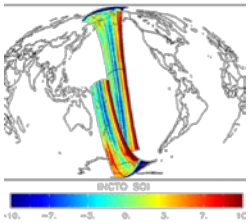
Suomi NPP OMPS EV SDR Delta Review

Fred Wu, OMPS SDR Team Lead

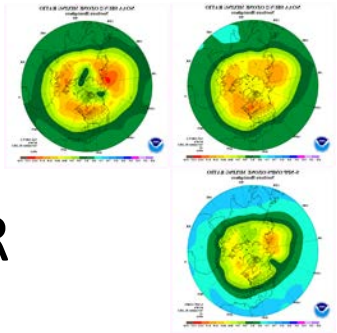
June 3, 2014

Remaining Issues from Dec 2013

- OMPS instrument performance is excellent, but has remaining issues that need to resolved in OMPS EV SDR
- Cross-track effects in NM need to be addressed.
  - SDR Team has a plan, needs to be implemented.
  - Some of these issues may be address by EDR algorithm
  - Wavelength Registration

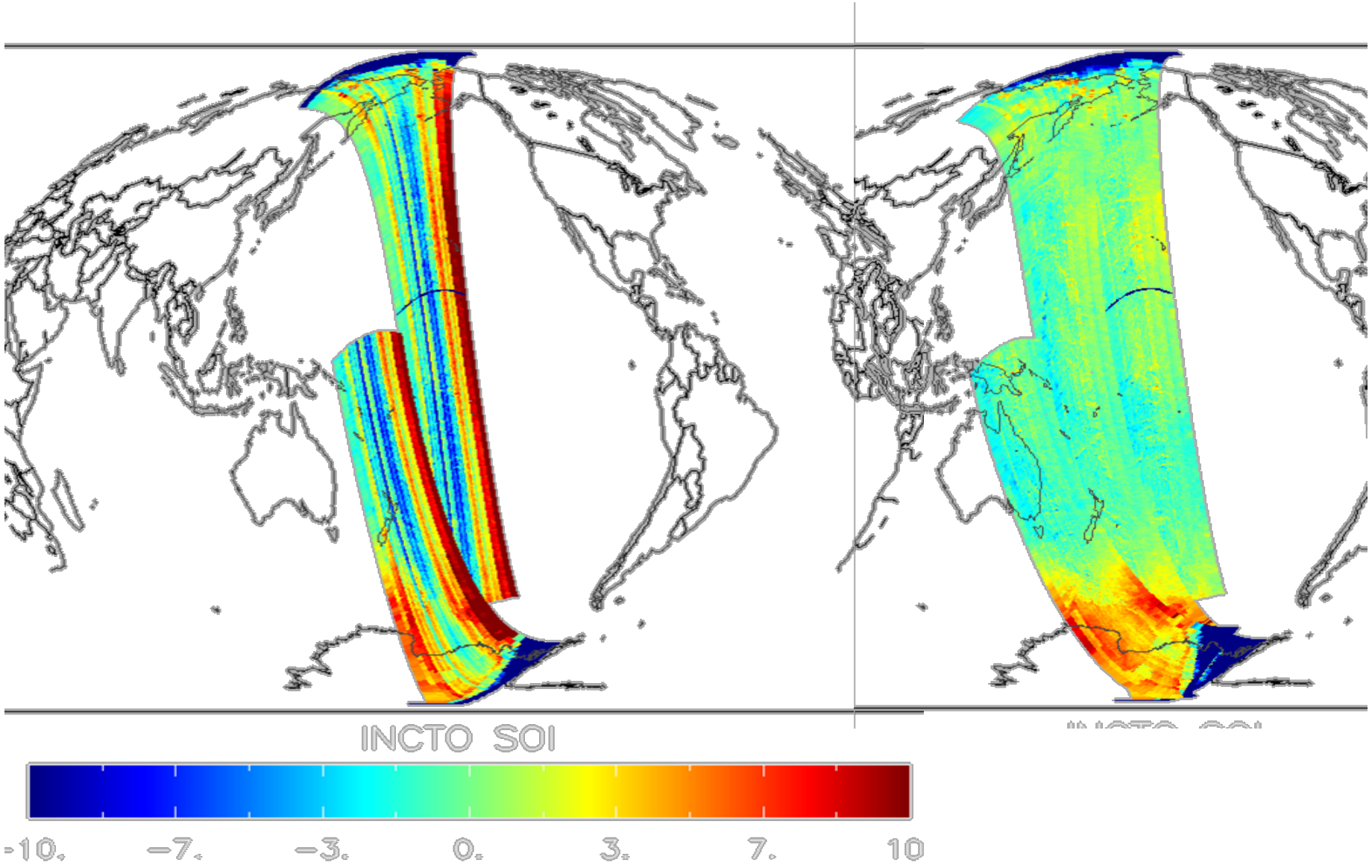


- Stray-light improvements still needed in NP SDR.
  - Stray Light Correction

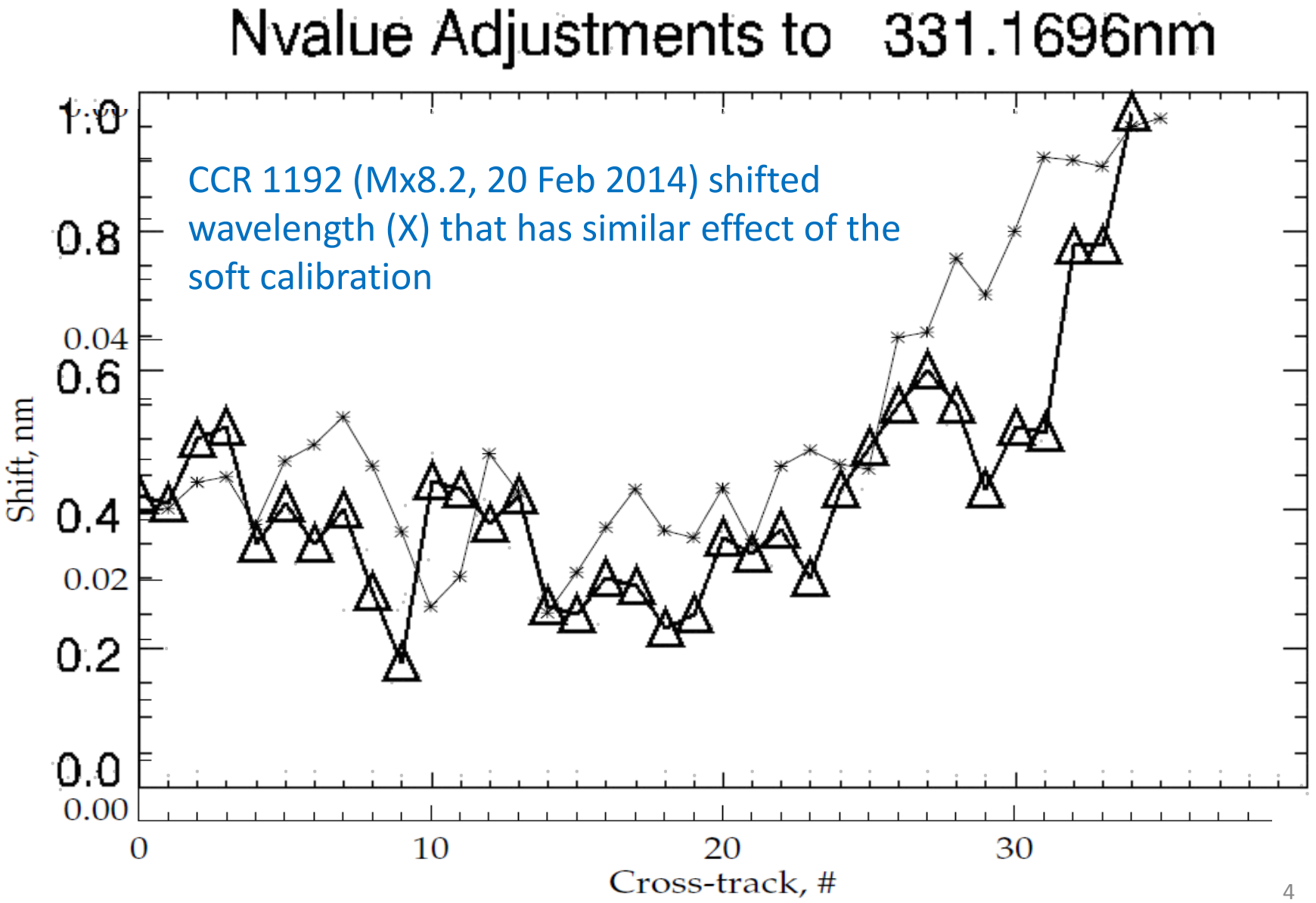


- Artificial separation between EV SDR and Cal SDR should be eliminated.
  - Cal SDR production in GRAVITE is a good solution. Why is it taking so long to implement?
  - CAL SDR Transition.

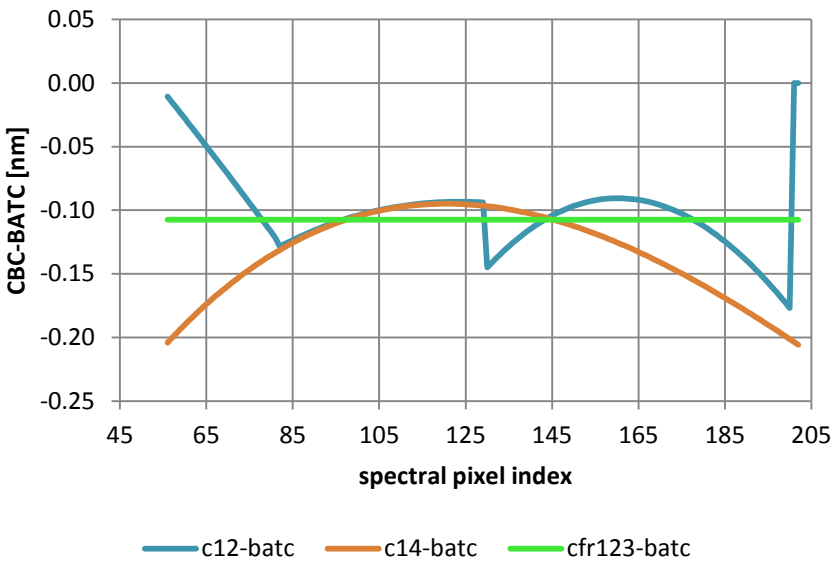
Wavelength Registration (1/3)

