OMPS Nadir Calibration
L1b Product Status and Outlook

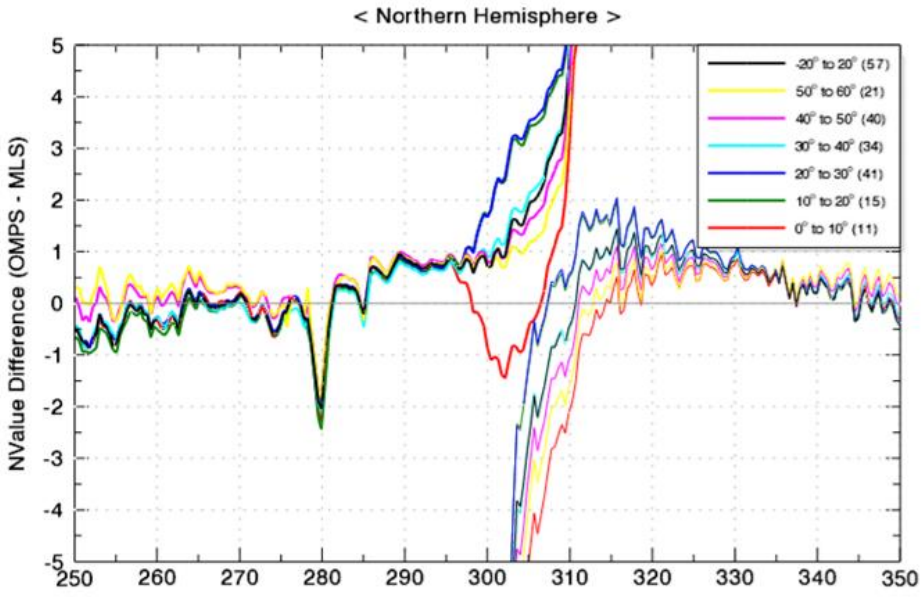
NASA OMPS Nadir Group
(Cal/Val, SIPS, Science Team)

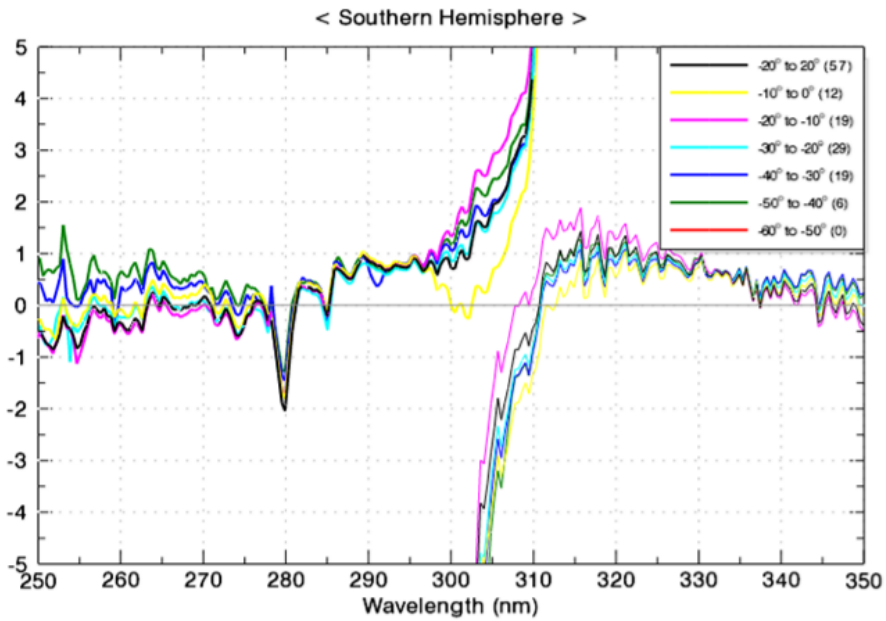
OMPS Nadir Calibration Summary

- Analysis of product indicates that OMPS nadir sensors generally performing within specification
  - Seftor, C.J., G. Jaross, M. Kowitt, M. Haken, J. Li, L.E. Flynn (2014), Post-Launch Performance of the Suomi NPP Ozone Mapping and Profiler Suite (OMPS) Nadir Sensors, *J. Geophys. Res.*, doi: 10.1002/2013JD020472
- V1 NM product scientifically useful
  - Kramarova, N., E. Nash, P. Newman, P. K. Bhartia , R. McPeters , D. Rault , C. Seftor , P. Q. Xu, and G. Labow (2013), Measuring the Antarctic ozone hole with the new Ozone Mapping and Profiler Suite (OMPS), *Atmos. Chem. Phys.*, 14, 2353-2361, doi:10.5194/acp-14-2353-2014
  - Ozone hole monitoring
  - Smoke (particularly from pyrocbs) / volcanic SO_2 and ash / dust monitoring via the aerosol index
- V1 NP product not sufficiently validated
- Analysis indicated 3 major areas left to tackle
  - Stray light
  - Pre-launch calibration (particularly in the 300-310 transition region)
  - Wavelength registration

OMPS/MLS comparison

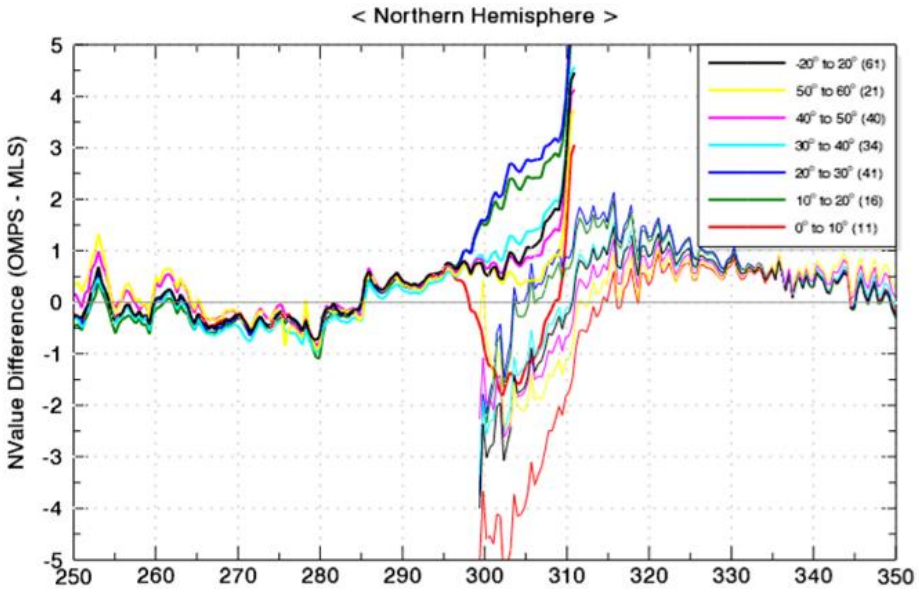
Comparison of normalized radiances calculated using co-located MLS data with OMPS measured NRs

