NOAA (SOUNDING) PRODUCTS VALIDATION SYSTEM (NPROVS) AND NUCAPS ASSESSMENT

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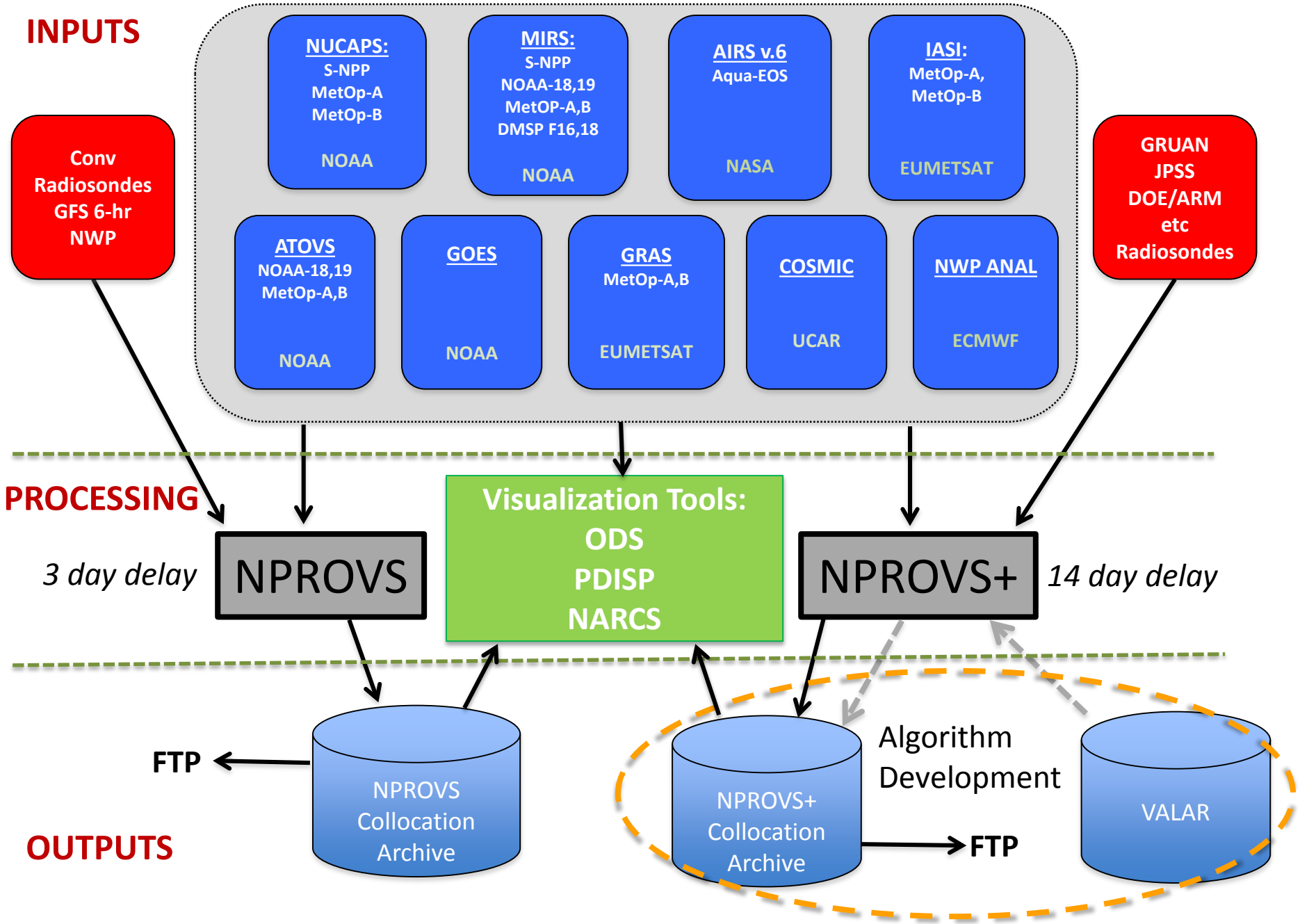
Outline

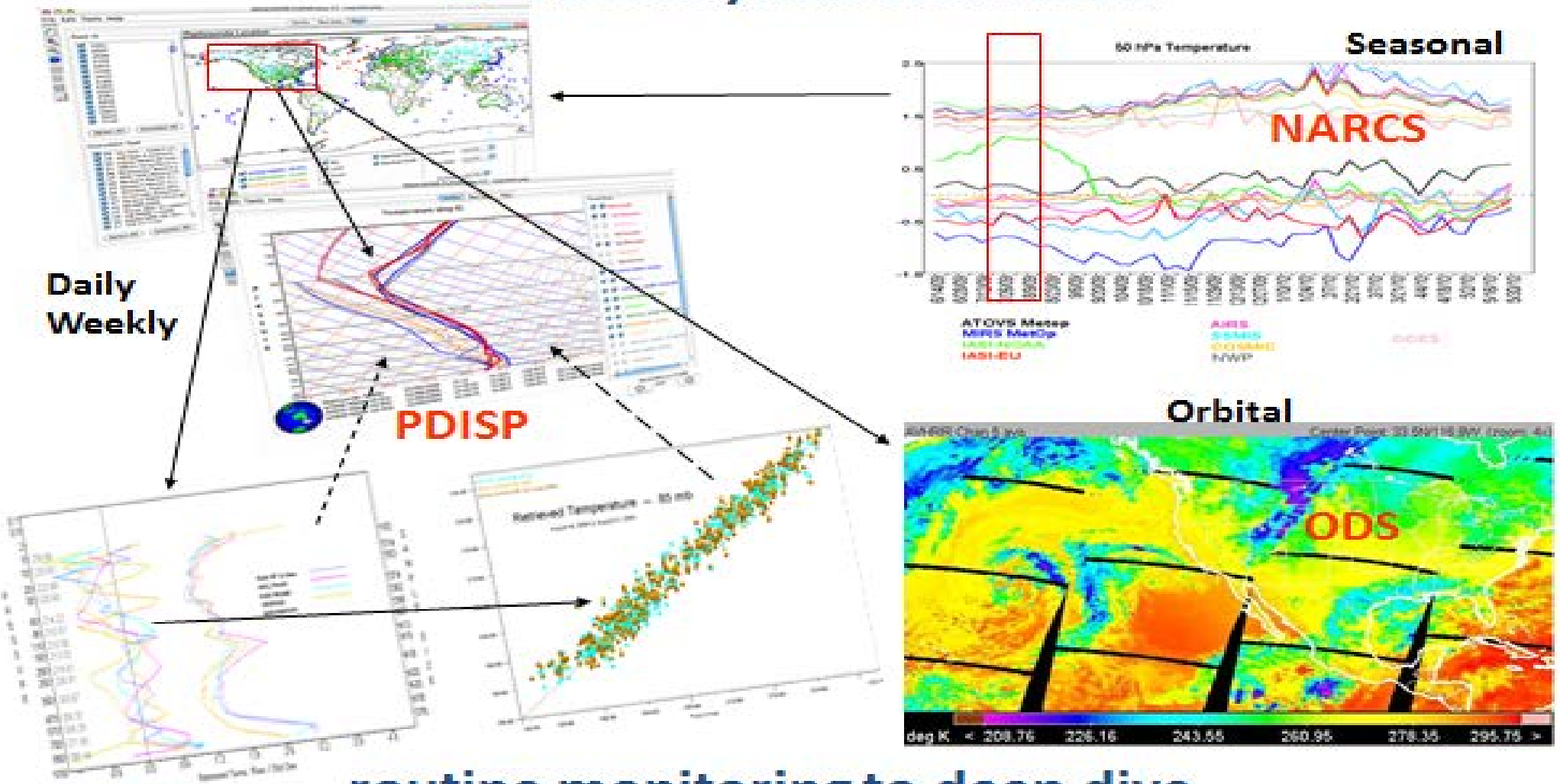
- NPROVS and NPROVS+ (Enterprise Validation)
- Staged FSR NUCAPS Sounding Assessment
  - ✓ *IR+MW*
  - ✓ *IR-only*
  - ✓ *MW only (including vs MiRS*
- IR-only and Microwave Retrieval Assessment
- NUCAPS in AWIPS
- Summary and Path Forward

