

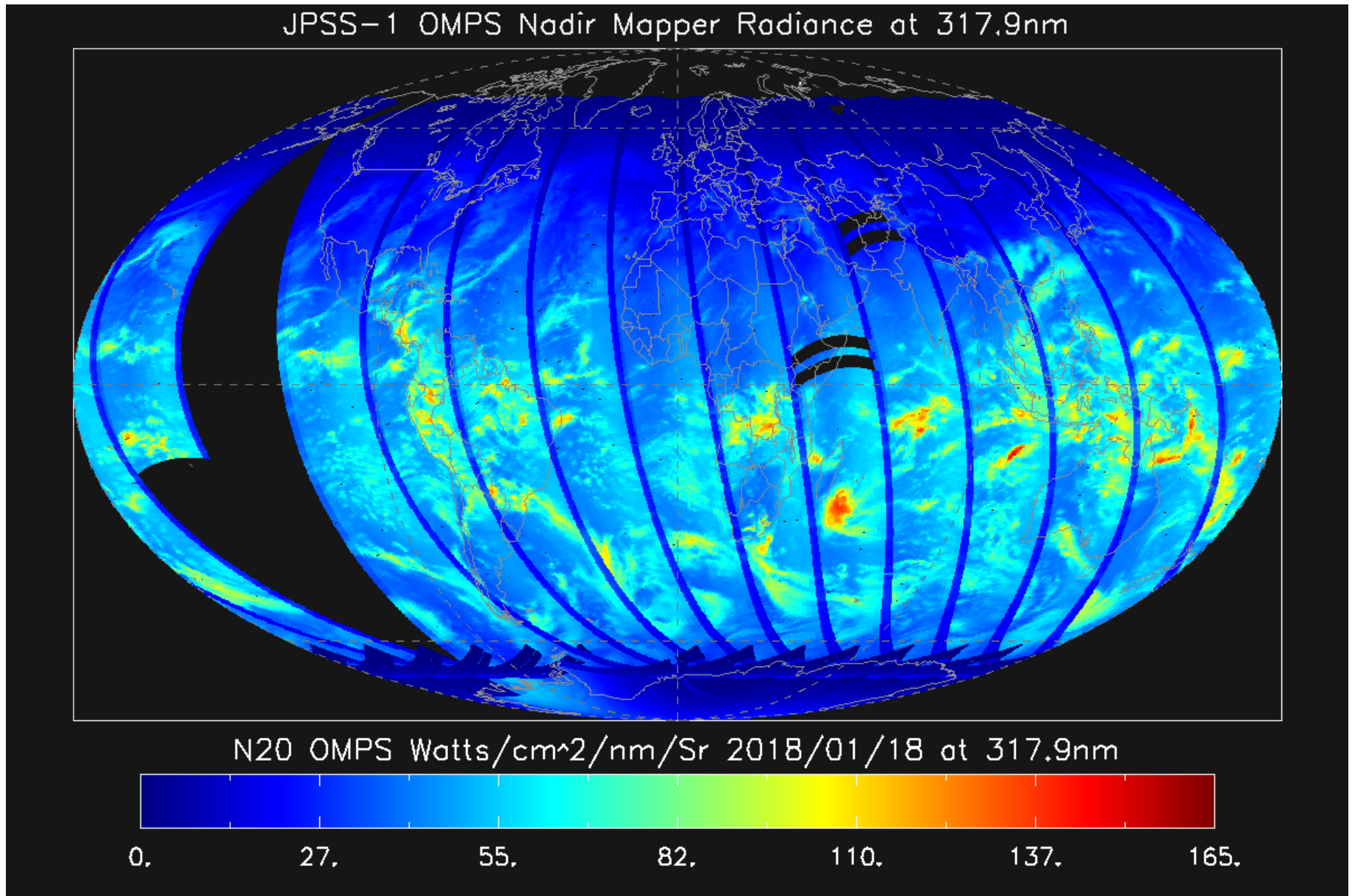
OMPS-TC SDR Update to Provisional Review

April 18, 2018
OMPS SDR Team
Presented by T. Beck

OMPS Changes Needed for Provisional

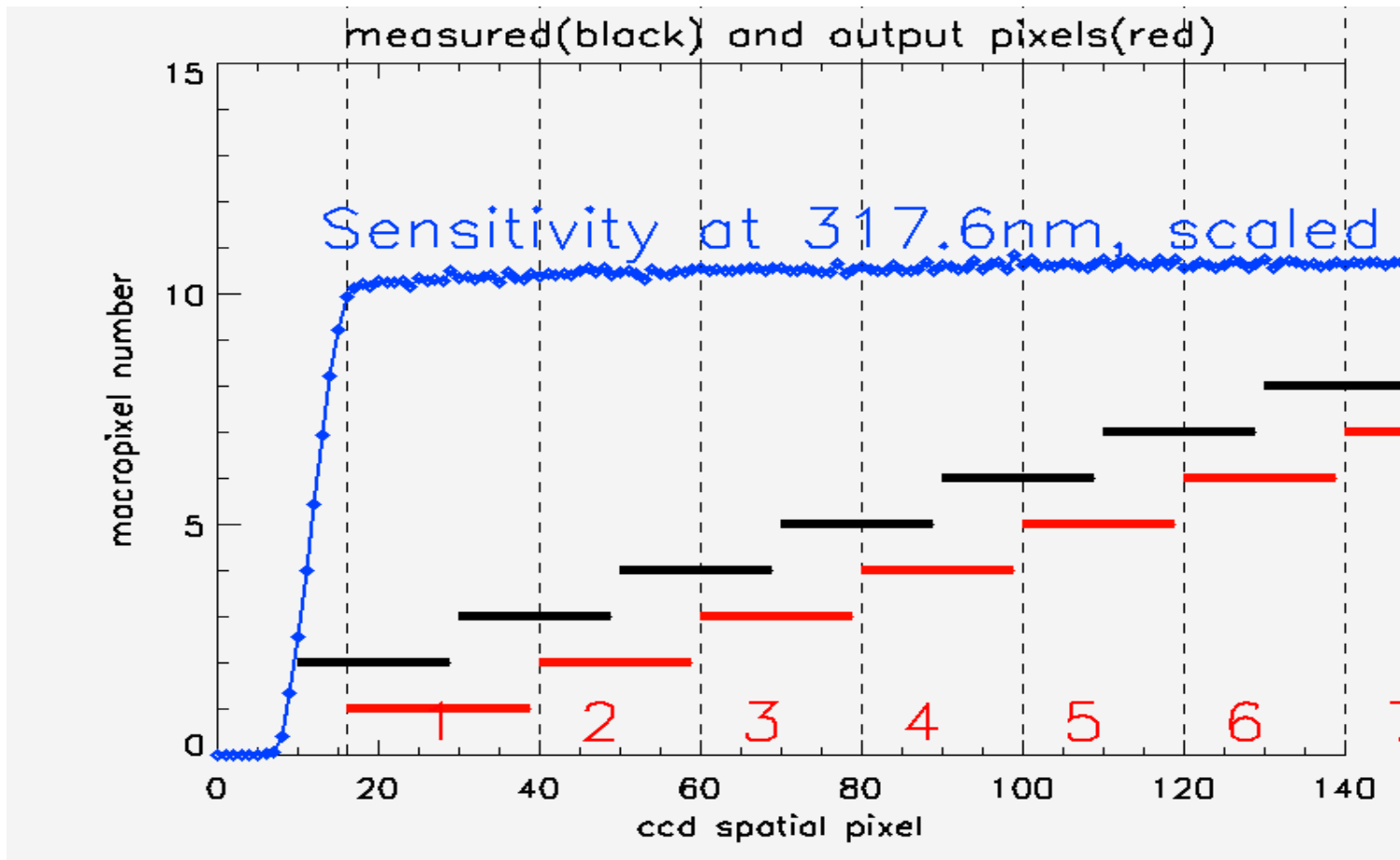
- OMPS-NP needed a coding change.
- OMPS-NP coding change submitted and accepted for MX02 baseline, nominal July 2, 2018 TTO.
- OMPS-NP provisional must wait until after MX02.
- OMPS-TC had poorly chosen sample tables
 - 1) caused striping at far eastern and western swath edge.
 - 2) pixel smearing in macropixel aggregation scheme.

