NOAA-20 ATMS Provisional Maturity Status Report

January 04, 2018

Revised on January 23, 2018

ATMS SDR Team

With contribution from NOAA/STAR, NASA/GSFC, MIT/LL, UMD/CICS, CSU/CIRA, Northrop Grumman, Raytheon

Outline

- Algorithm Cal/Val Team Members
- ATMS SDR Cal/Val Tasks Updates
- ATMS Instrument Evaluations
  - ICVS Monitoring
  - Optimal Space View Selection
  - Environment Characterization
  - Gain Stability Analysis
  - Roll Maneuver for Antenna Pattern Analysis, Effective Field-Of-View, and Earth Sidelobes assessments
- ATMS TDR/SDR Evaluations
  - Product Requirement
  - ATMS TDR images Error Budget (NEdT, accuracy, geolocation, striping, inter-channel noise correlation)
- User Feedback
- Downstream Product Feedback (MiRS)
- Documentations (Science Maturity Check List)
- Conclusion
- Path Forward

Cal/Val Team Members

PI	Organization	Team Members	Roles and Responsibilities
Quanhua (Mark) Liu	NOAA/STAR	Ninghai Sun (technical lead), Hu Yang, Xiaolei Zou, Lin Lin	Project management, SDR team coordination and algorithm test in IDPS, ATMS calibration and geolocation science support, ATMS TDR/SDR data quality and monitoring
Edward Kim	NASA	Craig Smith, Lyu, Cheng-hsuan, Lisa M. Mccormick	Liaison NASA flight team and NG Azusa, and independent SDR assessments
Vince Leslie	MIT/LL	Idahosa Osaretin, Mark Tolman	independent SDR assessments
Wesley Berg	Colorado State University		ATMS and GPM WG band cross-calibration
Wael Ibrahim	RAYTHEON		IDPS support

Provisional Maturity Definition

JPSS/GOES-R Data Product Validation Maturity Stages – COMMON DEFINITIONS (Nominal Mission)

1. Beta

- Product is minimally validated, and may still contain significant identified and unidentified errors.
- Information/data from validation efforts can be used to make initial qualitative or very limited quantitative assessments regarding product fitness-for-purpose.
- Documentation of product performance and identified product performance anomalies, including recommended remediation strategies, exists.

2. Provisional

- Product performance has been demonstrated through analysis of a large, but still limited (i.e., not necessarily globally or seasonally representative) number of independent measurements obtained from selected locations, time periods, or field campaign efforts.
- Product analyses are sufficient for qualitative, and limited quantitative, determination of product fitness-for-purpose.
- Documentation of product performance, testing involving product fixes, identified product performance anomalies, including recommended remediation strategies, exists.
- Product is recommended for potential operational use (user decision) and in scientific publications after consulting product status documents.

3. Validated

- Product performance has been demonstrated over a large and wide range of representative conditions (i.e., global, seasonal).
- Comprehensive documentation of product performance exists that includes all known product anomalies and their recommended remediation strategies for a full range of retrieval conditions and severity level.
- Product analyses are sufficient for full qualitative and quantitative determination of product fitness-for-purpose.
- Product is ready for operational use based on documented validation findings and user feedback.
- Product validation, quality assurance, and algorithm stewardship continue through the lifetime of the instrument.

NOAA-20 ATMS Provisional Maturity Rationale

ATMS TDR products are monitored and analyzed globally for one month (11/29/17 – 1/2/2018). NOAA-20 ATMS TDR data are better than requirements (see slides 12,13,41-44): Lower noise, smaller EFOR, good antenna pattern, less striping, smaller inter-channel noise correlation.

MiRS team has retrieved NOAA-20 environmental data records (EDRs) for one month global data. Even without tuning, the performance NOAA-20 EDRs is comparable to S-NPP (see slide 41 - 44).

This presentation summarizes NOAA-20 ATMS performance and issues and solutions in the TDR to SDR conversion and QC Flags. The conversion issue will be solved after uploading PCT 006 this month. The issue for QC Flags will be solved by adjusting thresholds in PCT 007. The NOAA-20 ATMS readme file here and ATBD will assist users for their applications.

The NOAA-20 ATMS instrument is table and performs well. The limb-corrected images look great (slide 41). The MiRS has successfully been retrieving atmospheric and surface variables using the NOAA-20 ATMS TDR data for one month (slides 43 and 44).

The ATMS SDR team recommends the NOAA-20 ATMS TDR data for operational use (user decision).

NOAA-20 ATMS Instrument Requirement

Ch	Channel Center Freq.(MHz)	Polarization	Bandwidth Max. (MHz)	Frequency Stability (MHz)	Calibration Accuracy (K)	Nonlinearity Max. (K)	NEΔT (K) @300K	3-dB Beamwidth (deg)	Applications
1	23800	QV	270	10	1.0	0.3	0.7	5.2	Water vapor, cloud, surface
2	31400	QV	180	10	1.0	0.4	0.8	5.2	Water vapor, cloud, surface
3	50300	QH	180	10	0.75	0.4	0.9	2.2	Surface, temperature
4	51760	QH	400	5	0.75	0.4	0.7	2.2	Atmospheric temperature
5	52800	QH	400	5	0.75	0.4	0.7	2.2	Atmospheric temperature
6	53596 $\pm$ 115	QH	170	5	0.75	0.4	0.7	2.2	Atmospheric temperature
7	54400	QH	400	5	0.75	0.4	0.7	2.2	Atmospheric temperature
8	54940	QH	400	10	0.75	0.4	0.7	2.2	Atmospheric temperature
9	55500	QH	330	10	0.75	0.4	0.7	2.2	Atmospheric temperature
10	57290.344(f_o)	QH	330	0.5	0.75	0.4	0.75	2.2	Atmospheric temperature
11	$f_o \pm$ 217	QH	78	0.5	0.75	0.4	1.2	2.2	Atmospheric temperature
12	$f_o \pm 322.2 \pm 48$	QH	36	1.2	0.75	0.4	1.2	2.2	Atmospheric temperature
13	$f_o \pm 322.2 \pm 22$	QH	16	1.6	0.75	0.4	1.5	2.2	Atmospheric temperature
14	$f_o \pm 322.2 \pm 10$	QH	8	0.5	0.75	0.4	2.4	2.2	Atmospheric temperature
15	$f_o \pm 322.2 \pm 4.5$	QH	3	0.5	0.75	0.4	3.6	2.2	Atmospheric temperature
16	88200	QV	2000	200	1.0	0.4	0.5	2.2	Surface, cloud
17	165500	QH	3000	200	1.0	0.4	0.6	1.1	Cloud
18	183310 $\pm$ 7000	QH	2000	30	1.0	0.4	0.8	1.1	Water vapor
19	183310 $\pm$ 4500	QH	2000	30	1.0	0.4	0.8	1.1	Water vapor
20	183310 $\pm$ 3000	QH	1000	30	1.0	0.4	0.8	1.1	Water vapor
21	183310 $\pm$ 1800	QH	1000	30	1.0	0.4	0.8	1.1	Water vapor
22	183310 $\pm$ 1000	QH	500	30	1.0	0.4	0.9	1.1	Water vapor

NOAA-20 ATMS PLT After Beta Maturity

Date	PLT	Orbit
December 8, 2017	Cold Cal Position Selection (SP4)	281
December 11, 2017	Cold Cal Position Selection (SP1)	323
December 14, 2017	Cold Cal Position Selection – Final Decision	366
December 15, 2017	ATMS Roll Maneuver (+30 deg)	385
December 15, 2017	ATMS Roll Maneuver (-65 deg)	386
December 18, 2017	Environmental Characterization	427-428
December 19, 2017	ATMS Roll Maneuver (-65 deg)	441
December 19, 2017	ATMS Roll Maneuver (+30 deg)	442
December 19, 2017	Noise Characterization	449

NOAA-20 ATMS Cal/Val Tasks Status

Task #	Title	Team - 1	Team - 2	Status
1	Proxy Instrument Data	NOAA/STAR	MIT/LL	Pre-launch
2	Independent Analysis of TVAC Data	NOAA/STAR	MIT/LL	Pre-launch
3	Analysis of Antenna Pattern Data	NOAA/STAR	MIT/LL	Pre-launch
4	Analysis of Spectral Response Function	NOAA/STAR	CSU/CIRA	Pre-launch
5	Parameter Trending	NOAA/STAR	MIT/LL	Checked
6	Functional Evaluation	MIT/LL	NOAA/STAR	Checked
7	Dynamic Range Evaluation	MIT/LL	NOAA/STAR	Checked
8	EMI From Spacecraft Transmitter	MIT/LL	NOAA/STAR	Checked
9	Digitization Artifacts	MIT/LL	NOAA/STAR	Checked

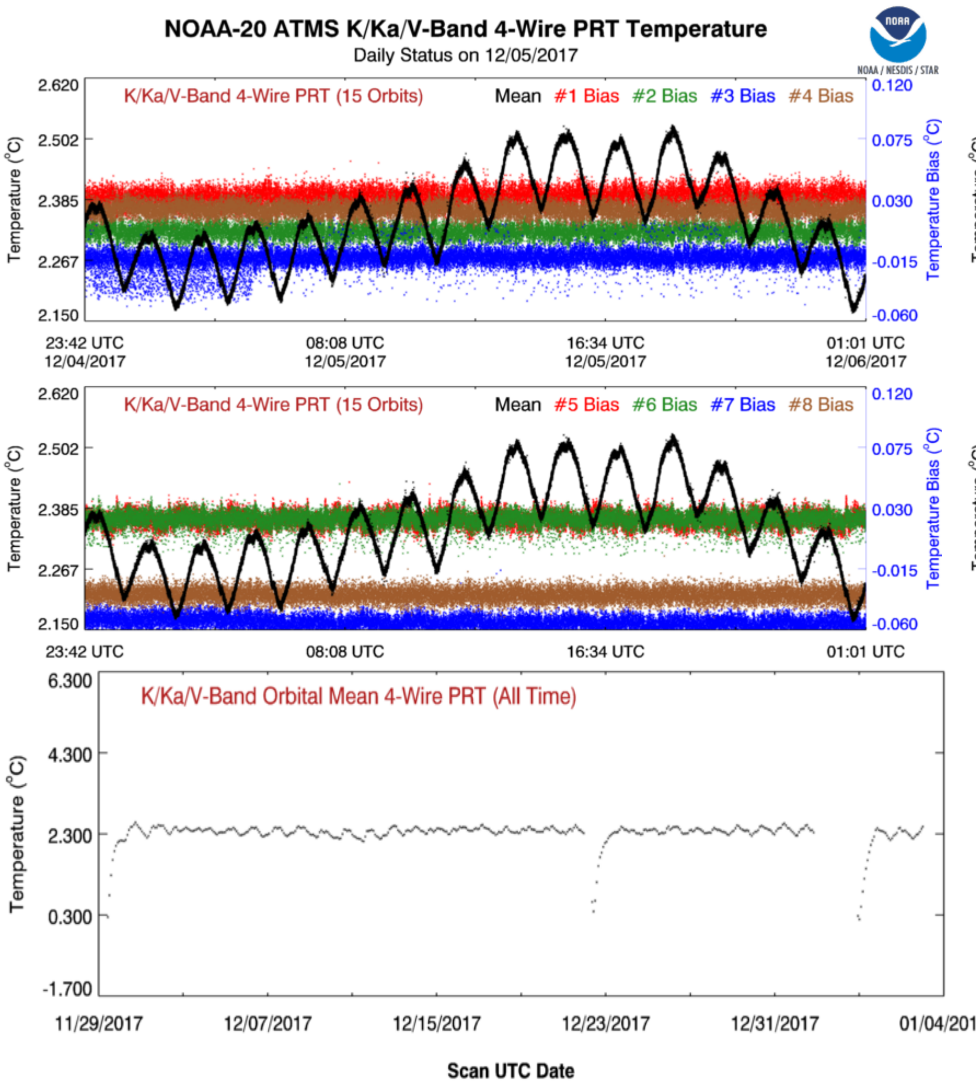
NOAA-20 ATMS Cal/Val Tasks Status

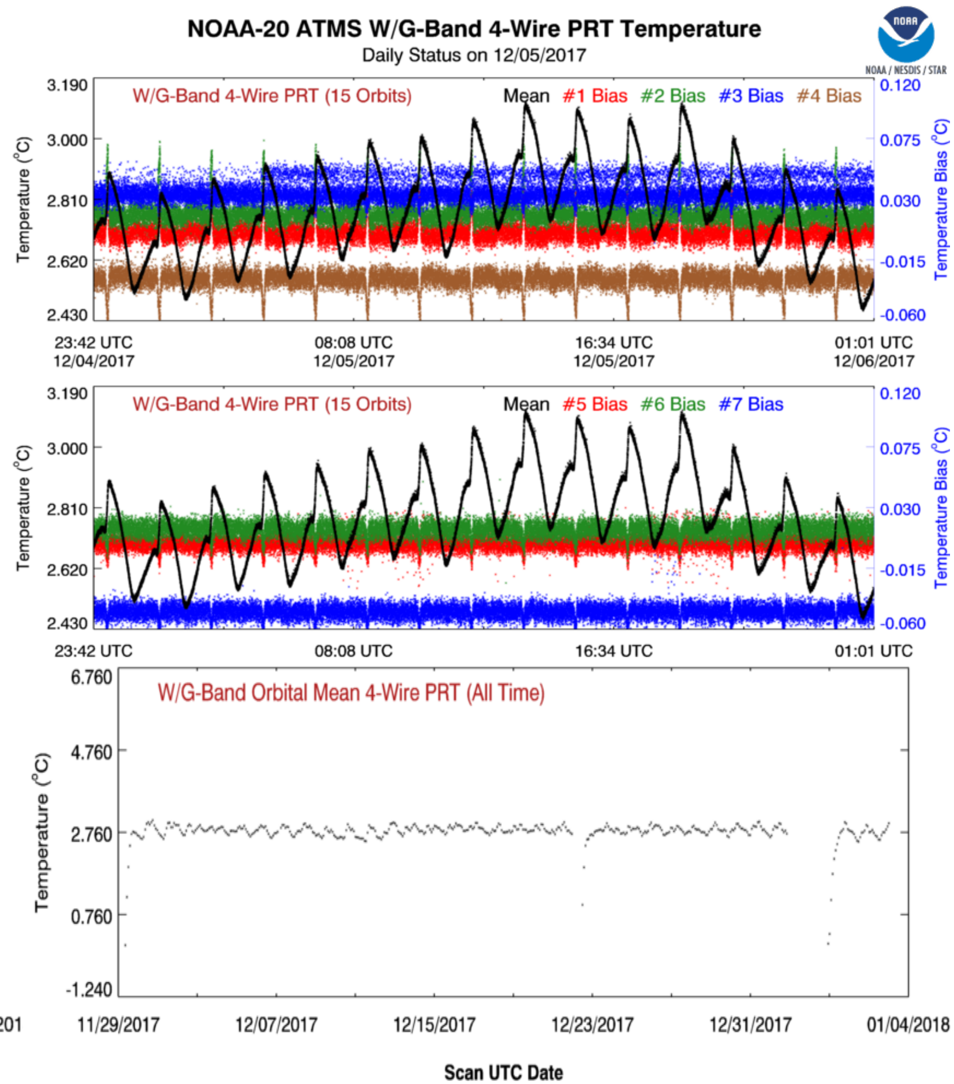
Task #	Title	Team - 1	Team - 2	Status
10	Scan Angle Evaluation	NOAA/STAR	MIT/LL	Checked
11	Continuous Sampling Mode	NOAA/STAR	MIT/LL	Checked
12	Spatial Resampling Assessments	NOAA/STAR	UMD/ESSIC	Checked
13	Optimal Space View Selection	NOAA/STAR	MIT/LL	Checked
14	Temperature Stabilization	MIT/LL	NOAA/STAR	Checked
15	RF Shelf to Cold Plate LUT Verification	MIT/LL	NOAA/STAR	Checked
16	Radiometric Sensitivity Evaluation	NOAA/STAR	MIT/LL	Checked
17	Striping Analysis and Noise Evaluation	UMD/ESSIC	NOAA/STAR	Checked
18	Heater Related Interference Checking	MIT/LL	NOAA/STAR	Checked
19	GPS-RO Bias Characterization	UMD/ESSIC	NOAA/STAR	Checked
20	NWP Bias Characterization	NOAA/STAR	UMD/ESSIC	Checked
21	SNO Bias Characterization	NOAA/STAR	UMD/ESSIC	Checked

NOAA-20 ATMS Cal/Val Tasks Status

Task #	Title	Team - 1	Team - 2	Status
22	Lunar Intrusion Evaluation	NOAA/STAR	MIT/LL	L+60
23	Geolocation Verification and Correction	NOAA/STAR	MIT/LL	Checked
24	Instrument to Spacecraft Alignment	NOAA/STAR	UMD/ESSIC	L+60
25	Central Frequency Salability Assessment	MIT/LL	NOAA/STAR	L+70
26	Point and Stare Data for Gain Fluctuation Assessment	NOAA/STAR	MIT/LL	checked
27	Pitch Maneuver Analysis	MIT/LL	NOAA/STAR	L+90
28	TDR to SDR Conversion Analysis	NOAA/STAR	CSU/CIRA	L+90
29	Terrestrial and Direct TV Sources RFI Detection	UMD/ESSIC	CSU/CIRA	L+90
30	Effective Field of View	NOAA/STAR	UMD/ESSIC	Checked
31	SDR Validation	NOAA/STAR	UMD/ESSIC	L+90
32	Polarization Response Angle	NOAA/STAR	UMD/ESSIC	L+90
33	Warm Load and Space View Bias	NOAA/STAR	MIT/LL	L+90
34	NUCAPS/MiRS Convergence	NOAA/STAR	UMD/ESSIC	L+90