NPROVS/NPROVS+ Data Management Schematic



NPROVS Graphical Analysis Tools

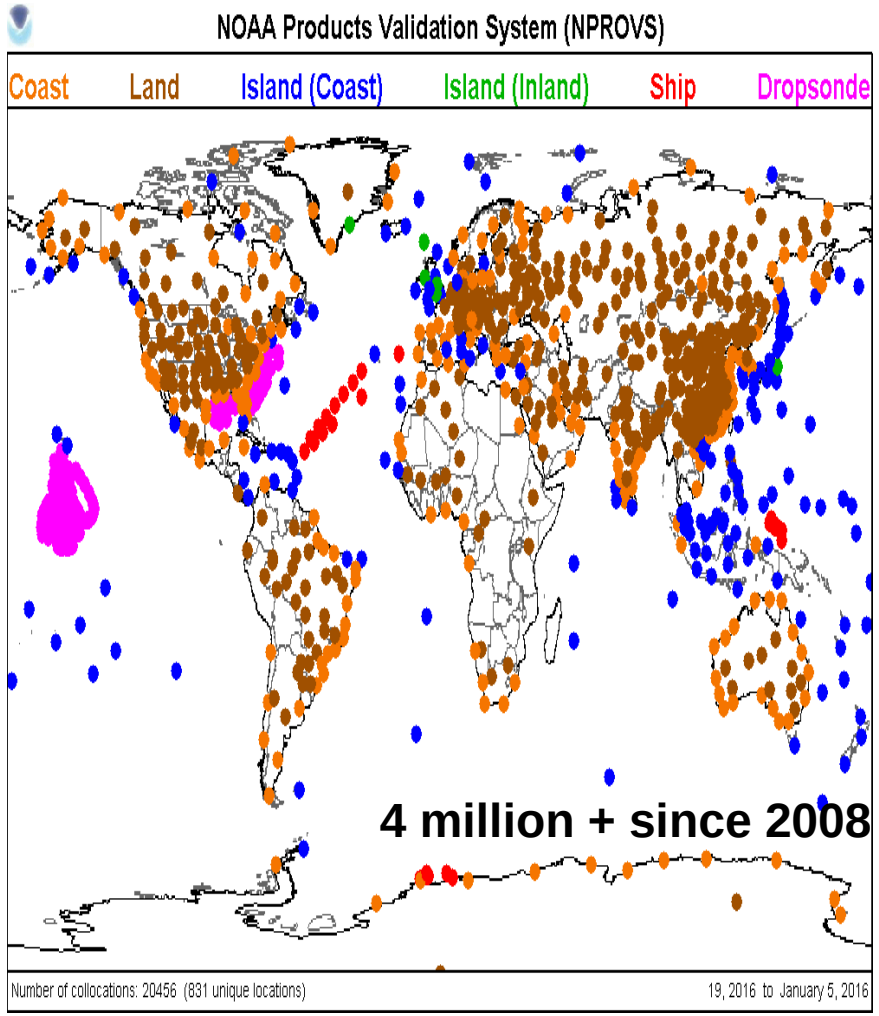
EDGE Analytical Interface …

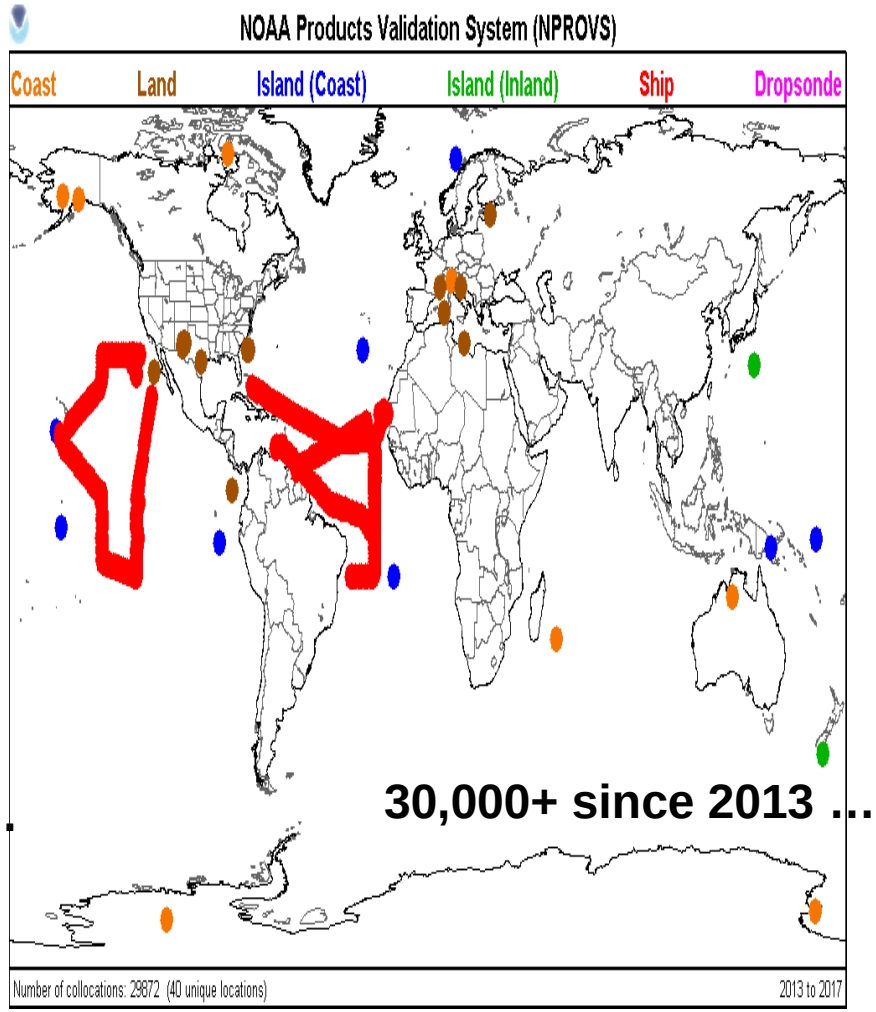


… routine monitoring to deep dive

NPROVS

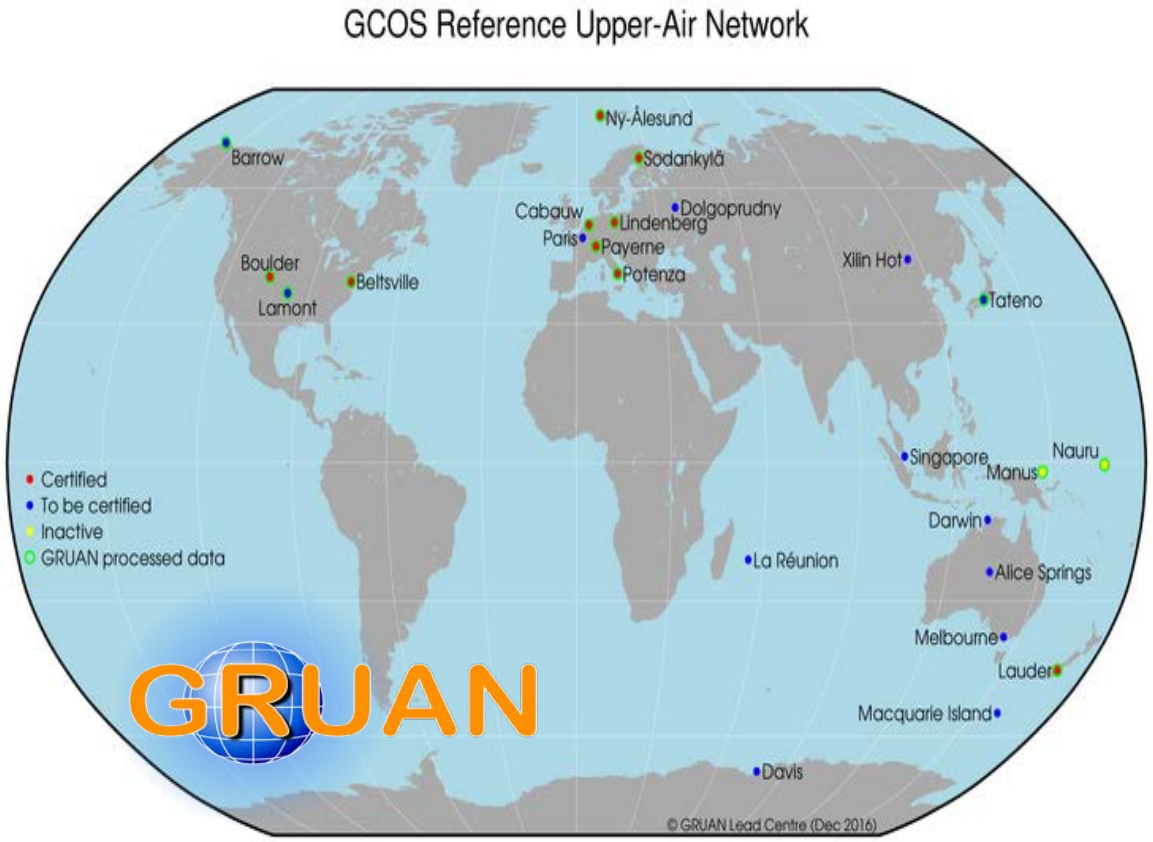
NPROVS+





Global distributions of collocated RAOB and Satellite Observations for NPROVS (left, 10-day period) and NPROVS+ (right, Jan 2013 to present)

N P R O V S +



+

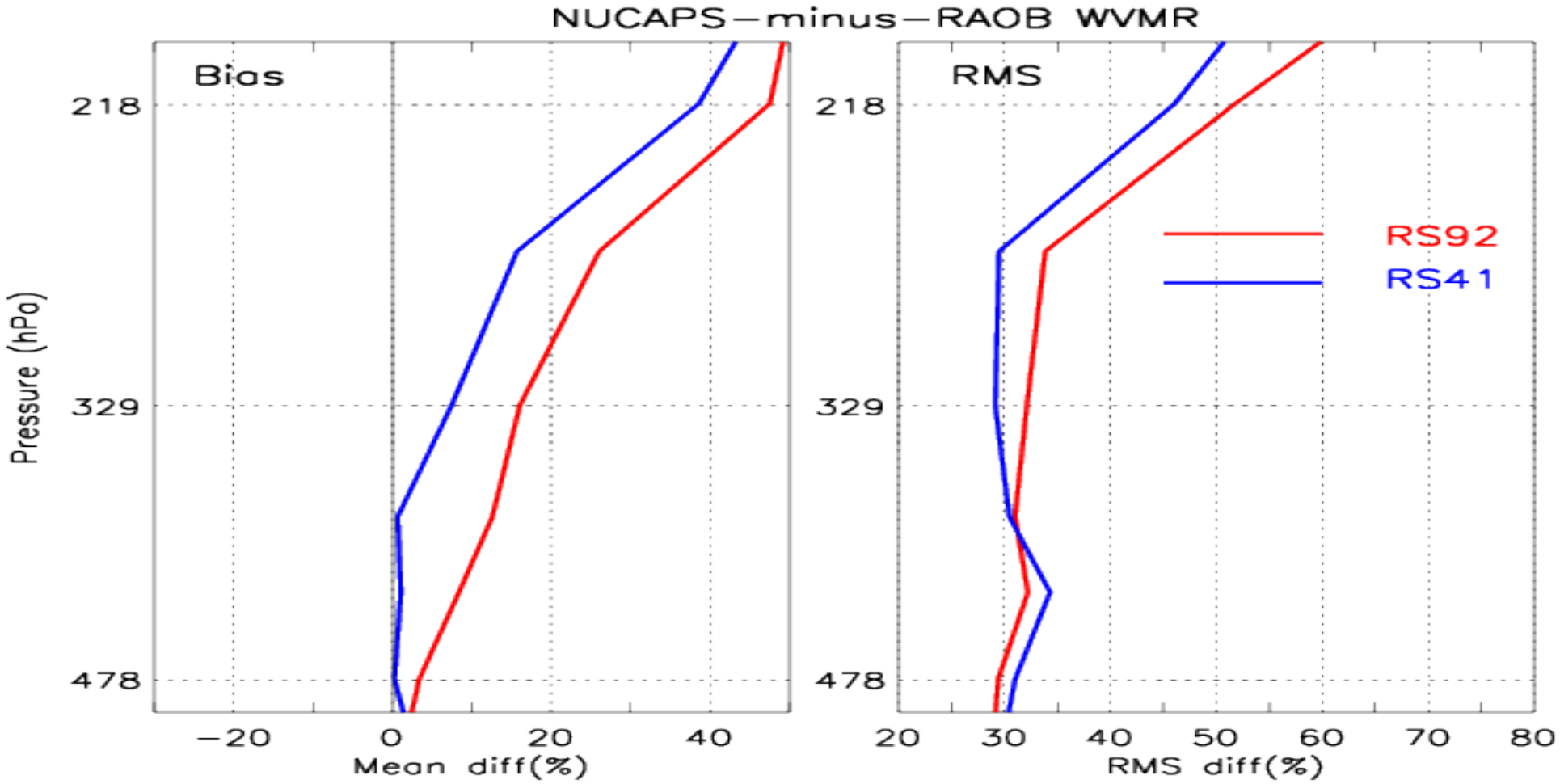
JPSS Funded Dedicated RAOB

- DOE ARM (SGP, NSA, ENA)
  - ✓SSEC / Madison
  - ✓(2) per week
  - ✓**GRUAN processed**
  - ✓ dual and single launches
- AEROSE (Saharan Dust)
- CALWATER (Atmospheric River)
- El-Nino Rapid Response

CIRA, PMRS
ARM Mobile Sites
Sterling Field Site Facility

New: Dual GRUAN RS92 / RS41
Radiosonde Intercomparison and VALidation (RIVAL) … Lori Borg (SSEC)

Potential Impact of dual RS41 / RS92 launches on sounding EDR cal/val ….