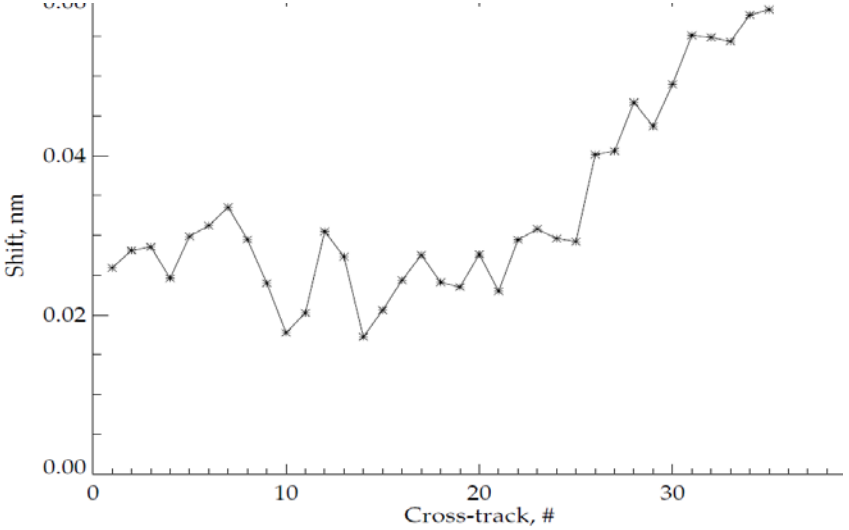


Wavelength Registration (2/3)



Wavelength Registration (3/3)

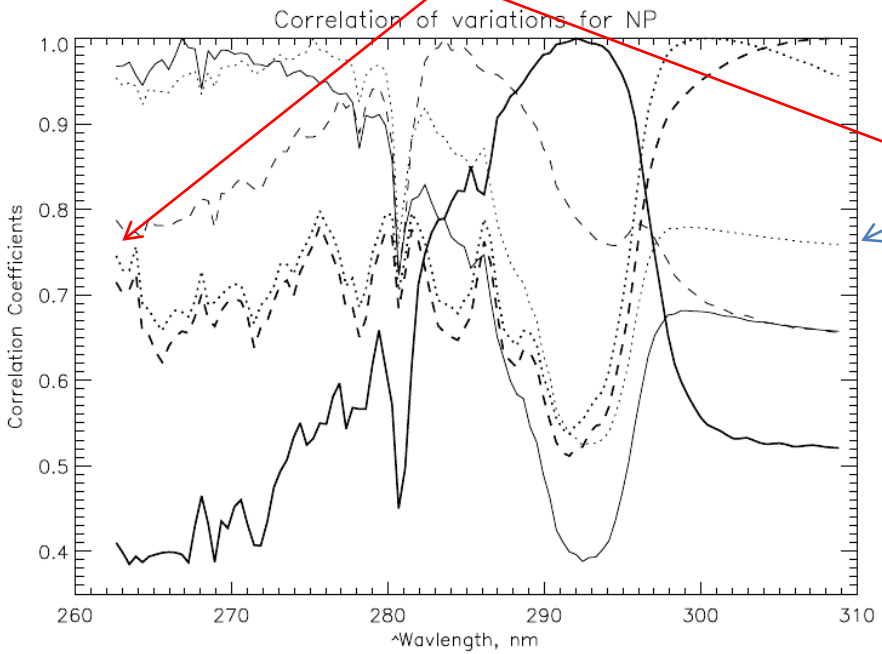




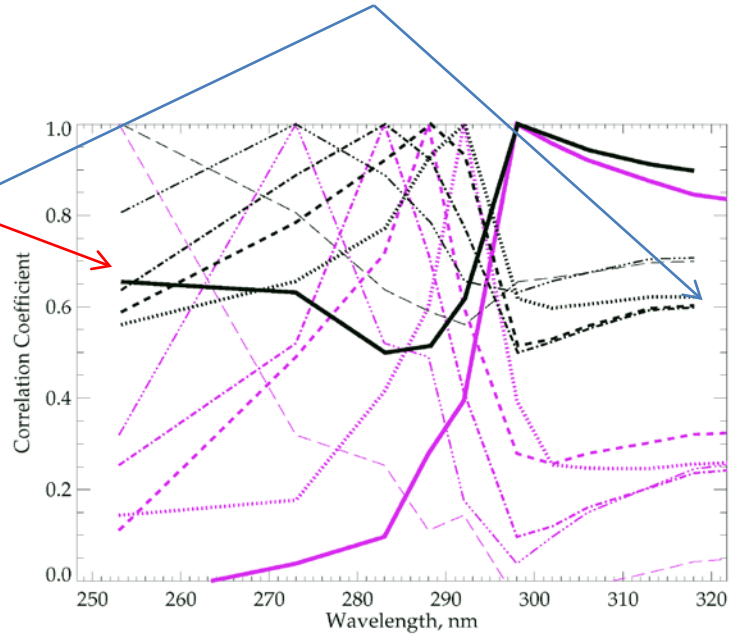
DR 7654 & 7655 will update a LUT for NP (left) and NM (right) to minimize the required shift.

