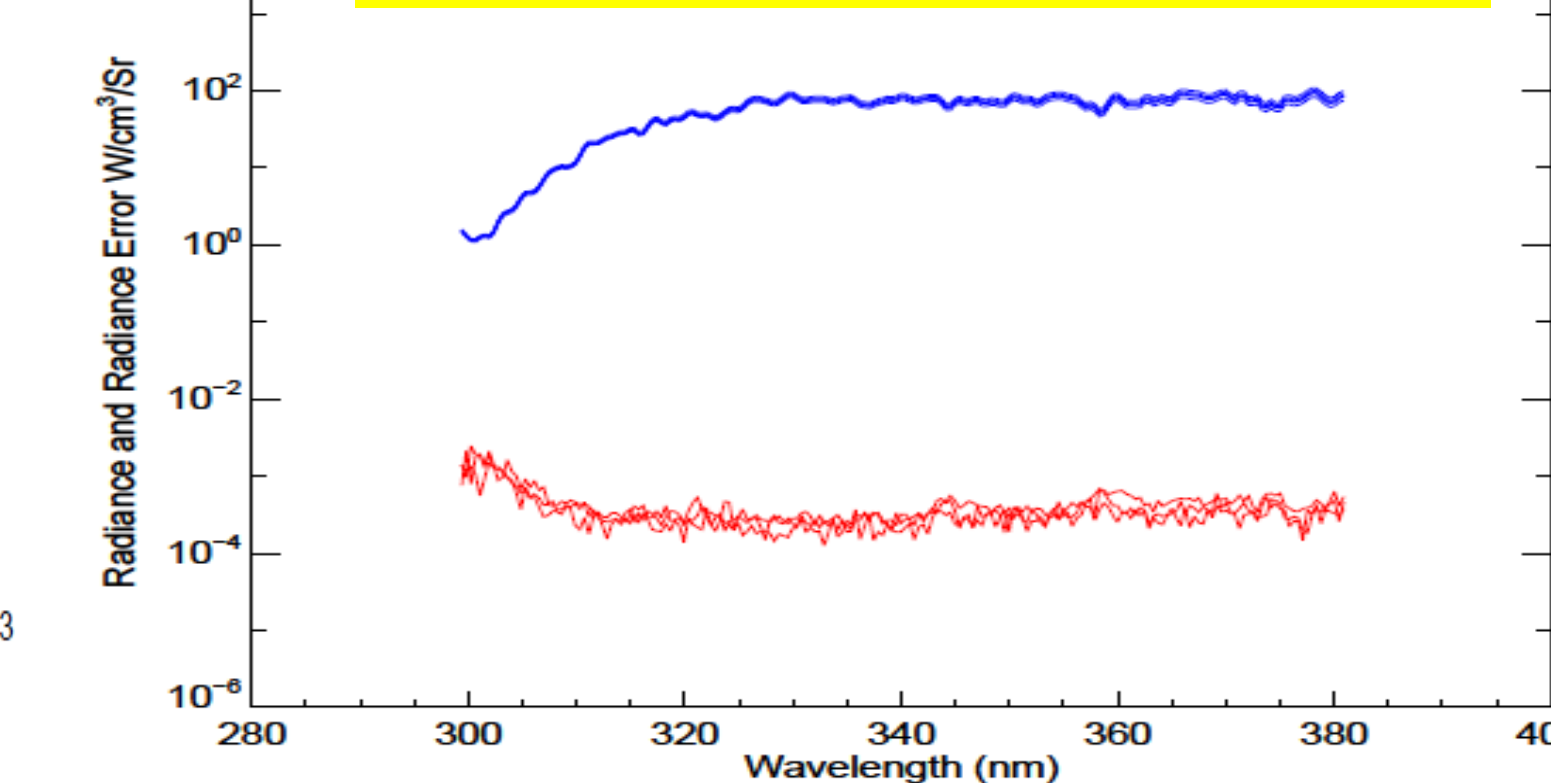
Hot pixel impact on EV SDR radiance



Transients observed from EV Image



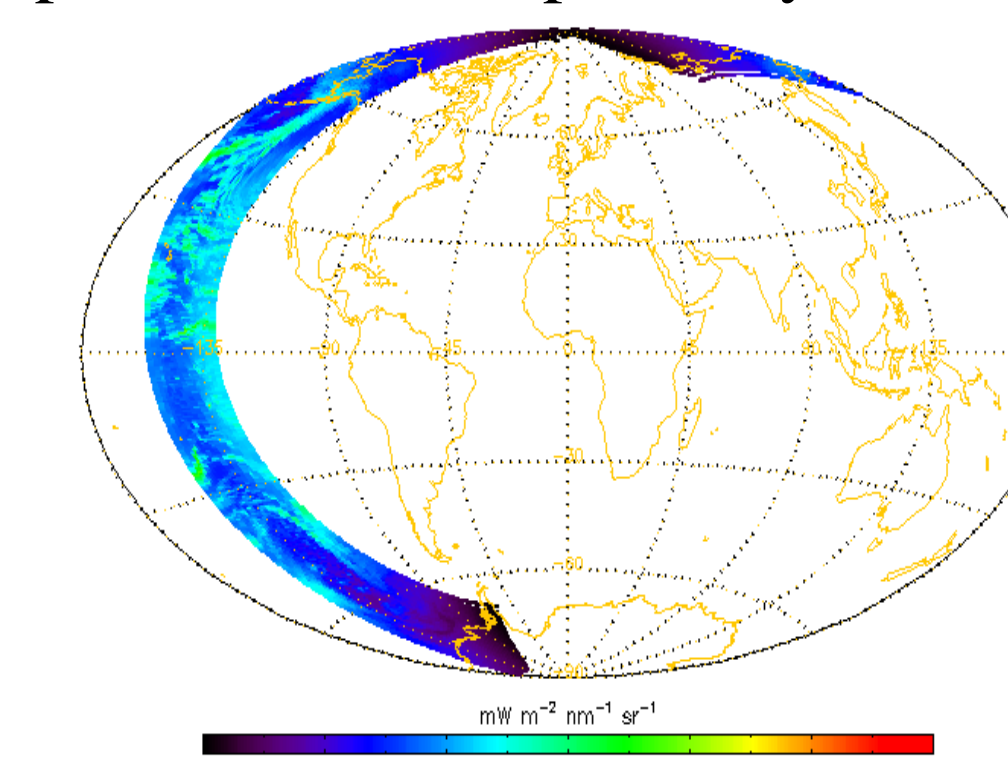
EV SDR Radiance and Radiance Error



Impact of in-flight Dark Signal Drifting on the SDR Products Radiance

OMPS Granule 03232012.O2093

EV data covers longitudes from -179.95 to 179.89 deg, and latitudes from -89.52 to 85.4 deg. The dark image data used for the earth view signal correction are measured on Nov. 11, 2011 and April 06, 2012, respectively.



Radiance ($W/m^2-sr-\mu m$) at 299.72 nm