RS41 corrects for upper tropospheric moisture dry bias evident in RS92 …
NUCAPS shows reduced RMS and Bias wrt to RS41 vs RS92 …. *courtesy Bomin Sun*

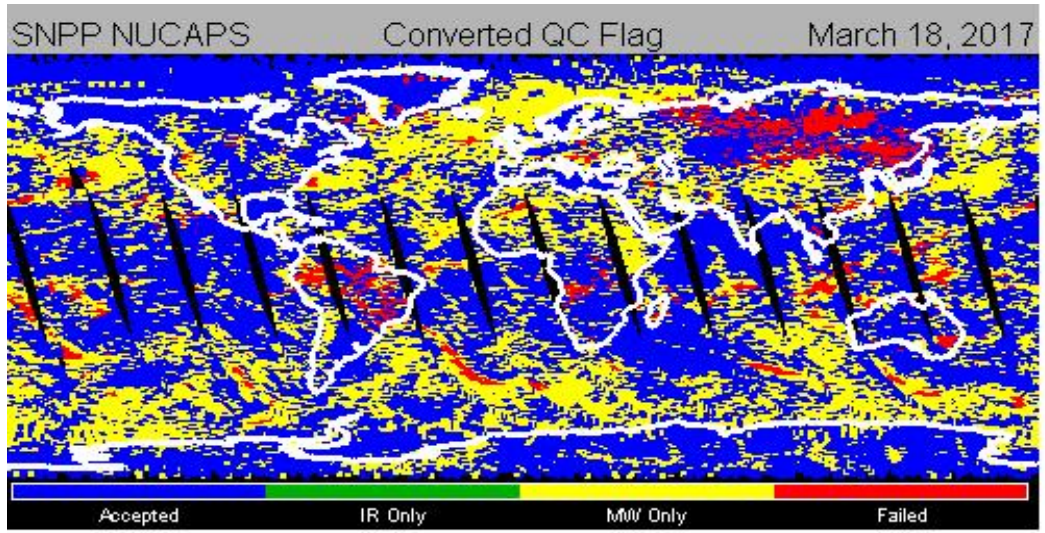
NPROVS Assessment of NUCAPS

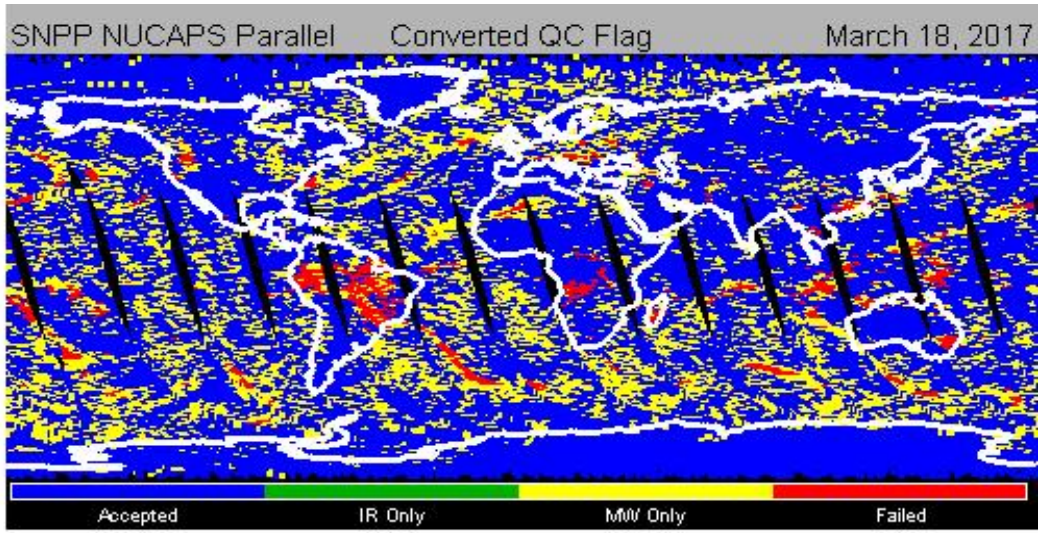
Time-line for NUCAPS "FSR" Staged Upgrades in Parallel Test:

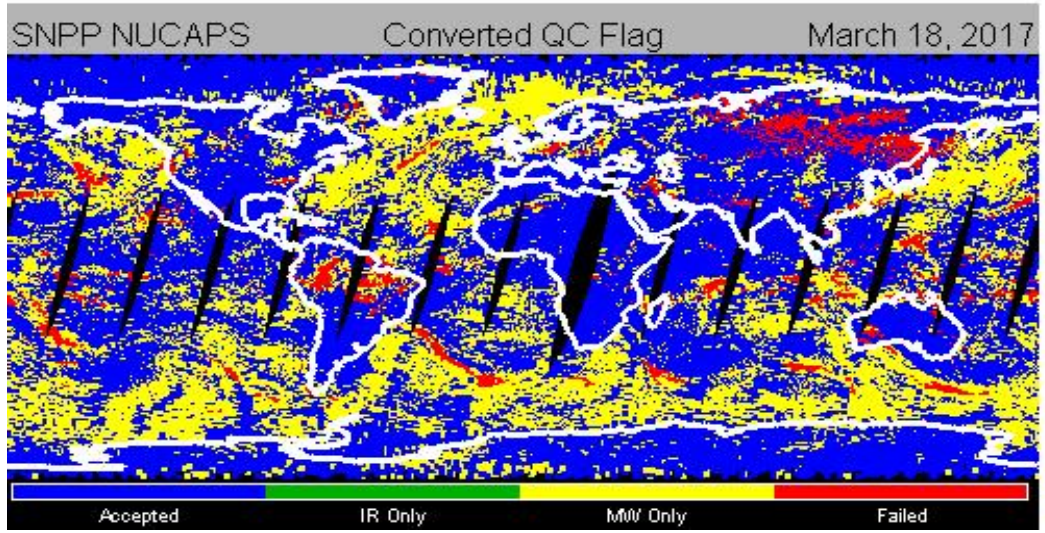
v1.9.3	up to March 3	
v2.0.1	March 3-13	*all-sky for MIT*
v2.0.2	March 13-17	*all-sky for MIT*
v2.0.4	March 17-30	IR+MW
v2.0.4.1	March 30	IR-only
v2.0.4	April 21	IR+MW
v2.0.5	**May 18**	**RTA tuning !!**
v2.0.5.4	June 22 16Z	Block 2 tuning
V2.0.5.?	July 14 19Z	IR-only

