

2014 STAR JPSS Science Teams Annual Meeting

ATMS/CRIS SDR Team Leads

ATMS SDR Team





Major Accomplishments (1/3)



- **SNPP ATMS TDR and SDR products have been declared a validated maturity level**
 - Noises for SNPP are well characterized and meet much lower than specification
 - ATMS processing coefficient table (PCT) were updated with nominal values
 - Destriping algorithms are being developed for K/Ka/V-band only
 - Geolocation errors for all the channels are quantified and are smaller than specification
 - On-orbit absolute calibration was explored using GPS RO data, LBLRTM and ATMS SRF. The biases at the upper-air sounding channels are characterized
 - Remap SDR (RSDR) coefficients were optimally set and RSDR biases are assessed
 - ATMS SDR products are well documented through ATBD, user manuals, OAD, peer reviewed publications



Major Accomplishments (2/3)



- **JPSS-1 Prelaunch Activities**

- Completed the CP Mid and CP High data analysis of J1 ATMS TVAC data
- The analyses are conducted by four groups with consistent results
- NEDT meets specification, except for channel 17
- Calibration accuracy and nonlinearity are meeting the spec
- Striping is less significant in V-band but more pronounced at WG bands. Some low frequency coherent noise at 10/20 Hz at mid temp; and 2, 4, and 5 Hz at low temp are shown (root-cause is to be investigated)



Major Accomplishments (3/3)



- **Advance in General SDR Sciences**

- From 19th ITSC, NWP users including NWS, ECWMF and UKMET require ATMS destriping data (30-45 days) in BUFR format. ATMS team is responding to request but, the algorithm is being developed.
- ATMS resampling algorithm is generalized to generate the TDR/SDR products at 2.2 degree and will be made available for National Hurricane Center storm monitoring
- Advanced radiance transformation system (ARTS) is being developed for SNPP and J1 processing. The system will further enhance the products and correct the angle dependent errors.
- A polarization correction term is developed and can be applied in TDR to SDR conversion to improve the calibration at the surface sensitive channels



Future Plan (1/3)



- **Refinements of SNPP ATMS TDR and SDR Products Quality**
 - Standardize the NEDT calculation algorithm
 - Provide timely updates on ATMS processing coefficient table (PCT)
 - Make the destriping algorithms operational at IDPS and ART systems
 - Update ATMS ATBD, user manuals, OAD



Future Plan (2/3)



- **Continue JPSS-1 Prelaunch Activities**

- Complete the analysis of J1 ATMS TVAC data at low, mid and high temperatures
- Generate the J1 PCT and deliver it for IDPS algorithm update
- Develop the proxy data for ATMS J1 algorithm
- Improve destriping algorithms for J1 ATMS WG band applications



Future Plan (3/3)



- **Advanced SDR Sciences**

- Generate SNPP ATMS destripping data (30-45 days) in BUFR format and deliver to NCEP NWP impact tests
- Generalize ATMS resampling algorithm at 2.2 degree for Ka/K/V bands
- Implement all the QC flags in Advanced radiance transformation system (ARTS) and make it ready for SNPP and J1 processing
- Implement a polarization correction term from third Stokes component for the TDR to SDR conversion