NOAA-20 ATMS ICVS Trending

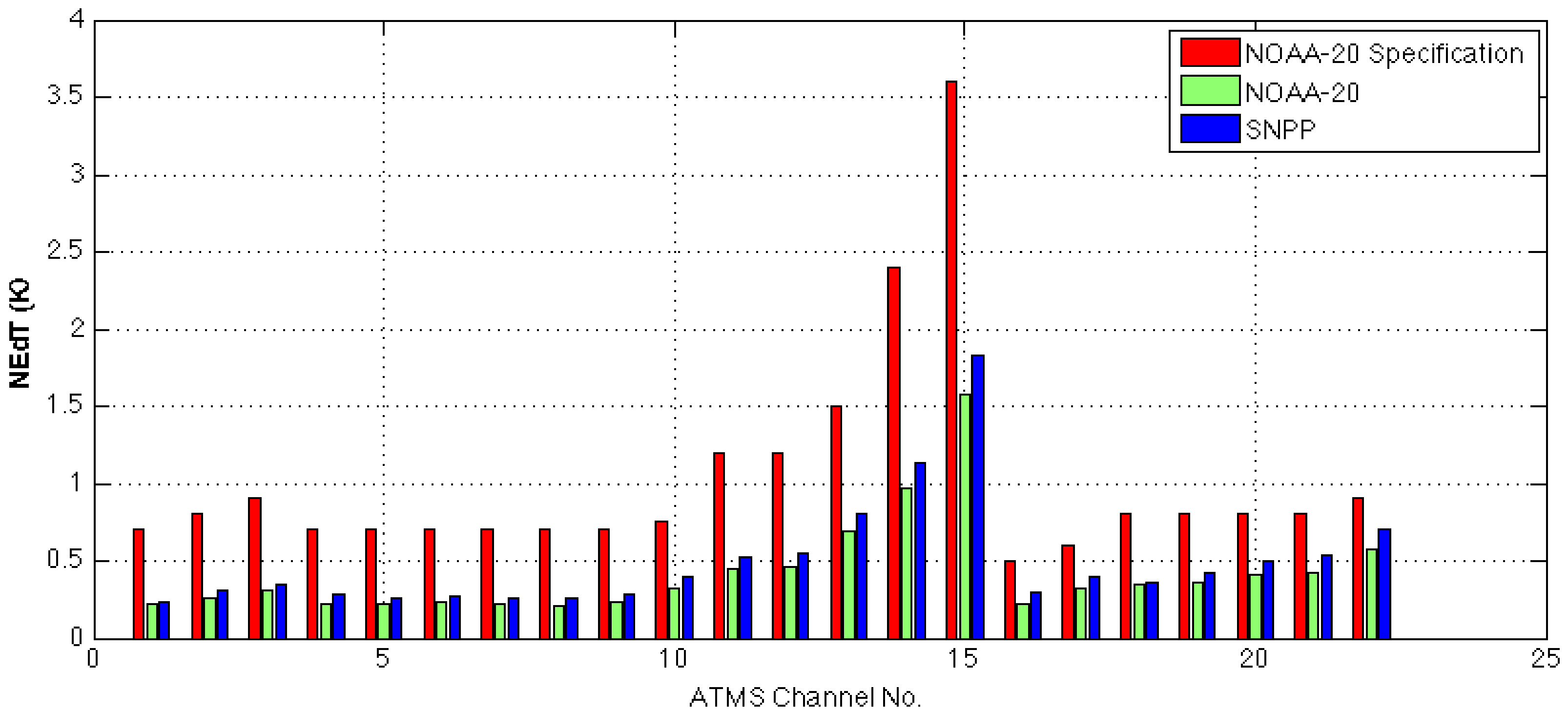




NOAA-20 ATMS On-Orbit NEΔT Status

Ch.	Central Frequency (MHz)	NEΔT (K) - Spec.	NOAA-20 On-Orbit
1	23800	0.7	0.23
2	31400	0.8	0.27
3	50300	0.9	0.31
4	51760	0.7	0.22
5	52800	0.7	0.22
6	53596±115	0.7	0.23
7	54400	0.7	0.22
8	54940	0.7	0.22
9	55500	0.7	0.23
10	57290.344(f_o)	0.75	0.32
11	f_o± 217	1.2	0.44
12	f_o±322.2±48	1.2	0.46
13	f_o±322.2±22	1.5	0.69
14	f_o±322.2±10	2.4	0.97
15	f_o±322.2±4.5	3.6	1.58
16	88200	0.5	0.22
17	165500±925	0.6	0.32
18	183310±7000	0.8	0.35
19	183310±4500	0.8	0.36
20	183310±3000	0.8	0.41
21	183310±1800	0.8	0.42
22	183310±1000	0.9	0.58

NOAA-20 ATMS On-Orbit NEΔT Status



Derived On-Orbit NOAA-20 ATMS Radiometric Accuracy

RE-20319 Rev D
October 16, 2017

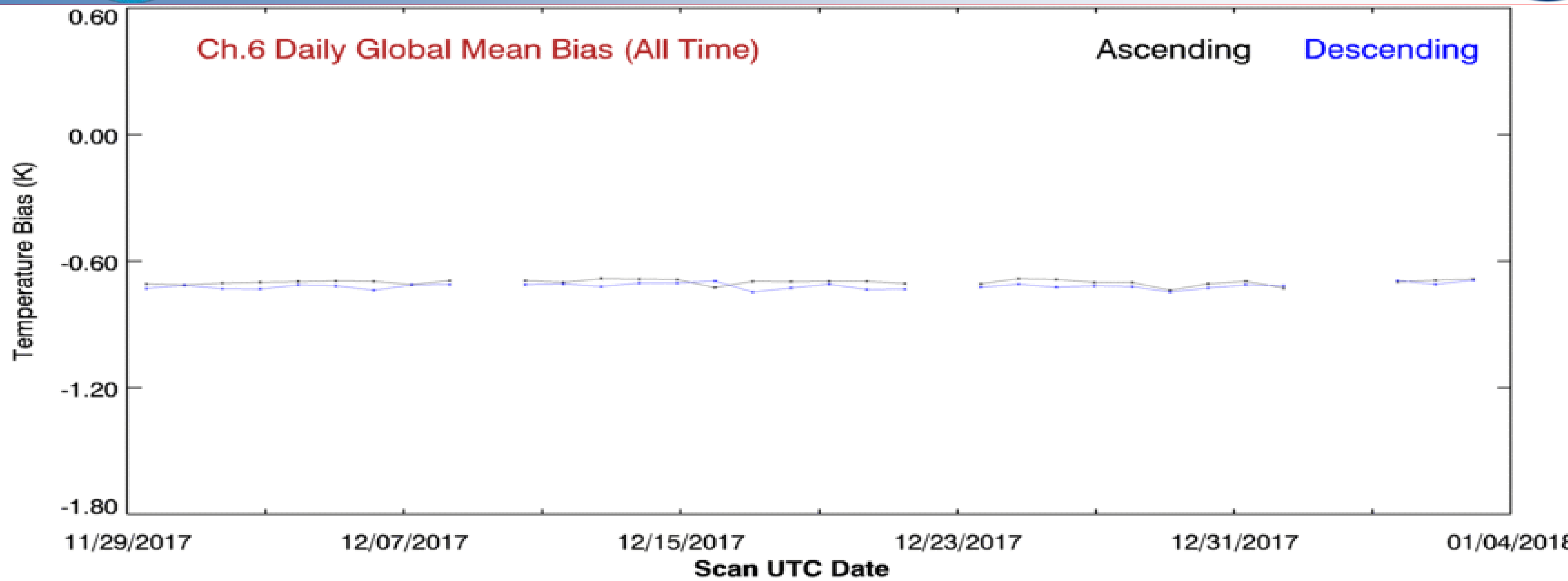
10.3 Derived On-Orbit Radiometric Accuracy

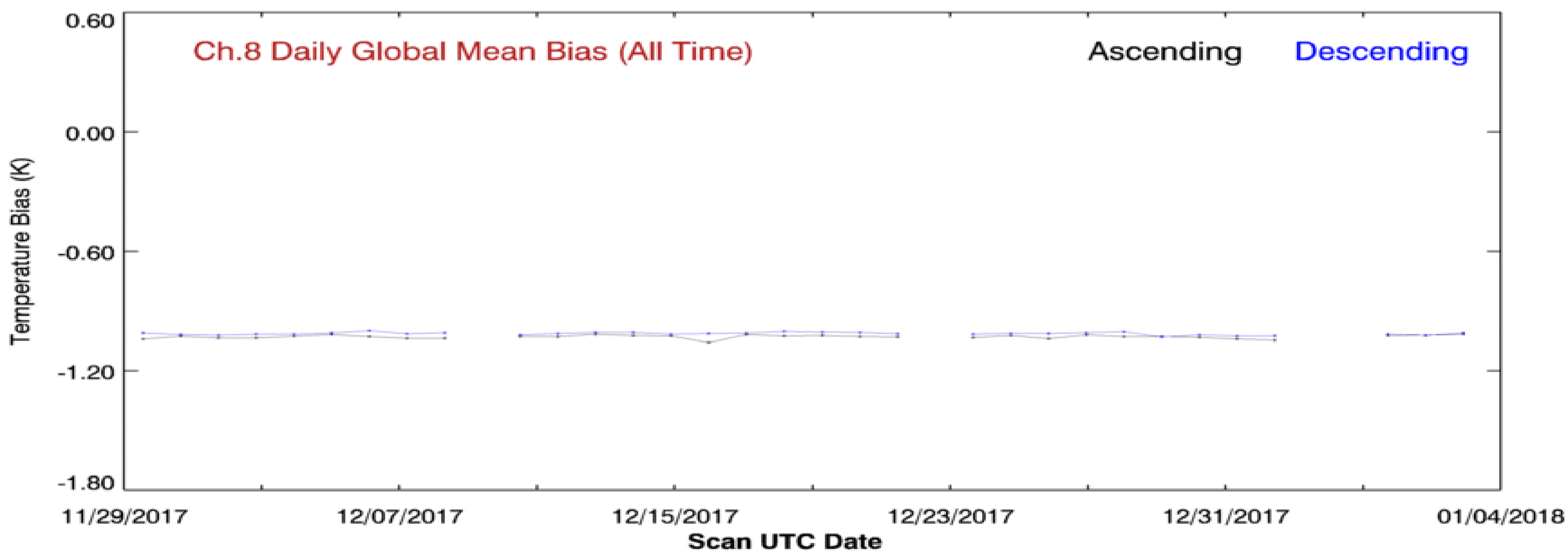
Using the derived worst-case on-orbit non-linearity uncertainties as inputs to the Radiometric Math Model (RE-12110 Rev F), and using the JPSS-1-specific parameters for hot calibration and cold calibration errors (see sections 8 and 9), the resulting predicted on-orbit accuracies are as listed in Table 10-29. These were computed for the two extremes of scene temperature and for the mid-point scene temperature, in order to capture the worst-case condition.

Table 10-30 Worst-Case On-Orbit Accuracy

Channel	Requirement	Cold Scene (80K)	Mid Scene (150K)	Hot Scene (300K)
1	1.00	0.106	0.110	0.161
2	1.00	0.106	0.110	0.161
3	0.75	0.062	0.086	0.158
4	0.75	0.063	0.088	0.158
5	0.75	0.063	0.087	0.158
6	0.75	0.064	0.088	0.158
7	0.75	0.063	0.087	0.158
8	0.75	0.063	0.087	0.158
9	0.75	0.064	0.088	0.158
10	0.75	0.064	0.088	0.158
11	0.75	0.072	0.100	0.158
12	0.75	0.075	0.104	0.158
13	0.75	0.086	0.119	0.158
14	0.75	0.071	0.098	0.158
15	0.75	0.085	0.118	0.158
16	1.00	0.048	0.074	0.137
17	1.00	0.047	0.072	0.127
18	1.00	0.069	0.098	0.128
19	1.00	0.054	0.080	0.128
20	1.00	0.052	0.077	0.128
21	1.00	0.059	0.086	0.128
22	1.00	0.052	0.077	0.128

Observations (TDR) – Simulations (SDR) (ECMWF)





Effect of NOAA-20 ATMS Specified (box-cut) and Measured SRFs on Brightness Temperature Simulations

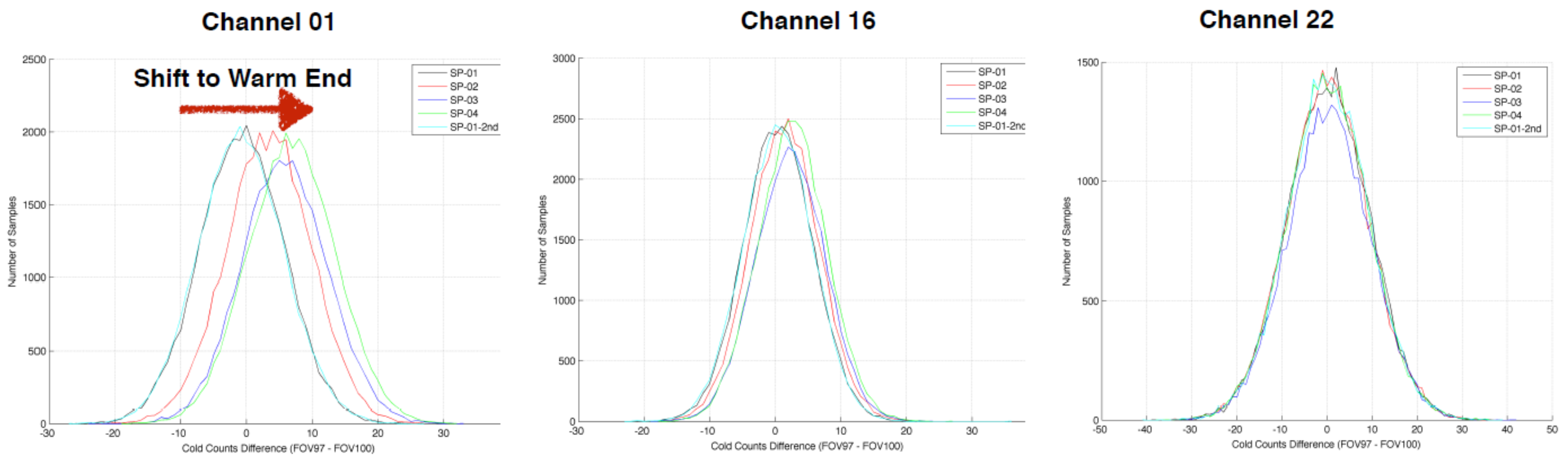
CRTM ATMS brightness temperature simulation difference in Kelvin between using "real" and box-cut SRF for U.S. Standard atmosphere over Ocean at zenith angles of 50 and 0 degree respectively.
"Real" SRF for ch. 1 to 17 are measured. The center frequency and bandwidth from Calibration Data Book" are used as "Real" SRF for channels 18 – 22. Box-cut SRF uses ATBD center frequency and bandwidth.

Channel Number	SRF, zenith=50°	bc-SRF	SRF, zenith=0°	bc-SRF
1	201.238	-0.046	156.151	0.047
2	193.671	0.006	149.121	0.008
3	229.126	0.029	219.352	0.033
4	249.615	0.110	240.735	0.117
5	254.349	-0.035	254.733	0.004
6	243.040	-0.300	251.142	-0.232
7	228.966	-0.016	236.682	-0.027
8	222.119	-0.050	227.361	-0.100
9	218.737	-0.002	221.206	-0.051
10	218.406	0.006	217.943	0.004
11	220.901	-0.006	219.763	-0.002
12	225.925	-0.096	224.038	-0.081
13	233.830	-0.085	230.882	-0.072
14	245.453	-0.127	241.401	-0.111
15	257.183	-0.009	253.309	-0.009
16	245.495	0.024	209.389	0.035
17	271.356	0.015	267.472	0.002
18	266.411	0.043	271.006	0.029
19	259.172	0.015	263.895	0.010
20	252.893	0.005	257.442	-0.000
21	245.926	0.065	250.222	0.072
22	240.043	0.014	244.297	0.018

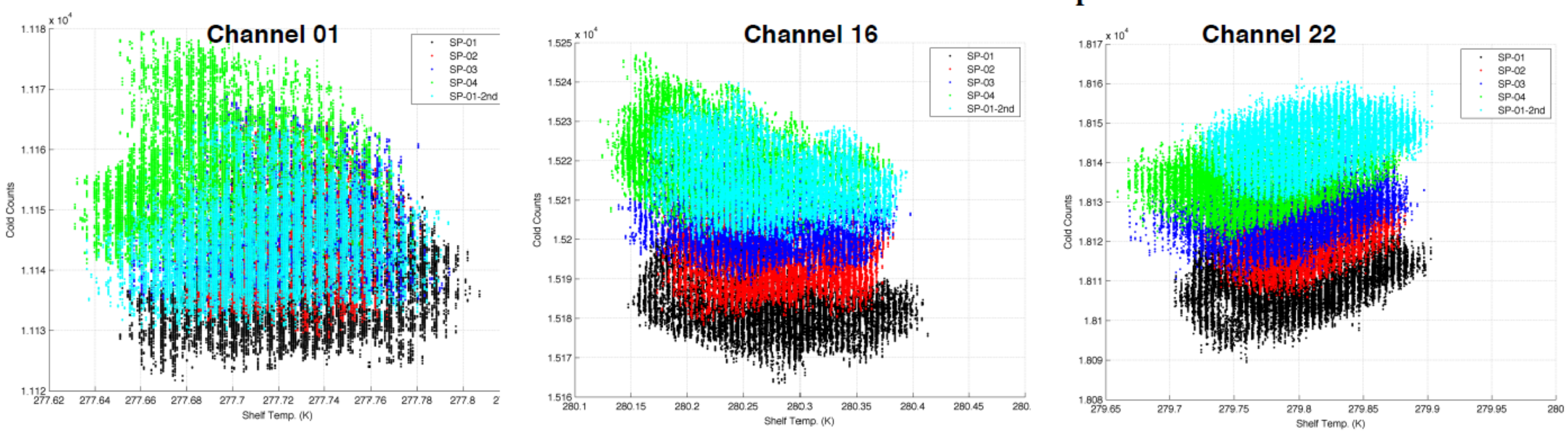
Impacts of Earth and Satellite Platform on Cold Counts

- For K/Ka band, cold counts shifted to warm end when space view profile switch from satellite side to earth side. Impact of SP profile switch for cold counts decreases with decreased beam width
- No strong correlation between cold counts and instrument temperature was observed except for G band, where the correlation was observed at all 4 SP profiles
- For all channels, higher consistency of space view samples was observed at SP1 than other SP profiles