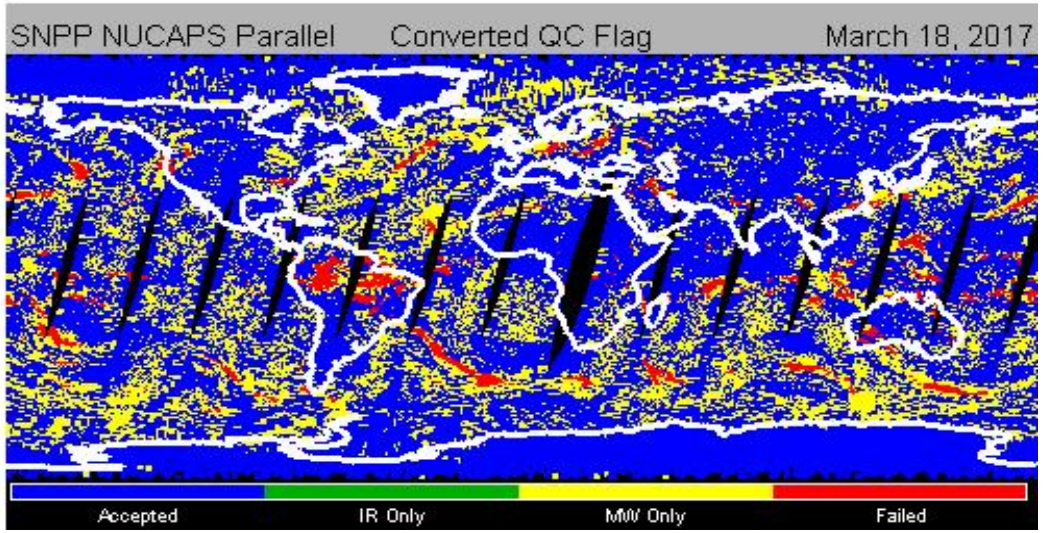
ATMS Block 1-2: March 8

ODS … QC flag analysis



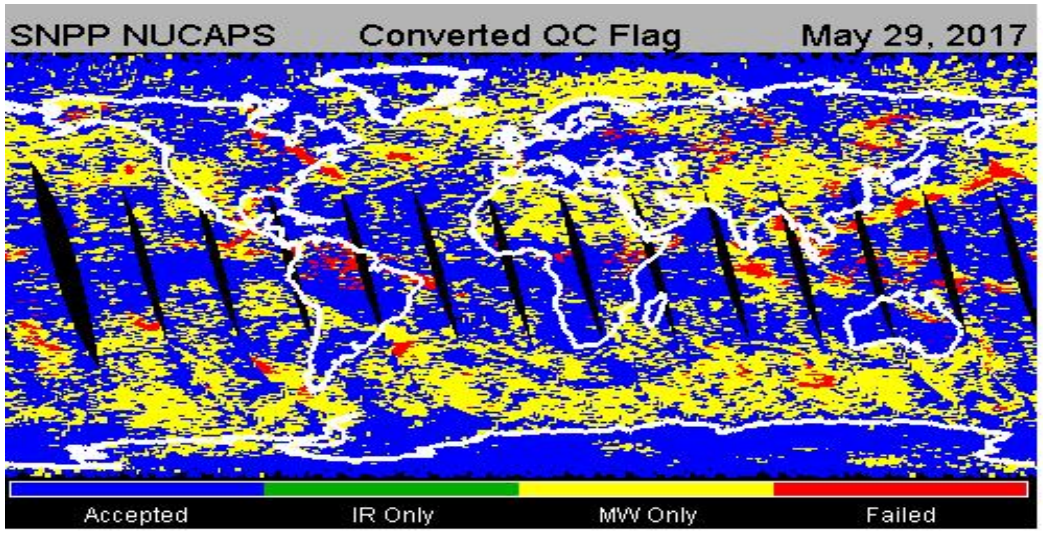


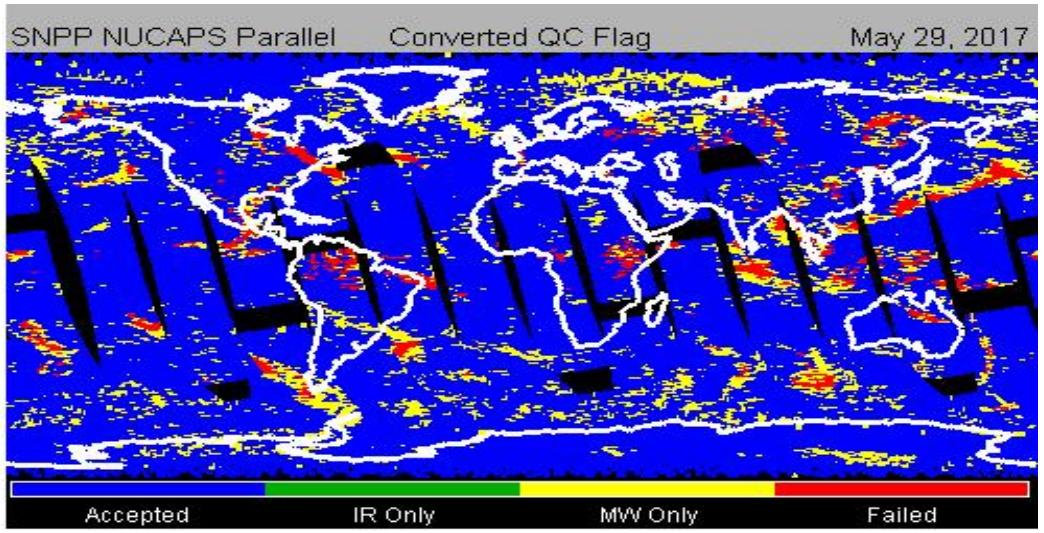


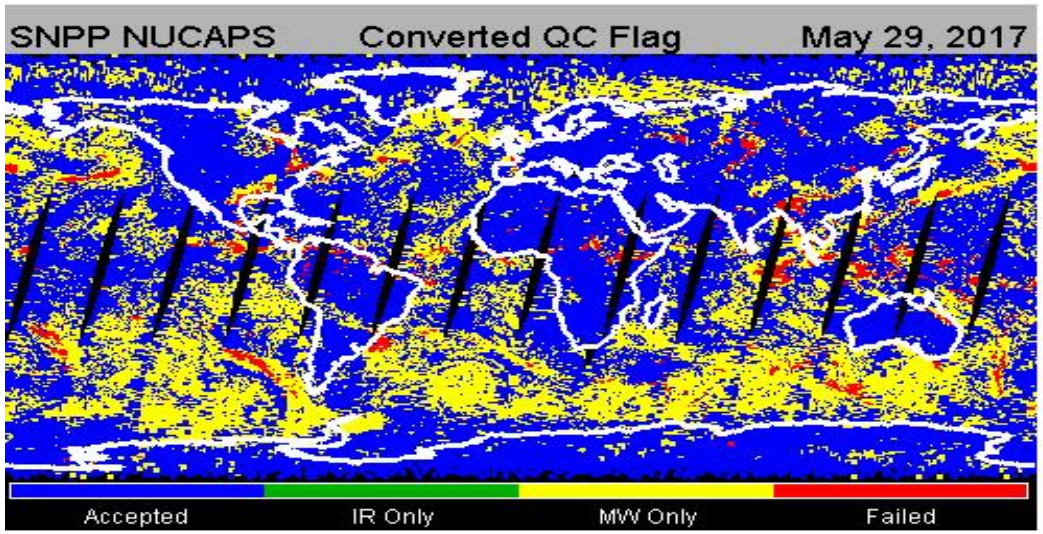


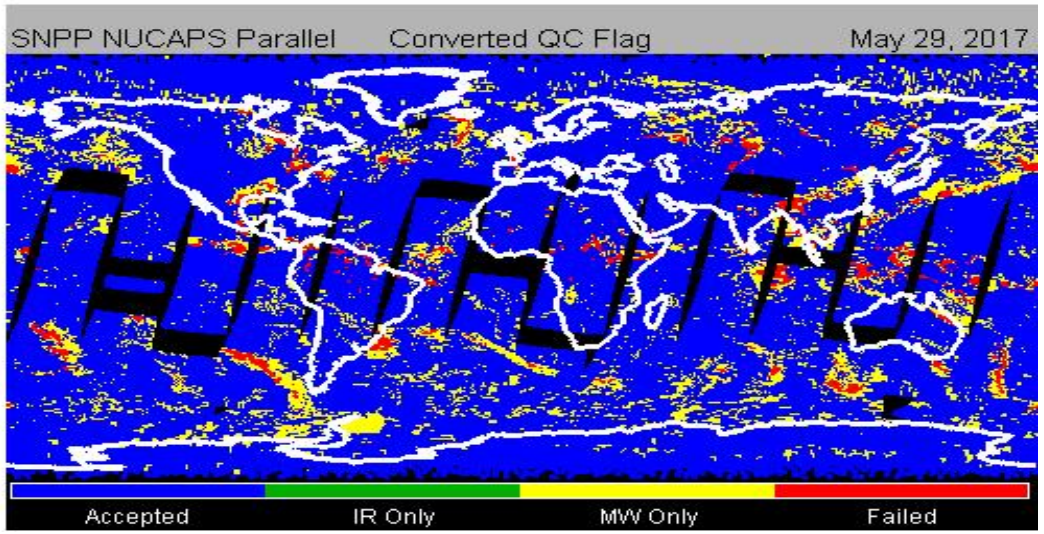
NUCAPS v1.5 (left) vs v2.0.4 … old IR RTA tuning (right)