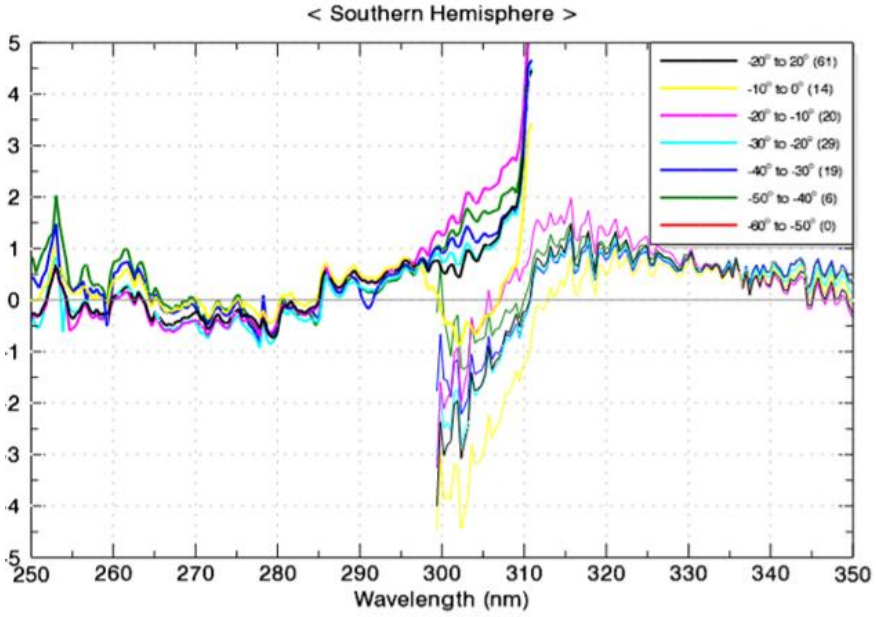




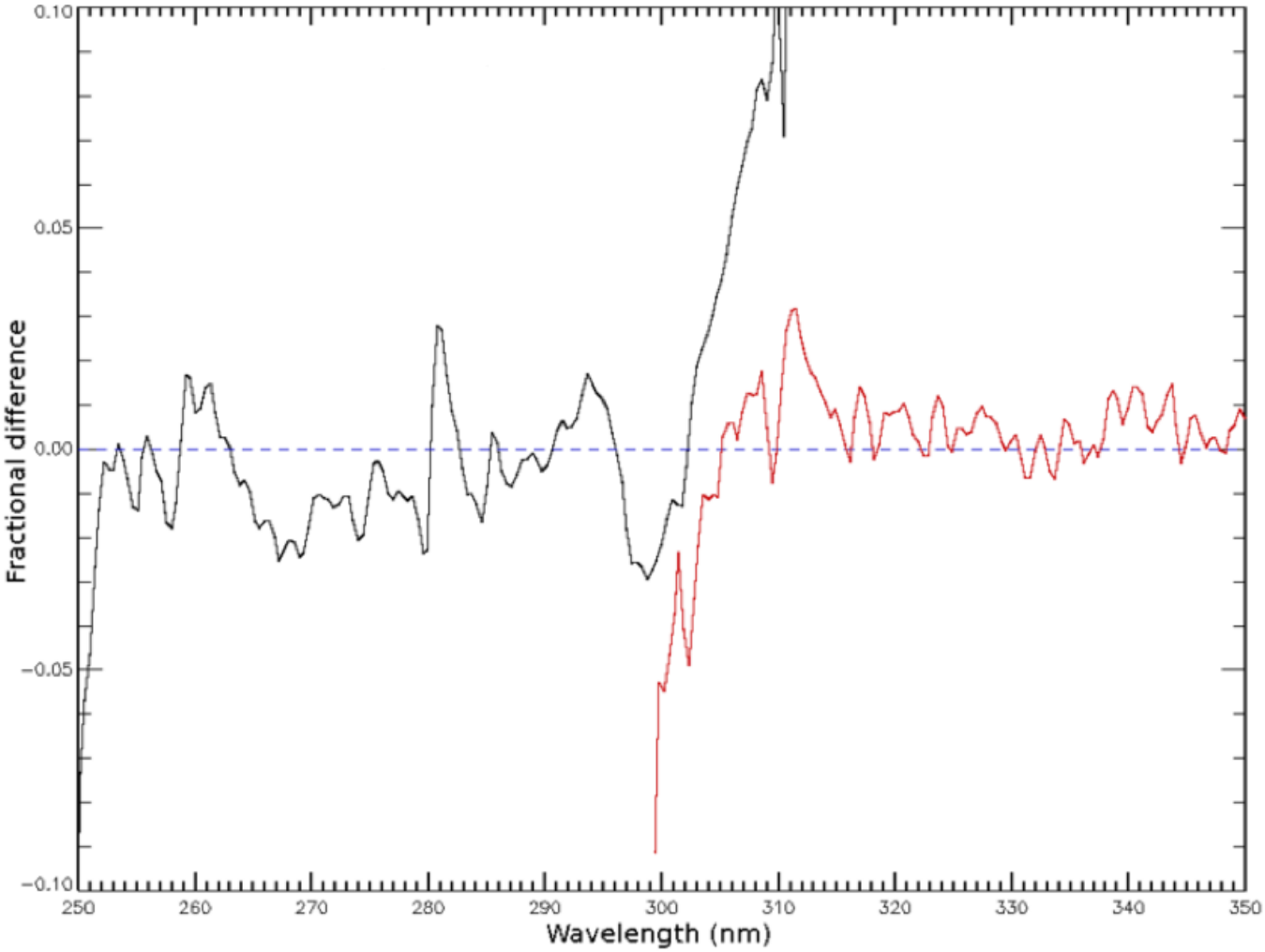
OMPS/MLS comparison

Application of original stray light correction showed improvement





OMPS Solar Flux Compared to Reference Solar Flux

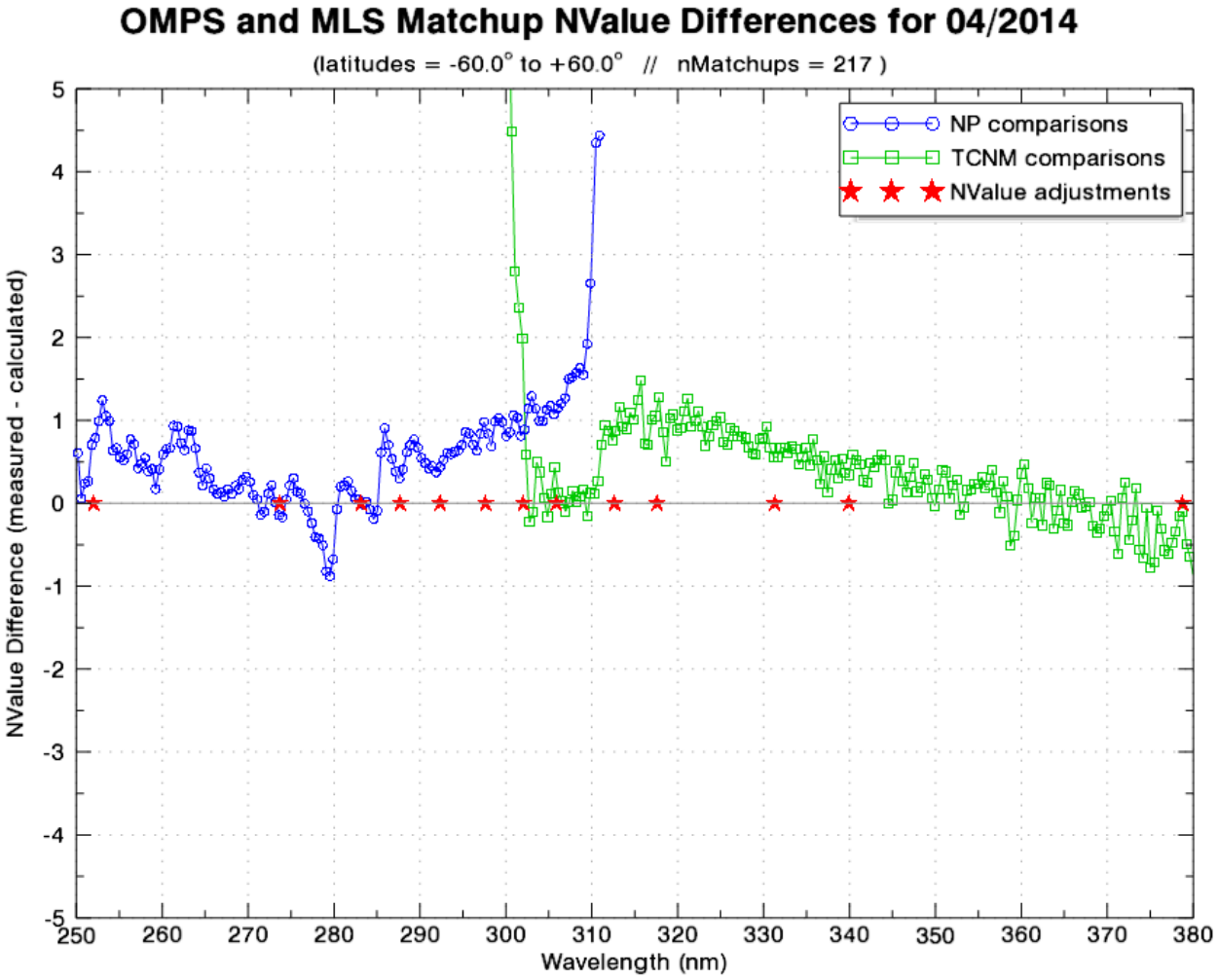