Striping at xtrack 1 and 35 with low-resolution SDR measurements, OMPS-TC. The was problem was found to be caused by poorly chosen sample tables.

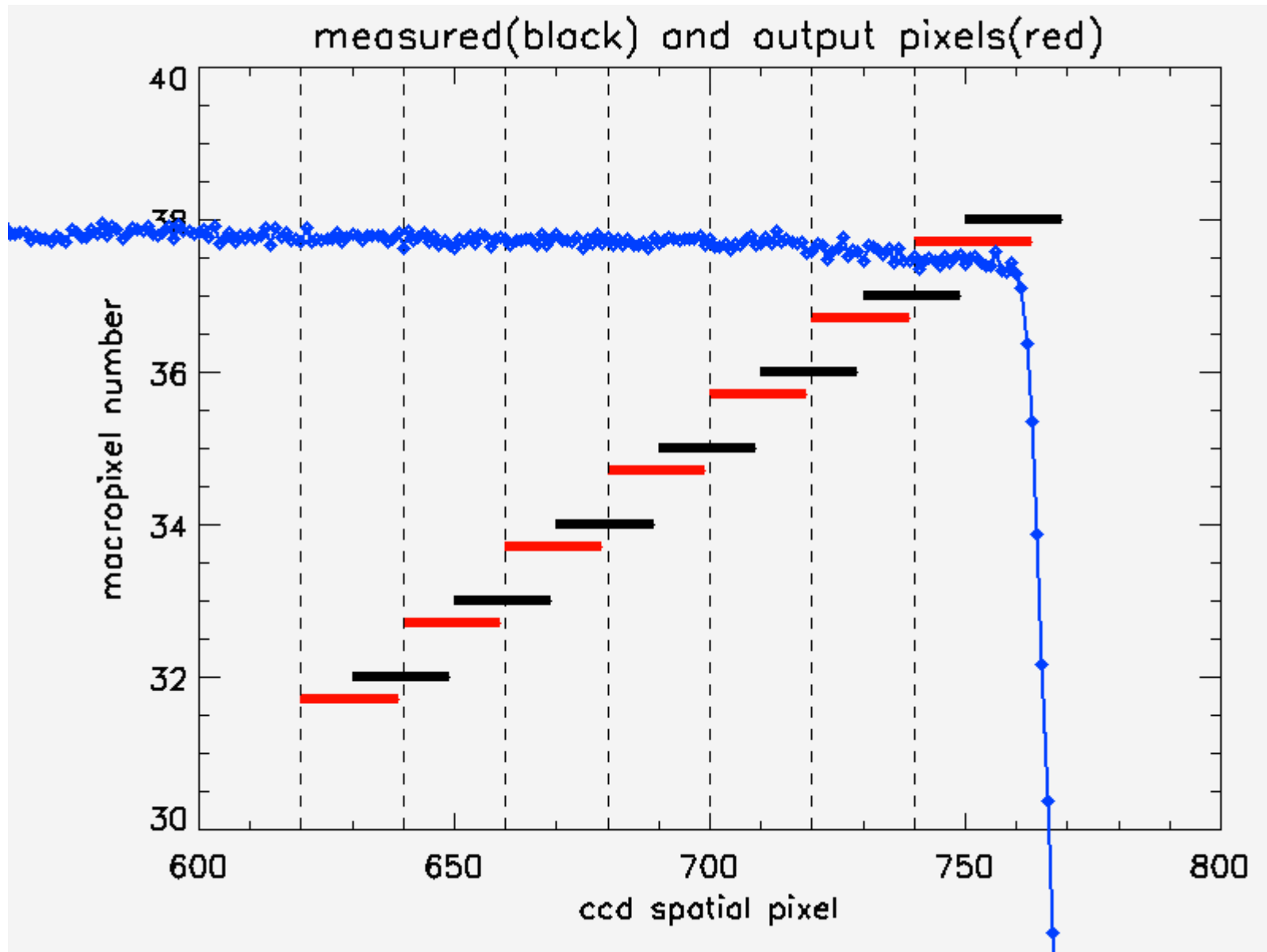


Poorly Chosen Sample Table, Western Edge of Measurement Swath

- Plots shows the binning scheme for OMPS-TC at-launch low resolution tables.
- The x-axis is the CCD Detector pixel number.
- The Black bars are the binned measurements, the measurement macropixels.
- The Red bars are the aggregated measurements, IDPS macropixel.
- The sensitivity is shown, it drops off rapidly near the detector spatial edge.