Cold Counts Shift

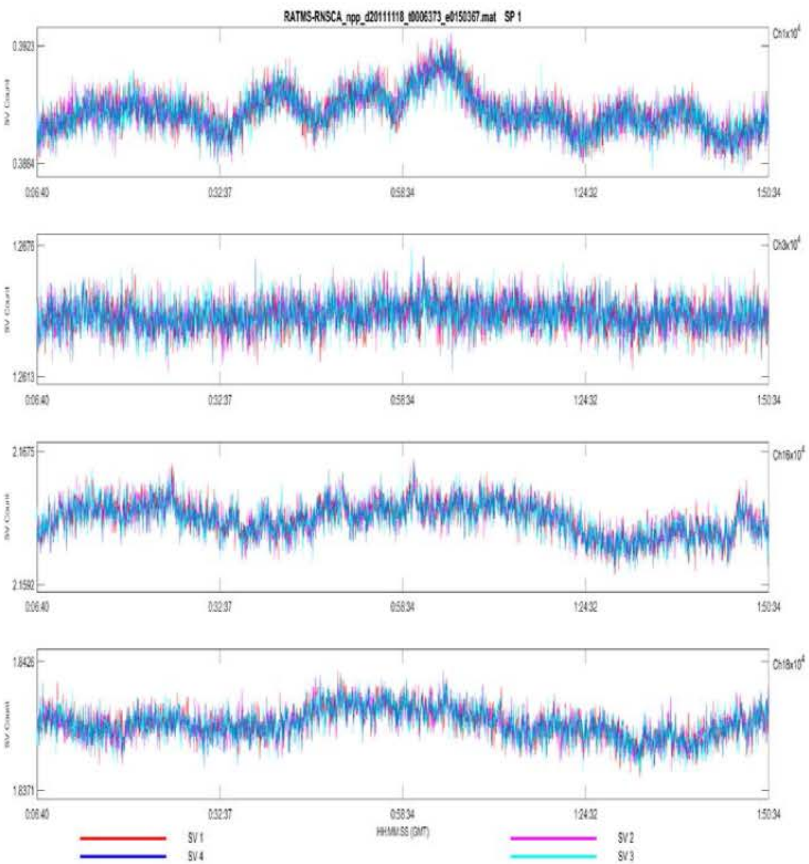


Cold Counts Correlation with Instrument Temperature

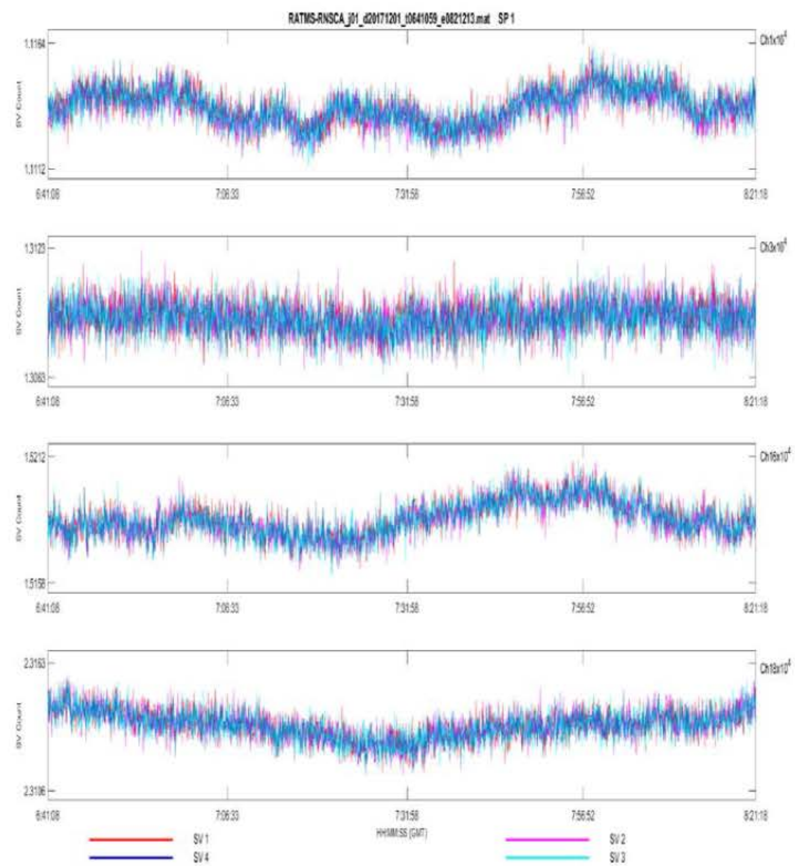


Data Collected for SP #1

S-NPP/ATMS on 2011-11-18

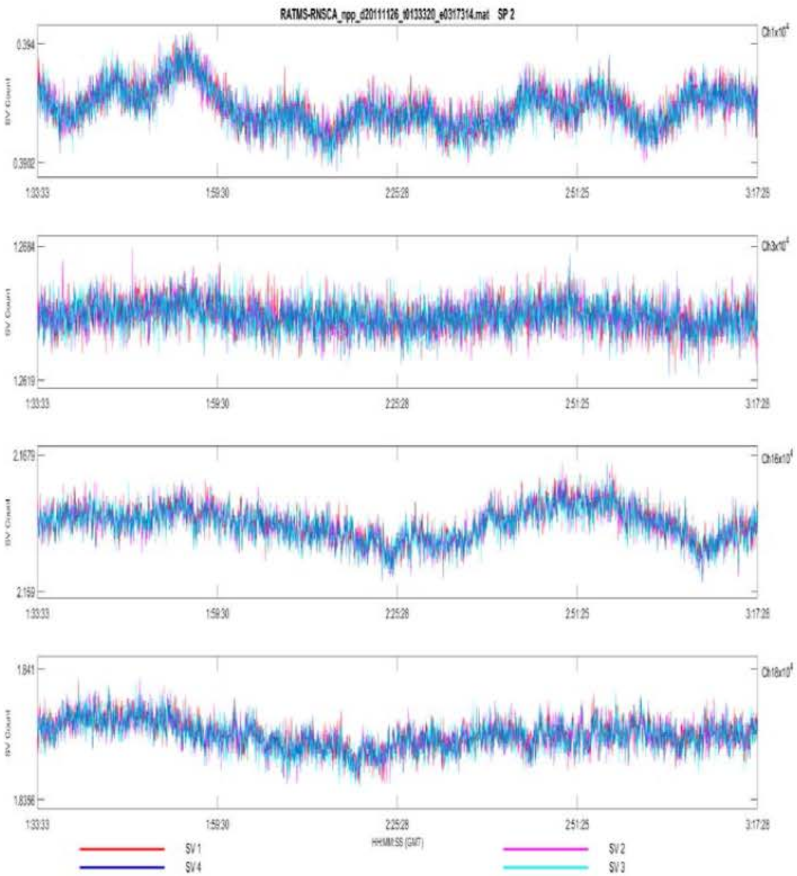


N20/ATMS on 2017-12-01

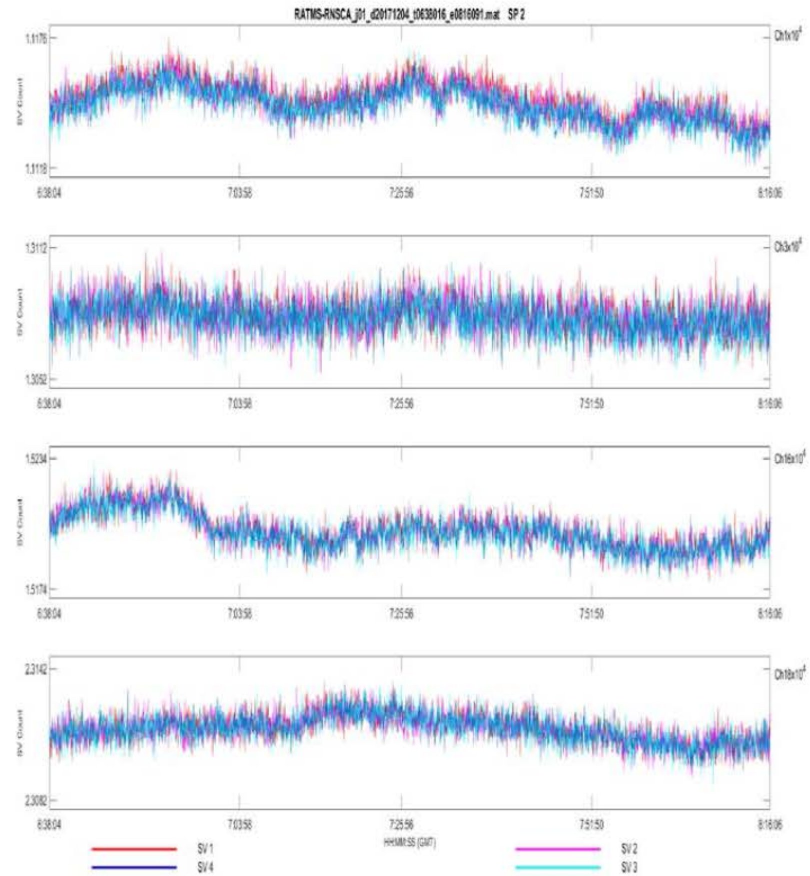


Data Collected for SP #2

S-NPP/ATMS on 2011-11-26



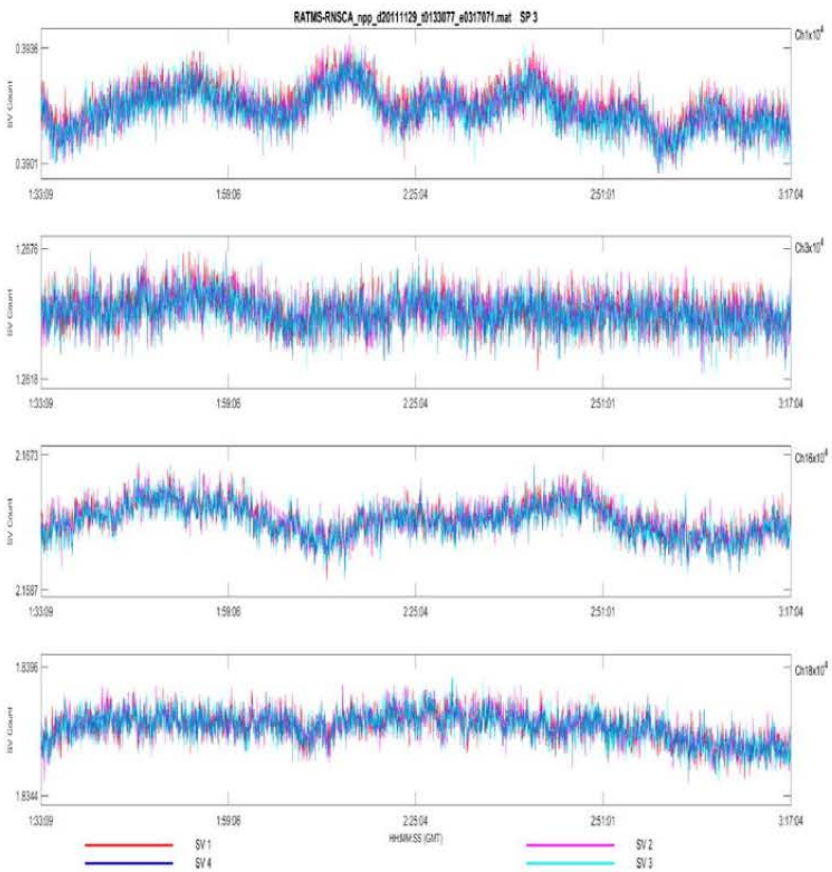
N20/ATMS on 2017-12-04



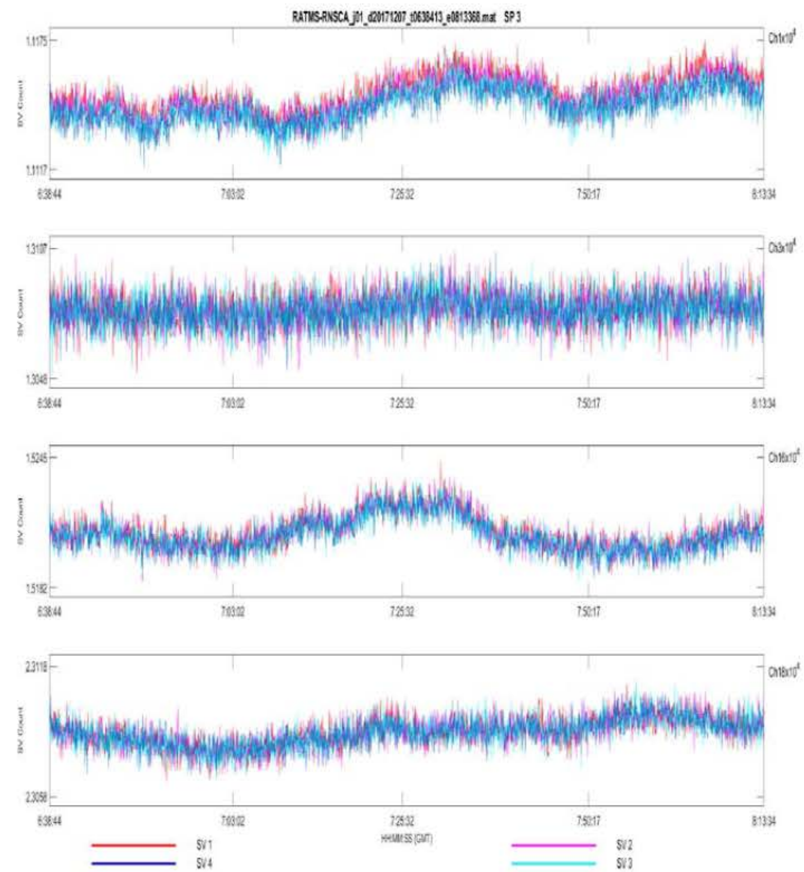
NOAA-20 ATMS Optimal Space View Selection

Data Collected for SP #3

S-NPP/ATMS on 2011-11-29

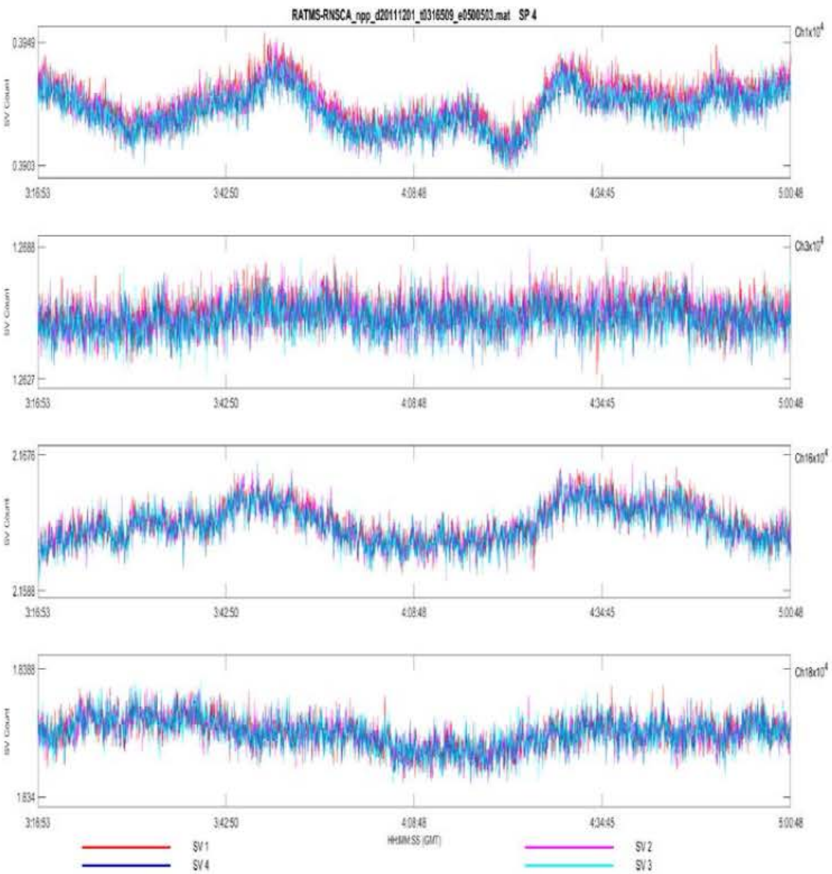


N20/ATMS on 2017-12-07

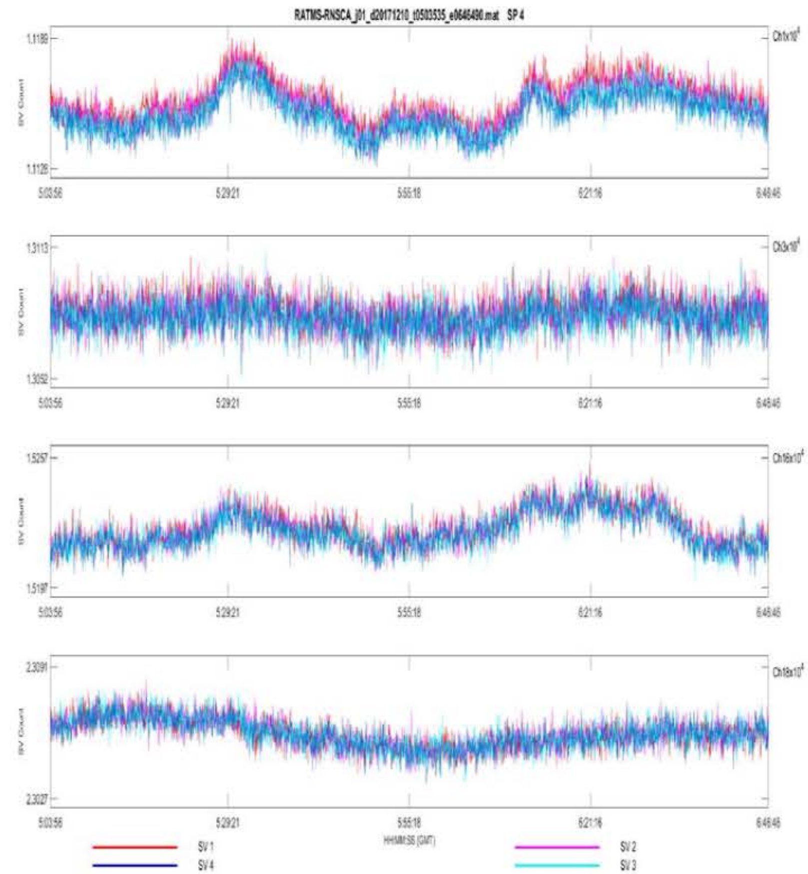


Data Collected for SP #4

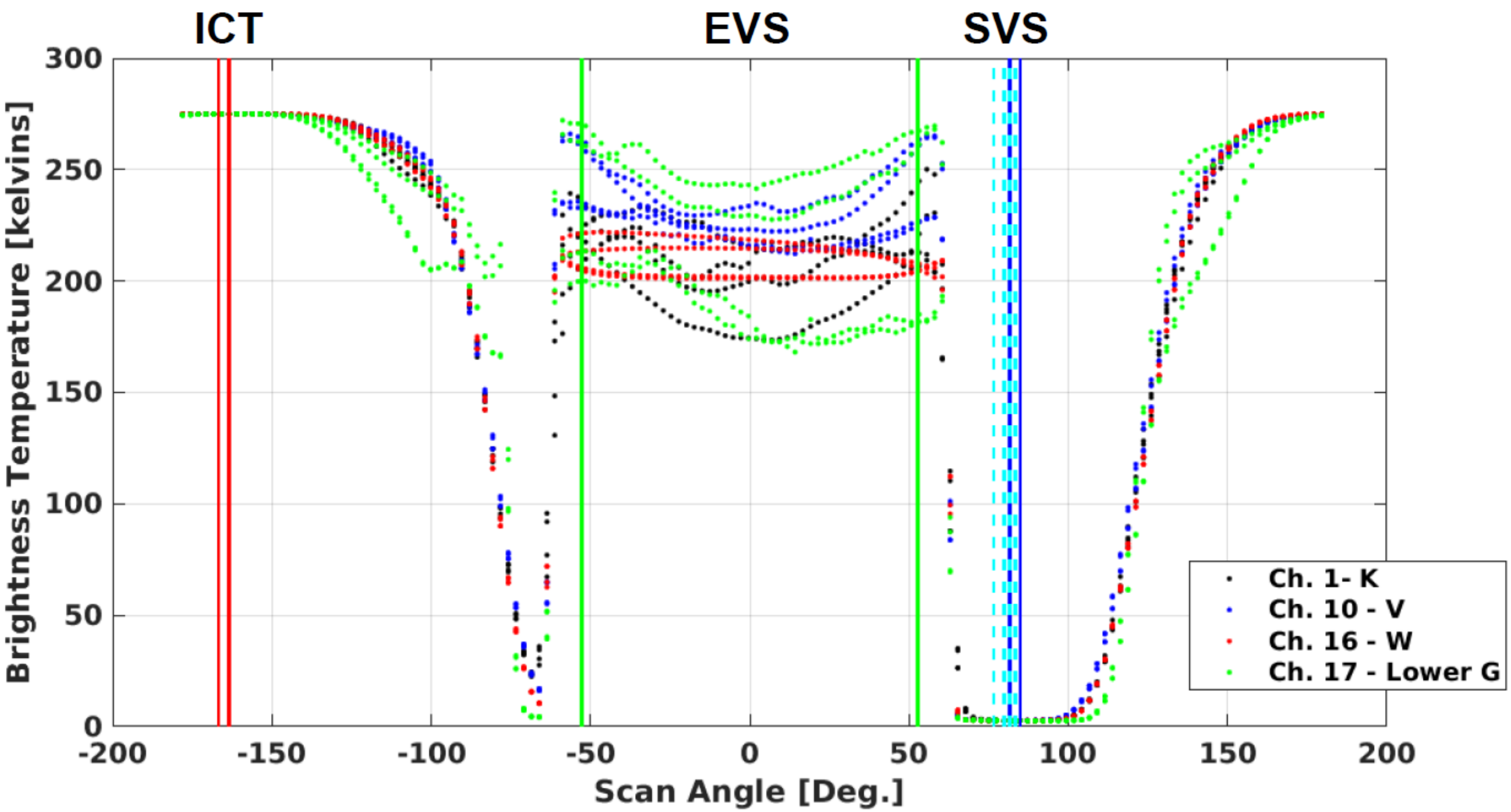
S-NPP/ATMS on 2011-12-01



N20/ATMS on 2017-12-10



N-20 Environment Characterization PLT



Repeated colors are from different 3-min collects (four total)