Backslides

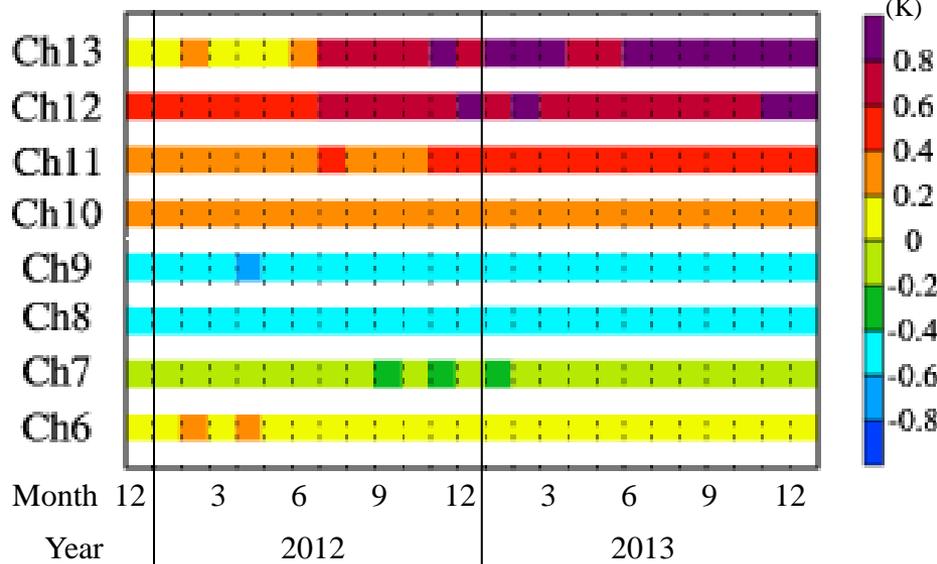


Monthly Mean of O-B^{COSMIC}

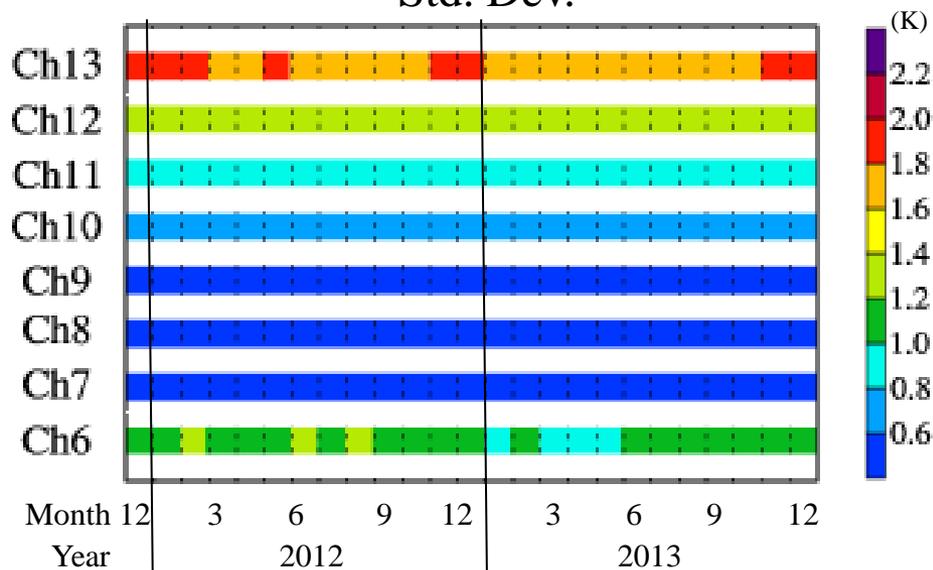


Clear-sky, over ocean, 60°S ~ 60°N, Dec. 10, 2011 ~ Dec. 31, 2013

Mean

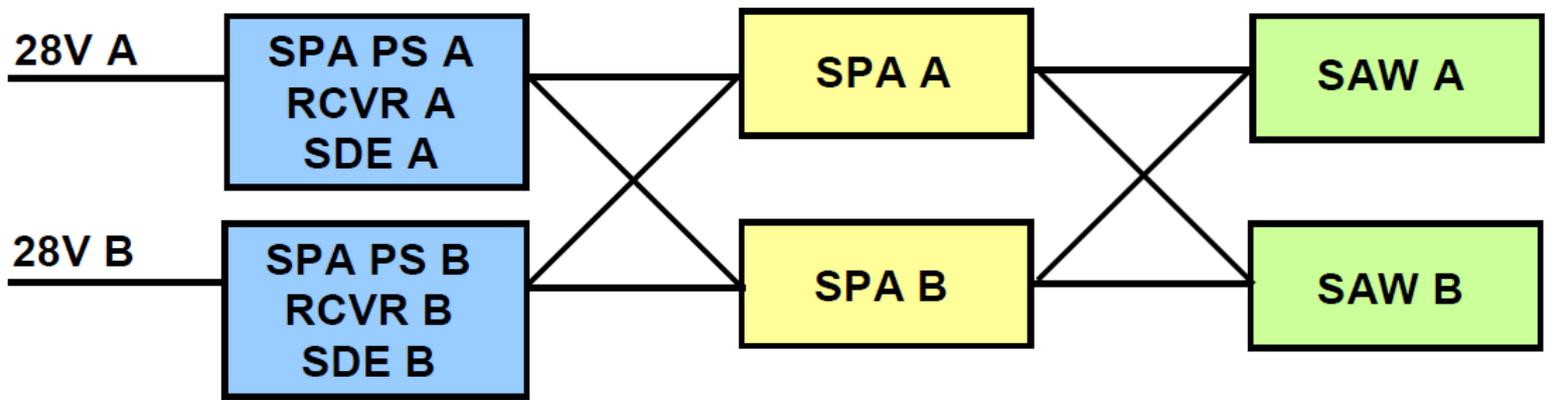


Std. Dev.



Channels 6 to 11 show consistently stable mean O-B and standard deviation.