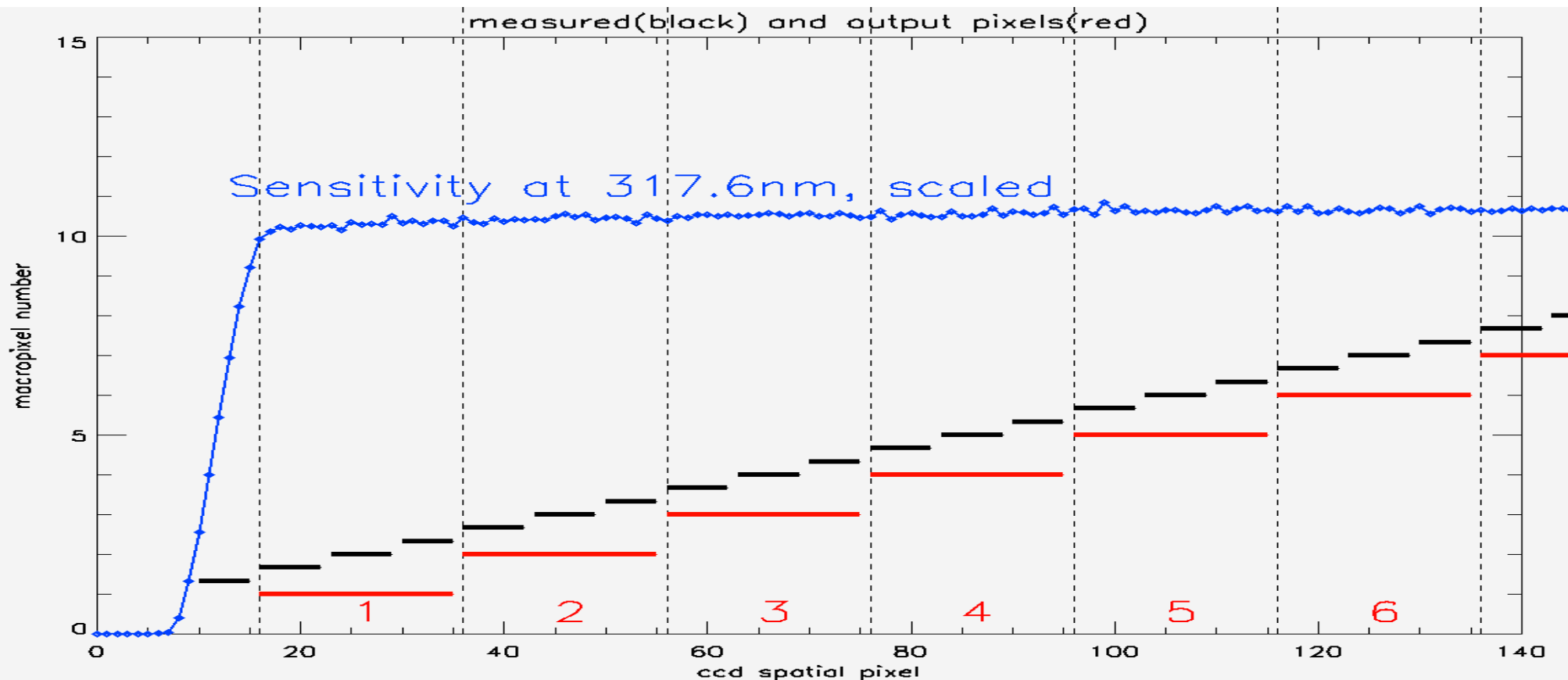
Poorly chosen Sample table Eastern Swath edge. Sensitivity in Blue.



Pixel smearing in aggregation fixed as of March 30, 2018, DR_8594

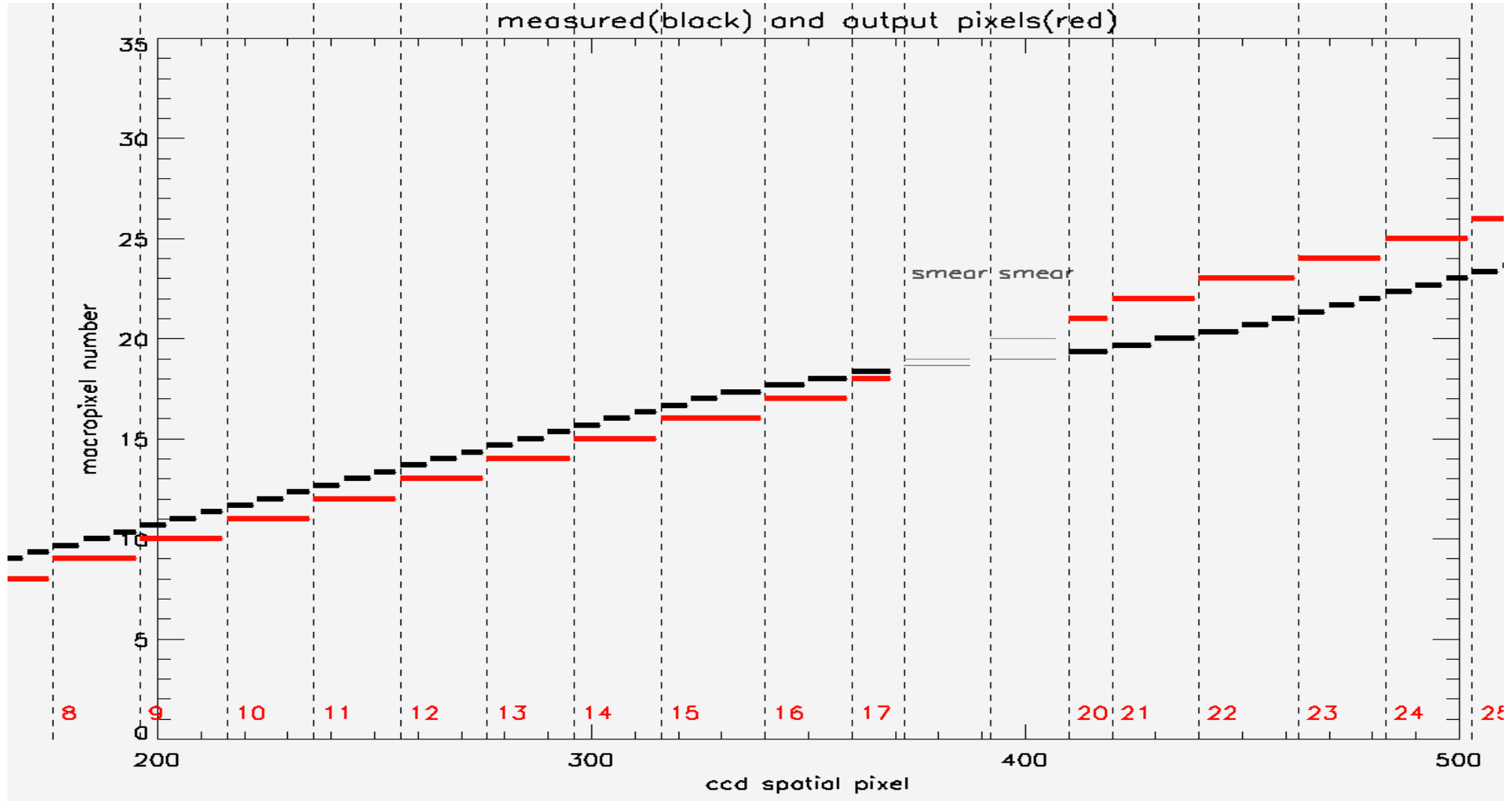
Requirements for sample table and pixel aggregation

- Equatorial coverage Available Downlink Bandwidth
- Sensitivity needs to be well behaved across each macropixel bin.
- No smearing across measured macropixels and aggregated macropixels.
- Alignment between OMPS-TC and OMPS-NP(currently sub-optimal).