N-20 ATMS SDR - 3
RVL 12/20/17

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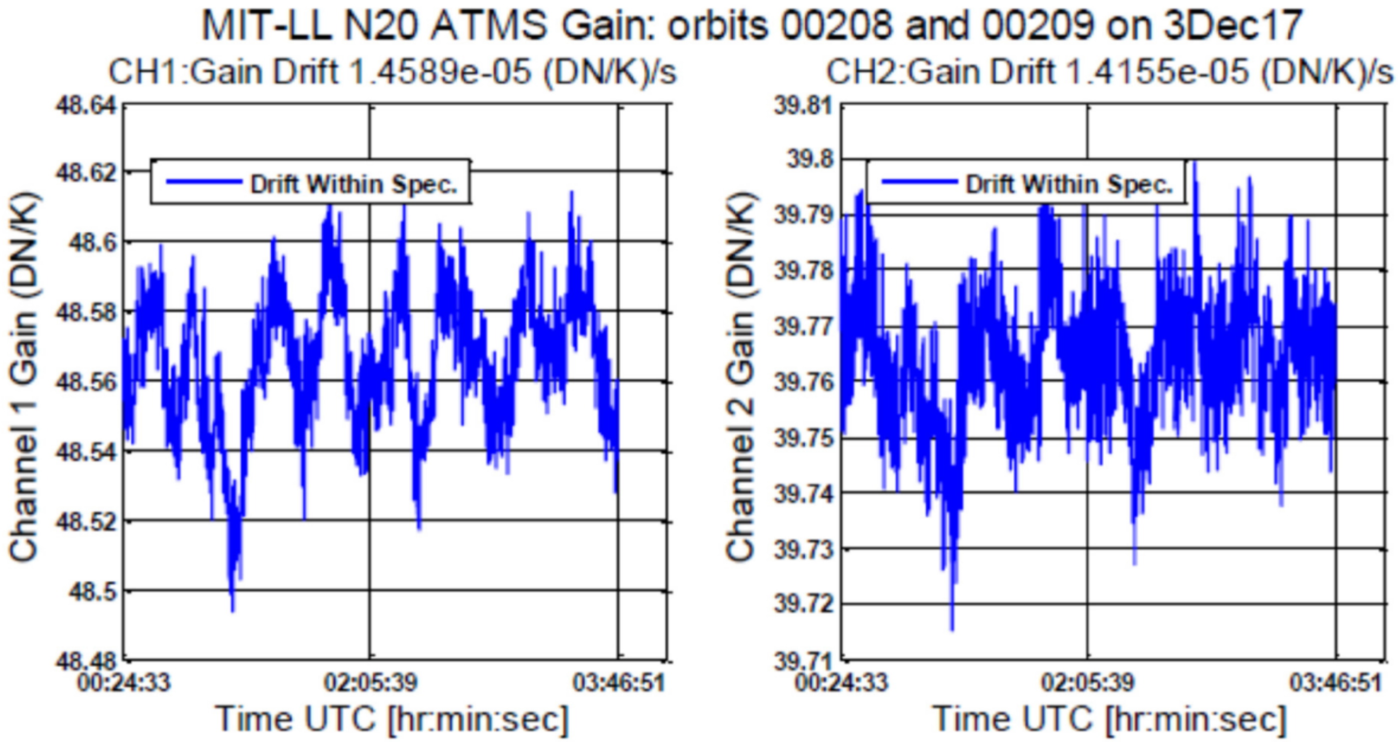
Temp. Stabilization (Task #14) Cont'd

Gain is meeting drift specification per NG JPSS-1 ATMS Cal/Val Plan (RE-20234)



N-20 ATMS SDR - 19
RVL 12/20/17

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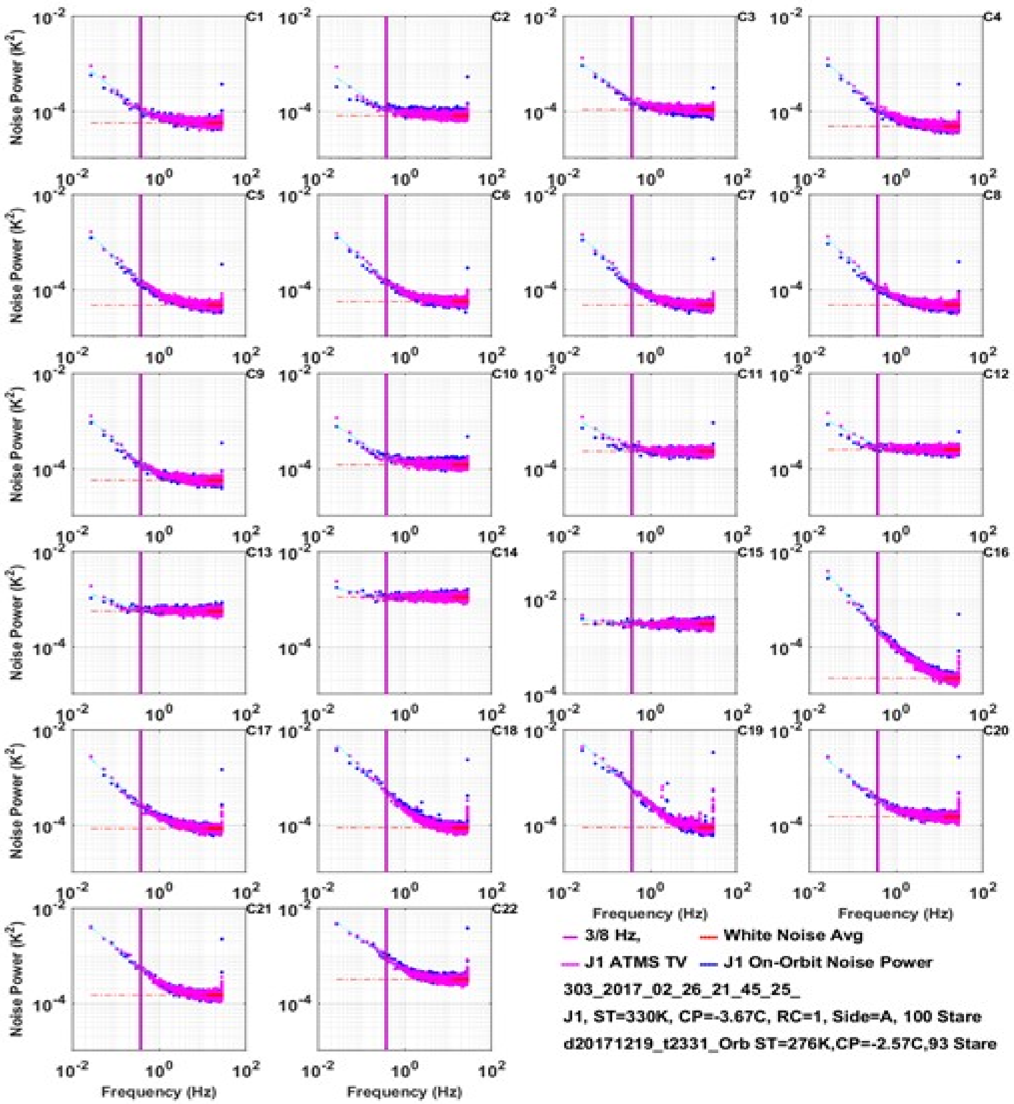
NOAA-20 ATMS Noise Characterization

Comparisons of J1 ATMS Noise Power From On-Orbit & TV

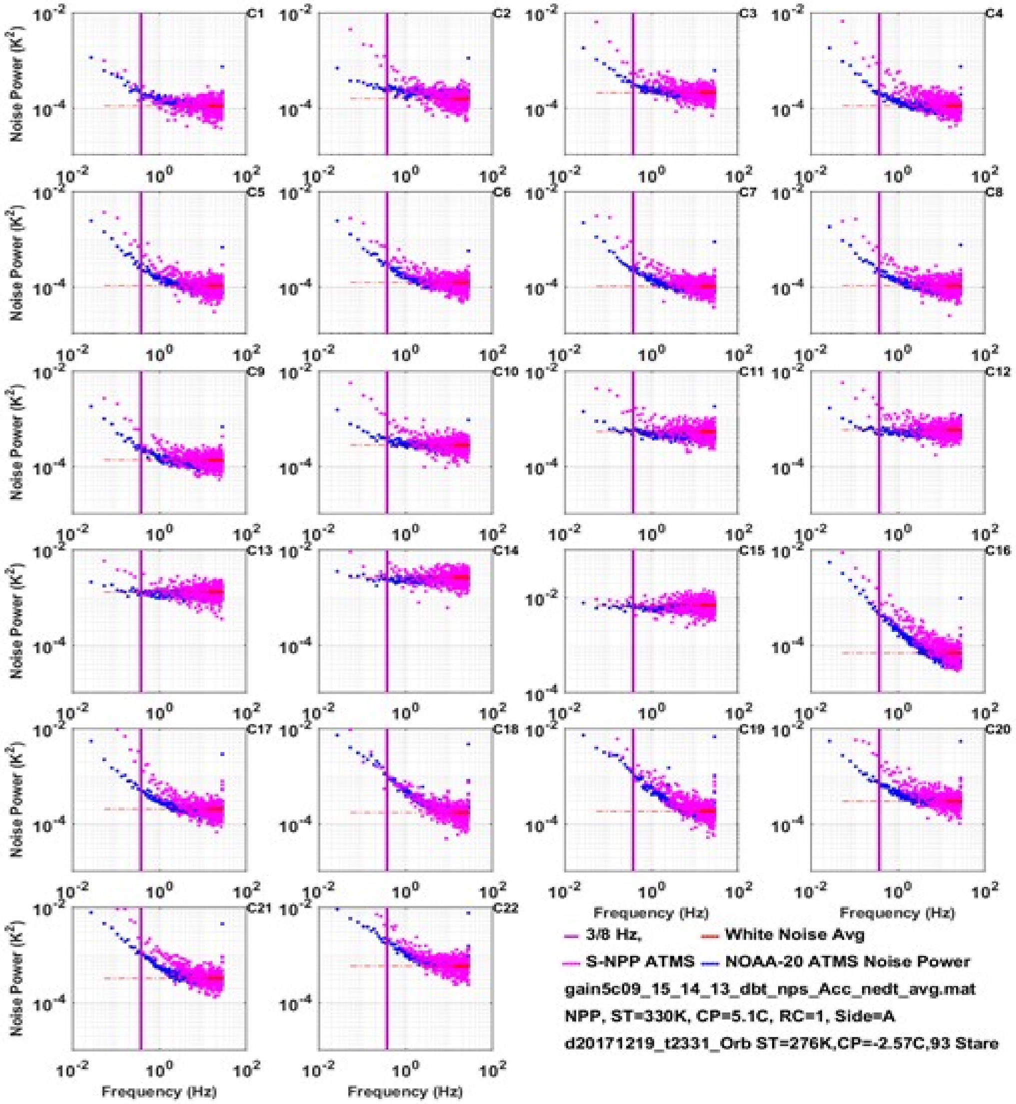
NOAA-20 ATMS On-Orbit Noise Characterization Part I PLT shows comparable *1/f* flicker noise to that from the Ground TV tests.



Suomi NPP ATMS Noise Characterization

Comparisons of ATMS Noise Powers From NOAA-20 & S-NPP

NOAA-20 ATMS On-Orbit Noise Characterization Part I PLT shows smaller *1/f* flicker noise than that from S-NPP TV Ground tests.



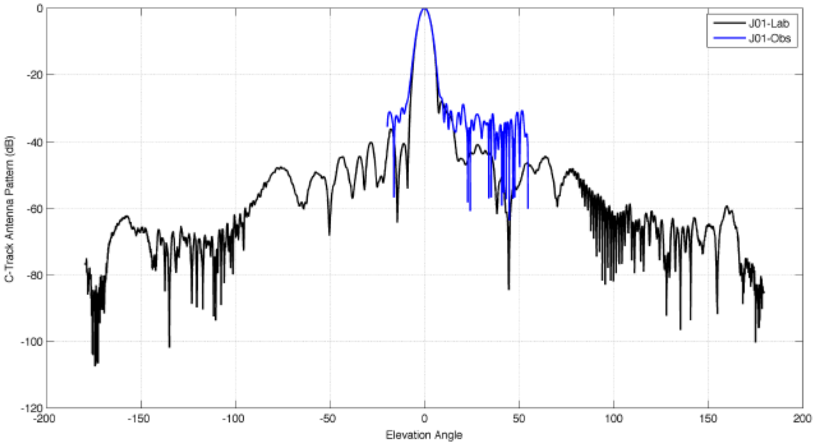
Smaller *1/f* flicker noise implies that less striping would be found in the data.

Note that S-NPP ATMS had only 11 stare sets and 1042 data-points for power spectrum analysis. NOAA-20 ATMS had 93 stare and 2048 data.

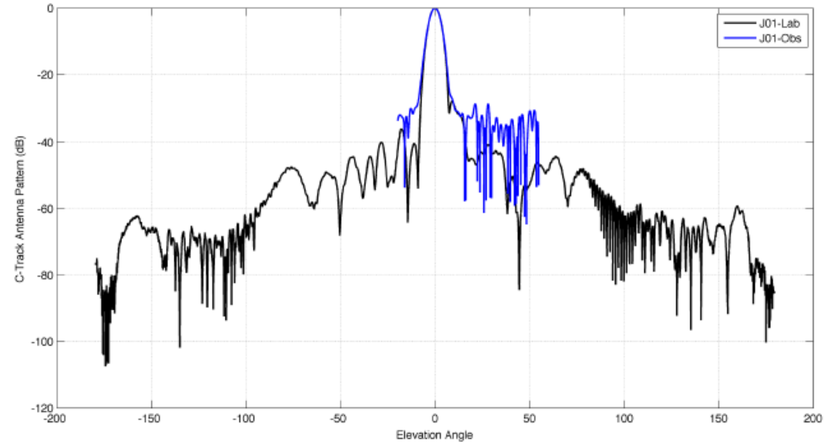
Prelaunch (black) and derived from roll maneuver data (blue)