Stray Light Correction - NP

298 nm: 0.75 to 0.65 (goal is <0.3)



273 nm: 0.75 to 0.60 (goal is <0.3)



Before (left), After (right), and Goal (purple)

CCR 1249 (Mx8.3, 18 Mar 2014) corrected part of the NP stray light.

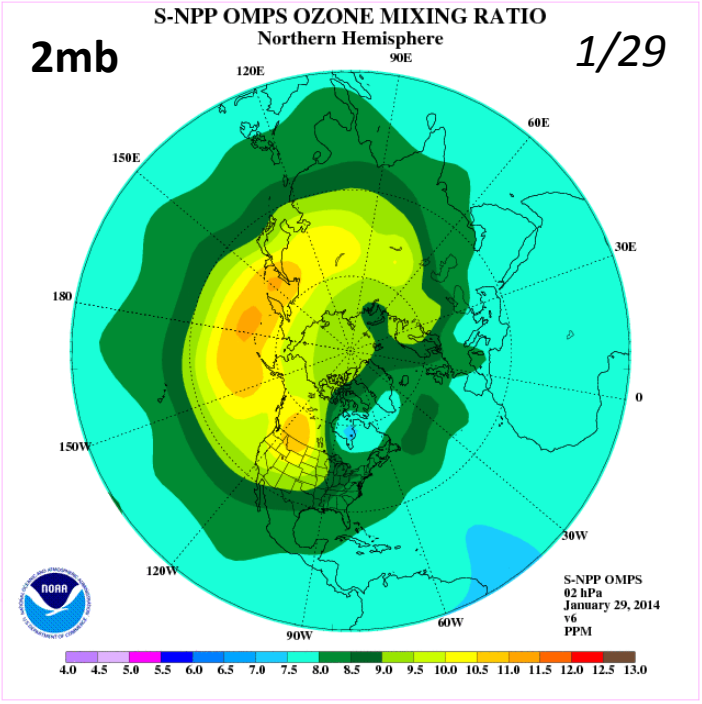
Further improvement is being investigated (DR 7623).

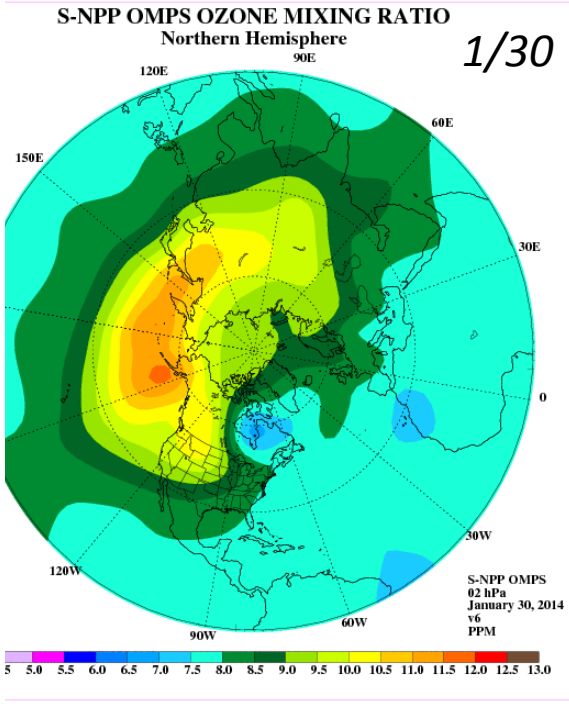
Improvements in O3MR due to addition of 252nm channel

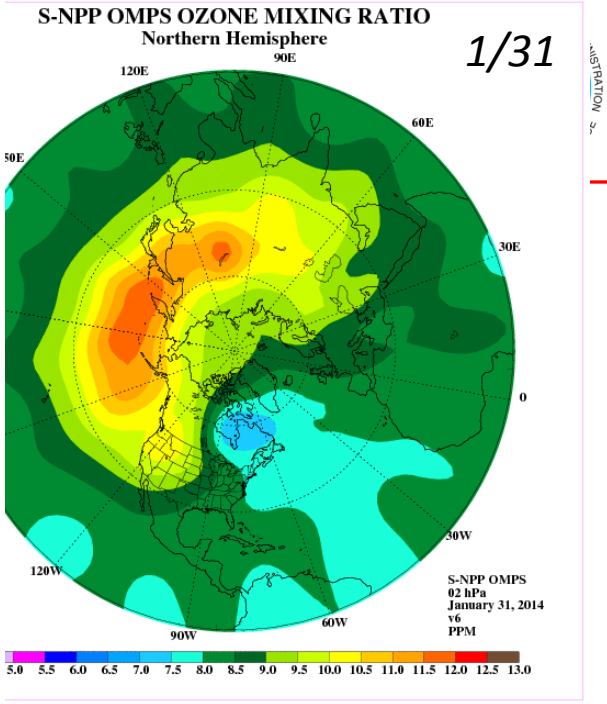
- Most noticeable improvements at 2 and 3 hPa.
- The OMPS v6 o3mr at 2mb now looks very similar to the N19 SBUV/2 2mb analysis.
- Further improvement with OMPS NP stray light correction.