Dichoric correction will resolve issues in transition region

However, correction will leave normalized radiance (NR) unchanged

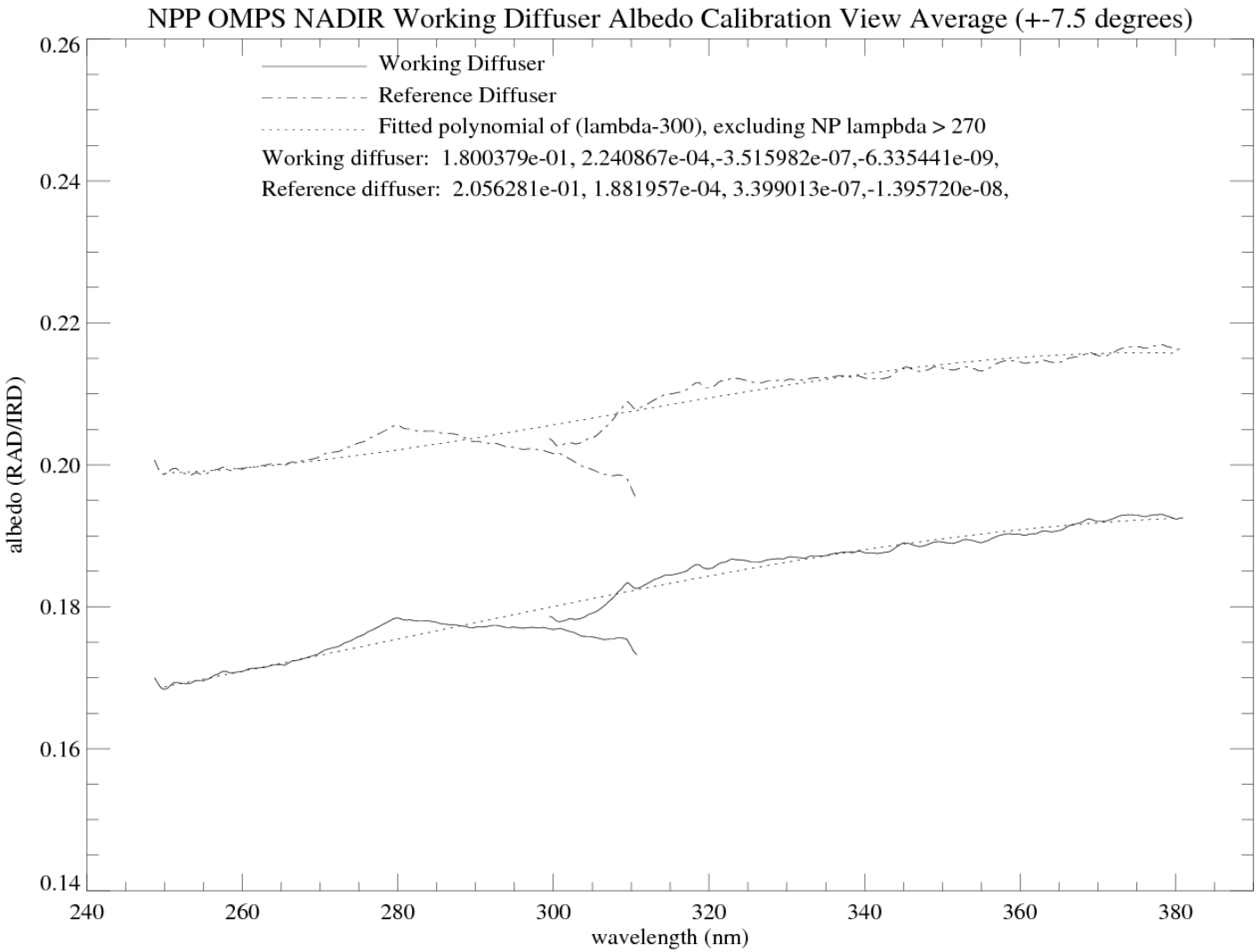
OMPS/MLS comparison

After application of final stray light correction