Channel 1

12/15,2017

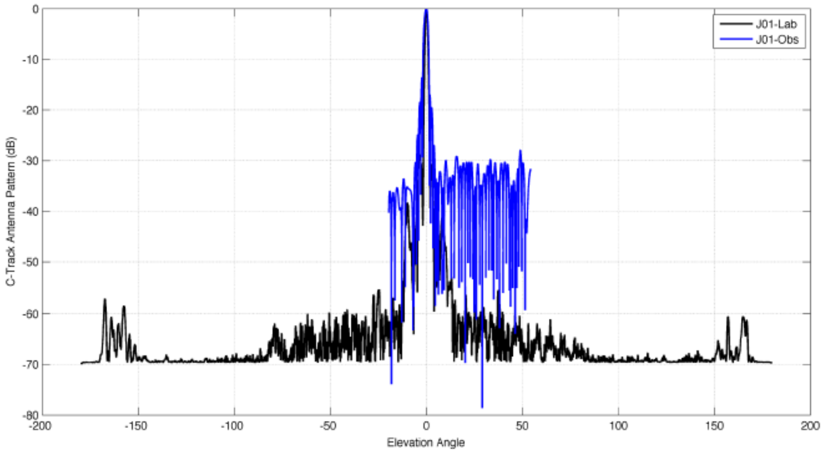


12/19,2017

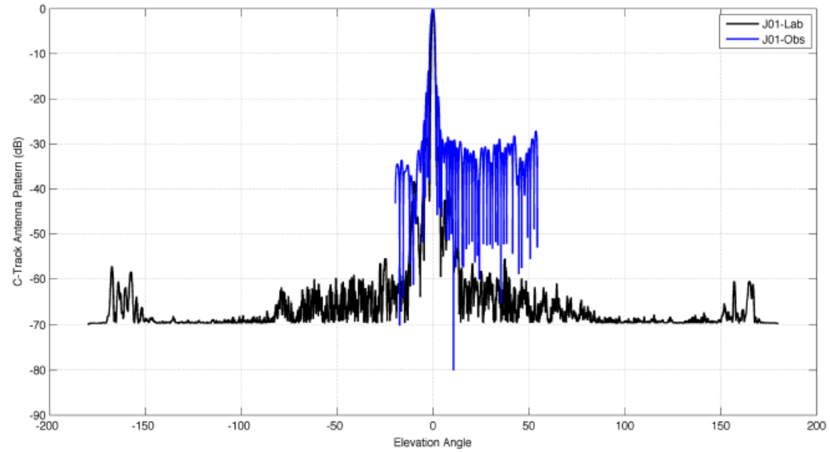


Channel 22

12/15,2017



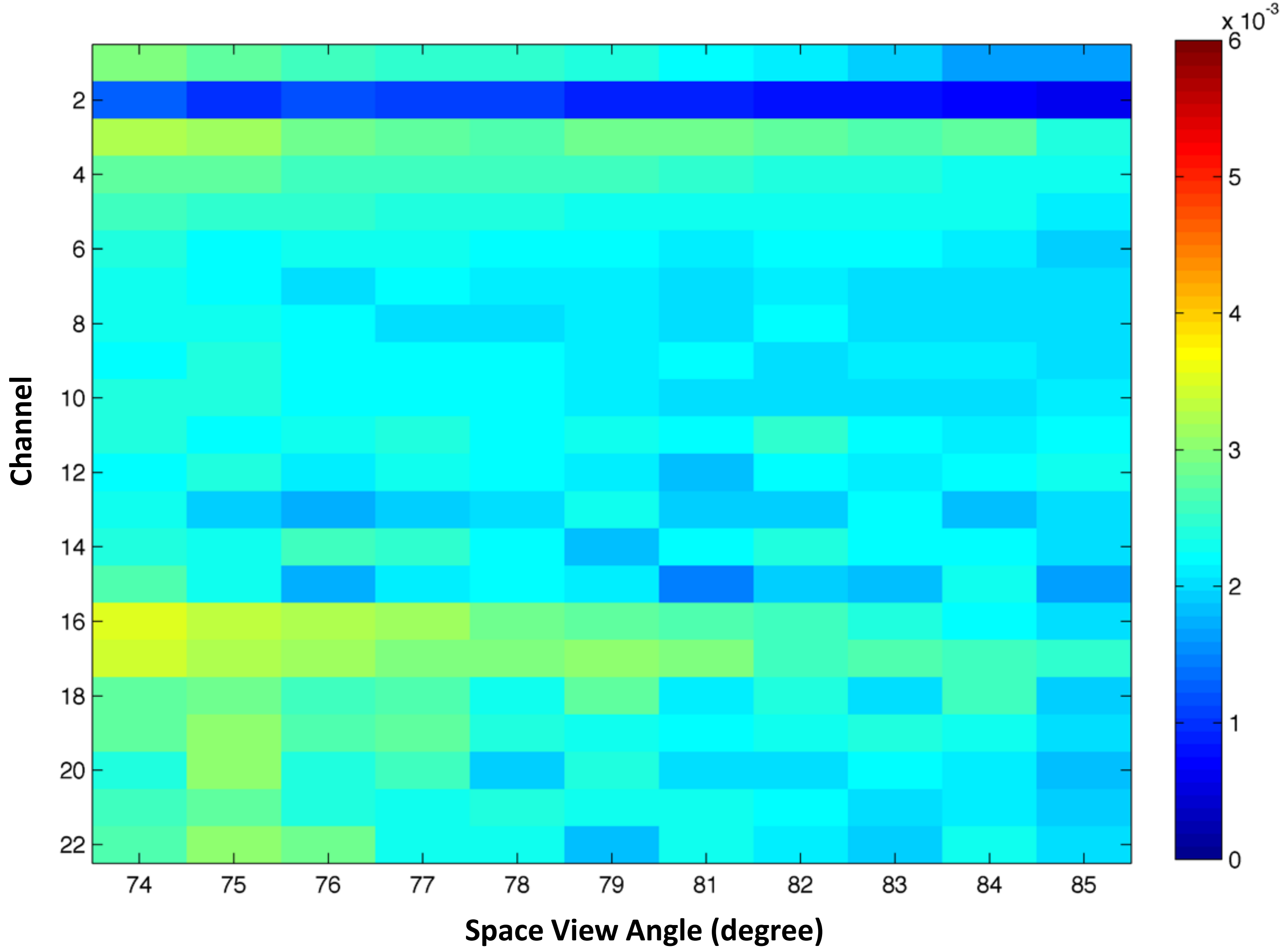
12/19,2017



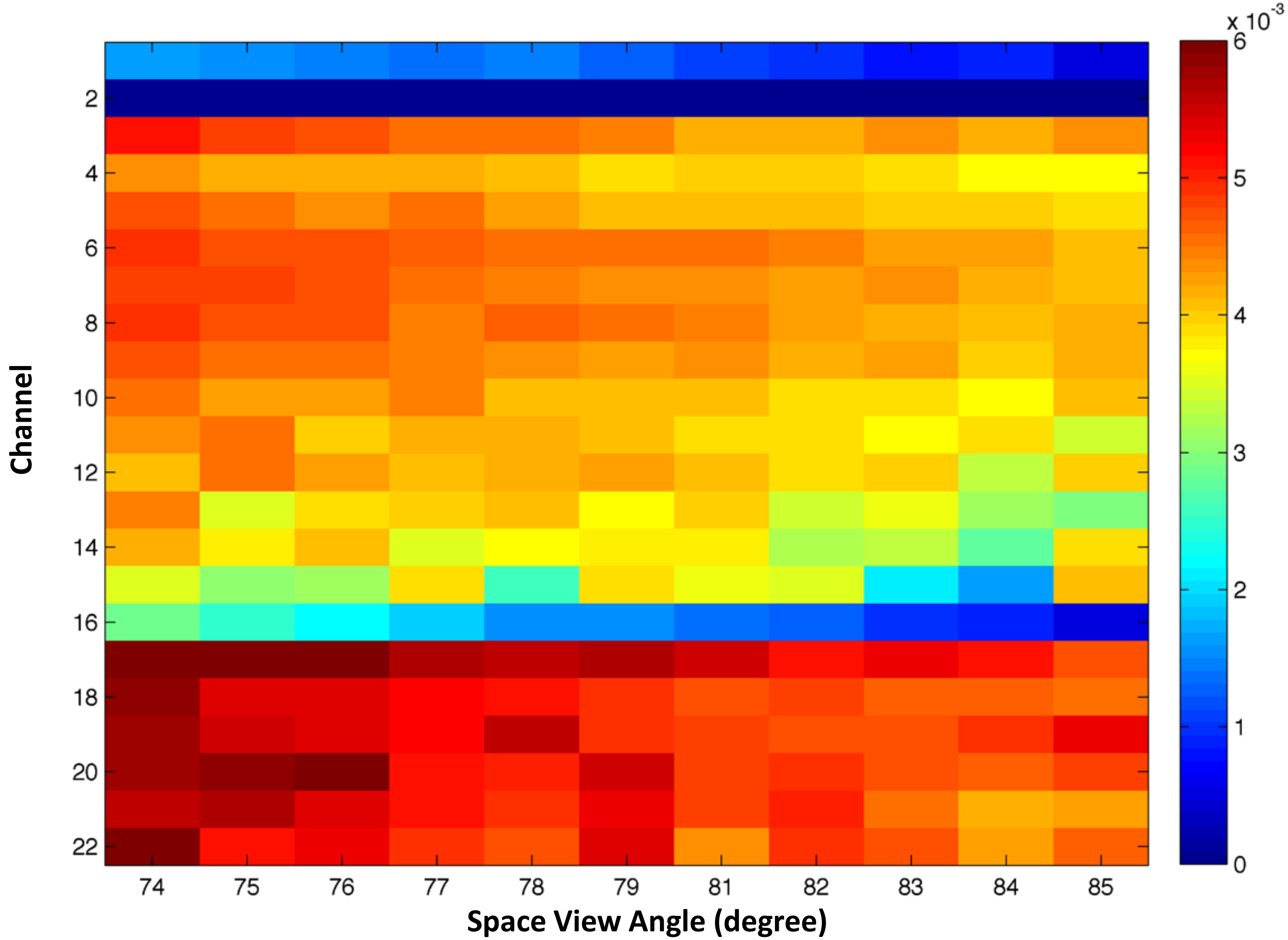
NOAA-20 ATMS Effective FOV Size

Ch.	EFOV Requirement – Cross-Track	NOAA-20 Roll Obs. (12/15/17)	NOAA-20 Roll Obs. (12/19/17)	S-NPP Roll Obs. (12/09/11)	S-NPP Roll Obs. (01/12/12)
1	6.3	5.41	5.40	5.40	5.38
2	6.3	5.61	5.62	5.65	5.63
3	3.3	2.54	2.55	2.60	2.59
4	3.3	2.55	2.54	2.63	2.61
5	3.3	2.52	2.52	2.60	2.59
6	3.3	2.46	2.47	2.53	2.53
7	3.3	2.43	2.44	2.45	2.46
8	3.3	2.40	2.40	2.41	2.42
9	3.3	2.39	2.40	2.41	2.41
10	3.3	2.42	2.42	2.38	2.37
11	3.3	2.44	2.45	2.39	2.40
12	3.3	2.47	2.48	2.45	2.46
13	3.3	2.52	2.52	2.53	2.53
14	3.3	2.55	2.54	2.59	2.60
15	3.3	2.57	2.57	2.63	2.63
16	3.3	2.53	2.55	2.54	2.52
17	2.2	1.86	1.86	1.93	1.90
18	2.2	1.83	1.83	1.91	1.88
19	2.2	1.83	1.84	1.92	1.88
20	2.2	1.85	1.83	1.92	1.88
21	2.2	1.86	1.86	1.92	1.90
22	2.2	1.87	1.88	1.89	1.89

NOAA-20 ATMS Earth Sidelobes



Suomi NPP ATMS Earth Sidelobes



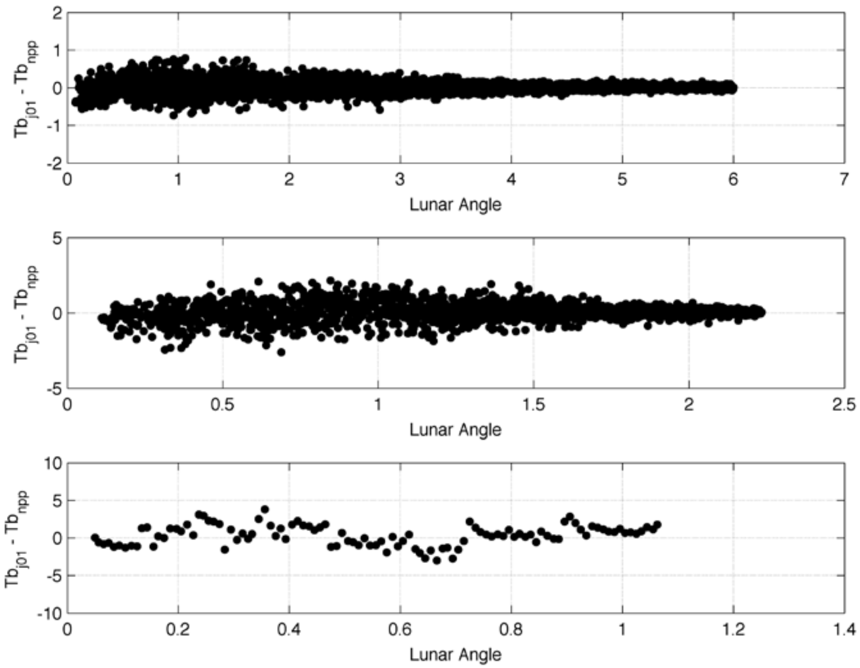
NOAA-20 ATMS Lunar Intrusion Evaluation

- Lunar observations are very sensitive to beam pointing angle at lunar angle close to antenna beam center, therefore lunar model need to be recalibrated after beam pointing error was quantified and corrected in TDR geolocation process
- Preliminary study on vicarious calibration by using lunar radiation show that NOAA-20 ATMS antenna temperature is colder than that of S-NPP for about 0.2K. The lunar observations can be taken as reference to identify instrument calibration error
- More lunar observations are need to be collected to get stable calibration bias results for NOAA-20 ATMS

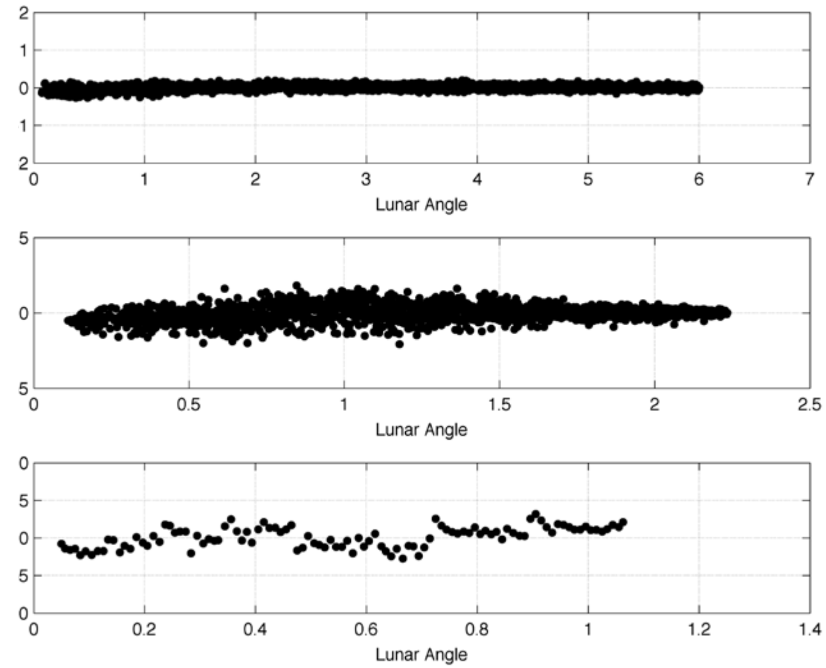
NOAA-20 ATMS Lunar Intrusion Evaluation

- Calibrated lunar TDR can be used to identify calibration difference between NOAA-20 and SNPP ATMS instruments
- Calibrated lunar TDR is very sensitive to pointing error at the angle near the antenna beam center
- Lunar model can be used to reduce impact of different pointing angle error in NOAA-20 and S-NPP

TDR(NOAA-20) - TDR (S-NPP)

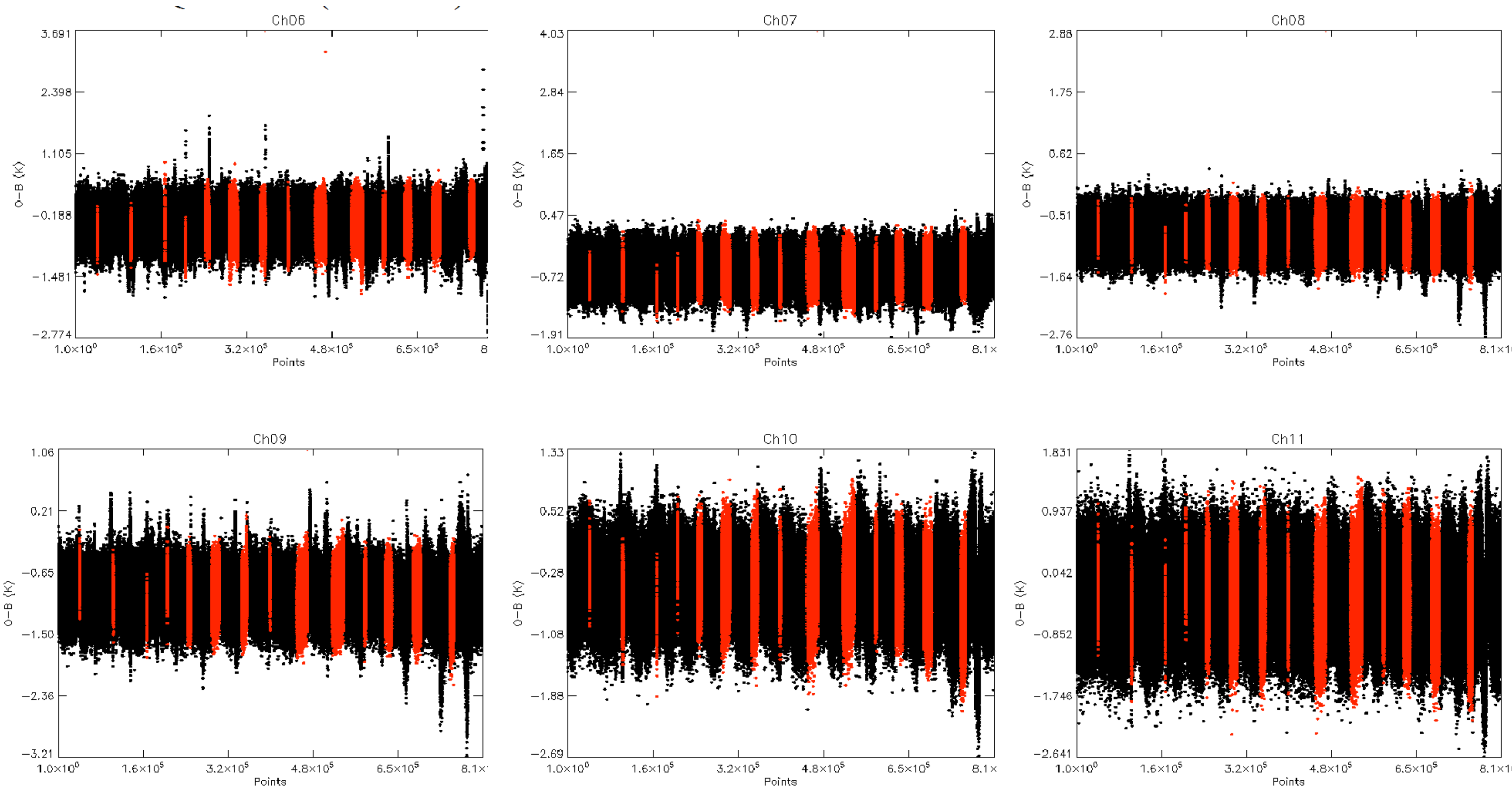


Lunar Model Corrected TDR Difference



Lunar intrusion correction results in NOAA-20 TDR illustrated by O-B

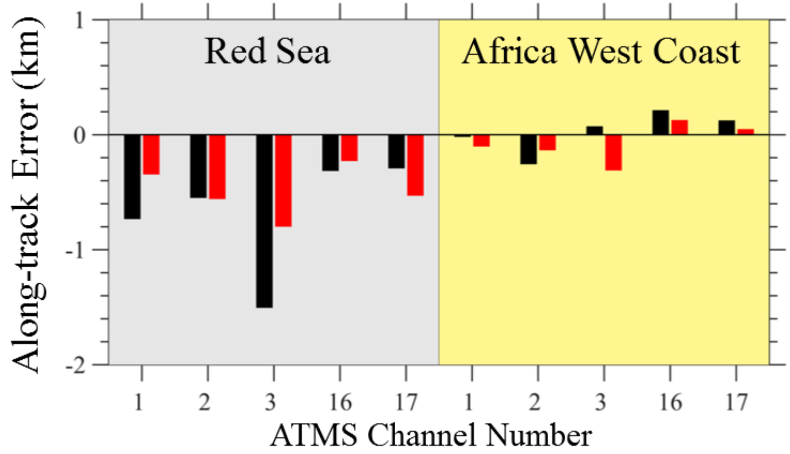
- Lunar intrusion QF triggered
- No lunar intrusion detected



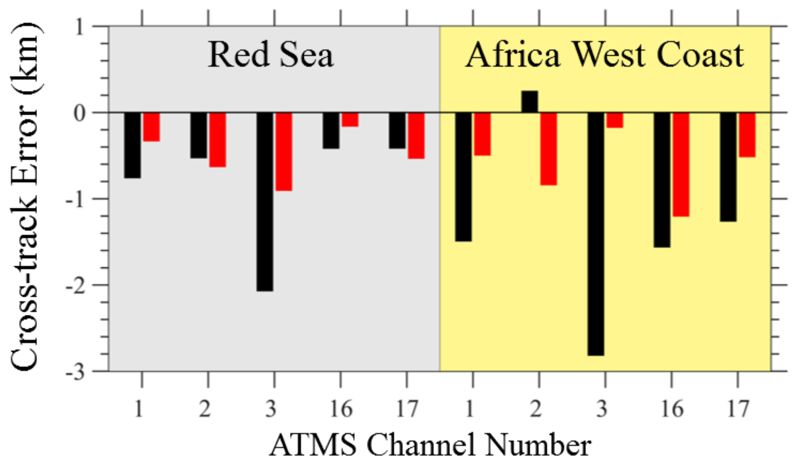
NOAA-20 ATMS Geolocation Evaluation

Comparison of ATMS Geolocation Errors between NOAA-20 and S-NPP

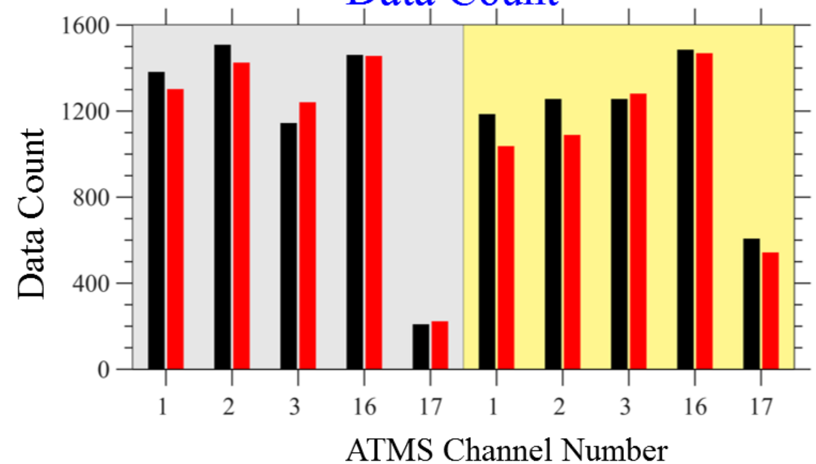
Mean Errors



The ATMS geolocation errors from NOAA-20 are in general smaller than that from S-NPP.