ODS … QC flag analysis



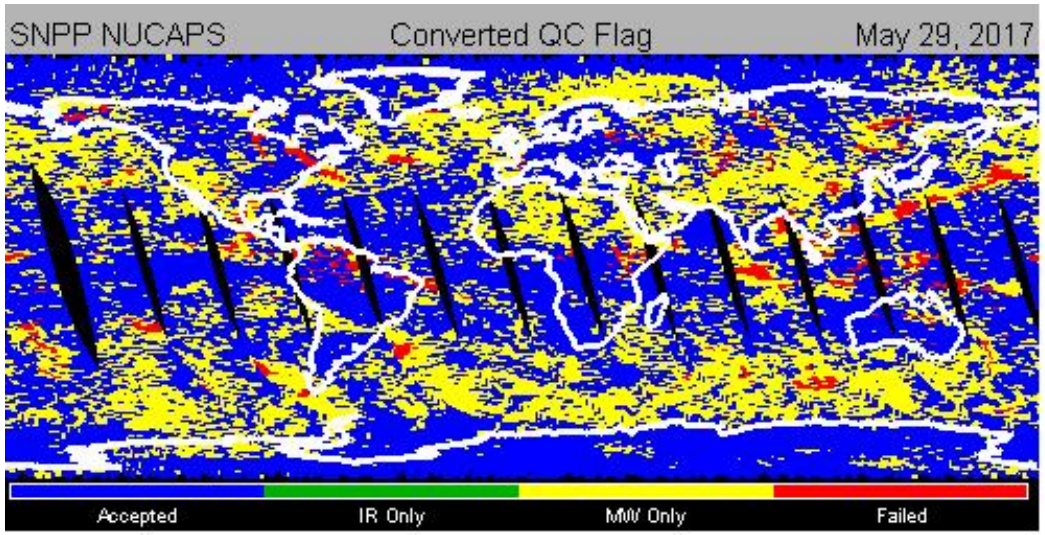


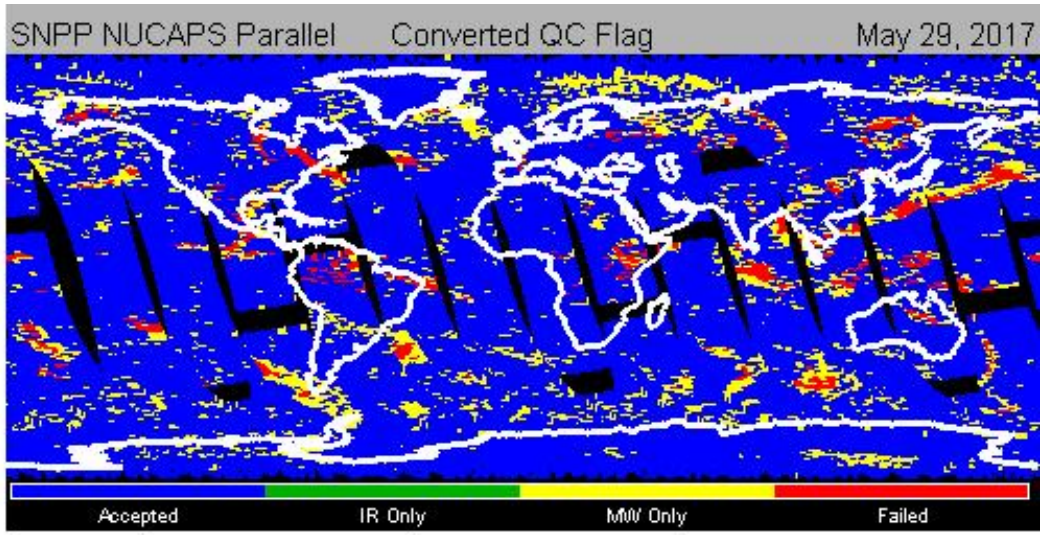


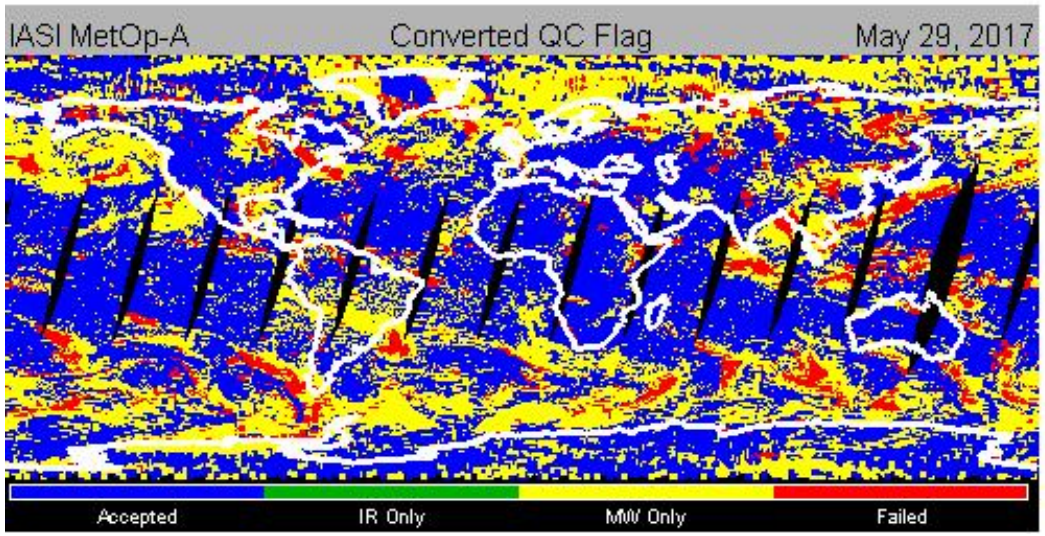


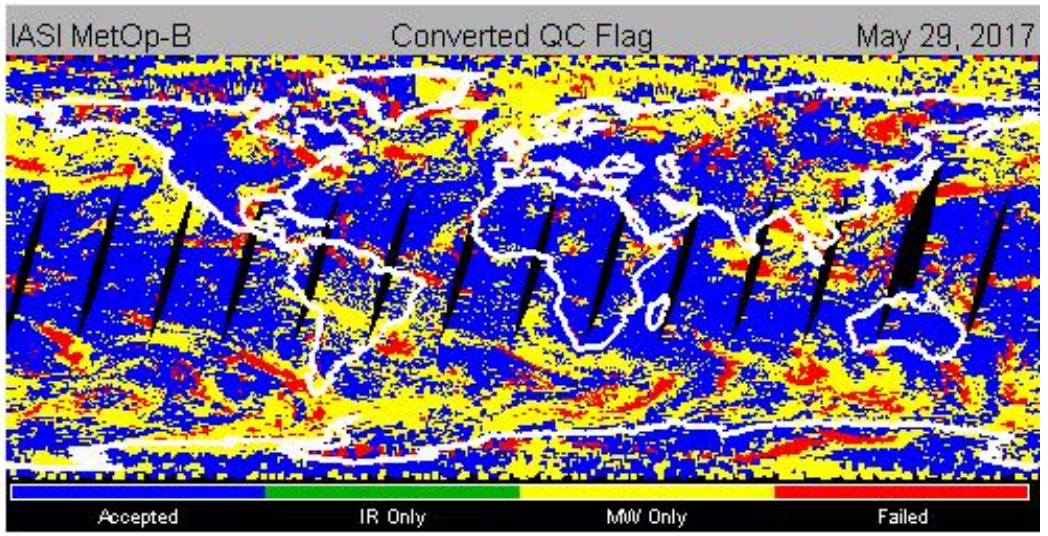
NUCAPS v1.5 (left) vs v2.0.5 … new IR RTA tuning (right)

ODS … QC flag analysis





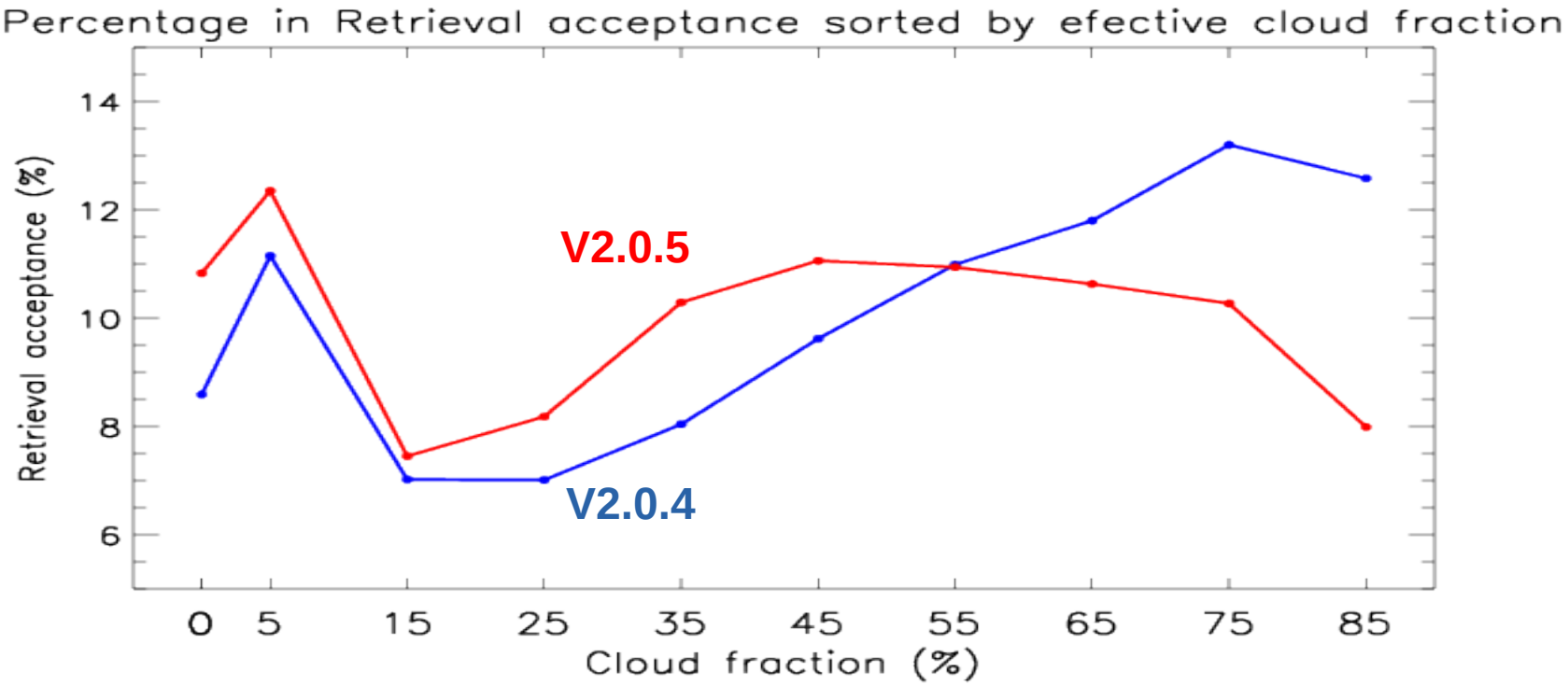




NUCAPS v1.5 (up left) vs v2.0.5 (up right) vs MetOp-A (low left) vs MetOp-B (low right)

V2.0.4 (old IR RTA) vs V2.0.5 (new IR RTA)

V2.0.4 yield: 70%
V2.0.5 yield: 85%



Note: The y-axis retrieval acceptance rate is the number of accepted retrievals associated with a certain cloud fraction divided by the total number of accepted retrievals.

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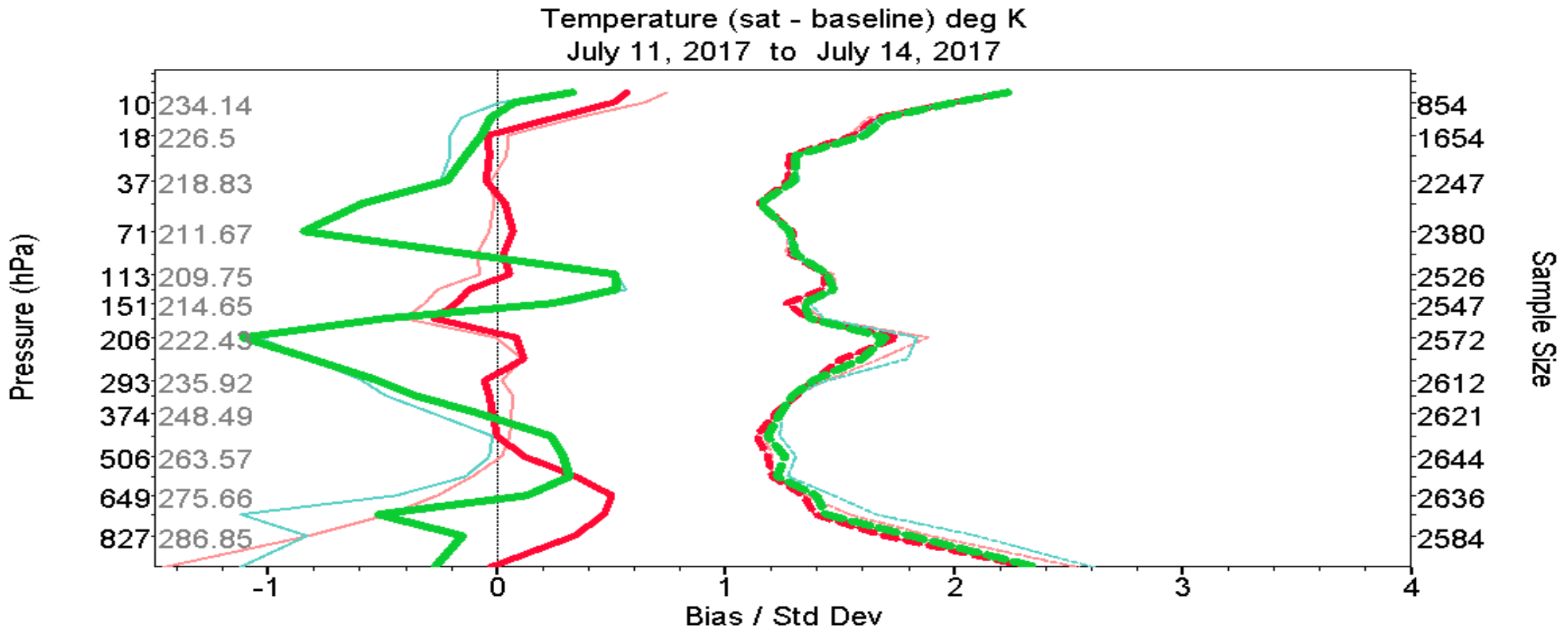
PDISP