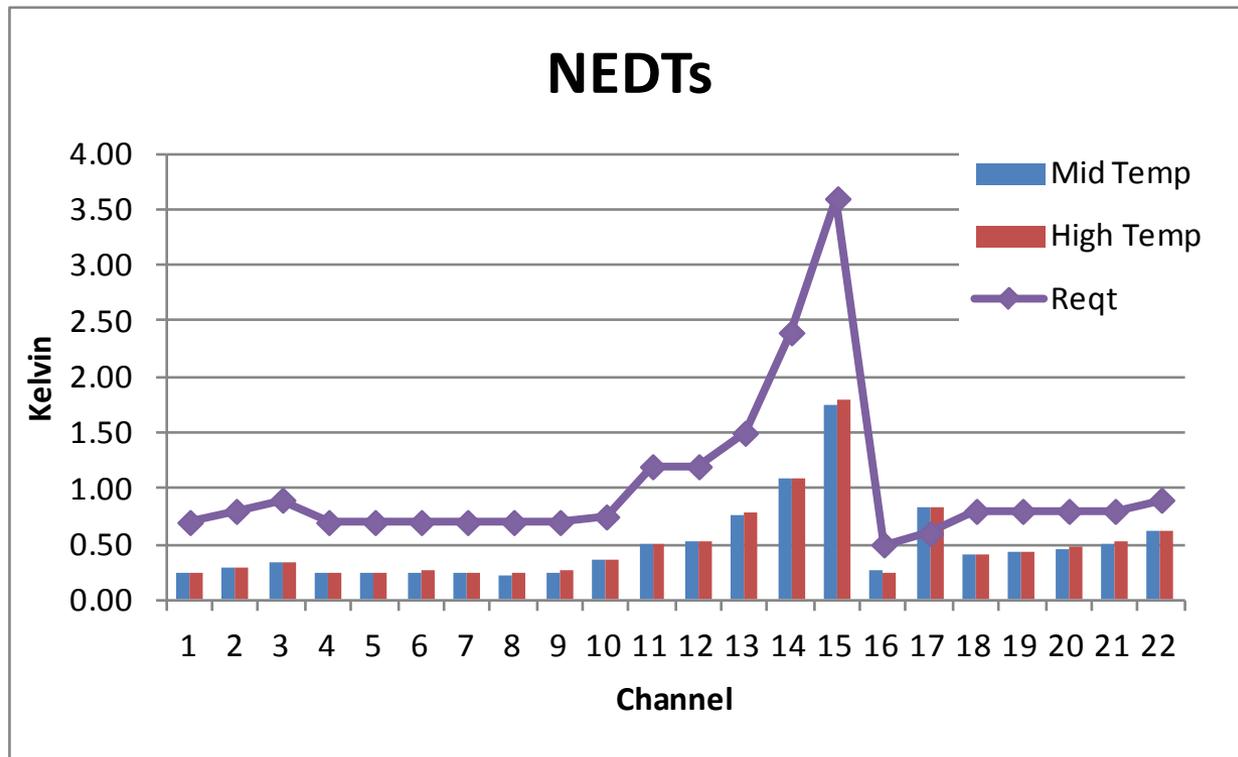
J1 ATMS TVAC Redundancy Configuration



CONFIG.	SPA PS	RECEIVER SELECT	SDE SELECT	SPA CROSS	SAW CROSS
1	A	REC A - PLO, CSO, GDO, RPS	SDE A	SPA A	SAW A
2					SAW B
3				SPA B	SAW B
4					SAW A
5	B	REC B - PLO, CSO, GDO, RPS	SDE B	SPA B	SAW B
6					SAW A
7				SPA A	SAW A
8					SAW B

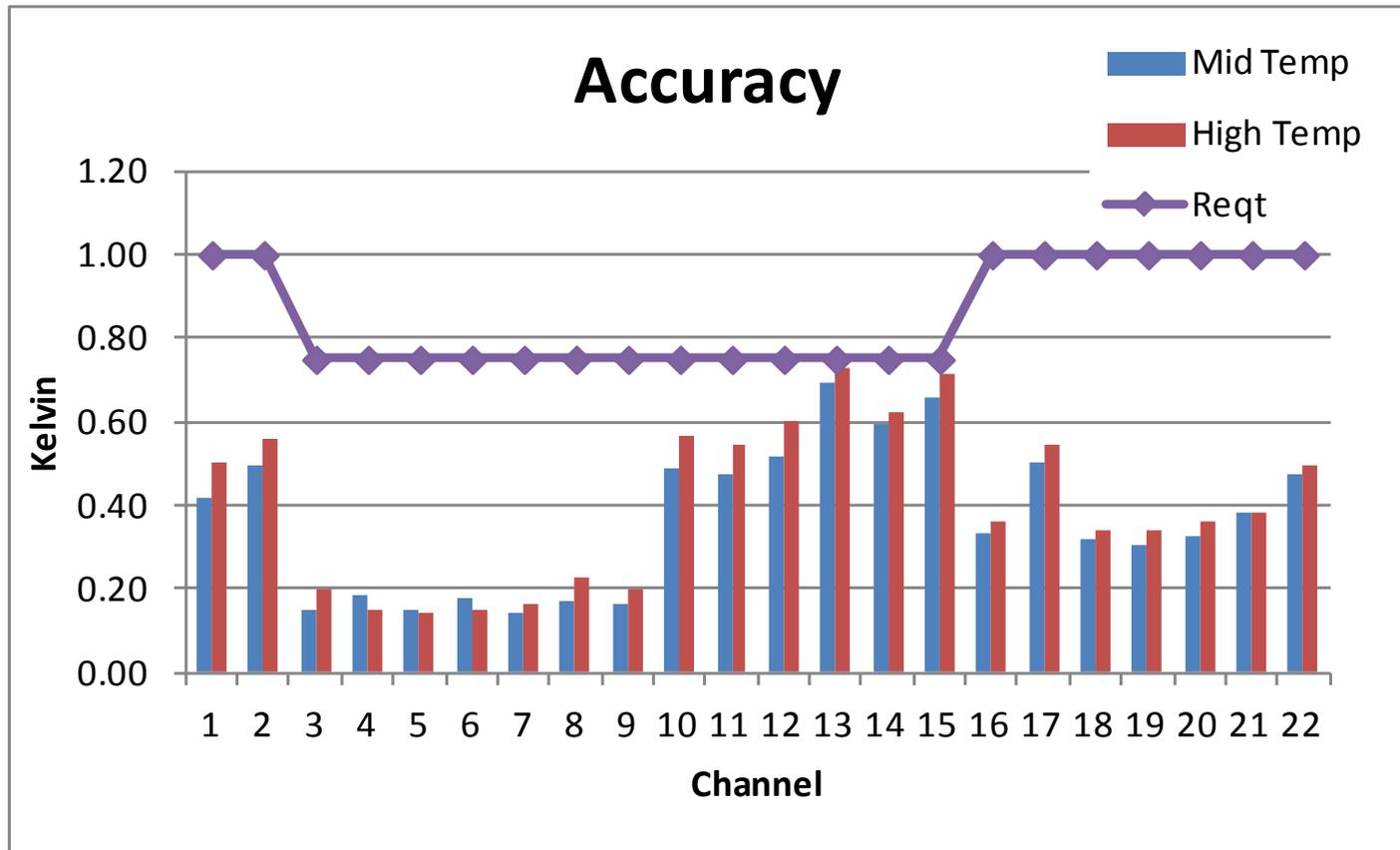
JPSS1 ATMS NEDT Performance

- Worst Case of 4 Redundancy Configurations
- Scene temperature at 300 K



- Waiver request will be submitted for Channel 17 NEDT
- All other channels compliant