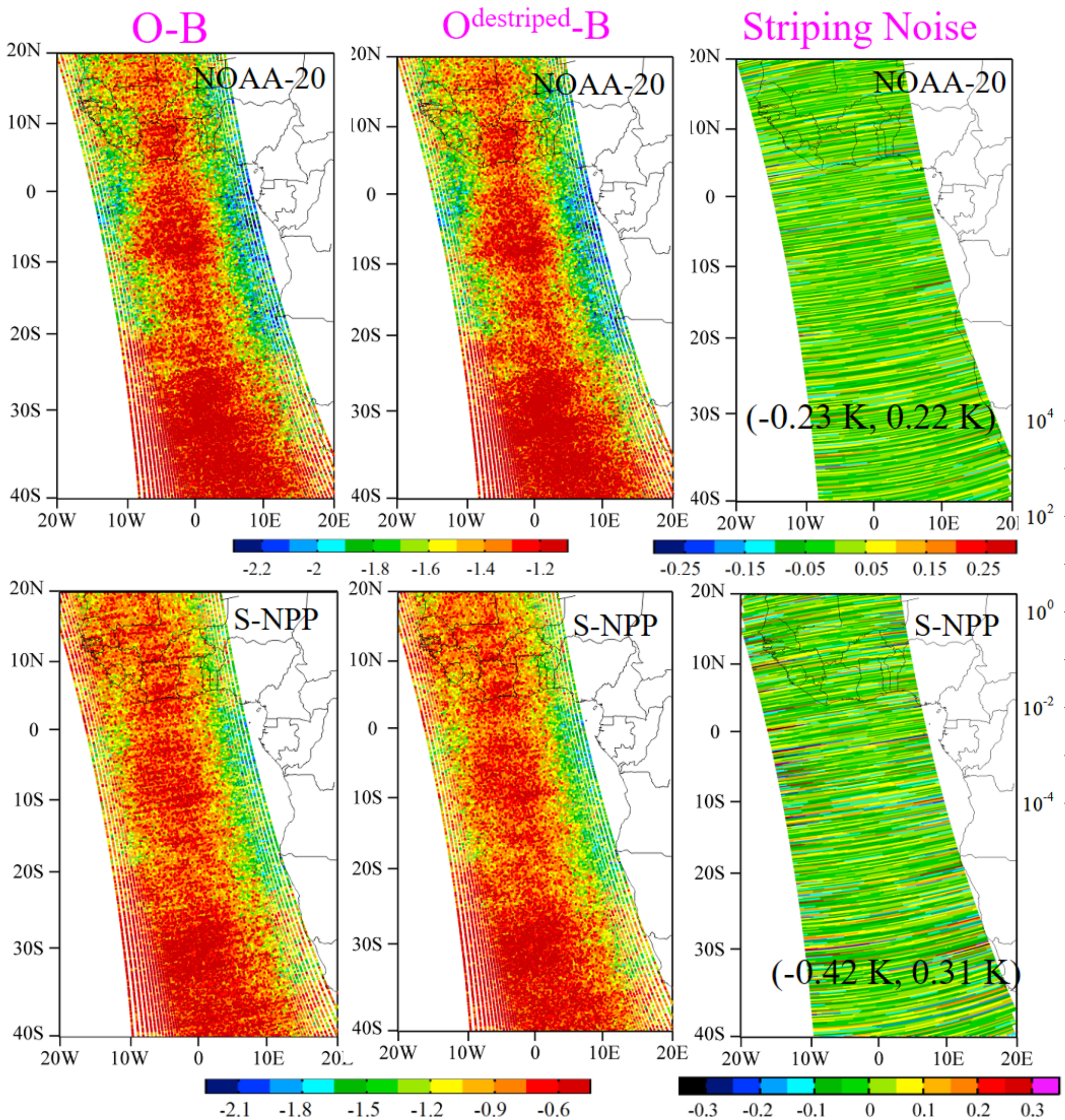
Data Count



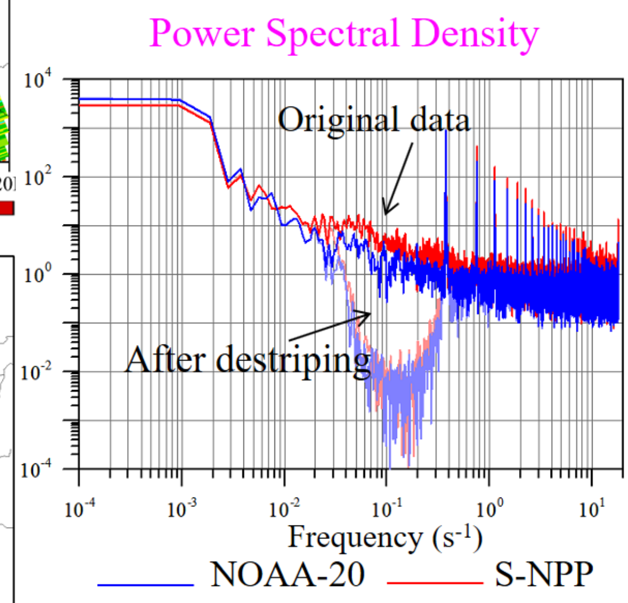
NOAA-20 S-NPP

Data used for the geolocation error estimate are from November 29 to December 18, 2017.

ATMS Striping Noise Comparison between NOAA-20 and S-NPP



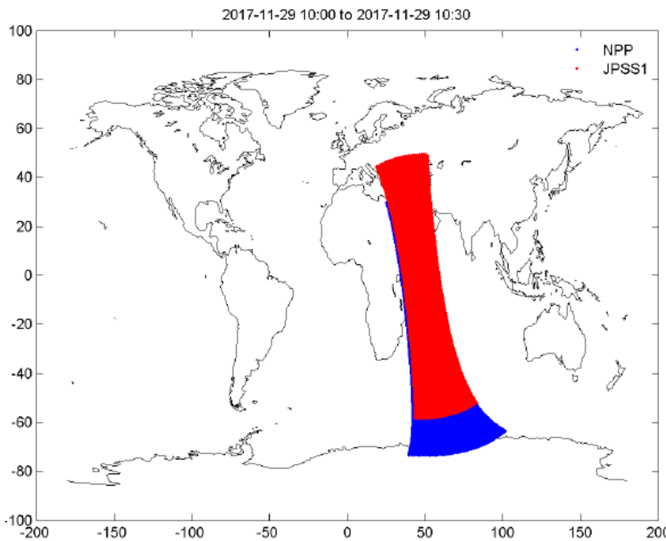
NOAA-20 ATMS striping noise is slightly smaller (~0.1K) in magnitude than that of S-NPP ATMS.



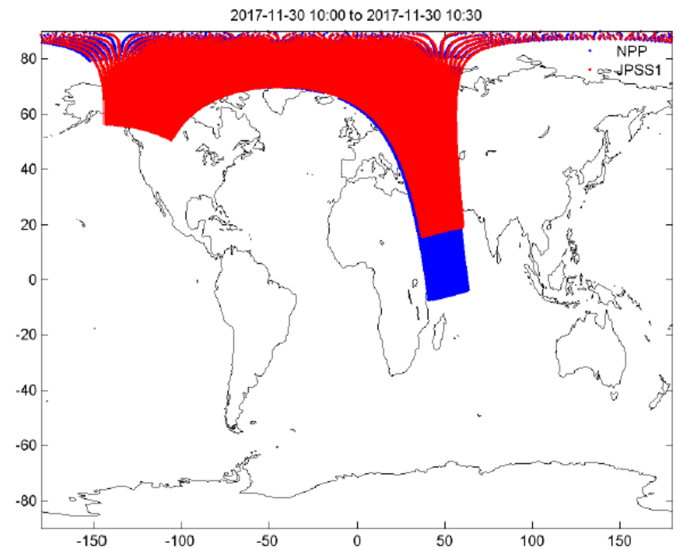
Channel 9 Observations on 29 December 2017

NOAA-20 ATMS Direct Comparison With S-NPP

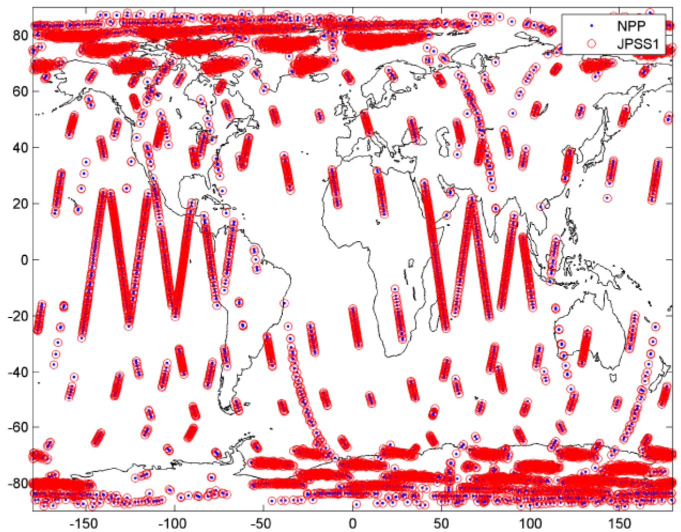
SNPP(Blue) and N20(Red) Ascending Orbit in 11/29



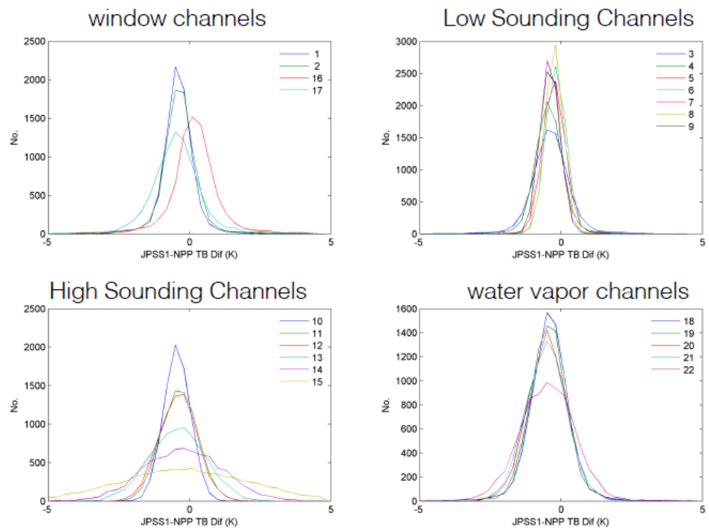
SNPP(Blue) and N20(Red) Ascending Orbit in 11/30



Collocation of J01 and SNPP

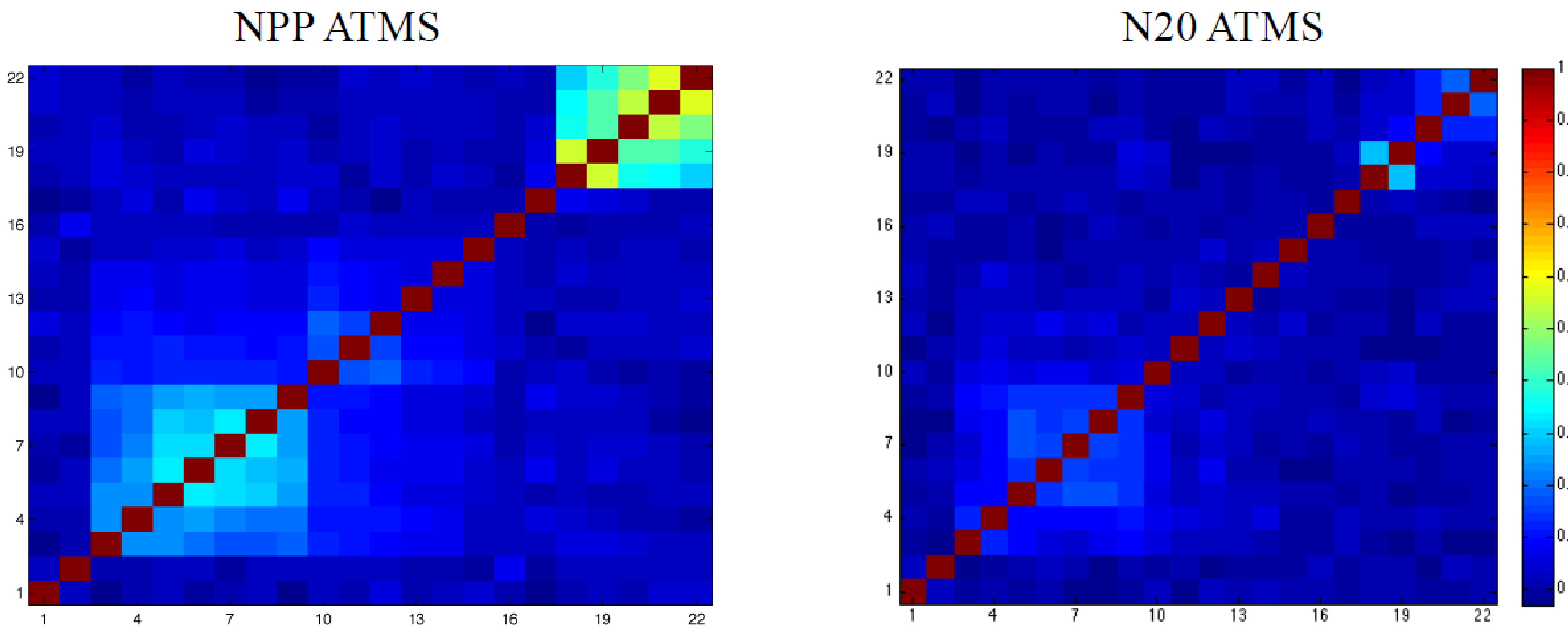


Ta Difference (J01- SNPP)



NOAA-20 ATMS Inter-Channel Noise Correlation

- One hour stable observations of warm load were calibrated
- Data noise can be derived from the difference between calibrated warm load temperature and PRT temperature
- Inter-channel noise correlation of NOAA-20 is much smaller than that of S-NPP, especially in low V- and G-bands

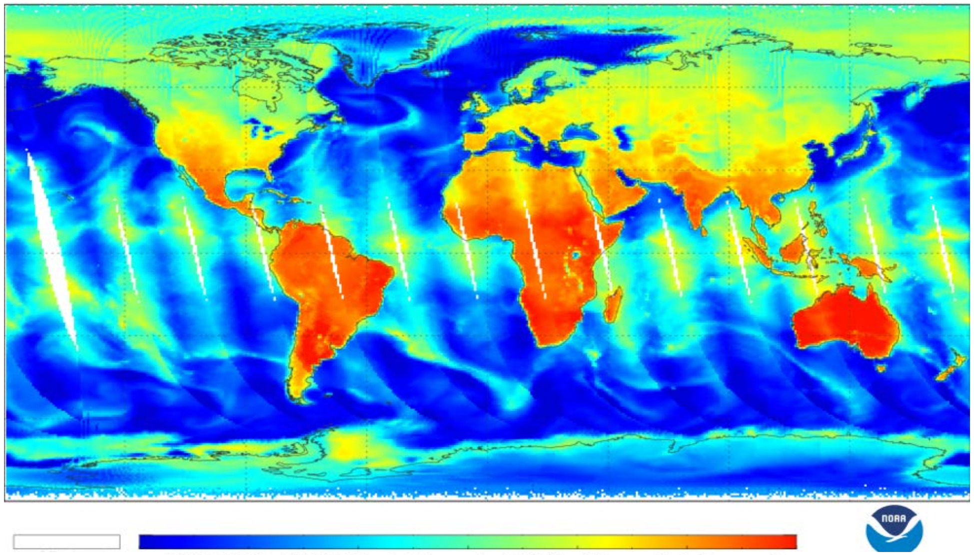


Users' Feedback

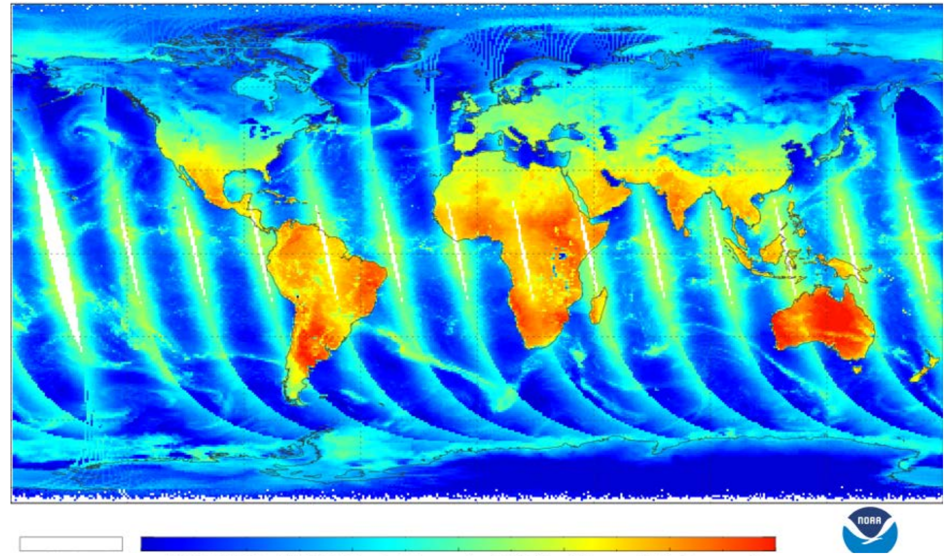
- NOAA/STAR MiRS team uses ATMS TDR data and generates more than 10 EDRs. The team is happy with NOAA-20 ATMS data. Even without tuning, the NOAA-20 MiRS EDRs and SNPP EDRs are comparable.
- NOAA/NCEP EMC has received NOAA-20 ATMS TDR BUFR data and worked on the data.
- ECMWF is waiting for ATMS SDR data.

NOAA-20 ATMS TDR (upper) and limb-corrected (bottom)

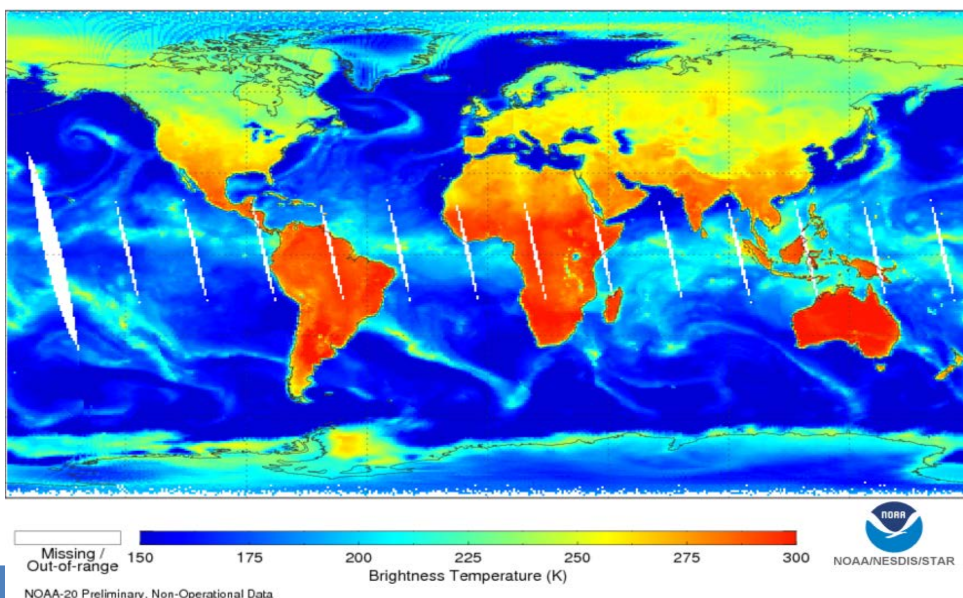
NOAA-20 - ATMS TDR - Channel 1 Ascending
25 Dec 2017



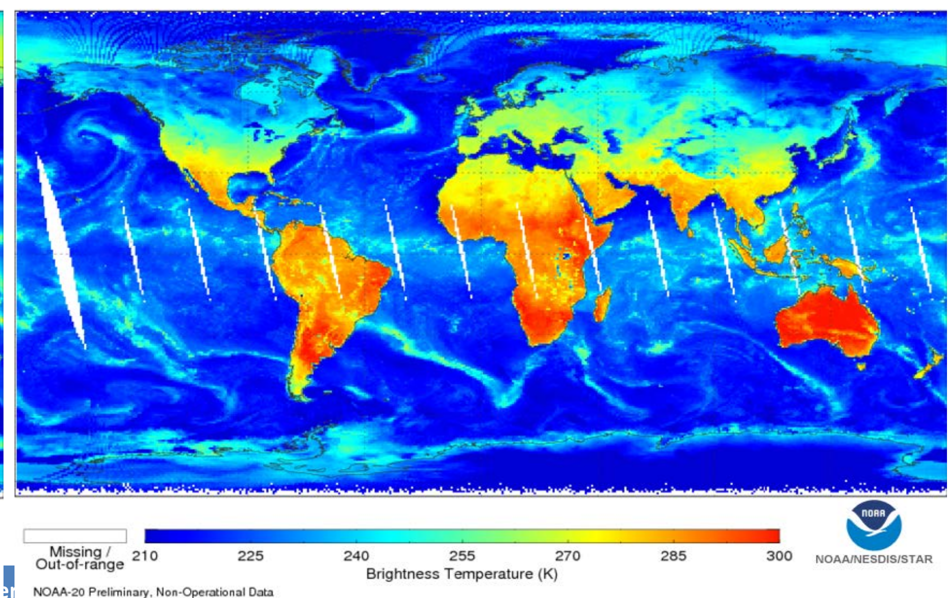
NOAA-20 - ATMS TDR - Channel 3 Ascending
25 Dec 2017