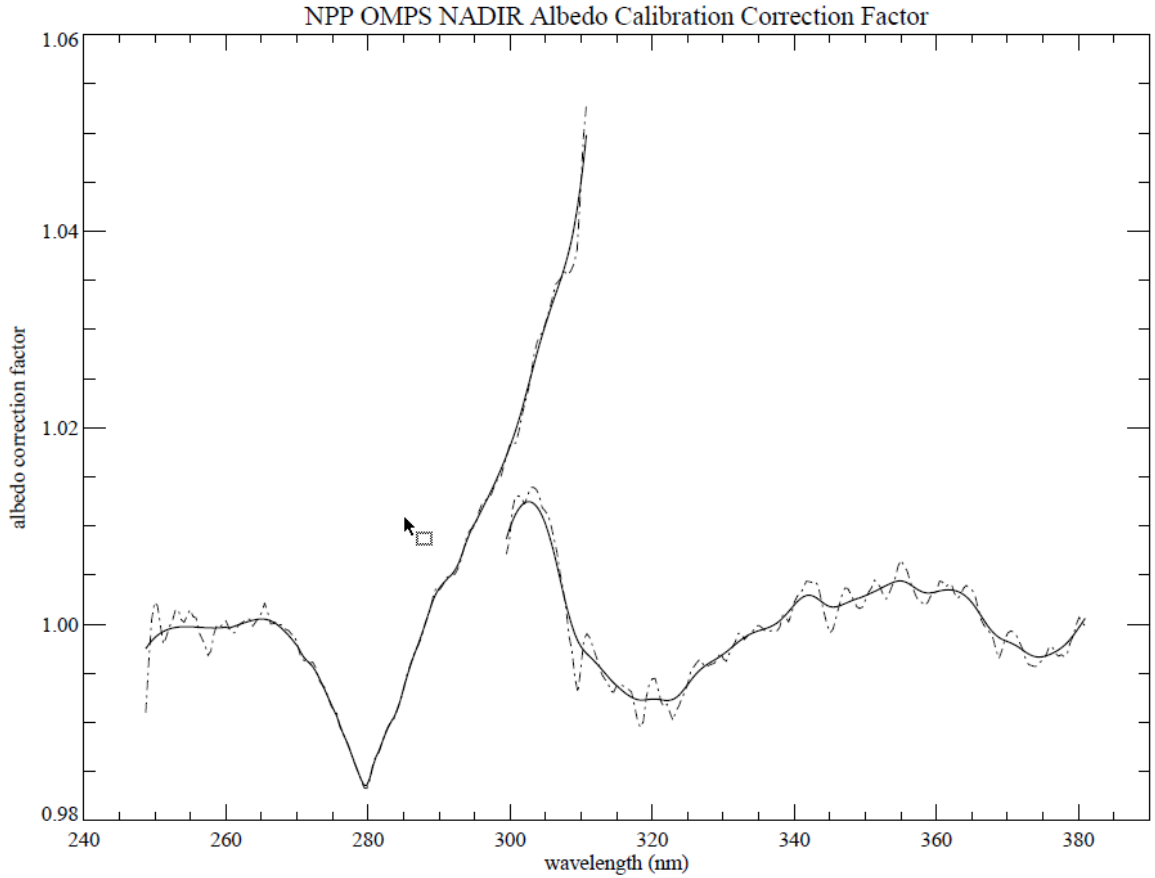


NR issues in transition region will not be resolved by dichroic correction applied to correct solar flux

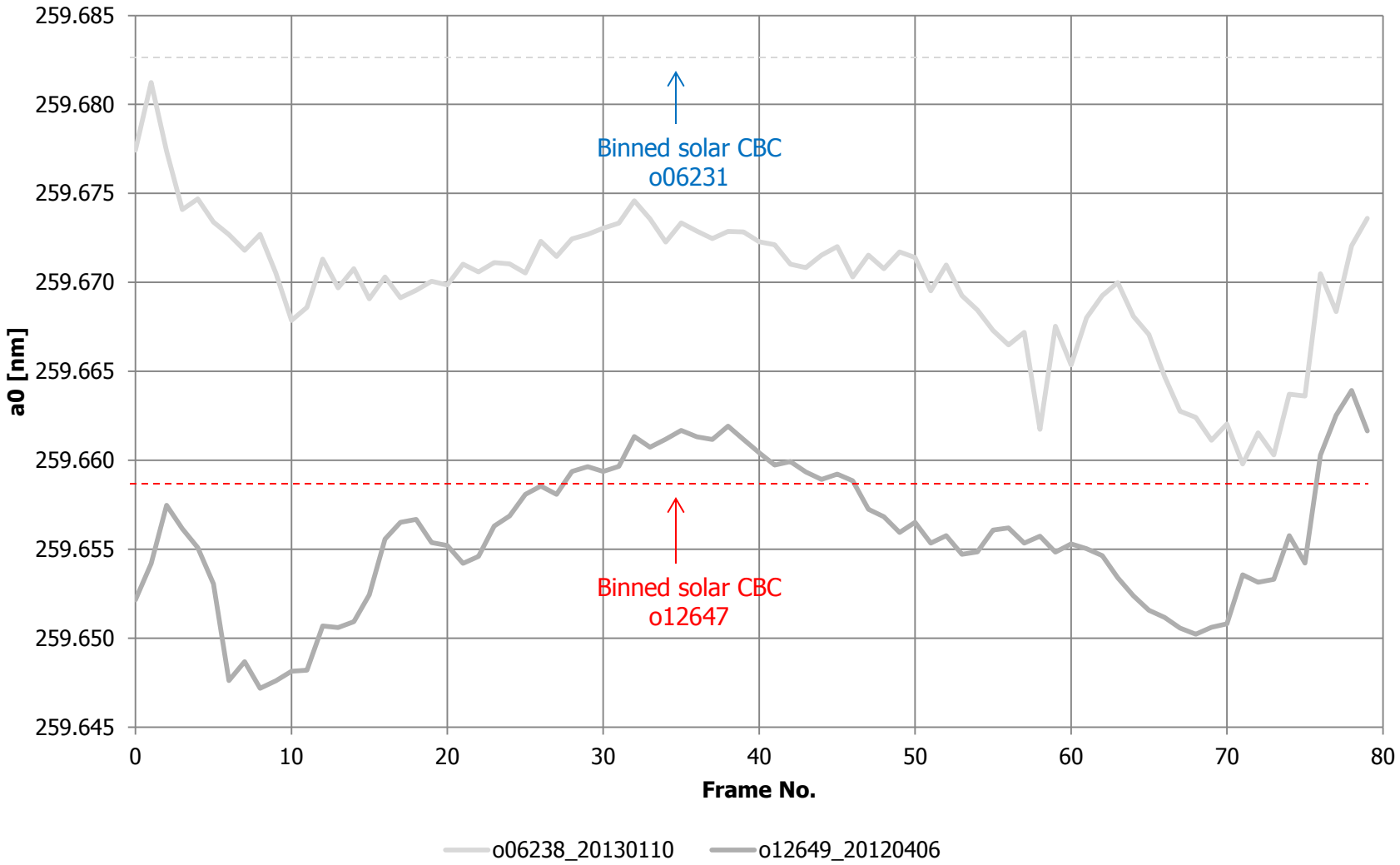
Pre-launch Radiance Calibration Coefficients