- **note that 2/01 is the same as 1/31 since there is no new obs for 2/01.*

2mb


S-NPP OMPS OZONE MIXING RATIO
Northern Hemisphere
1/29
S-NPP OMPS
02 hPa
January 29, 2014
v6
PPM
4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0


S-NPP OMPS OZONE MIXING RATIO
Northern Hemisphere
1/30
S-NPP OMPS
02 hPa
January 30, 2014
v6
PPM
5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0


S-NPP OMPS OZONE MIXING RATIO
Northern Hemisphere
1/31
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02 hPa
January 31, 2014
v6
PPM
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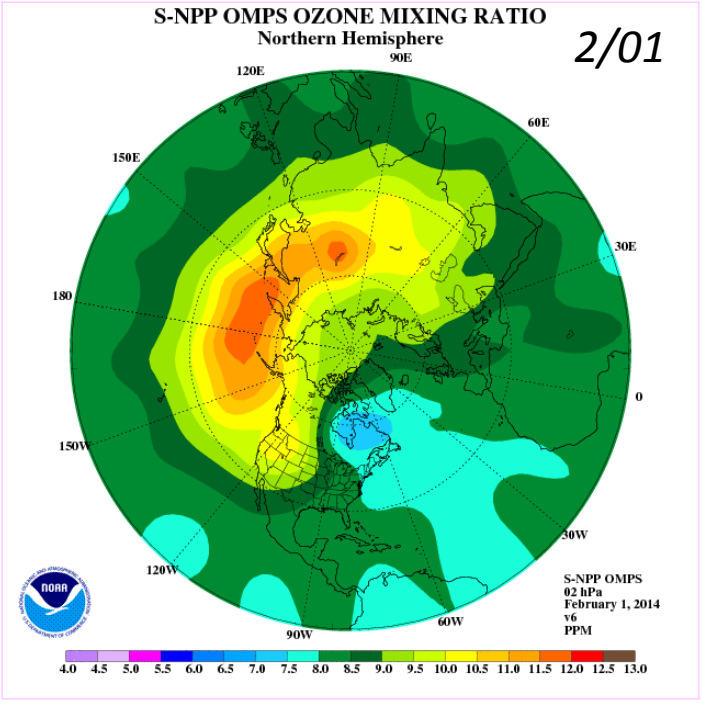
S-NPP OMPS OZONE MIXING RATIO
Northern Hemisphere
2/01
S-NPP OMPS
02 hPa
February 1, 2014
v6
PPM
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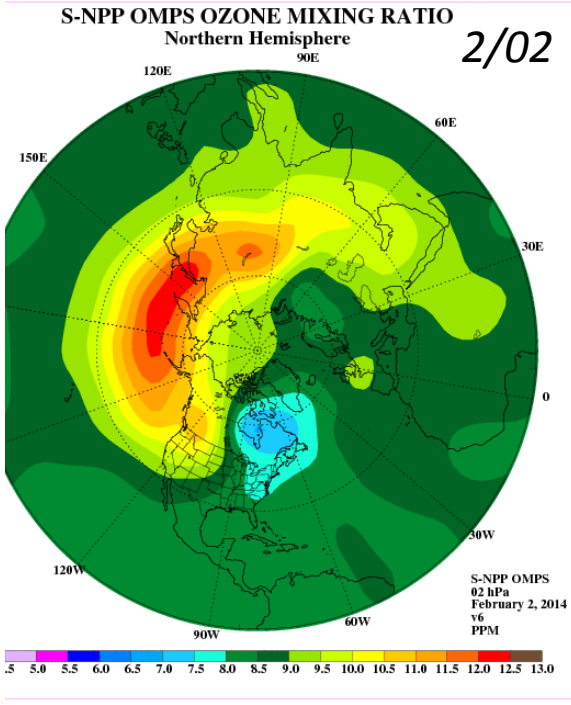
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Northern Hemisphere
2/02
S-NPP OMPS
02 hPa
February 2, 2014
v6
PPM
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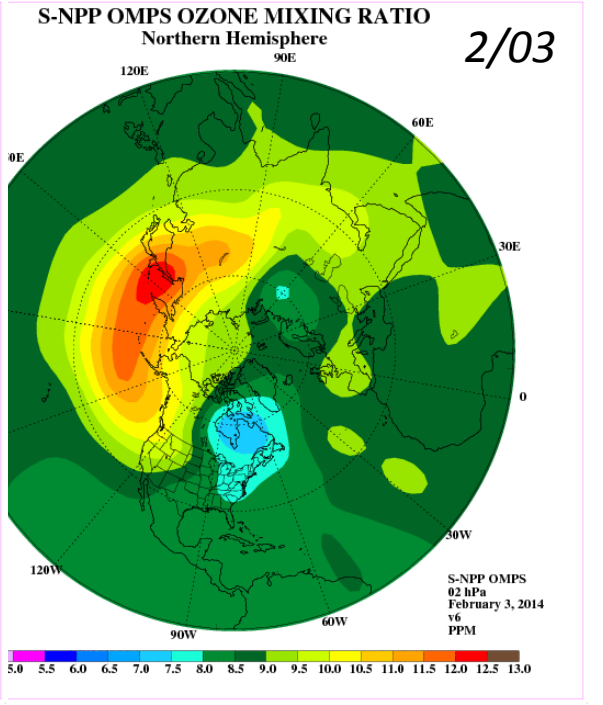
S-NPP OMPS OZONE MIXING RATIO
Northern Hemisphere
2/03
S-NPP OMPS
02 hPa
February 3, 2014
v6
PPM
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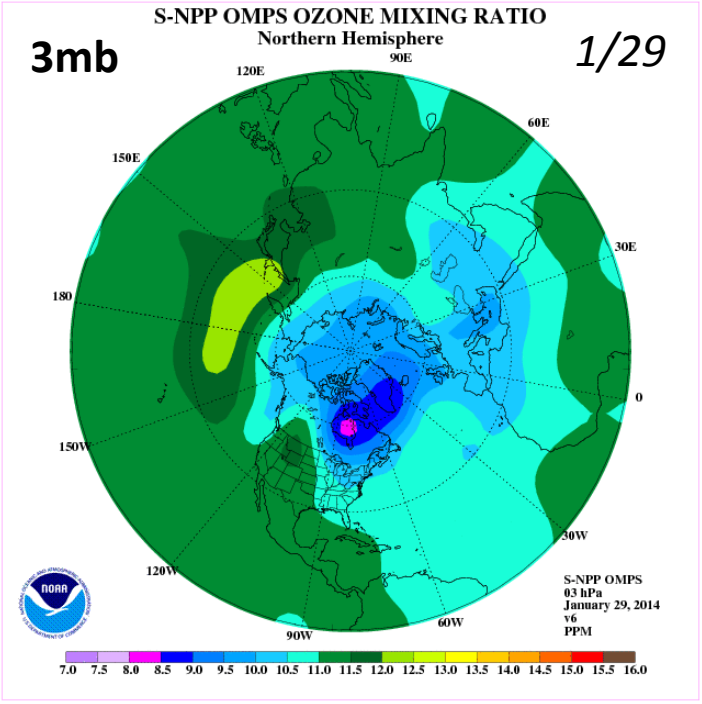
3mb