Baseline: SONDE

NUCAPS NPP

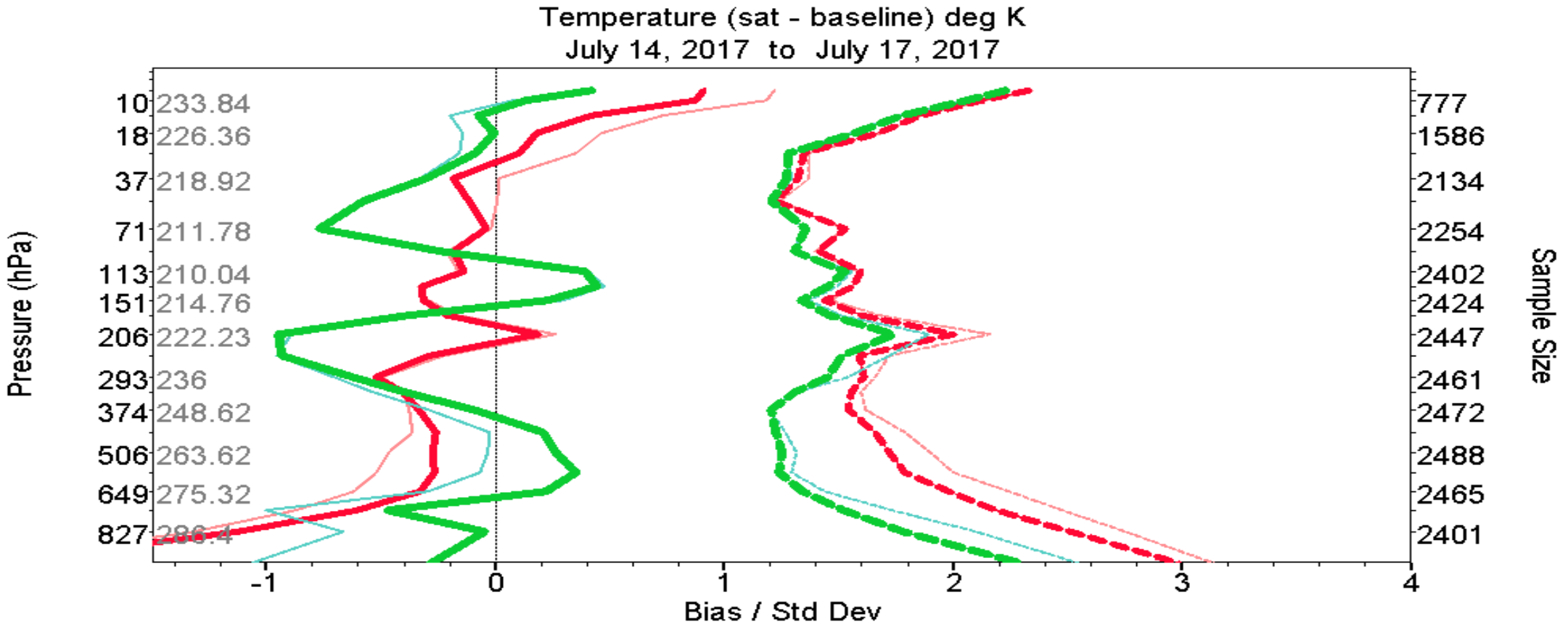
NUCAPS NPP First Guess

NUCAPS NPP TEST

NUCAPS NPP TEST First Guess

IR + MW v2.0.5

PDISP



Baseline: SONDE

NUCAPS NPP

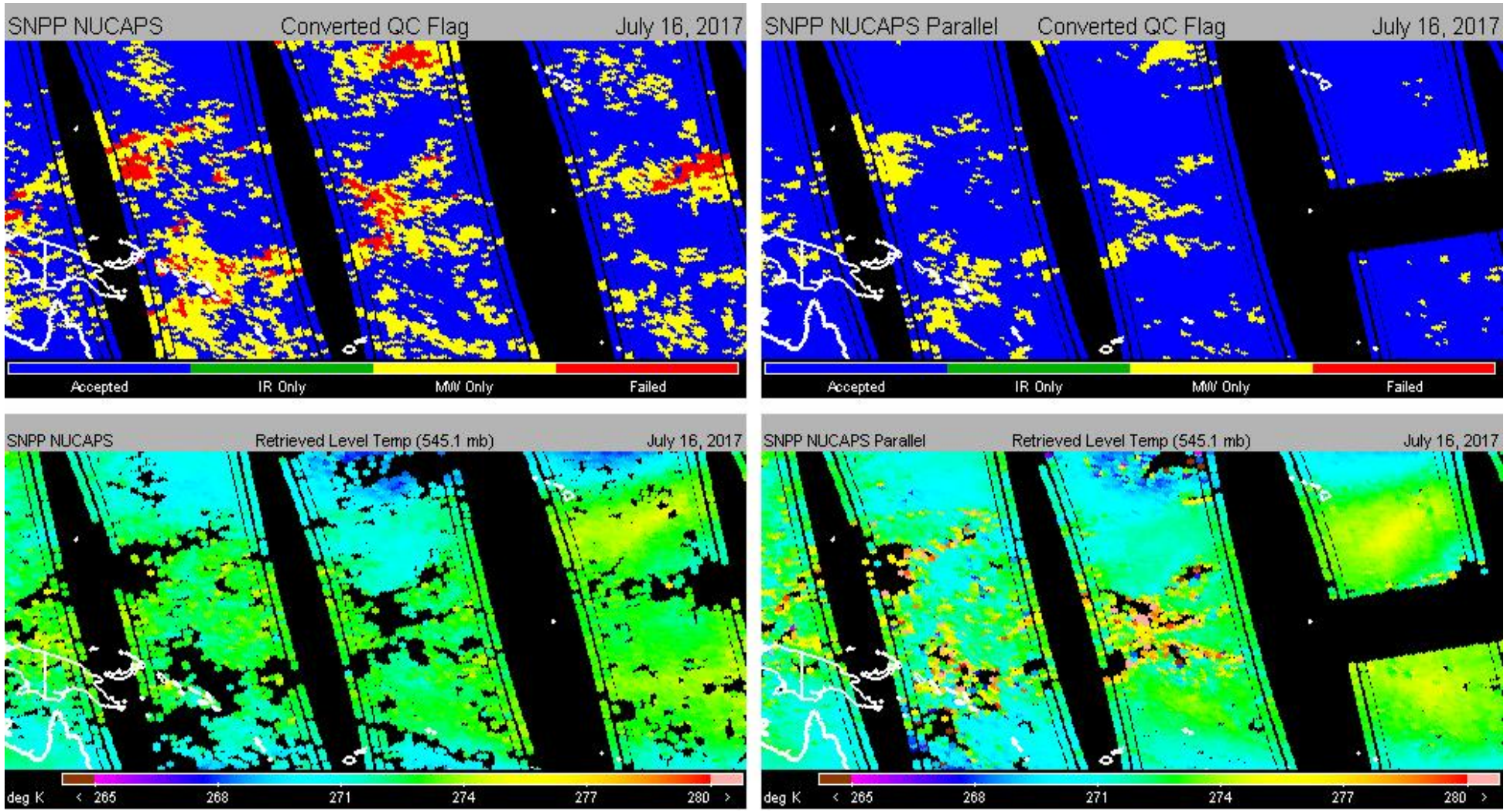
NUCAPS NPP First Guess

NUCAPS NPP TEST

NUCAPS NPP TEST First Guess

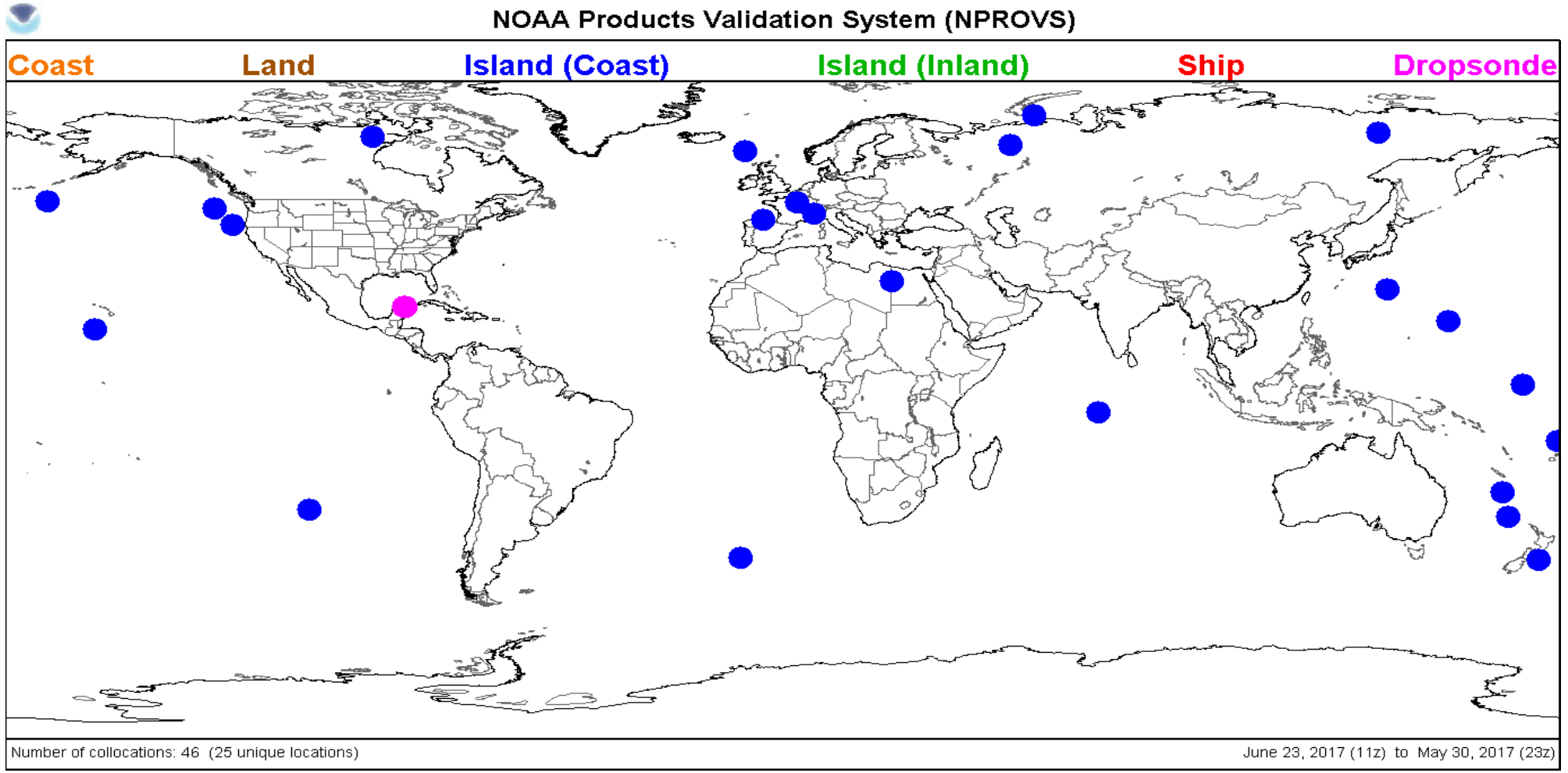
IR- only v2.0.5

ODS … QC flag (top), 545 hPa temp (bottom)