IDPS aggregated Pixels are correct in terms of spatial alignment.
There is no smearing of medium resolution measurement pixels
binned to low resolution.

There are 104 medium resolution macropixels aggregated to 38 low
resolution macropixels.



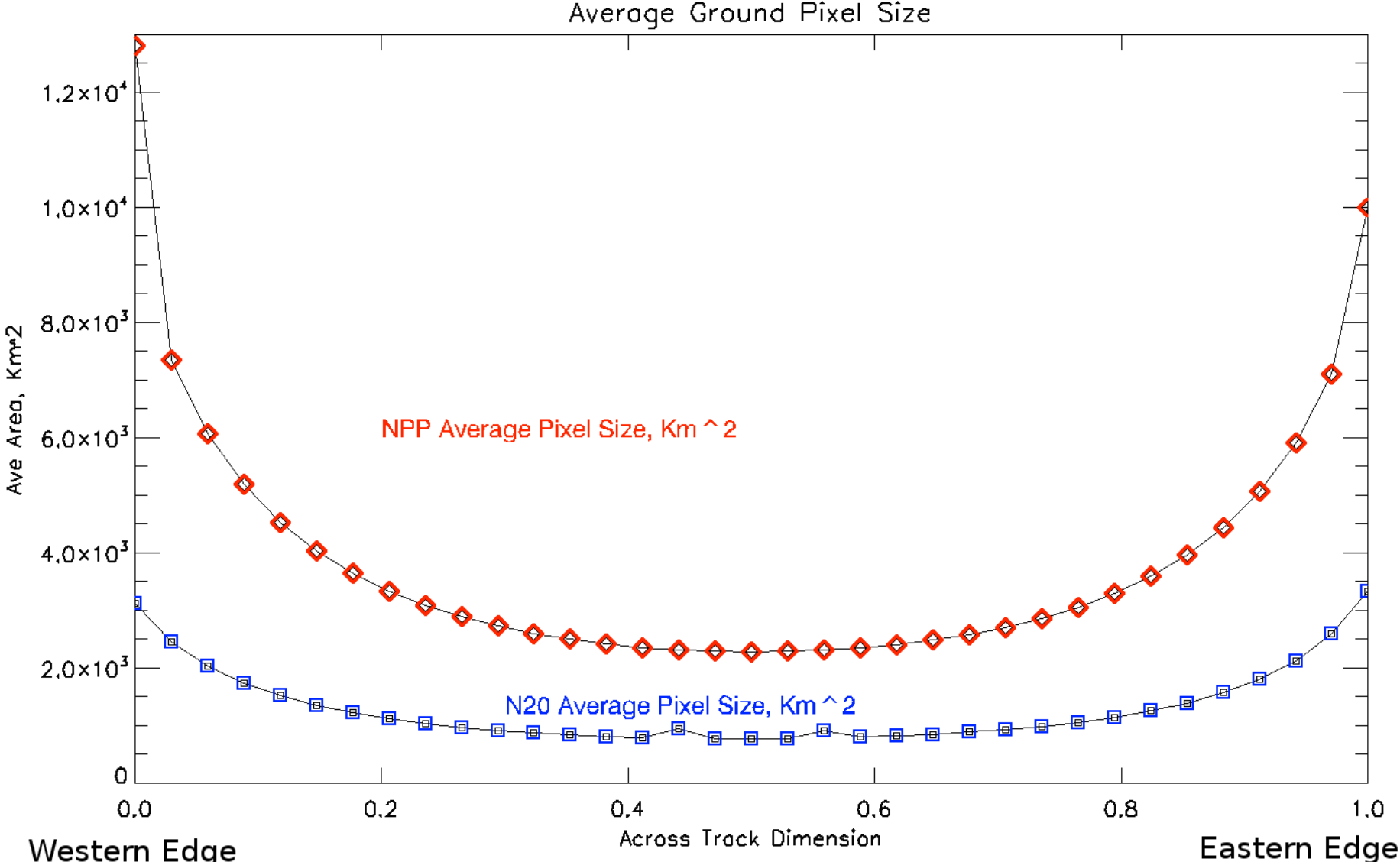
Summary of changes between N20 and S-NPP IDPS OMPS-TC SDR

- OMPS-TC is now operating in Medium resolution mode, 17km by 17km ground pixel at nadir.
- IDPS no longer aggregates in the along track dimension, there are three times as many ground pixels per granule in each OMPS-TC SDR granule.
- IDPS aggregates the measurement pixels in the cross track direction to low resolution, 50km by 17km at nadir
- SNR Decreases
- Spatial Resolution Increases

CSN	Description	Fast Track	Delivery Date to ASSIST	Status
OMPS-NP-FAM-LUT	Nadir Profiler Field Angle, for geolocation		Jan. 23, 2018	CCR 3761, In Ops
OMPS-TC-FAM-LUT	Nadir Mapper Field Angle, for geolocation		Jan. 23, 2018	CCR 3760, In Ops
OMPS-NP-OSOL-LUT	Nadir Profile Solar Flux	Yes	Feb. 1, 2018	CCR 3770, In Ops
OMPS-NP-WAVLENGTH-GND-PI	Nadir Profiler wavelength	Yes	Feb. 1, 2018	CCR3770, In Ops
OMPS-TBL-VERS-GND-PI	Version Table for IDPS		Feb. 13, 2018	CCR 3821 In Ops
OMPS-TC-OSOL-LUT	Nadir Mapper solar flux	Yes	Feb. 13, 2018	CCR 3769, In Ops
OMPS-TC-WAVELENGTH-GND-PI	Nadir Mapper wavelength		Feb. 12, 2018	CCR 3769, In Ops
OMPS-TC-MACROTABLE-GND-PI	Nadir Mapper macropixel binning definitions		Feb. 13, 2018	CCR 3821, In Ops
OMPS-TC-EV-SAMPLE-GND-PI	Nadir Mapper sample table and bad pixel map		Feb. 13, 2018	CCR 3821, In Ops
OMPS-TC-STRAYLIGHT-GND-PI	Nadir Mapper straylight correction		Feb. 13, 2018	CCR 3821, In Ops
OMPS-TC-TIMING-PATTERN-GND-PI	Nadir Mapper timing definitions		Feb. 13, 2018	CCR 3821, In Ops
OMPS-TC-CF-EARTH-GND-PI	Nadir Mapper multiplicative correction factor. Currently set		Feb. 13, 2018	CCR 3821, In Ops