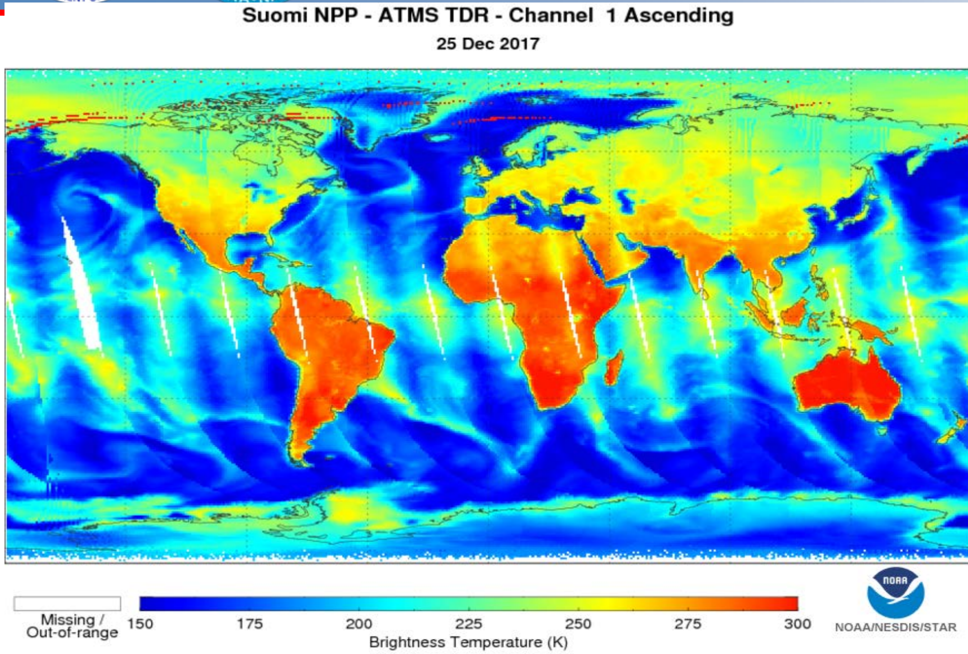
NOAA-20 - ATMS Limb-Corrected TDR - Channel 1 Ascending
25 Dec 2017

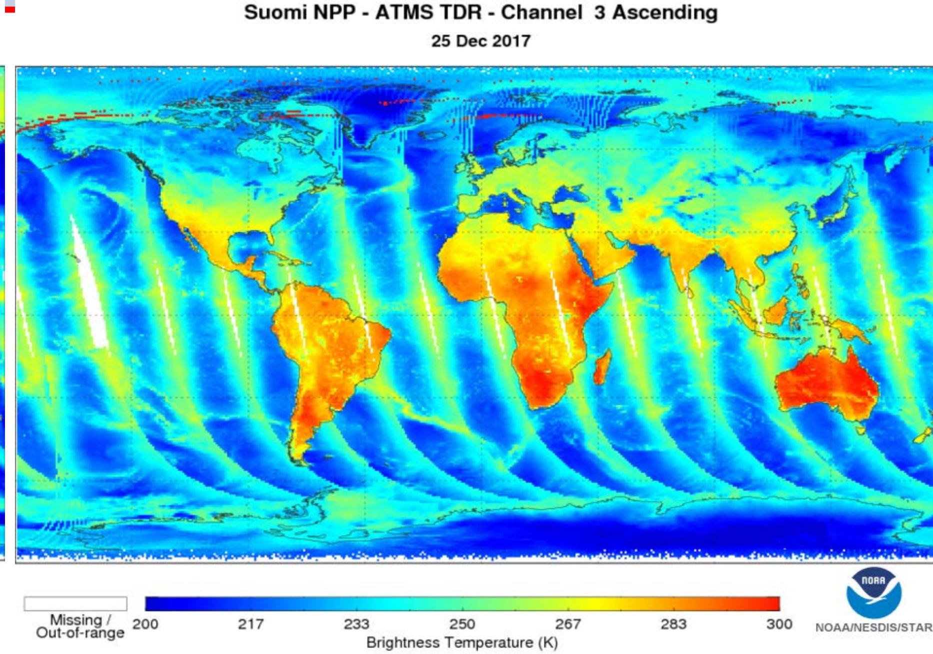


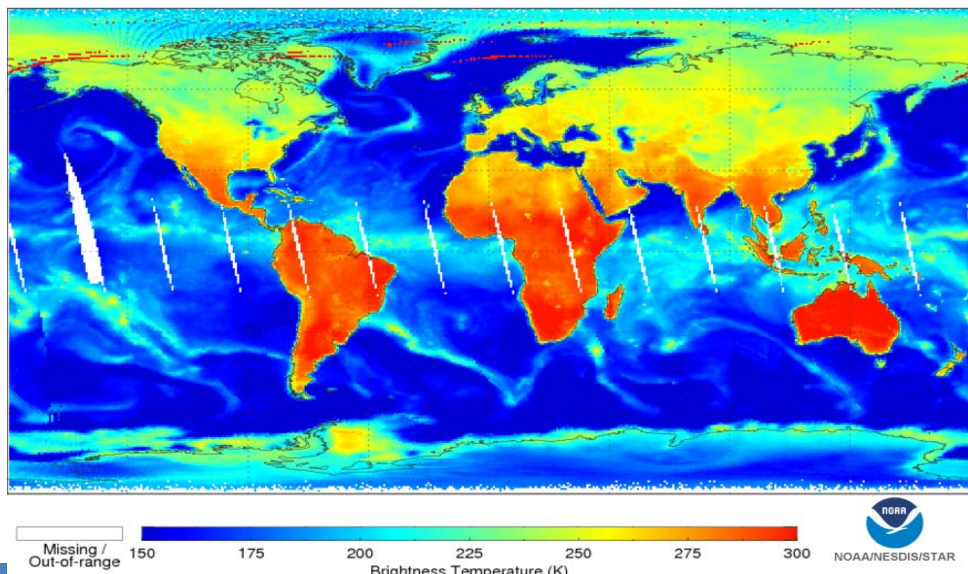
NOAA-20 - ATMS Limb-Corrected TDR - Channel 3 Ascending
25 Dec 2017

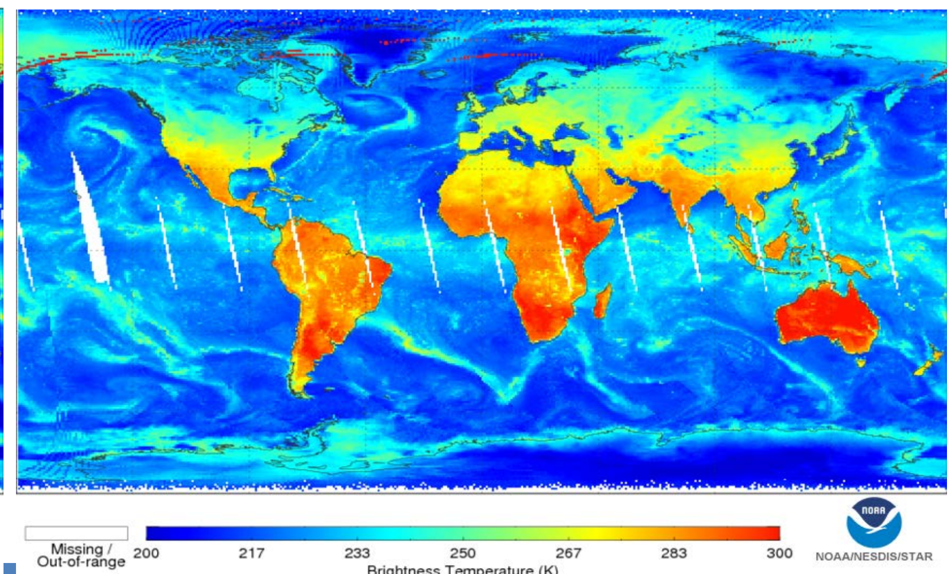


S-NPP ATMS TDR (upper) and limb-corrected (bottom)



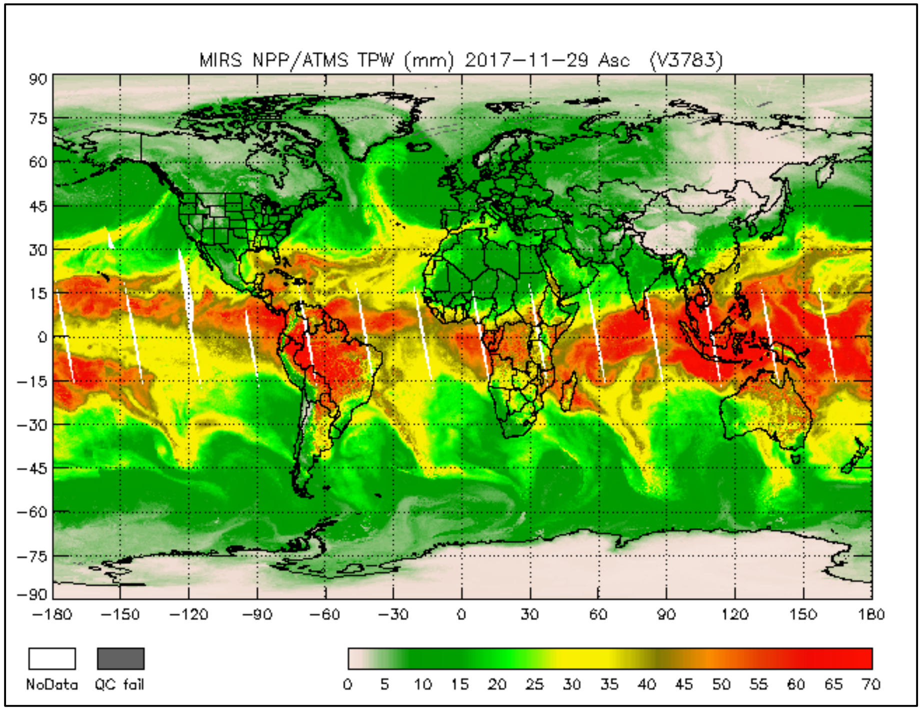


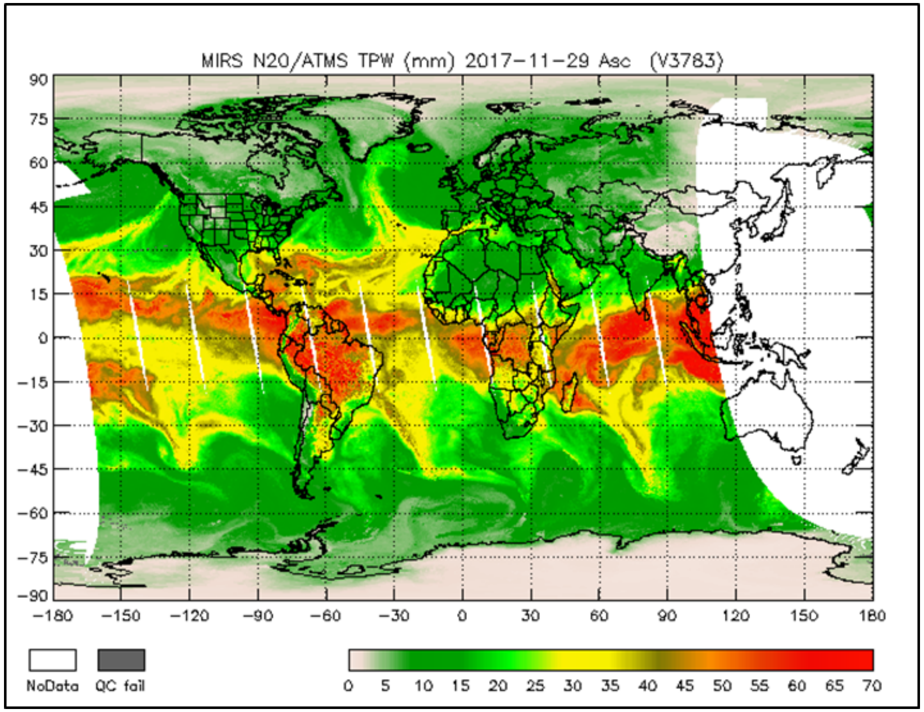




NOAA-20 ATMS MiRS Retrieval Products

S-NPP vs NOAA-20 Total Precipitable Water



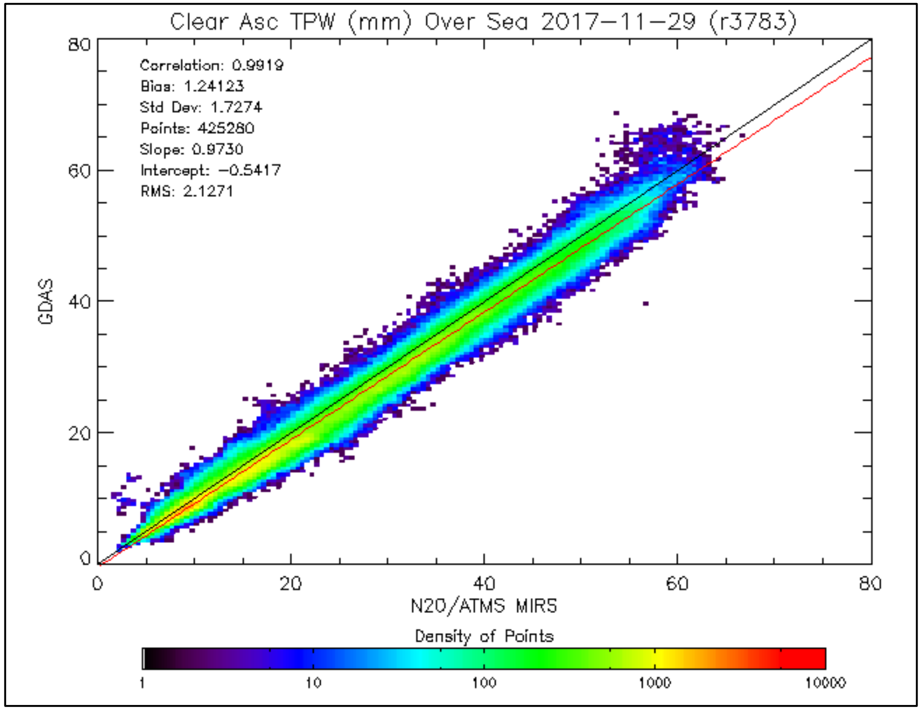


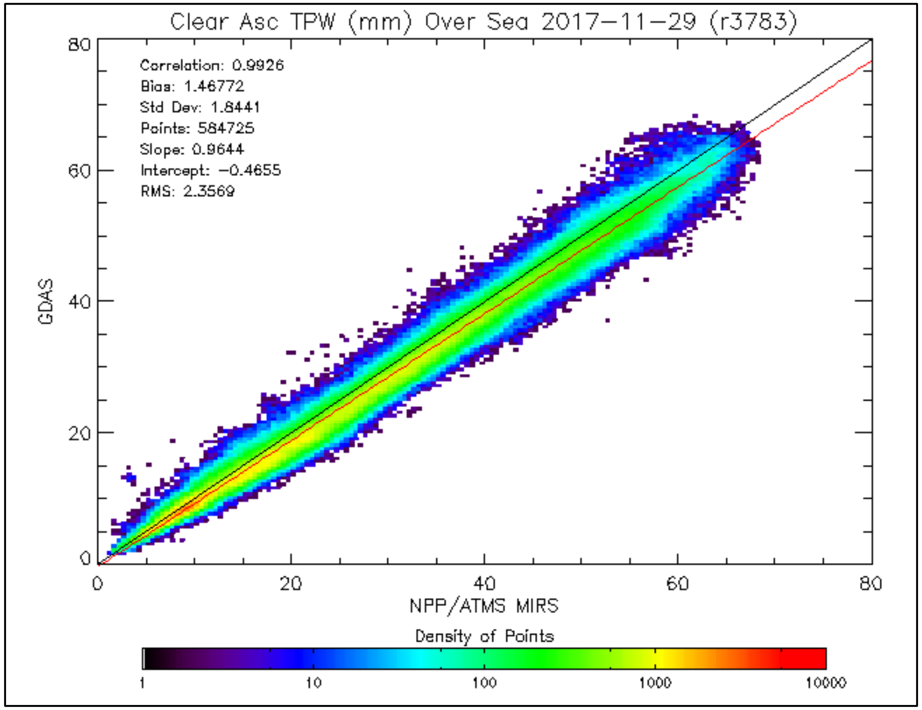
Produced by the MiRS Algorithm Development Team at NOAA/NESDIS/STAR

Total Precipitable Water: Comparison with GDAS

Clear Ocean

JPSS-1/N20	SNPP





Note: differing sample sizes due to incomplete global coverage of N20 data

Produced by the MiRS Algorithm Development Team at NOAA/NESDIS/STAR

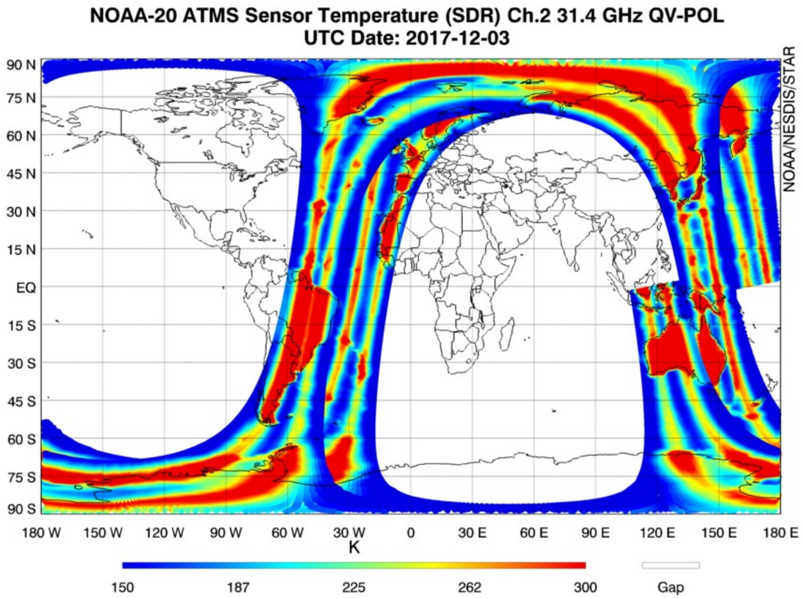
Identified Issues, To Be Resolved (PCT upload)

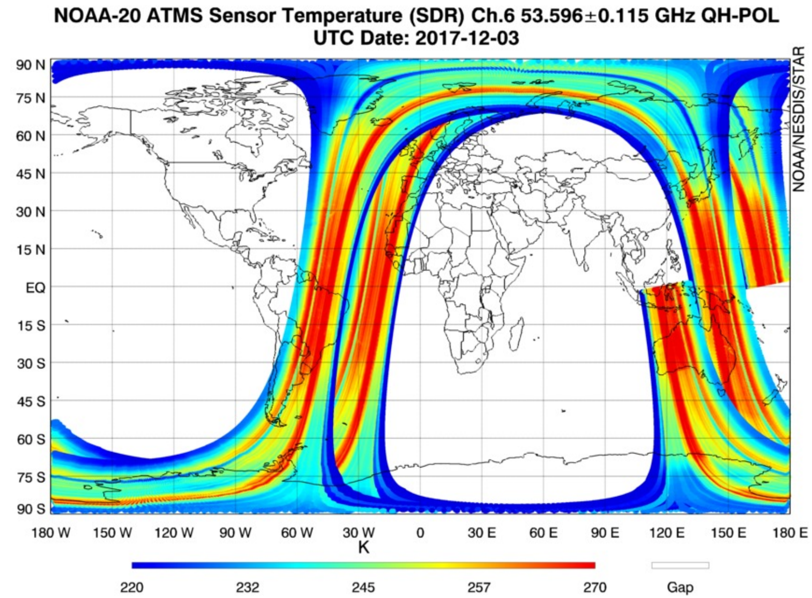
Error in the ATMS TDR to SDR conversion. This issue will be solved by uploading PCT 006 (see following slides).