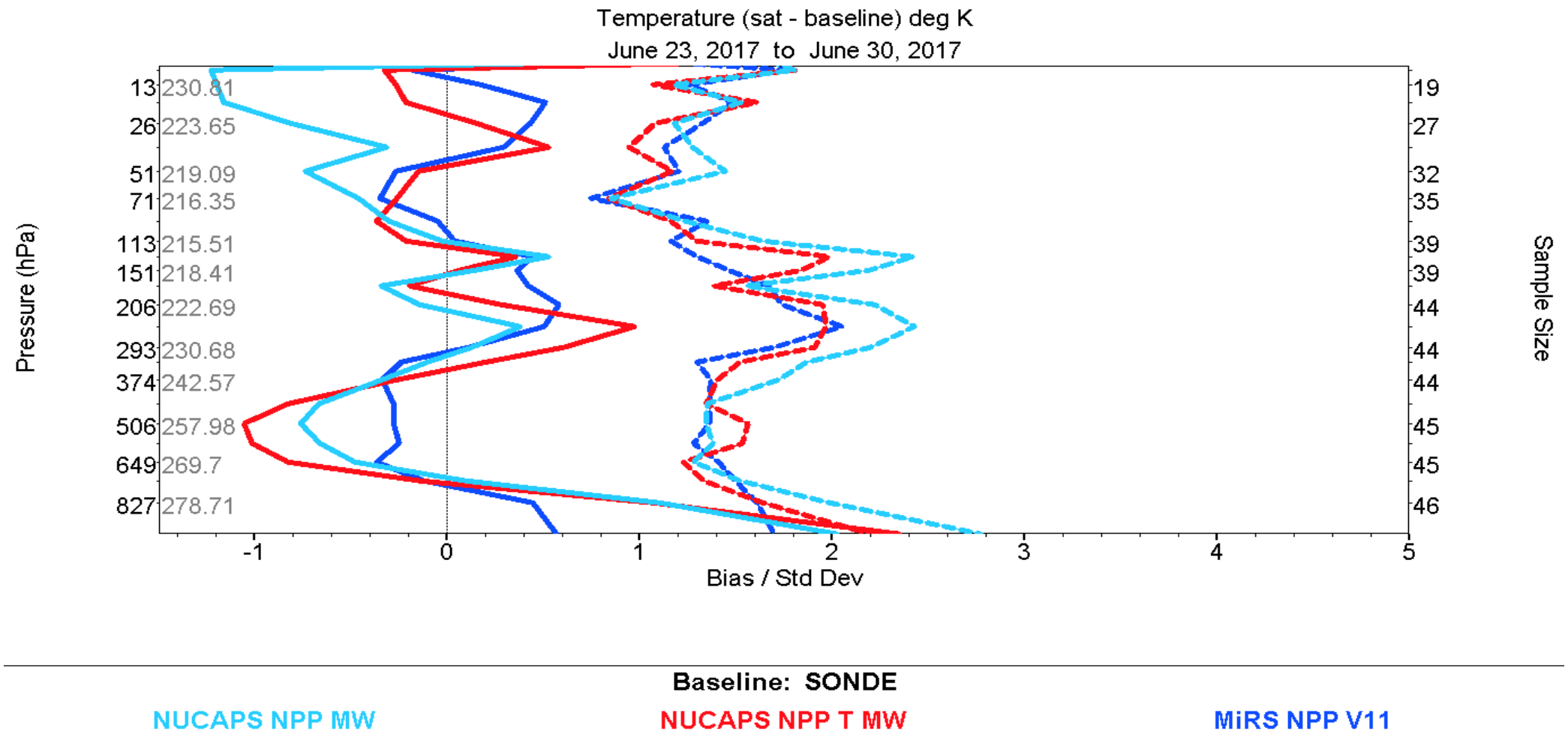
NUCAPS v1.5 (left) vs v2.0.5 … IR-only (right)

PDISP



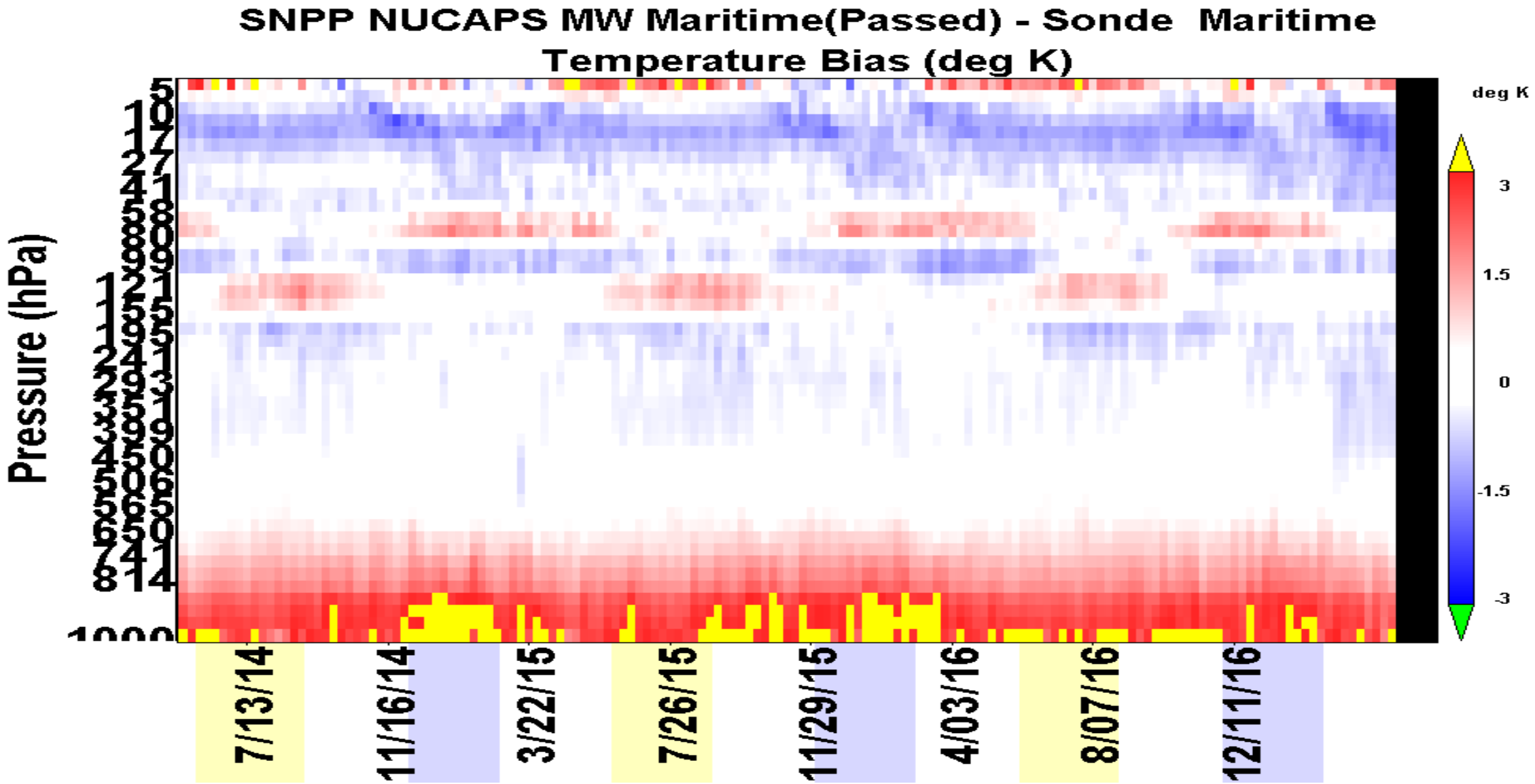
Collocations with NUCAPS MW-only and MiRS Sea observations