OMPS-TC IDPS Ground pixel Relative Sizes

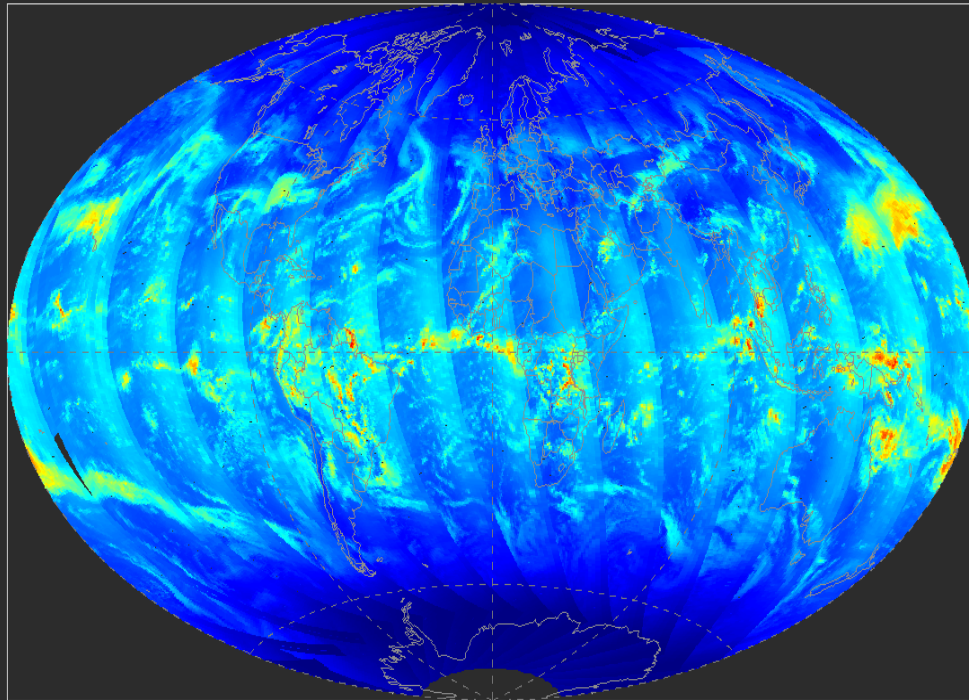
S-NPP and NOAA-20



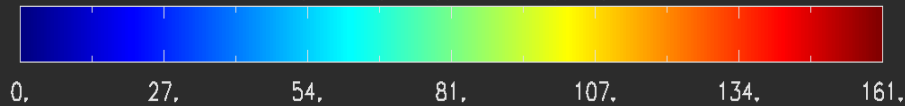
OMPS TC Global Maps, S-NPP and NOAA-20

NOAA-20 has better spatial resolution.

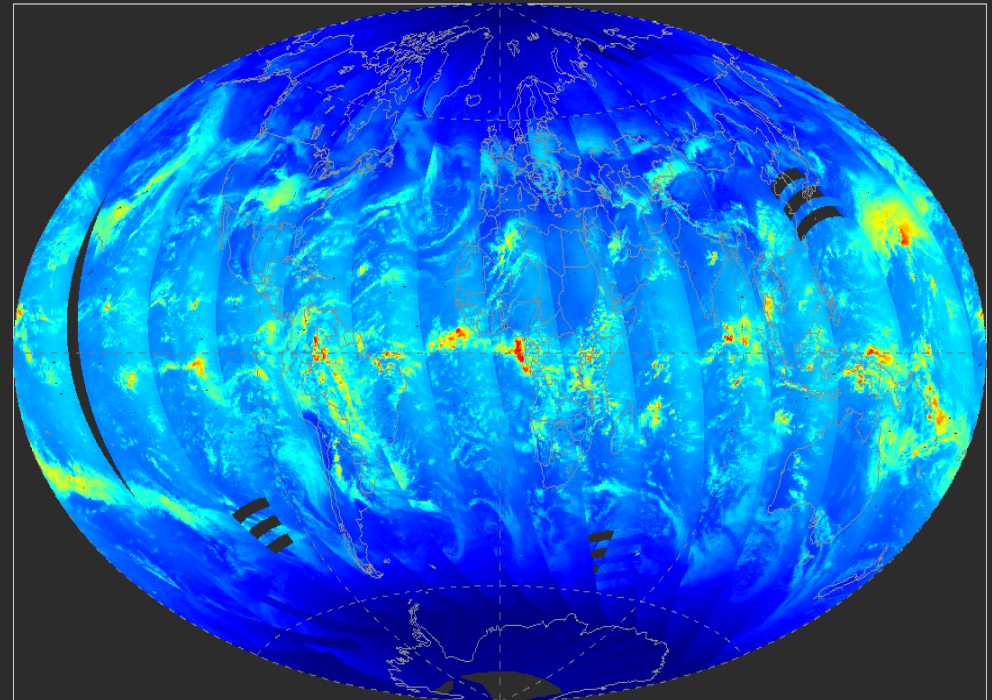
NPP OMPS Nadir Mapper Radiance at 317.9nm



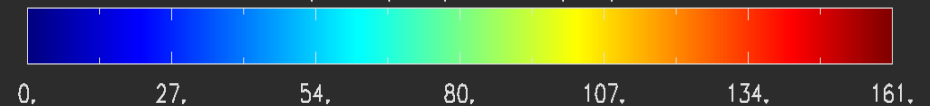
NPP OMPS Watts/cm²/nm/Sr 2018/04/01 at 317.9nm