Correction to smooth out coefficients will resolve albedo calibration issues



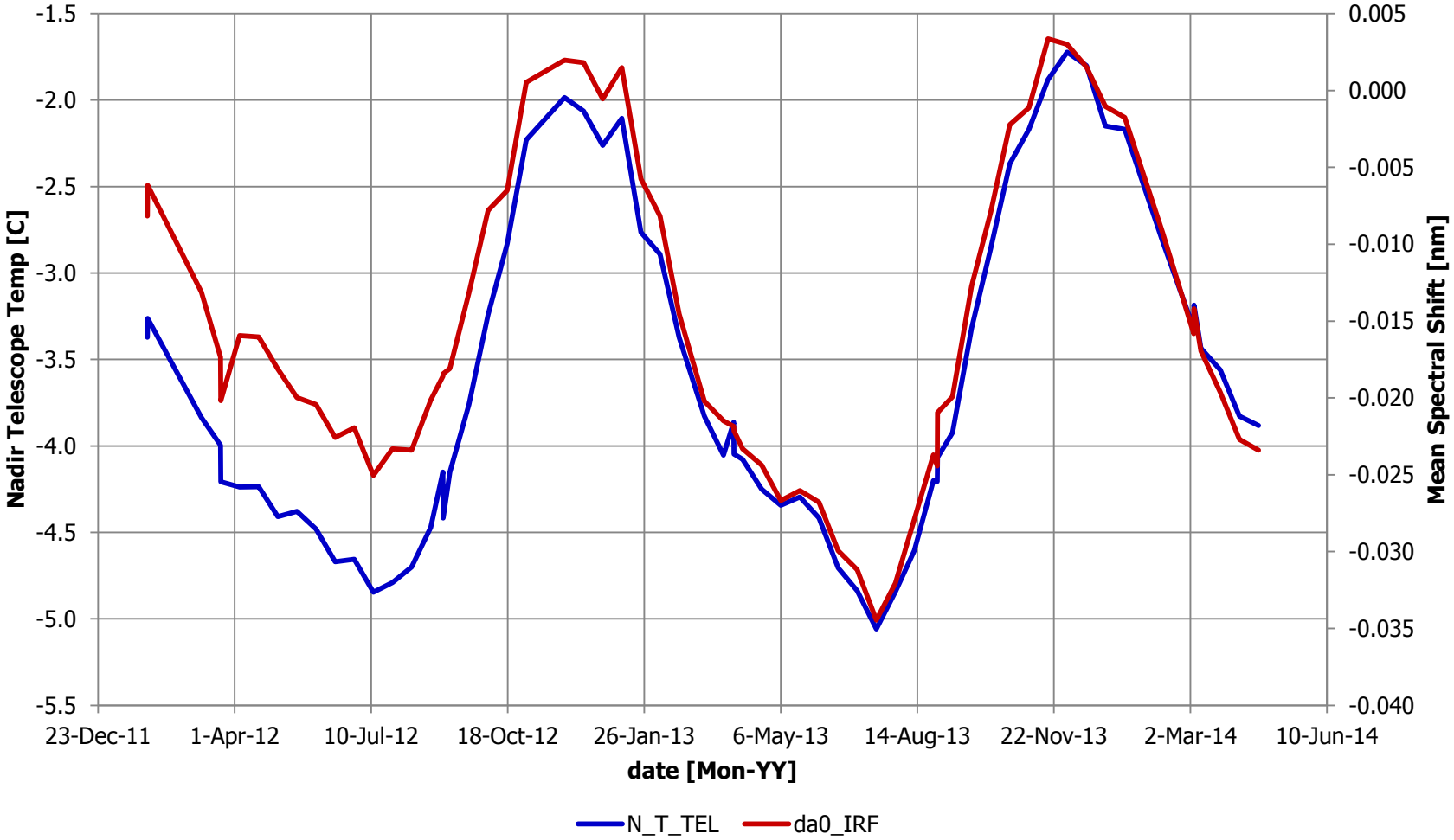
NP EV intra-orbital wavelength shift within 0.01 nm