S-NPP OMPS OZONE MIXING RATIO
Northern Hemisphere
1/29
90E
120E
60E
150E
30E
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90W
S-NPP OMPS
03 hPa
January 29, 2014
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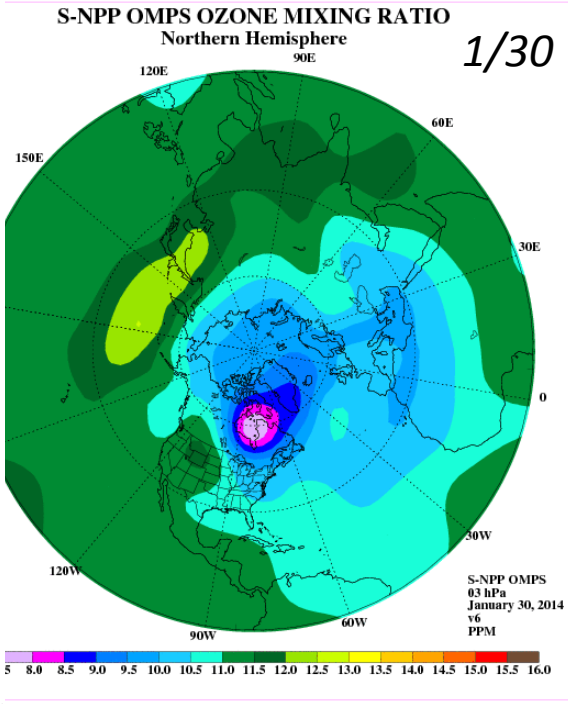
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120E
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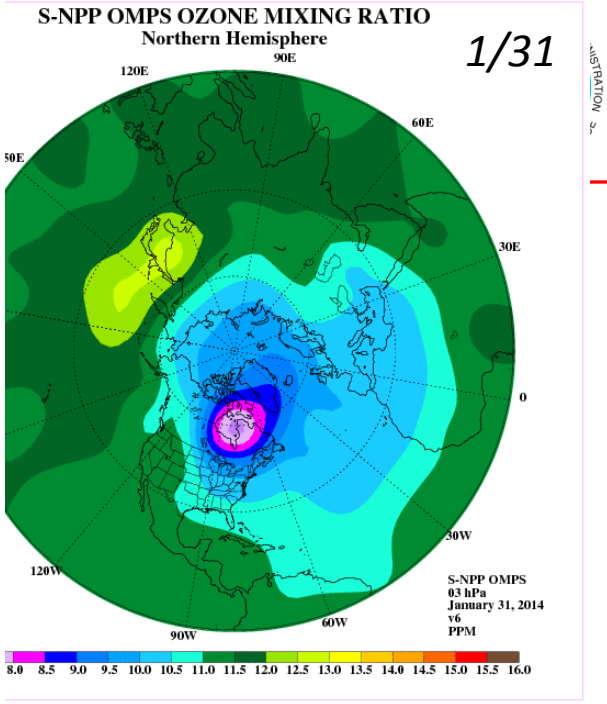
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90E
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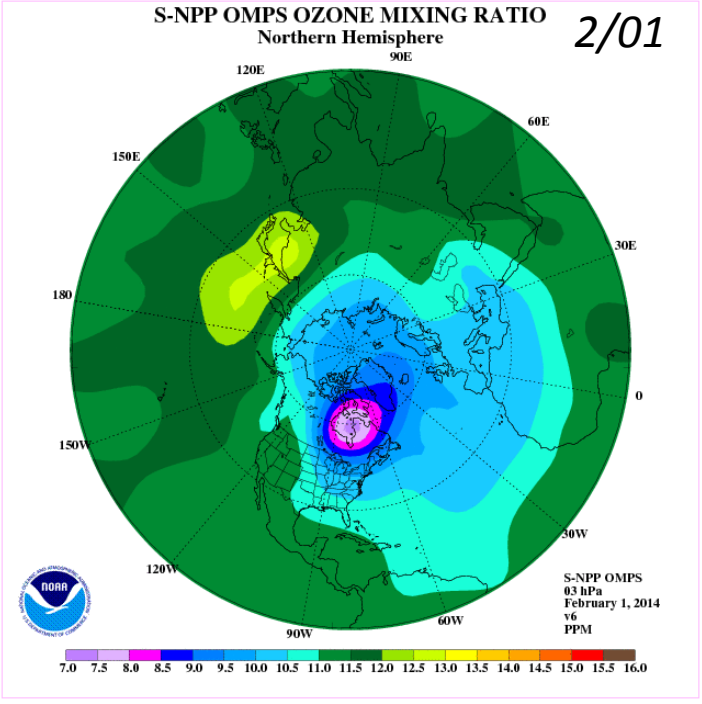