JPSS1 ATMS On-Orbit Accuracy

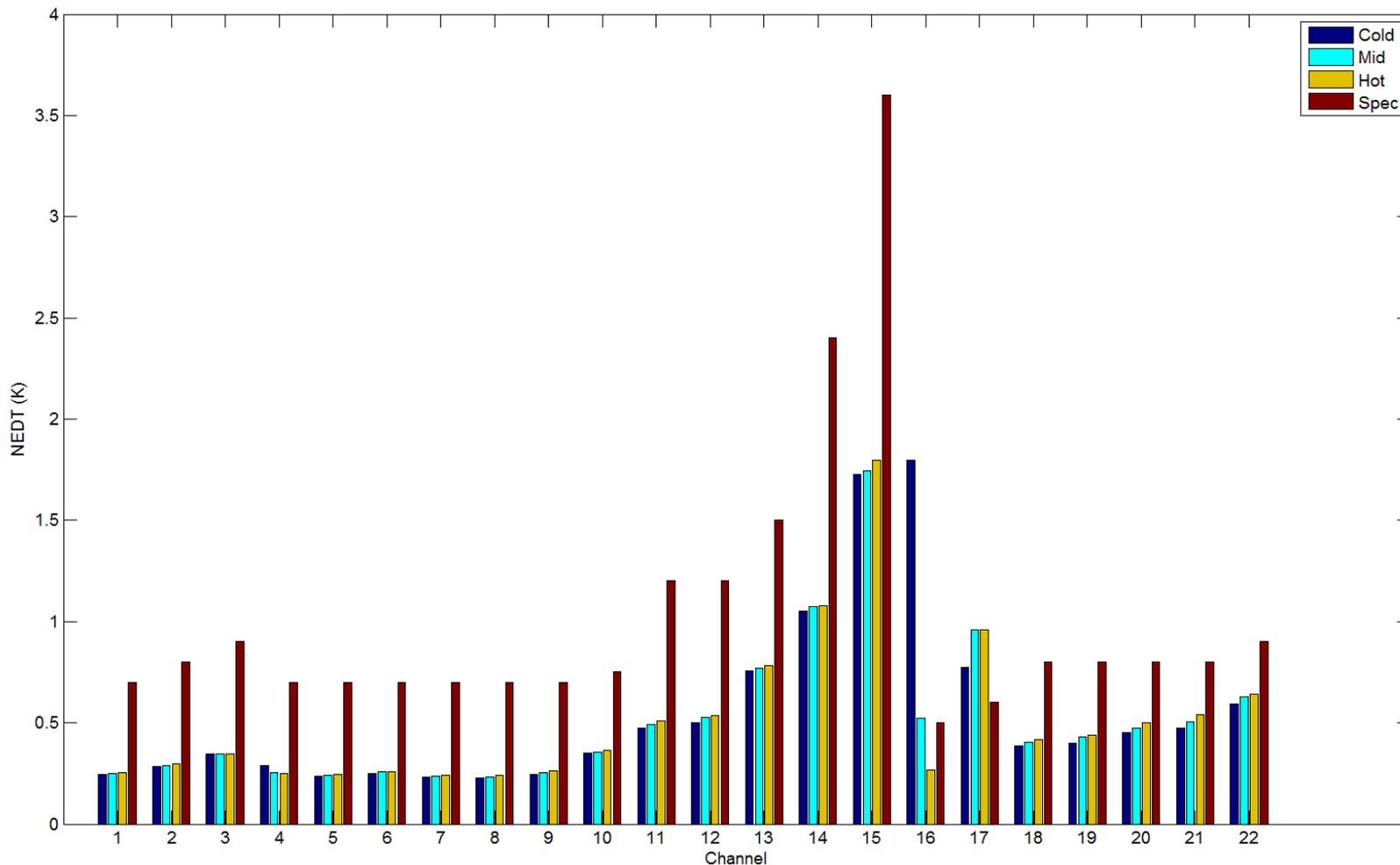


- Worst Case of 4 Redundancy Configurations
- All channels compliant

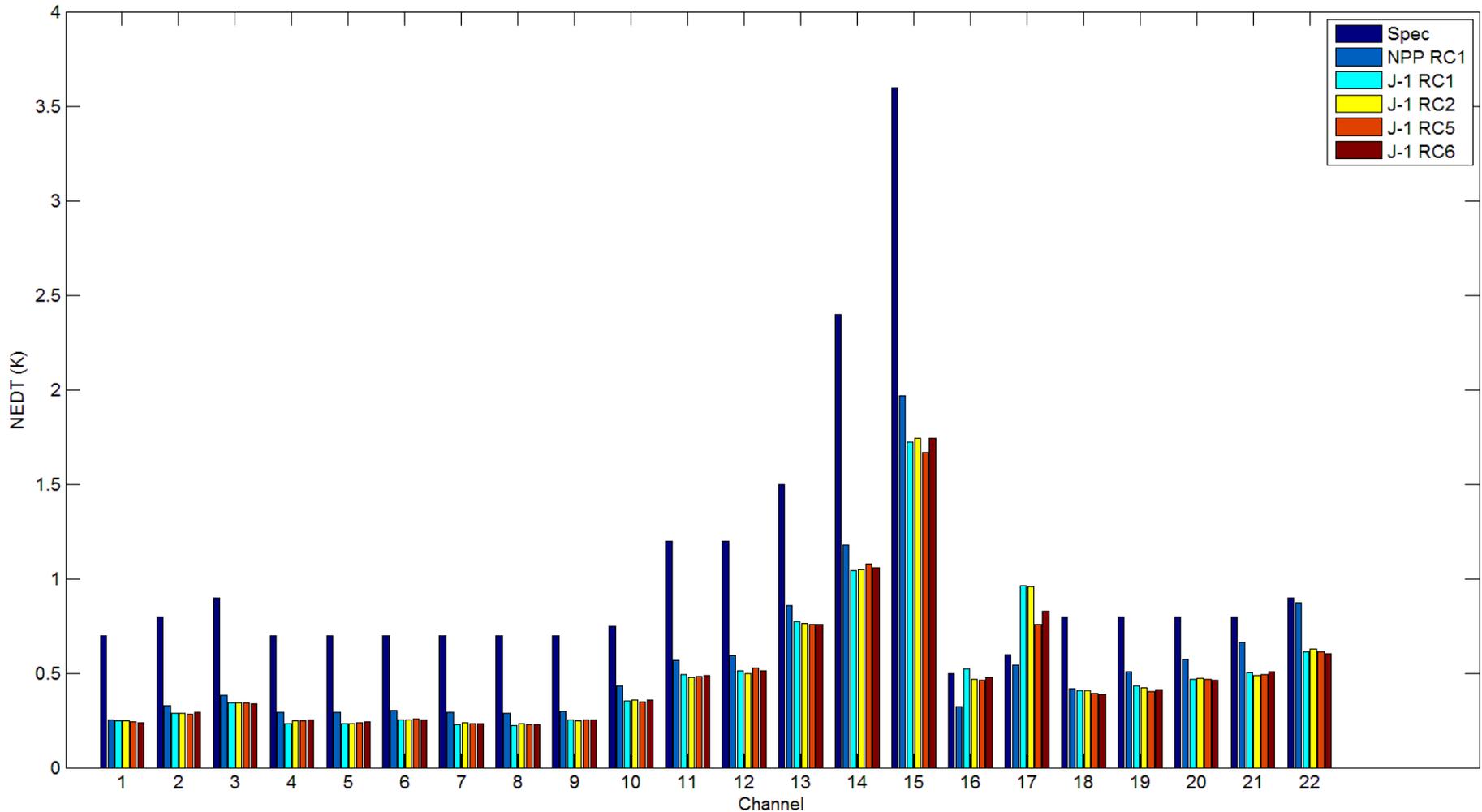