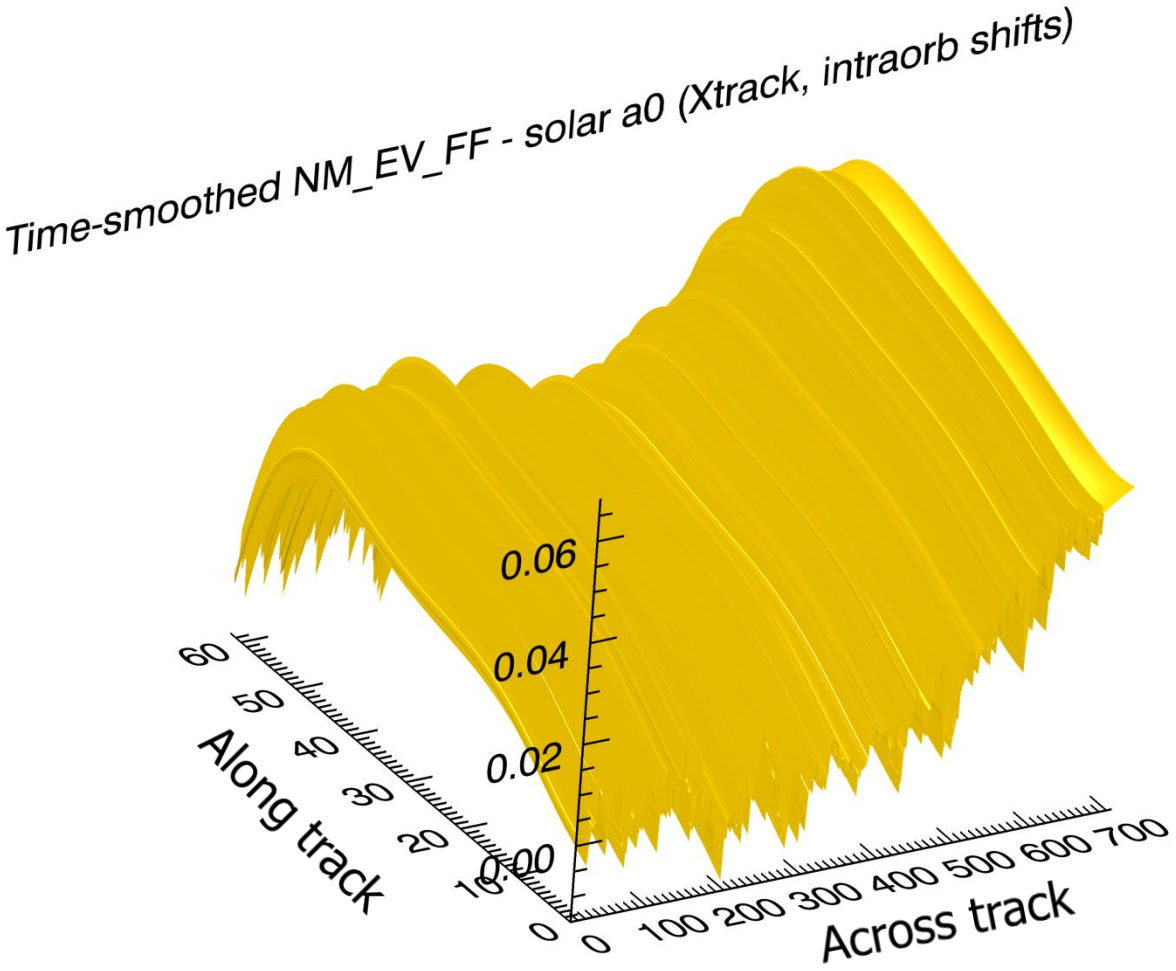
NP "seasonal" wavelength shift is ~0.04 nm, correlated with temperature

Spectral shift in red

Telescope temperature in red



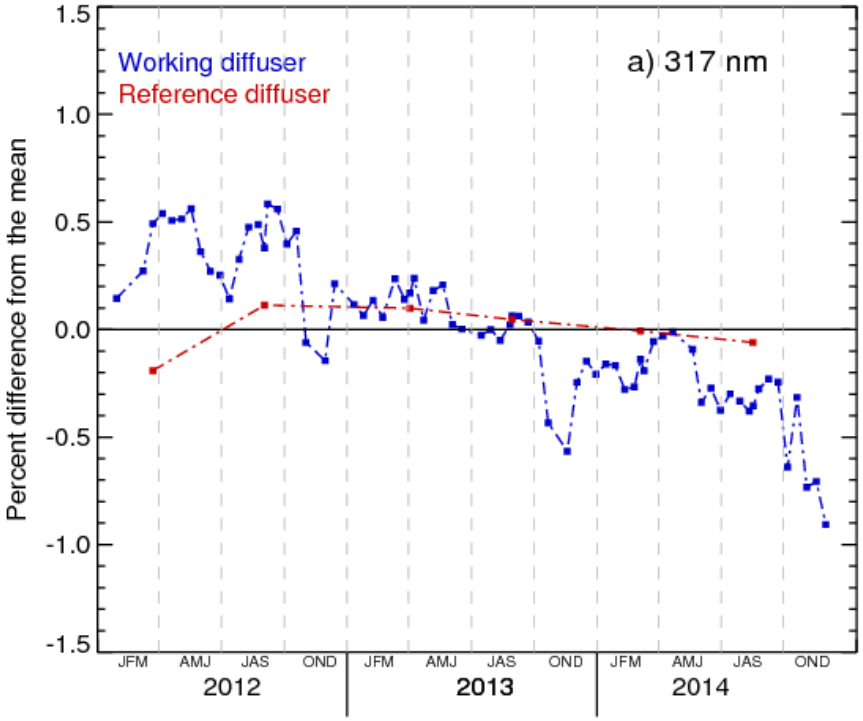
NM earth view shows both a xtrack and intraorbital change