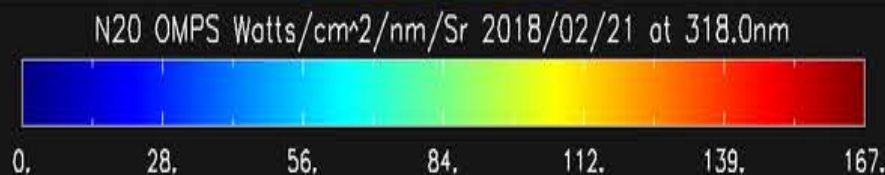
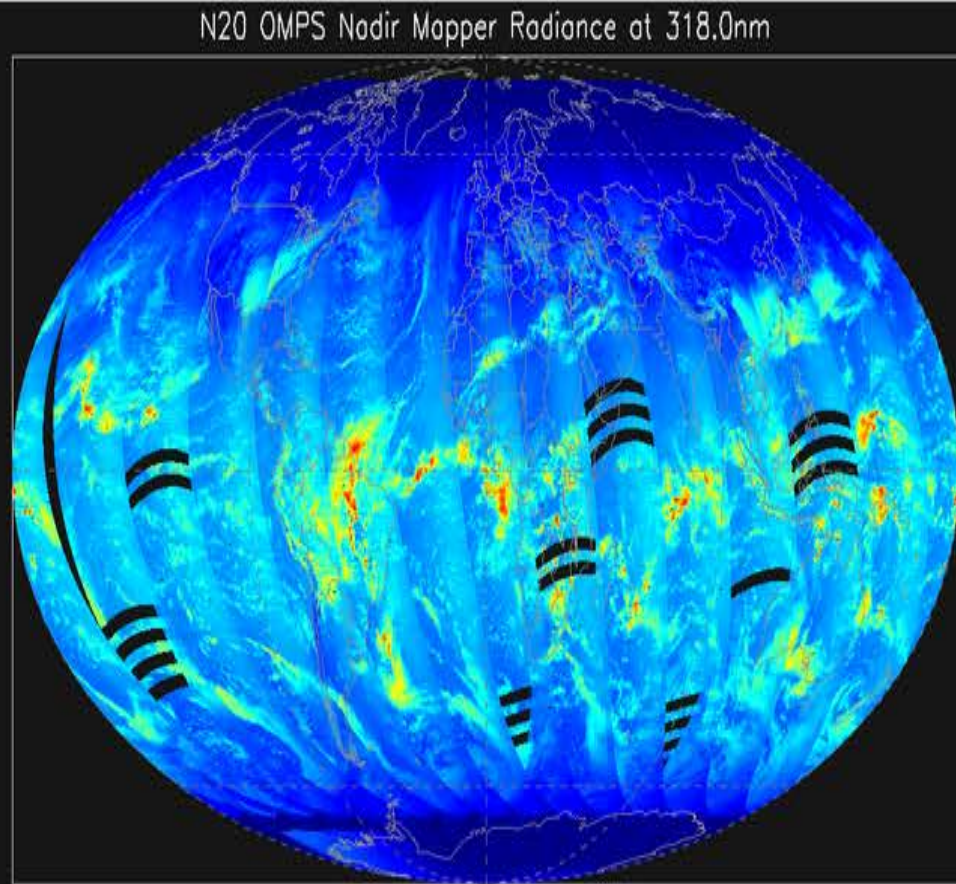
N20 OMPS Nadir Mapper Radiance at 318.0nm



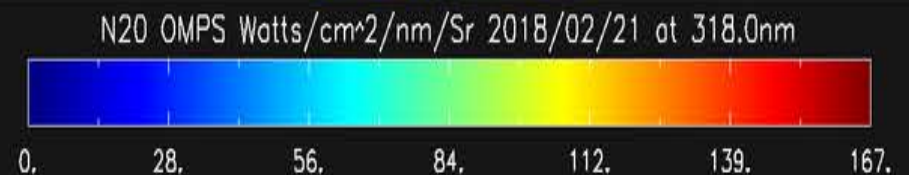
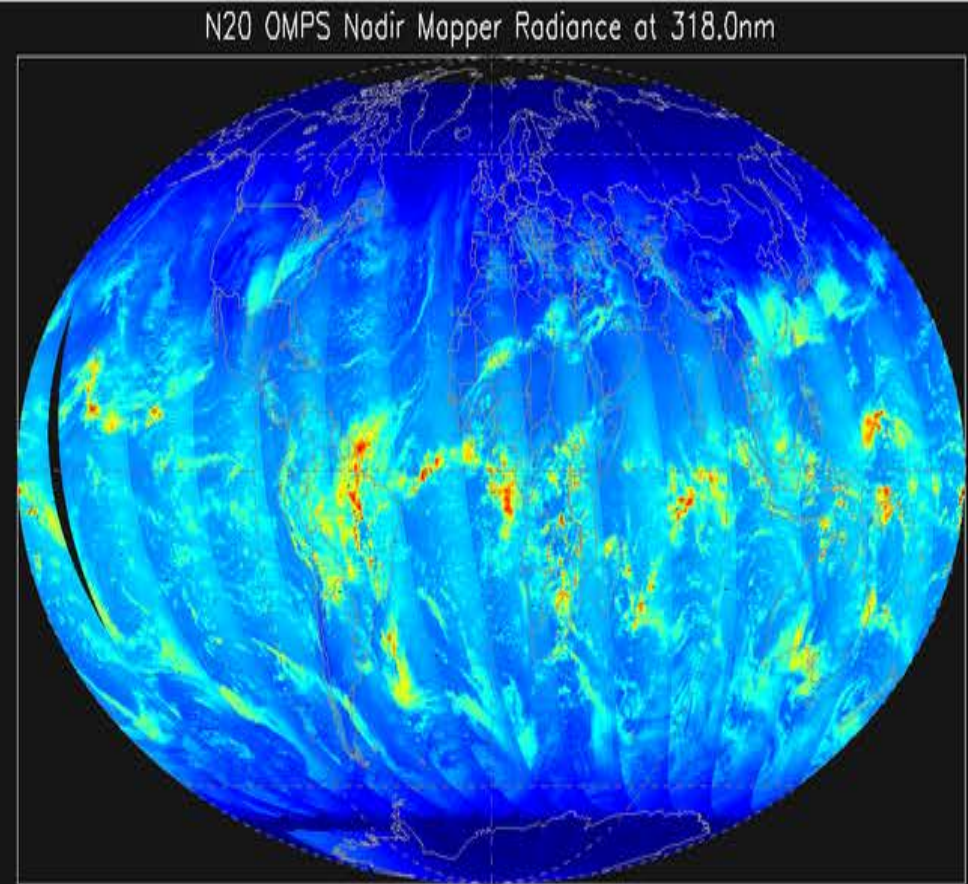
N20 OMPS Watts/cm²/nm/Sr 2018/04/01 at 318.0nm



16 Scan RDRs cause missing granules. This will be fixed in MX03 September, 2018.
Raytheon devised a cross granule input solution.