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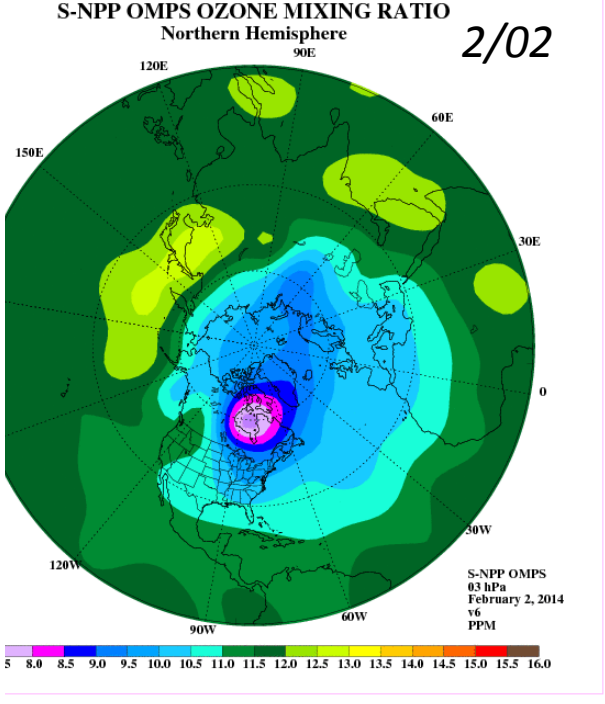
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February 2, 2014
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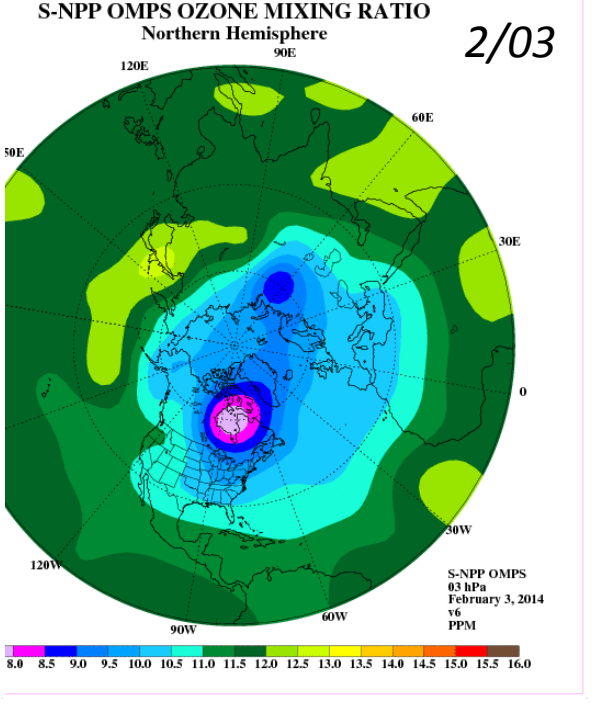
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PPM
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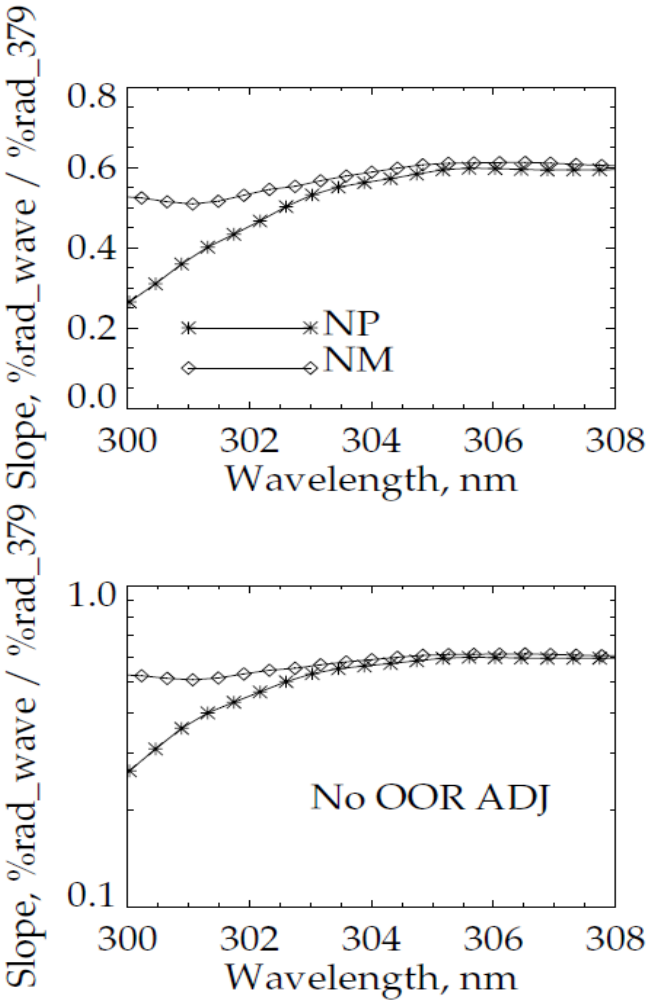
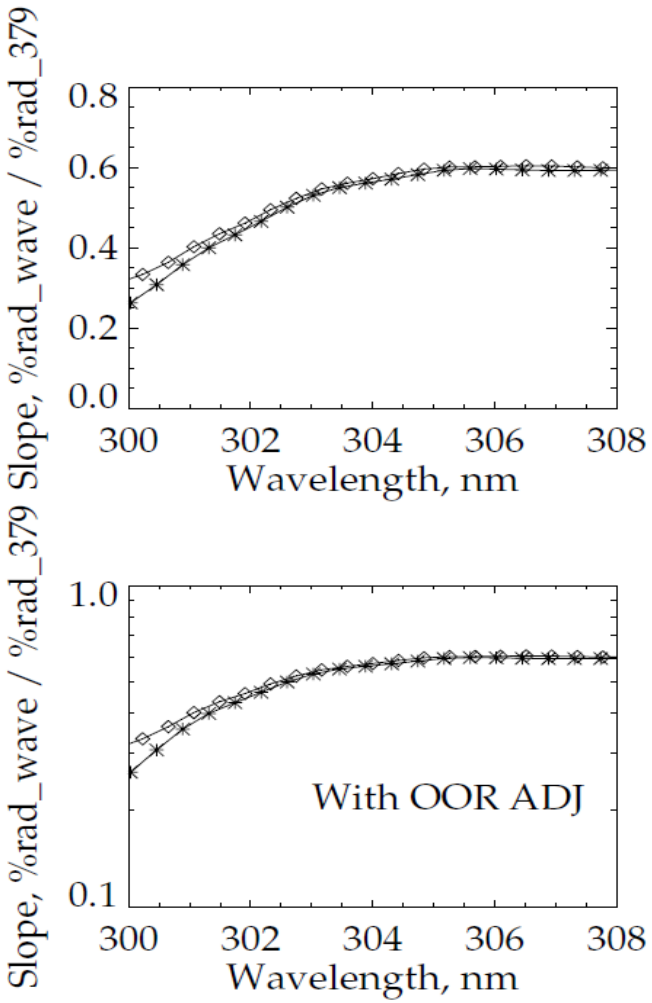
Stray Light Correction - NM