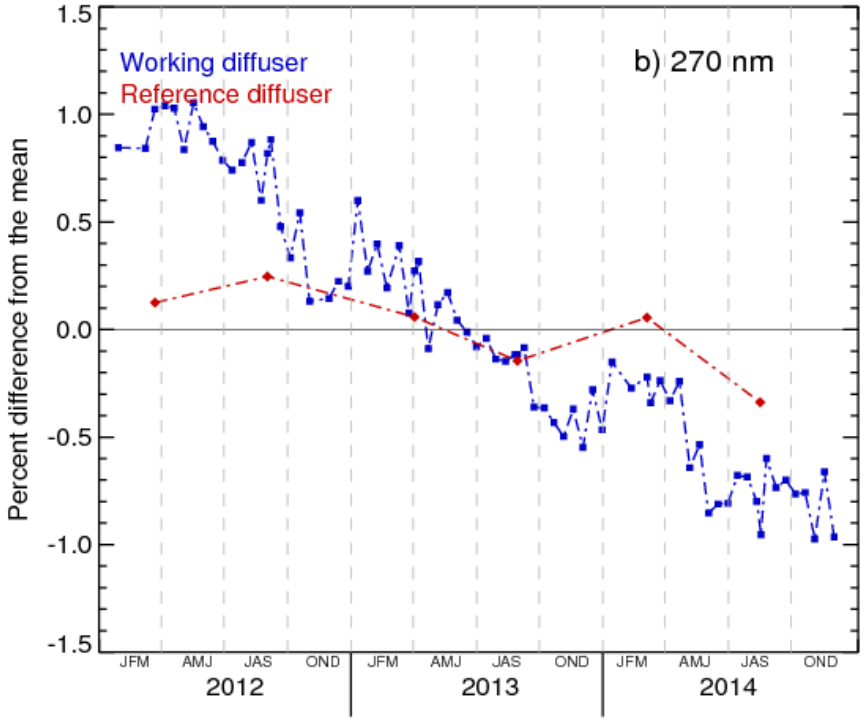


Change approximately 0.03 nm along-track
Up to 0.06 nm across-track

OMPS nadir sensors very stable - solar data indicate no sensor throughput change

Blue points are working diffuser
Red points are reference diffuser





OMPS nadir sensors very stable
Diffusers indicate no sensor degradation

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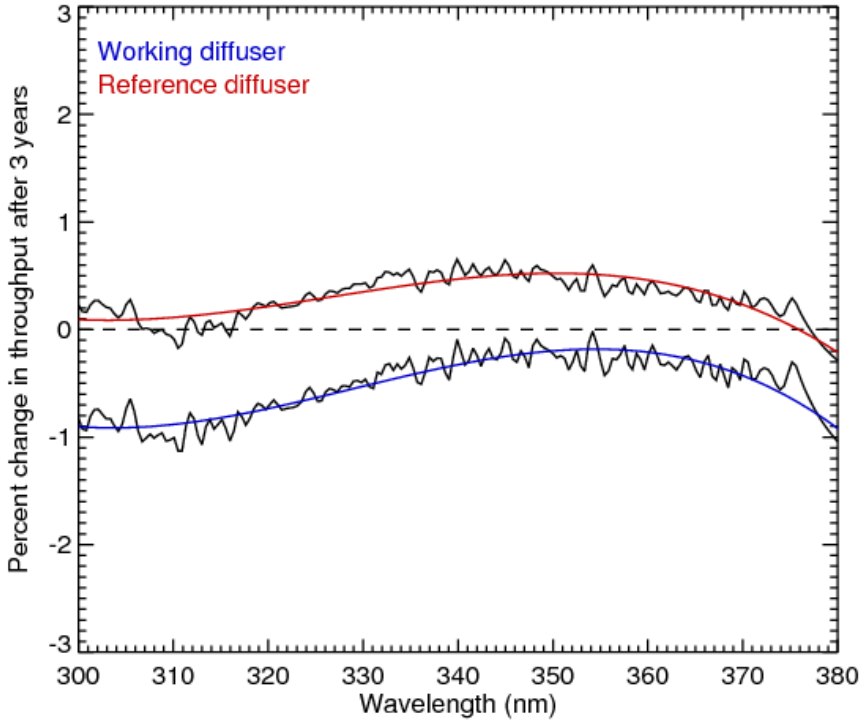

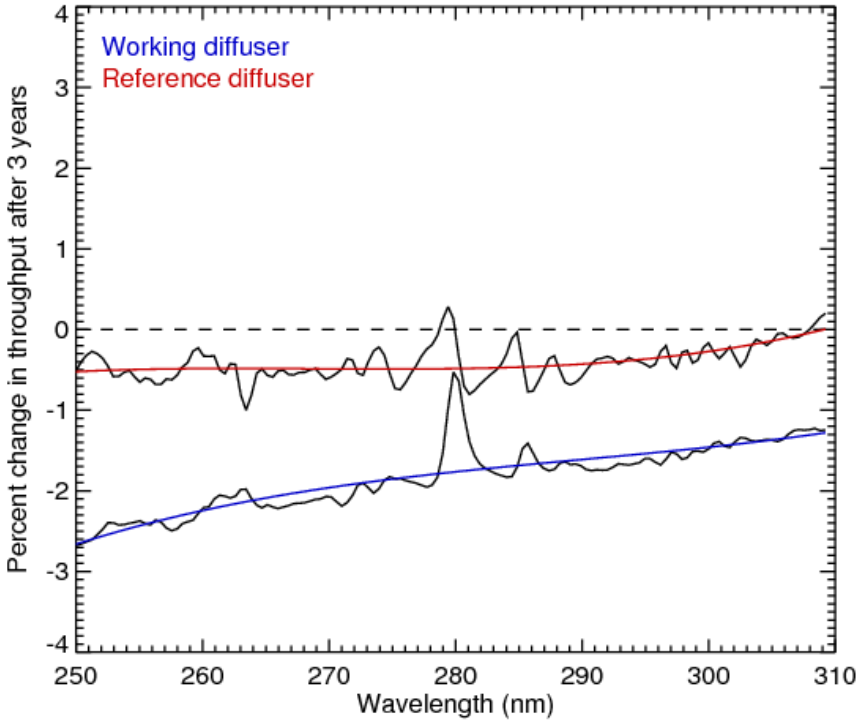

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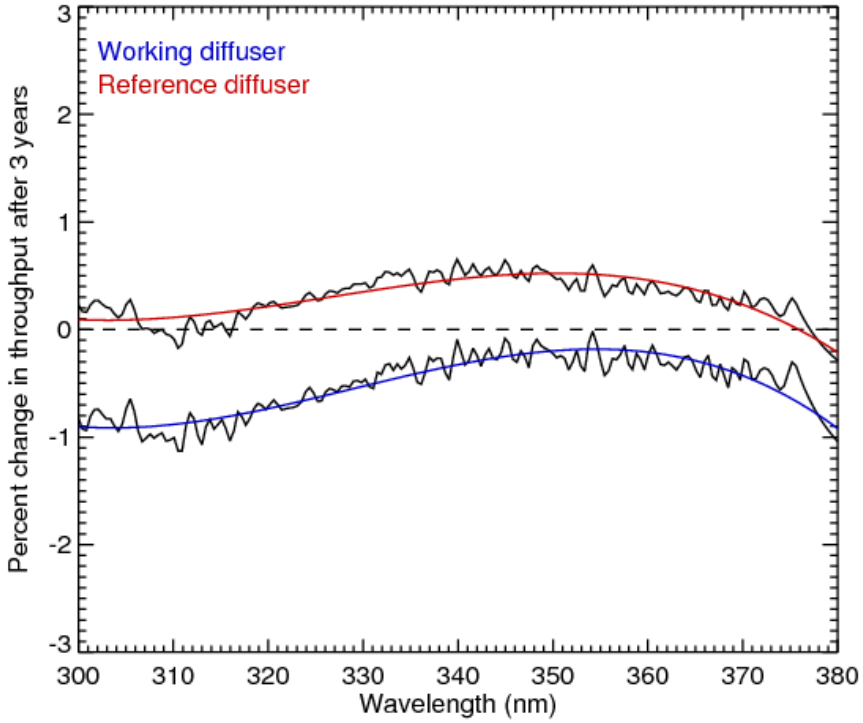
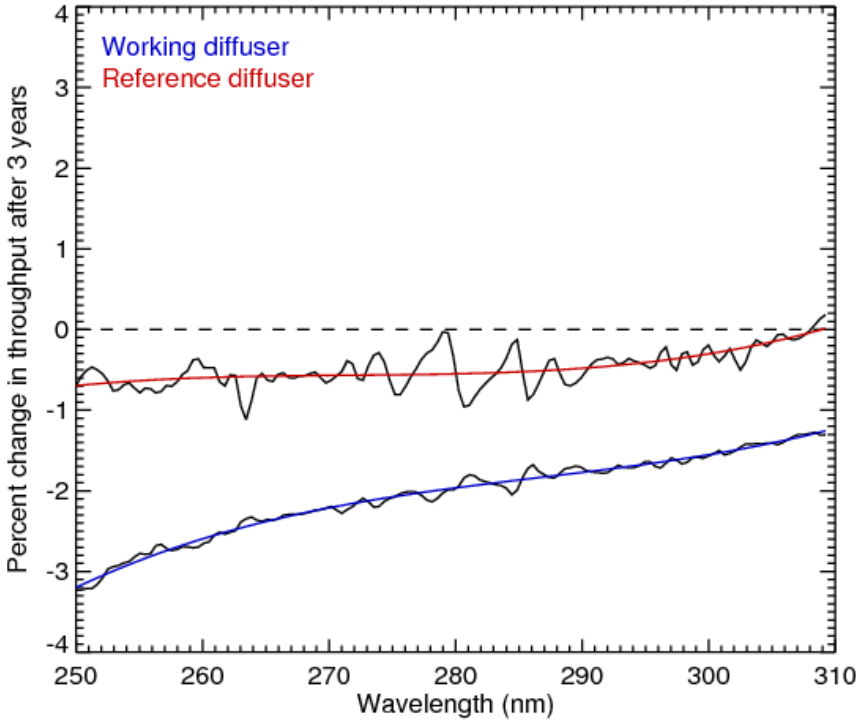
Solar activity corrected