before_xGran_2018-02-21.png



with_xGran_DR_8616_2018_02_21.png

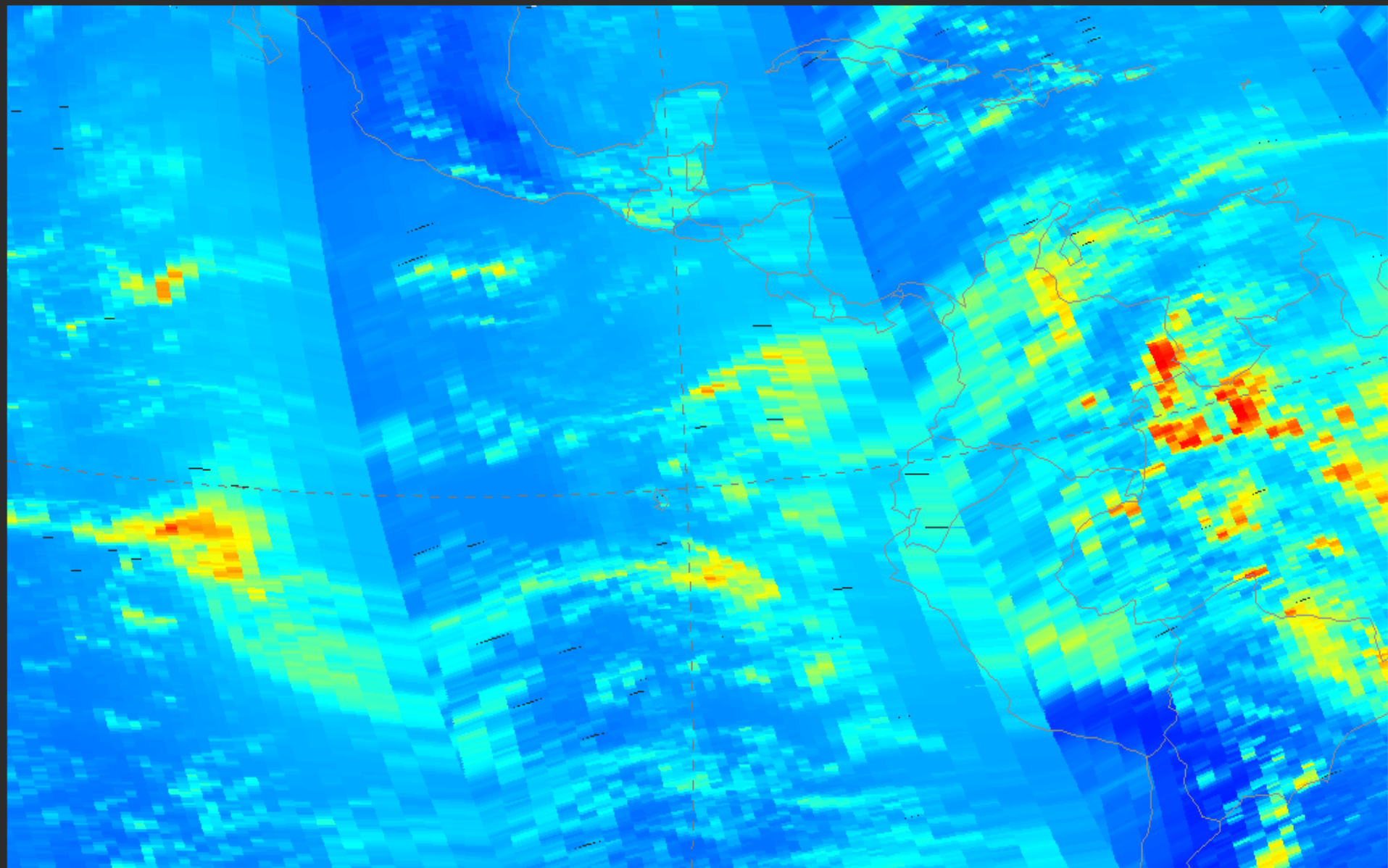
- Difference in S-NPP and NOAA-20 over Central America April 1st, 2018.

The maps on the following slides are centered over Galapagos Islands. Gulf of California is at the top of the image.

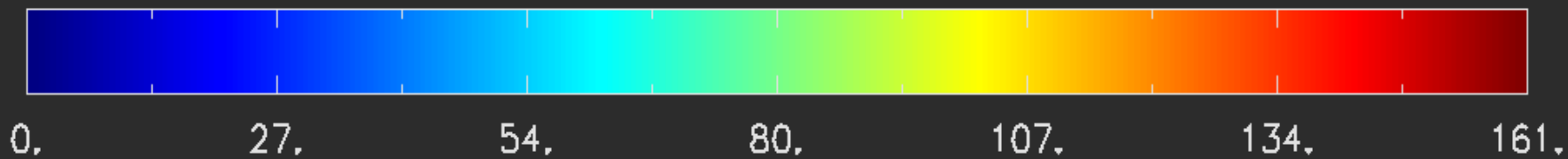
The differences are due to:

- $\frac{1}{2}$ Orbit shifted between S-NPP and NOAA-20
- Ground pixel size changes across the swath
- Wavelength not exactly the same, 0.1nm difference(inherent in different sample tables of each instrument.
- NOAA-20 not as well characterized as S-NPP.
- NOAA-20 spatial resolution better

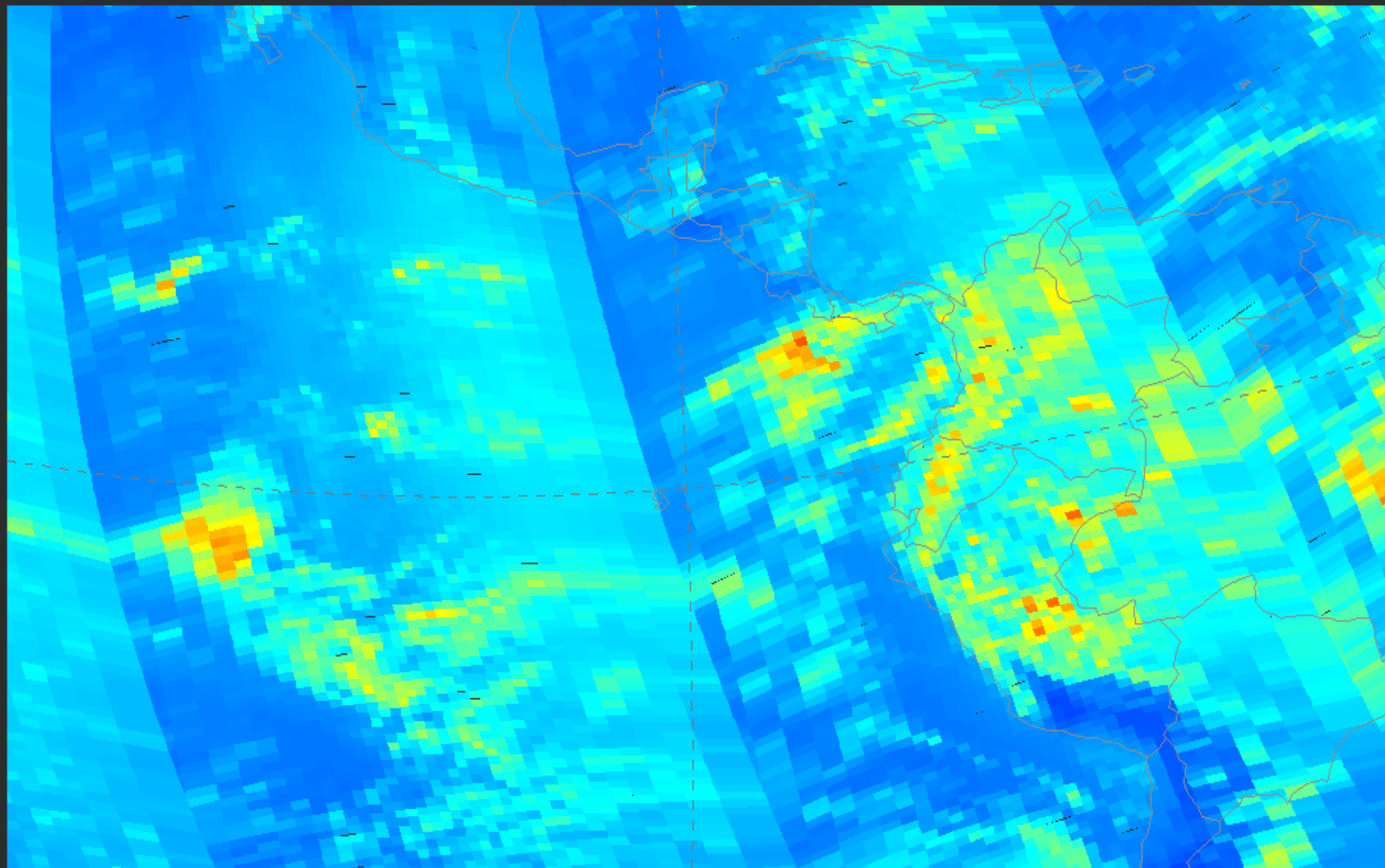
N2O OMPS Nadir Mapper Radiance at 318.0nm