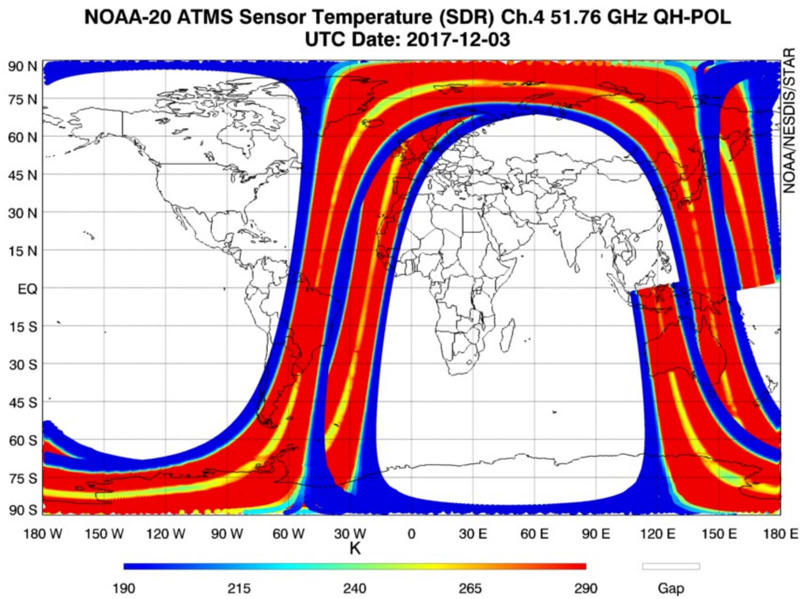
QC Flags. This issue will be solved by uploading PCT 007 (see following slides).

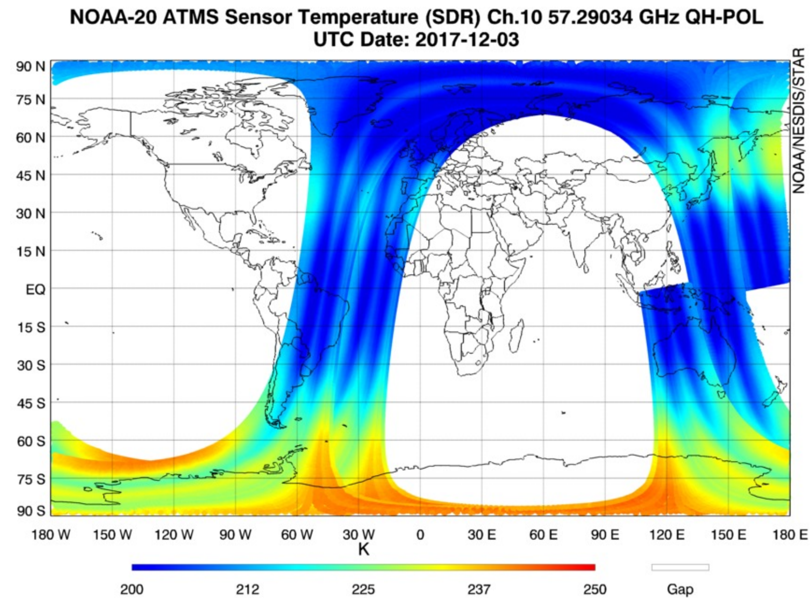
PCT 006 has been uploaded on Jan. 23, 2018. The TDR to SDR conversion problem is fixed.
The fix has been started from the descending node in orbit 940 (see slide 50).

NOAA-20 ATMS SDR Artifacts

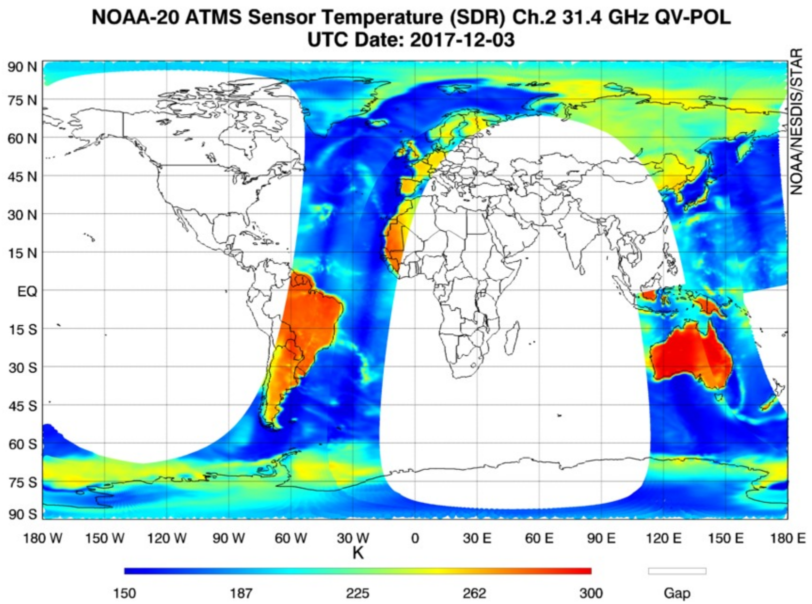


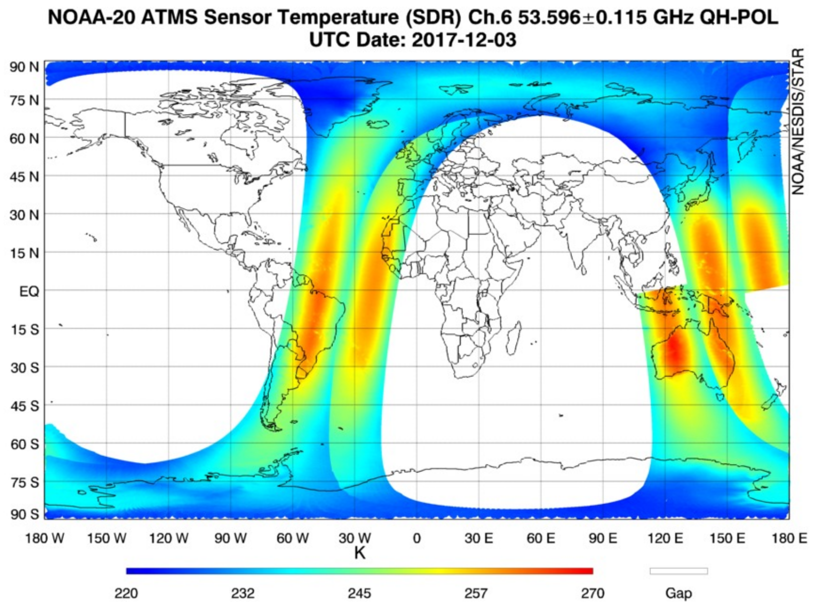


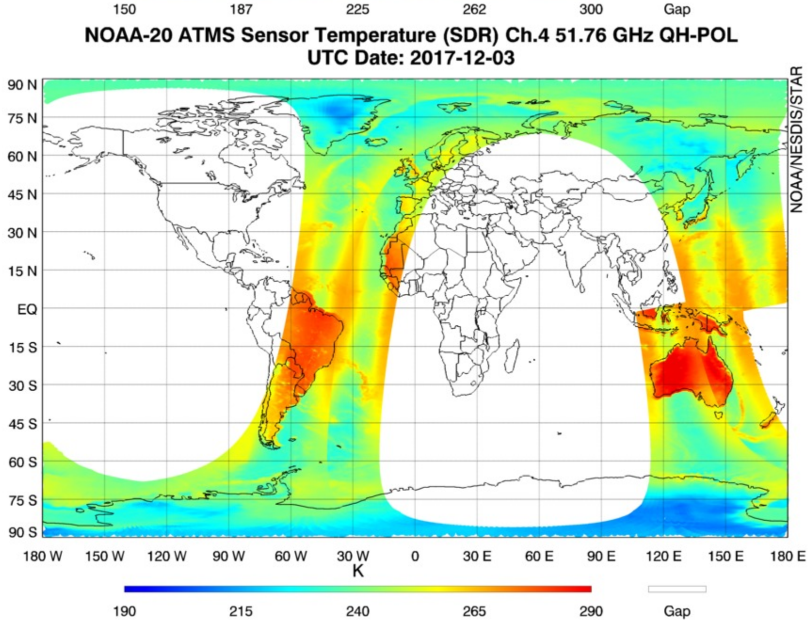


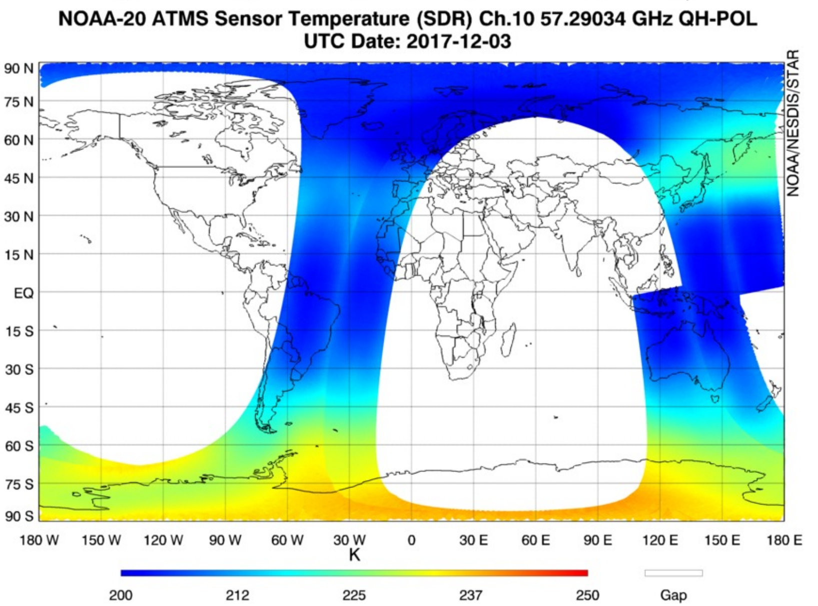


NOAA-20 ATMS SDR Artifacts Analysis

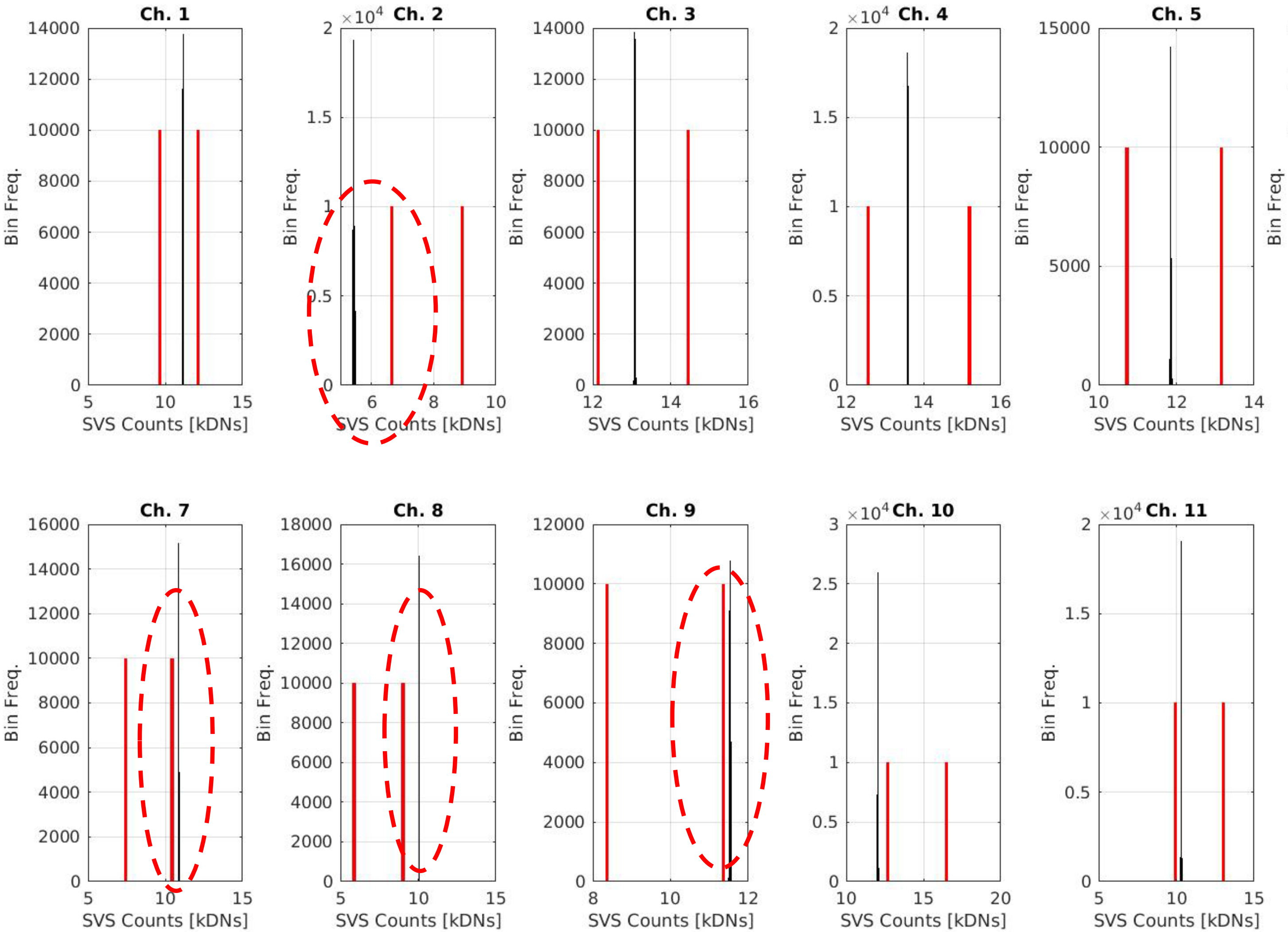








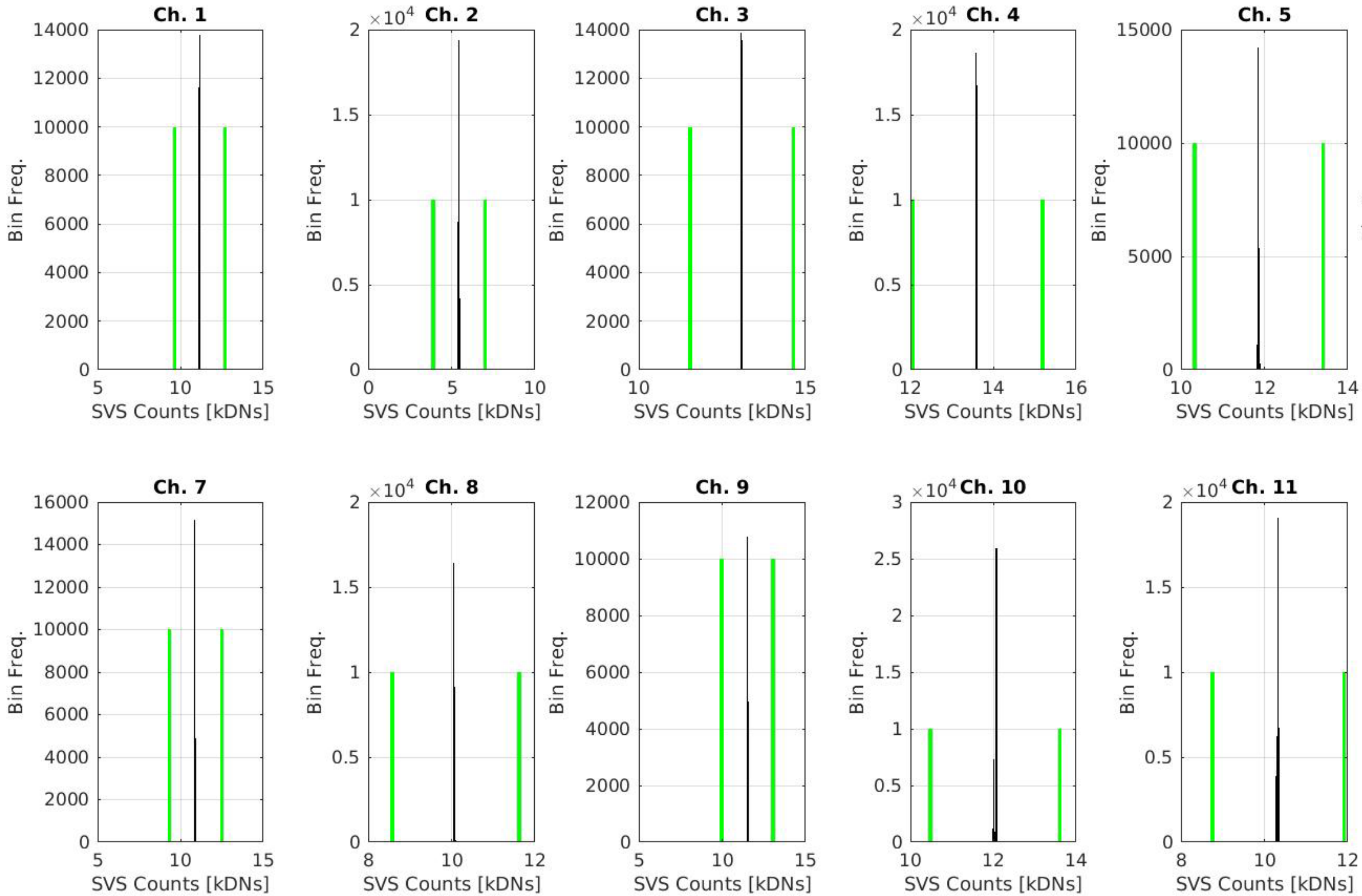
SVS Count Check (Ch. 1 to 11)



Red lines are PCT005 Limit Check

SVS = Space View Sector

SVS Count Check (Ch. 1 to 11)



Green lines are PCT007 Limit Check

SVS = Space View Sector

Documentations

Science Maturity Check List	Yes ?
ReadMe for Data Product Users	yes
Algorithm Theoretical Basis Document (ATBD)	yes
Algorithm Calibration/Validation Plan	yes
(External/Internal) Users Manual	N/A
System Maintenance Manual (for ESPC products)	N/A
Peer Reviewed Publications (Demonstrates algorithm is independently reviewed)	yes
Regular Validation Reports (at least. annually) (Demonstrates long-term performance of the algorithm)	yes

Conclusion

- ✓ NOAA-20 ATMS space view profile #1 is declared the optimal space view profile
- ✓ NOAA-20 ATMS channel NEΔTs are stable since activation and lower than S-NPP
- ✓ NOAA-20 ATMS channel on-orbit effective field-of-view (EFOV), earth sidelobes effects, and antenna pattern are derived from roll maneuver data
- ✓ NOAA-20 ATMS preliminary geolocation accuracy analysis results show an improvement from S-NPP
- ✓ NOAA-20 ATMS image striping is slightly less than of S-NPP
- ✓ NOAA-20 ATMS inter-channel noise correlation is much lower than that of S-NPP.
- ✓ NOAA-20 ATMS PLTs are still ongoing. Current analysis results didn't show significant instrument or data issues based on performed PLTs
- ✓ NOAA-20 ATMS data gaps have been recorded and missing data have been recovered
- ✓ NOAA-20 ATMS calibration and validation tasks are on schedule
- ✓ Ka band data transmitter RFI isn't observed so far.
- ✓ Heater induced EMI isn't observed.

Path Forward

- ✓ PCT 006 update for TDR/SDR artifacts correction identified in beta maturity report have been submitted for implementation
  - TDR to SDR conversion coefficients update
  - spaceViewresolverCounts update for SVS#2 at FOV 99
  - Upper limit for V-band PLO voltage monitoring, both Side-A and Side-B
- ✓ Pitch maneuver
- ✓ Lunar intrusion analysis
- ✓ PCT 007 update for adjusted dynamic ranges and others

The SDR fix takes in effect from the descending node in orbit 940