JPSS1 ATMS NEDT Performance



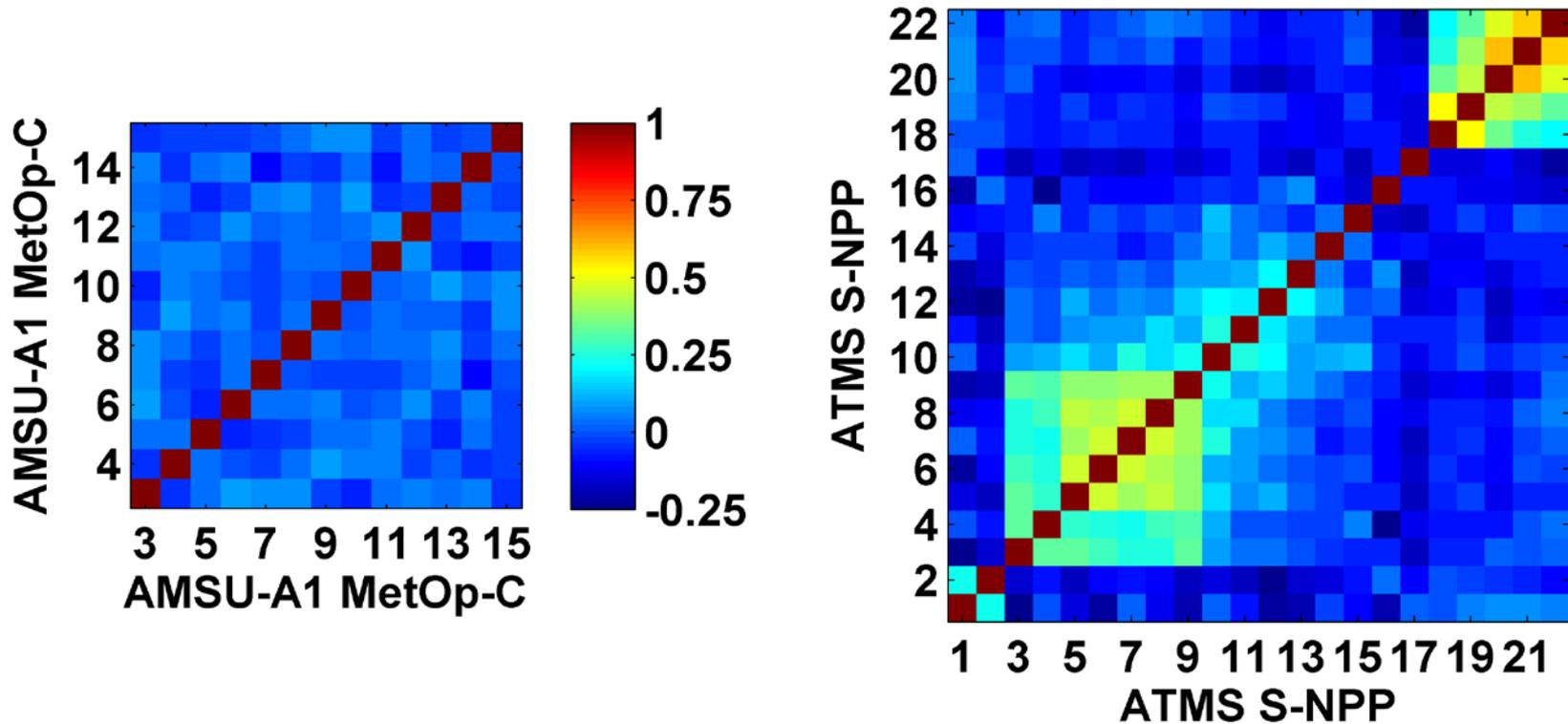
- Worst Case of 4 Redundancy Configurations
- Scene temperature interpolated to 300 K