CAL SDR Transition

GRAVITE OMPS SDR Cal Integration Design Review

April 17, 2014

Pat Purcell,
JPSS DPES SEI& T Manager

Documentation

- ATBD – updated.
- Users' Manual – optional
- Error Budget – updated

Other Improvements

- DR 7315 (Revise bias correction to remove negative smear in NM) – CCR 1672- LUT update, out of cycle implementation expected by first week of July
- DR 4818 (Revise bias correction to remove negative smear in NP) - CCR 1777 – LUT update, out of cycle implementation expected by first week of July
- DR 7630 (Revise the incorrect use of 94 as spatial bin size in NP bias calculation) - CCR 1798 – under regressing testing. Expected AERB approval on June 4, 2014 and implementation in 8.6
- DR 7014 (Modification of CDFCB dark fields)- Work under PCR – Expected implementation for 8.5
- DR 7253 (Field modifications in the CDFCB for OMPS NP dark orbit and id information) - Work under PCR – Expected implementation for 8.5
- DR 7613 (Obsolete QF for NM) - CCR 1766 – approved May 28
- DR 7614 (Obsolete QR for NP) - CCR 1767- approved May 28

Path Forward

- Suomi NPP
  - Instrument and SDR performance monitoring, characterization, and improvement.
  - Support instrument cal/val (e.g., orbit adjustment, anomaly resolution)
  - Complete documentation (Users' Guide)
  - SDR software improvements
    - Stray light correction
    - Wavelength registration
  - Transition CAL SDR operation to GRAVITE.
- JPSS J1
  - Analyze TVAC data and derive LUT for J1.
  - Develop science code for J1
    - More wavelength and higher data rate for EV SDR
    - New algorithm for CAL SDR
  - Test data (high resolution data from S-NPP)

Summary

- With additional accomplishments since December 2013, the OMPS nadir EV SDRs are found to have
  - Characterized for on-orbit sensor performance
  - Defined SDR product uncertainties over a range of representative conditions
  - Adjusted calibration parameters accordingly, pending soft calibration that can be applied to validated SDRs
  - Plan for later improved version
  - Strong versioning with documentation
  - Been ready for use in applications and scientific publication
- Request to declare that OMPS nadir EV SDR be Validated