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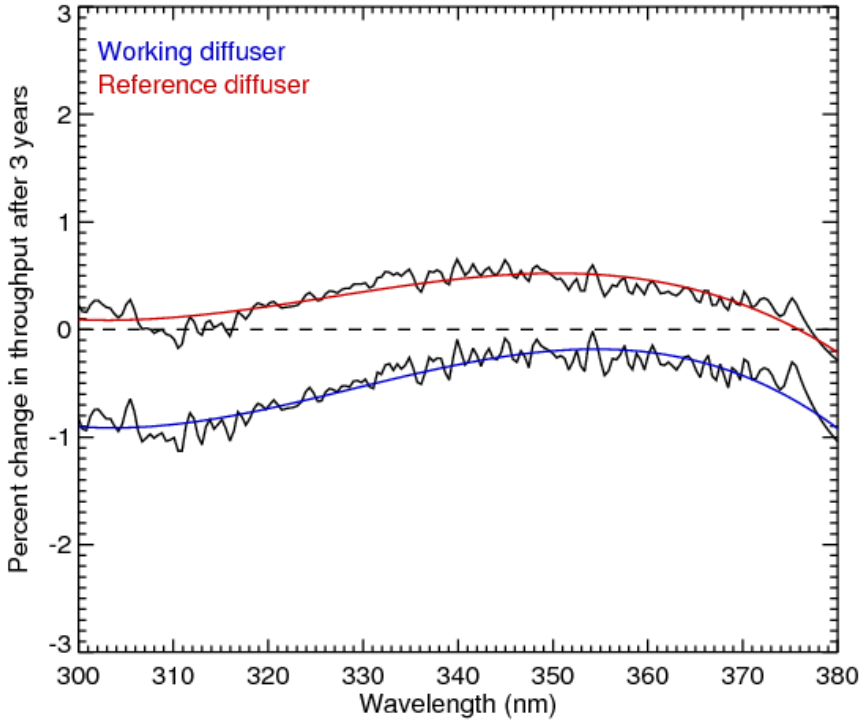
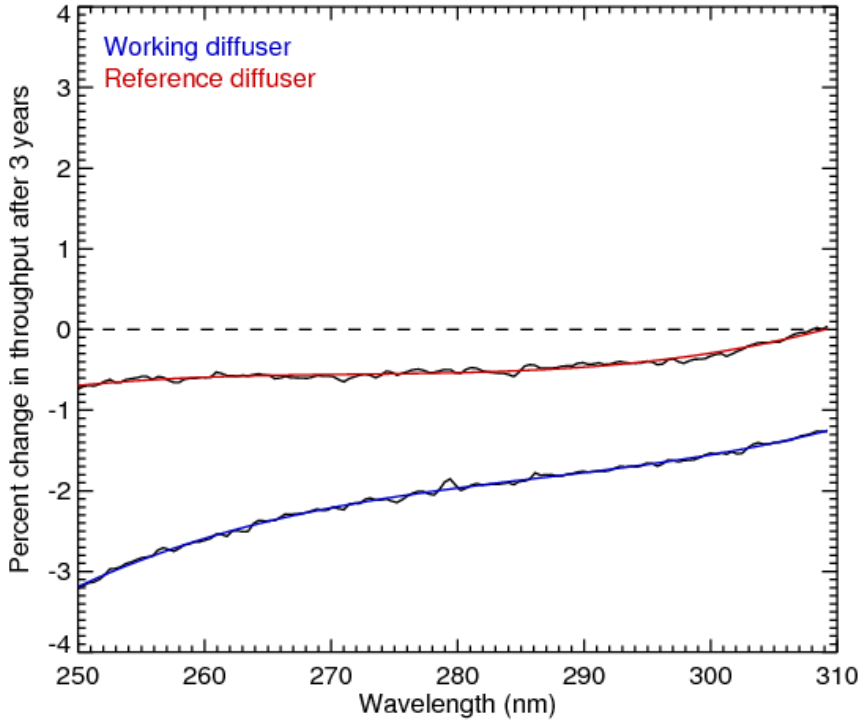
Solar activity, wavelength shift corrected





Level 1B Status and Outlook

- Version 1 is released, being generated "operationally"
  - Still using SDR nomenclature
- Version 2 will be generated December 2014 / January 2015
  - Will revert to L1B nomenclature
  - Will include
    - Stray light correction
    - Corrected wavelength registration to account for xtrack, temporal effects
      - Separate wavelength information for solar, earth view (including wavelengths for each separate swath)
    - Corrected pre-launch calibration coefficients
    - Transient detection and removal
  - No sensor throughput adjustments will be applied to either sensor
  - Ancillary information (snow/ice, terrain pressure, OCP, etc) will be removed
    - Put into a separate HDF5 file for use in the L2 processing
- Initial dataset will be analyzed
  - If necessary, a second reprocessing will be performed
- Release concurrent with release of V2 of L2 products
- ATBD still currently being reviewed "in-house"
  - Will be released to project office for outside review shortly