NEDT for J-1 and NPP at Mid Cold Plate Temp Interpolated to 300K



Inter-channel Correlation Coefficients

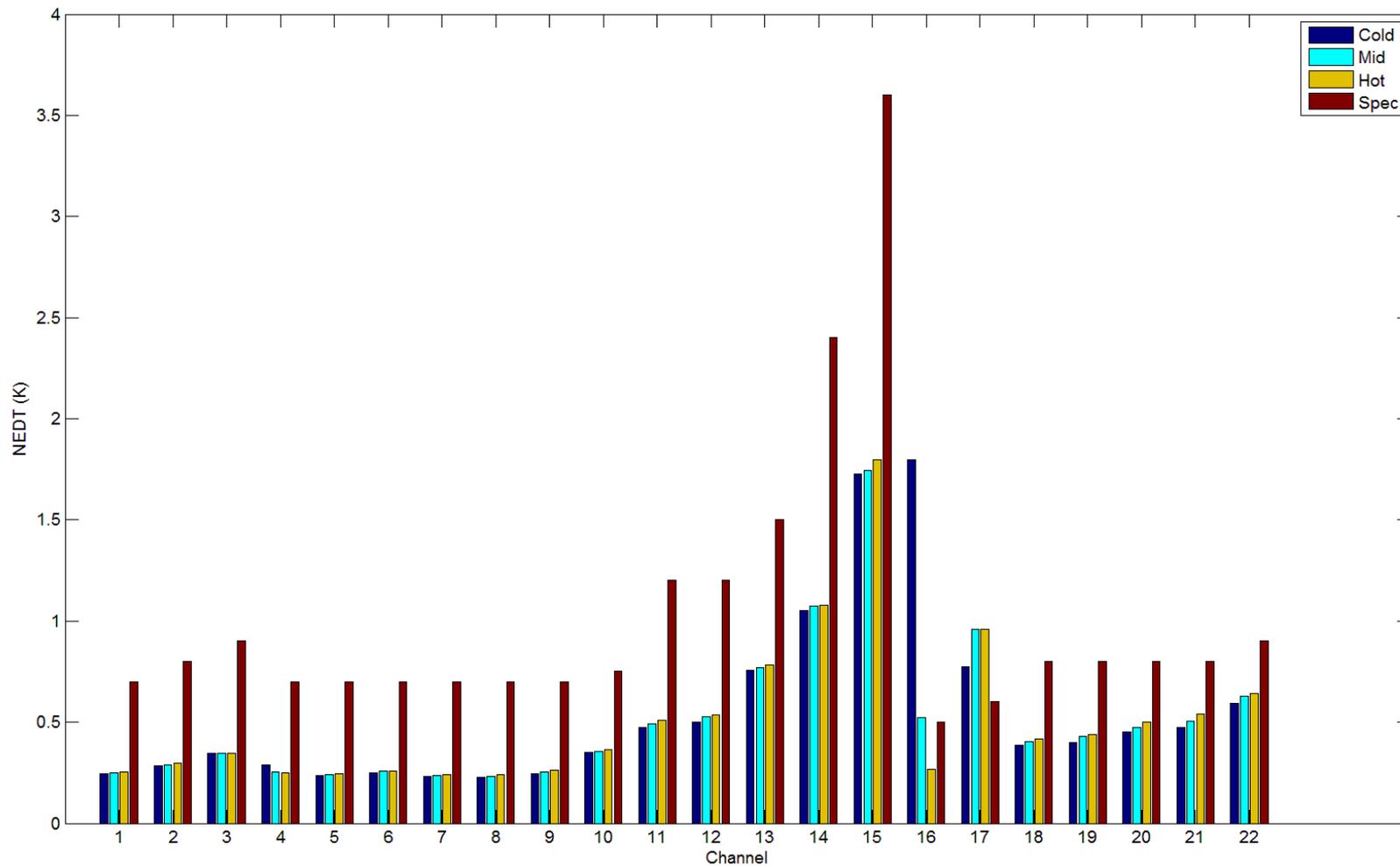


Correlation Coefficients of (left) AMSU-A1 and (right) ATMS Channel Gains.