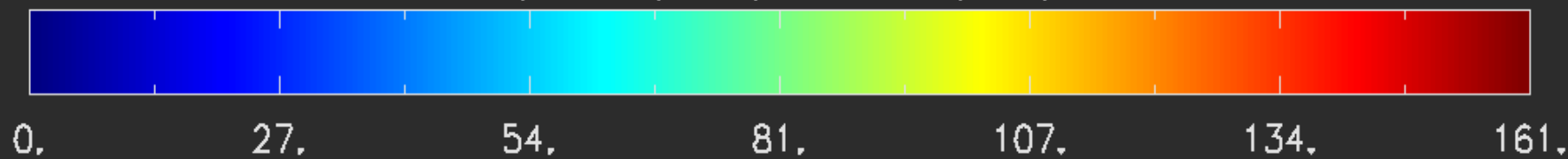
N2O OMPS Watts/cm²/nm/Sr 2018/04/01 at 318.0nm



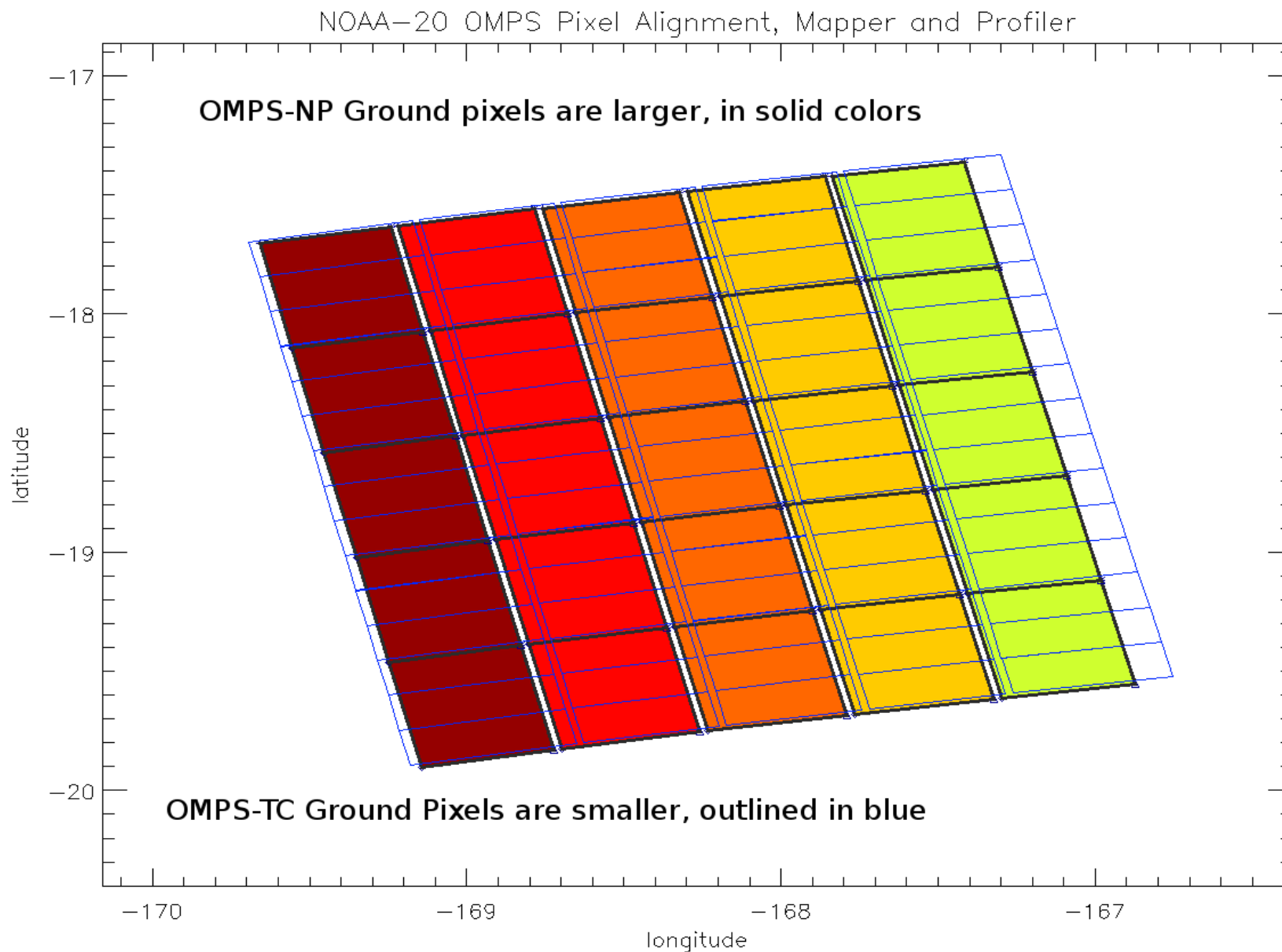
NPP OMPS Nadir Mapper Radiance at 317.9nm



NPP OMPS Watts/cm²/nm/Sr 2018/04/01 at 317.9nm



Sub-Optimal Alignment in OMPS-TC and OMPS-NP Ground Pixels



Path Forward

- OMPS-NP still has not reached Provisional. Required code change has been baselined and is expected to be in IDPS operational build in July, 2018, MX02.
- Sub-optimal spatial alignment of OMPS-TC and OMPS-NP. Change in sample and macropixel tables for both OMPS-TC and OMPS-NP is being considered. Special measurements have been scheduled to test new tables.
- Work with EDR team to better characterize NOAA-20 OMPS-TC.
- Improve straylight, wavelength, and solar lookup tables as more data becomes available.
- Inter-comparisons with satellite UV instruments.
- Radiative transfer modeling and studies.