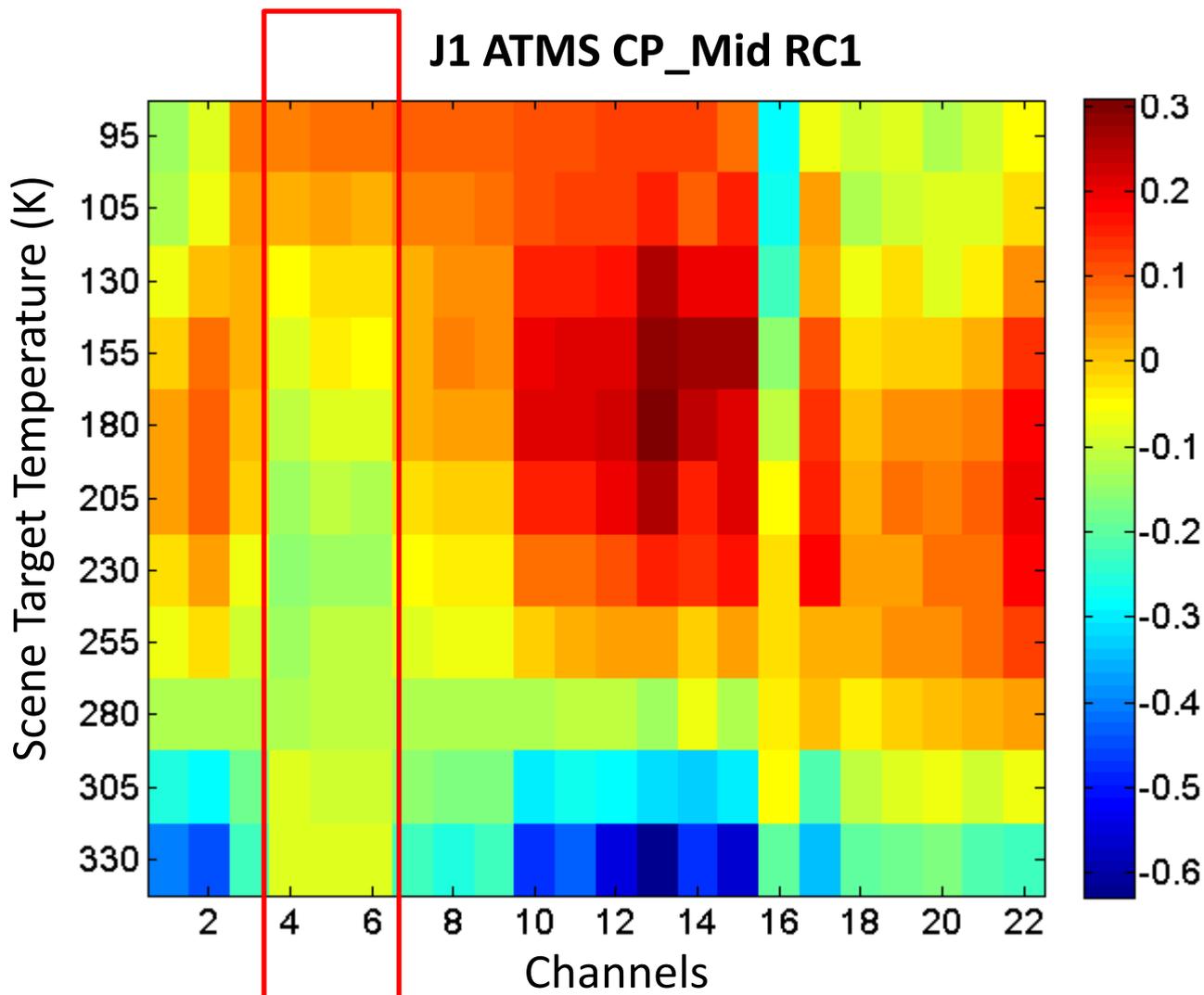
JPSS1 ATMS NEDT Performance



- Worst Case of 4 Redundancy Configurations
- Scene temperature interpolated to 300 K



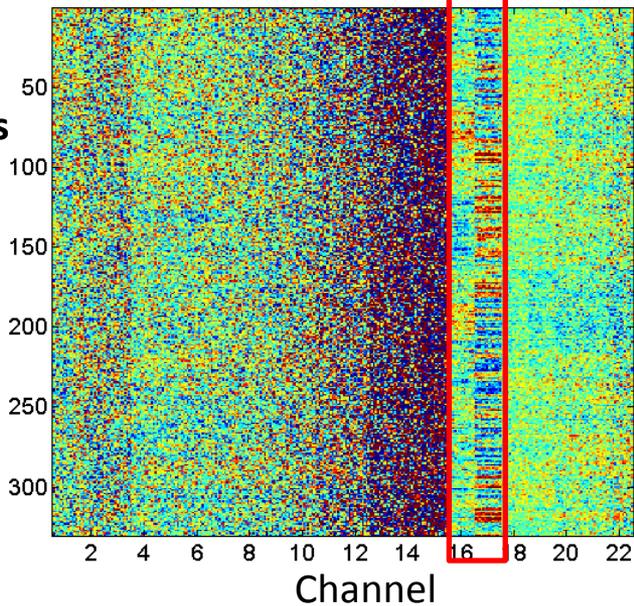
Radiometric Accuracy at CP_Mid RC1



Striping in RC1 at CP_Mid ST-95 vs. ST-330

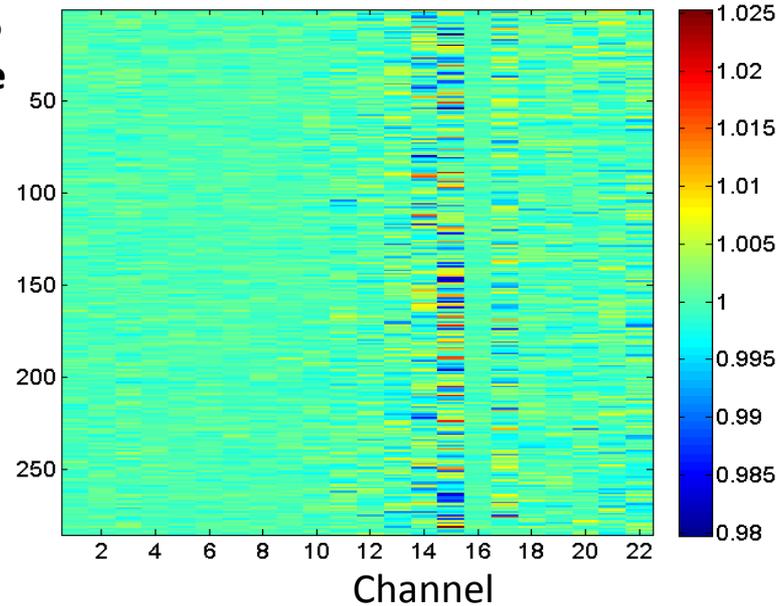
ST-95
Scene
Counts

Scan



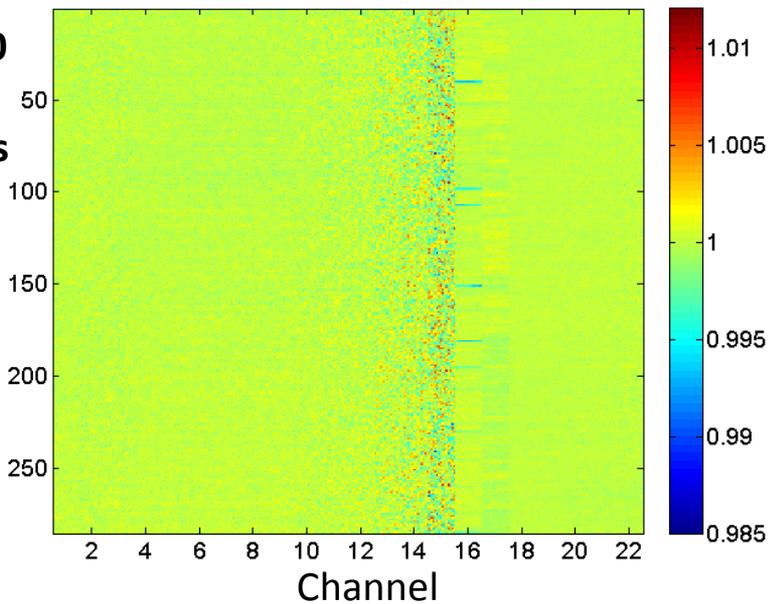
ST-95
Scene
TB

Scan



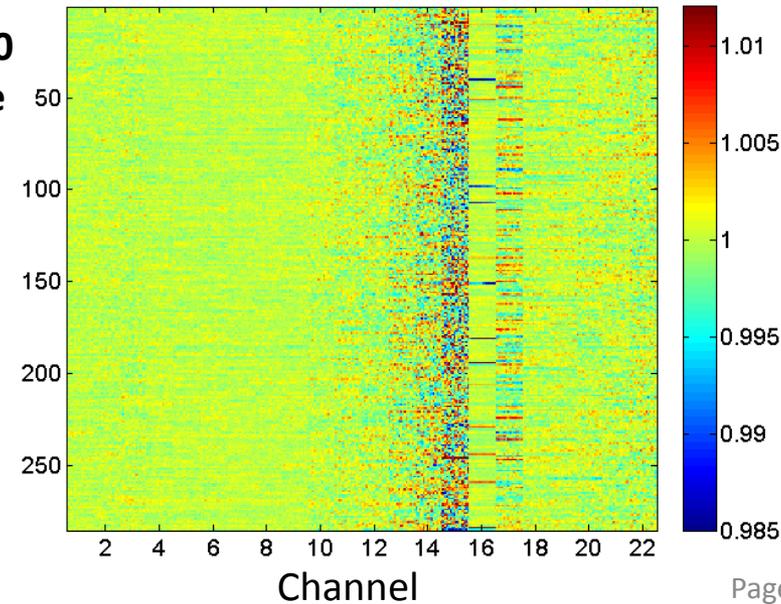
ST-330
Scene
Counts

Scan

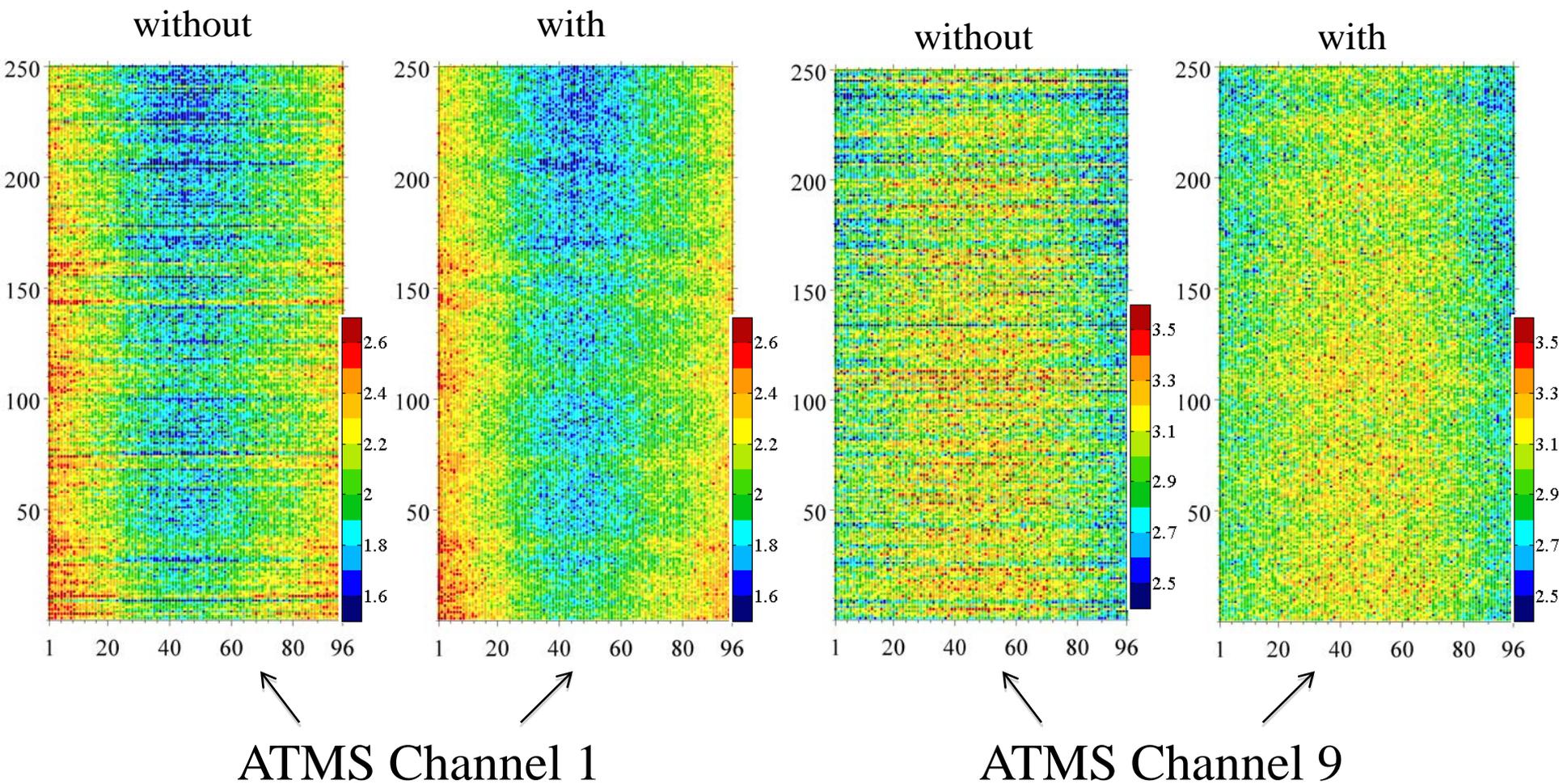


ST-330
Scene
TB

Scan



Pitch-Over Maneuver Data with and without Optimal Filtering



Calibrated Space View Tb from ARTS