PDISP

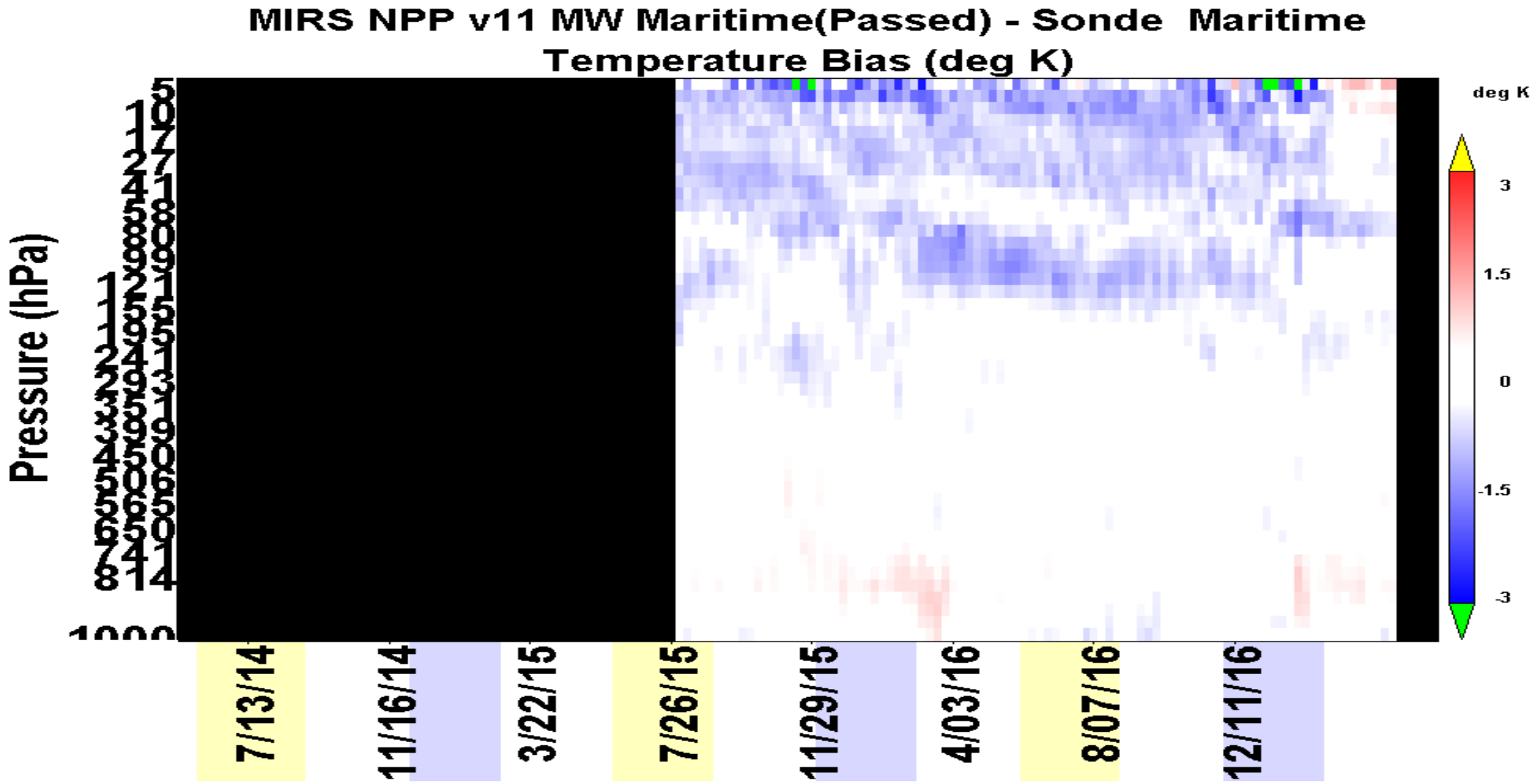


NUCAPS MW-only v1.5 and v2.0.5 vs MiRS

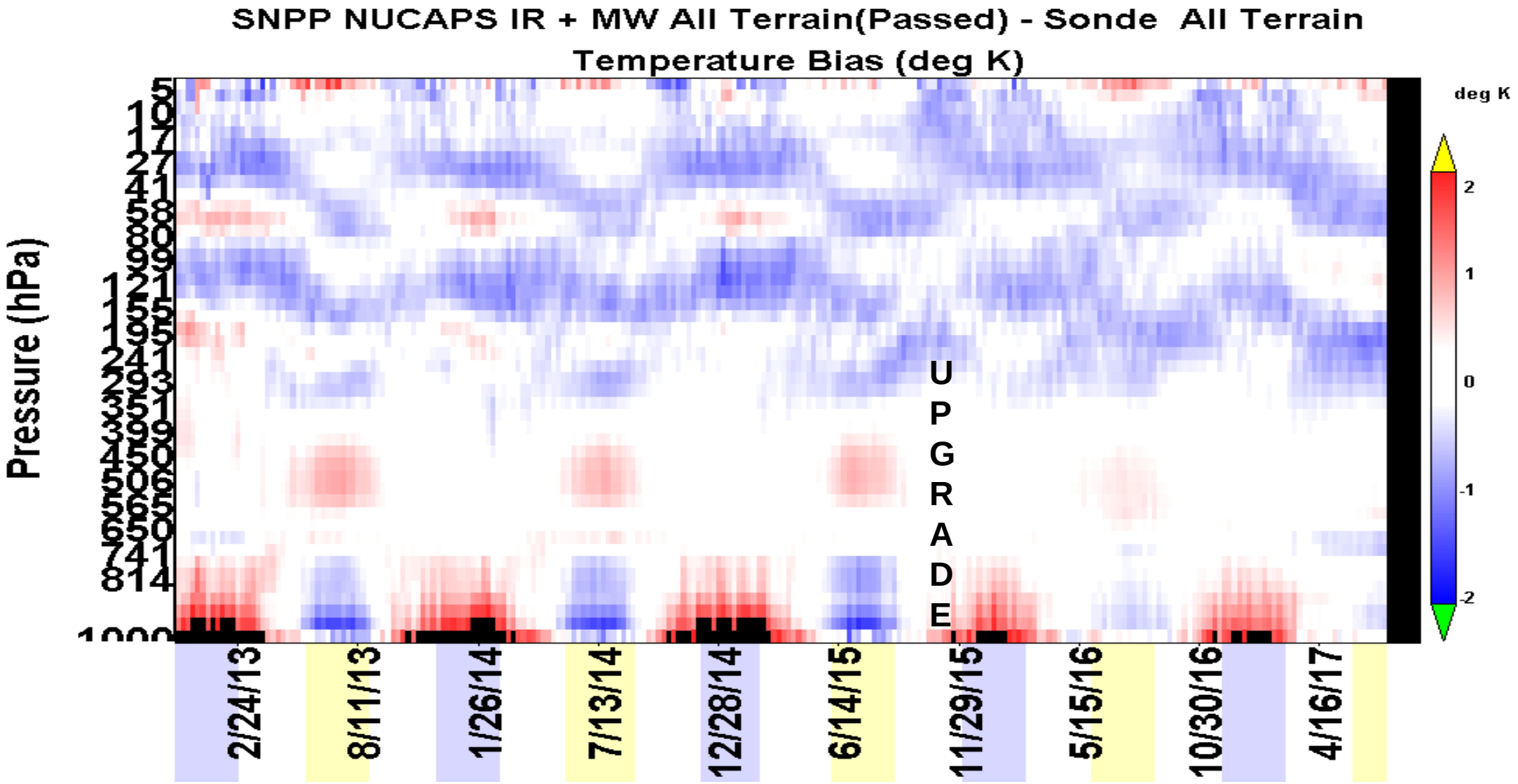
NARCS-LTM


SNPP NUCAPS MW Maritime(Passed) - Sonde Maritime
Temperature Bias (deg K)
Pressure (hPa)
deg K
3
1.5
0
-1.5
-3
7/13/14
11/16/14
3/22/15
7/26/15
11/29/15
4/03/16
8/07/16
12/11/16

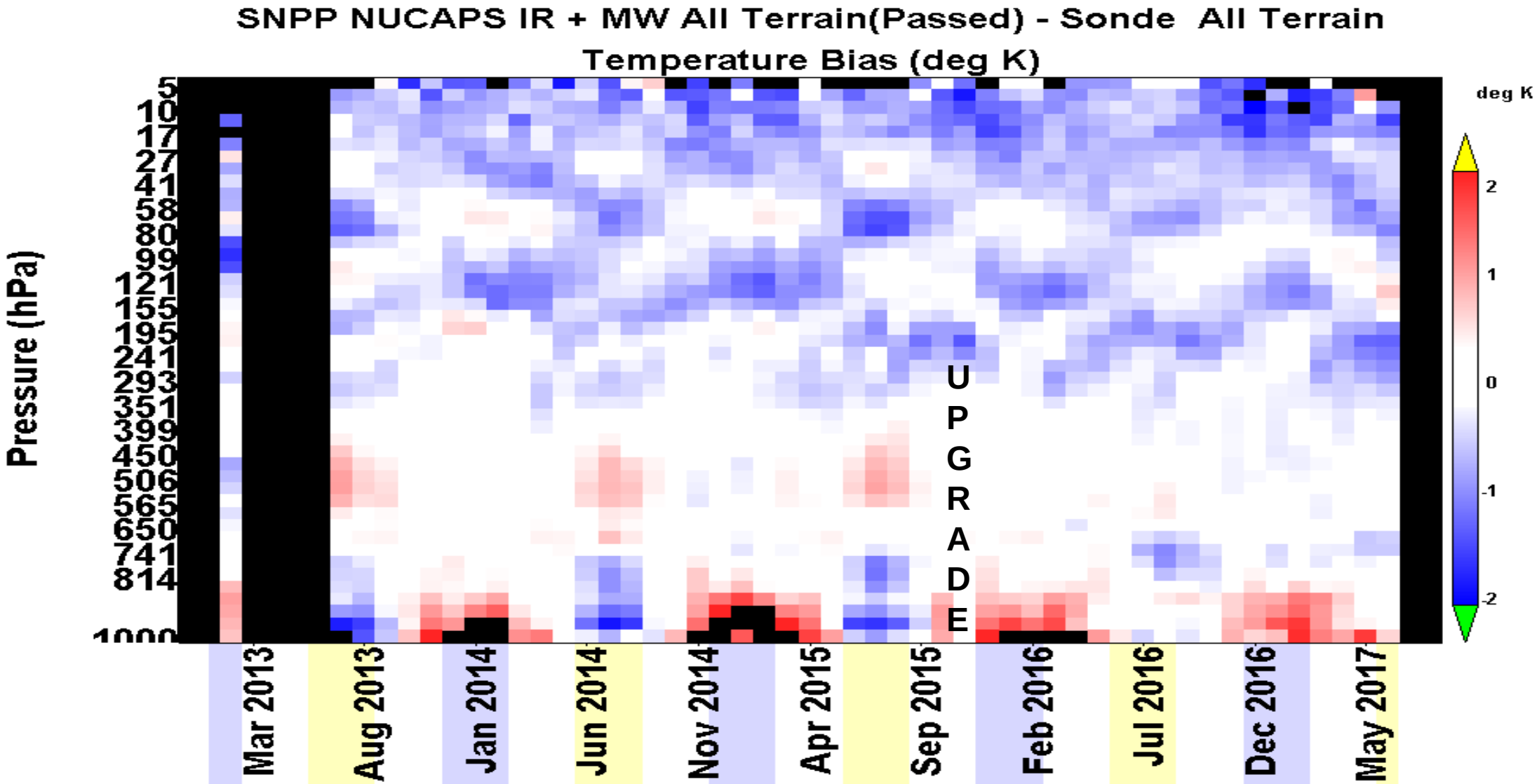
NARCS-LTM


MIRS NPP v11 MW Maritime(Passed) - Sonde Maritime
Temperature Bias (deg K)
Pressure (hPa)
deg K
3
1.5
0
-1.5
-3
7/13/14
11/16/14
3/22/15
7/26/15
11/29/15
4/03/16
8/07/16
12/11/16

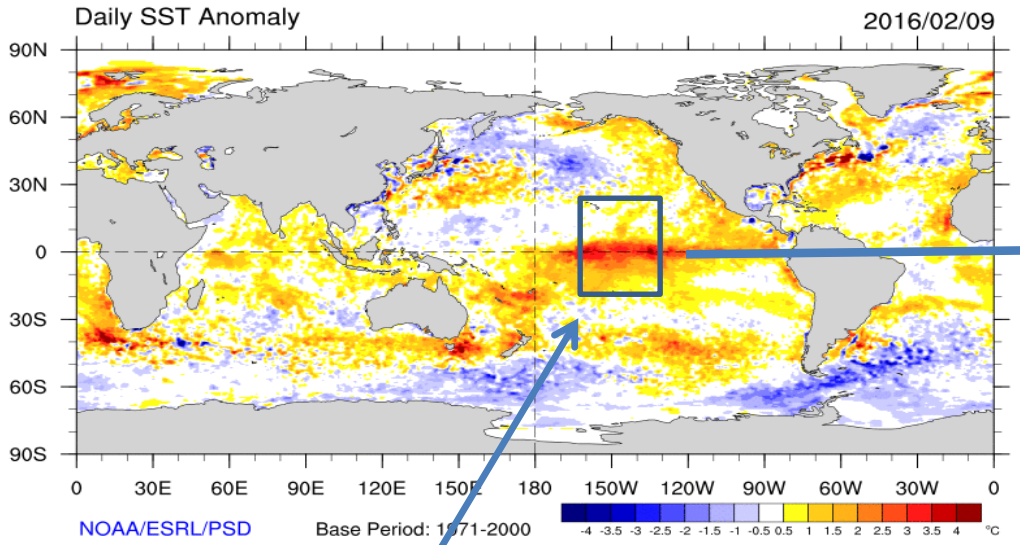
NARCS-LTM

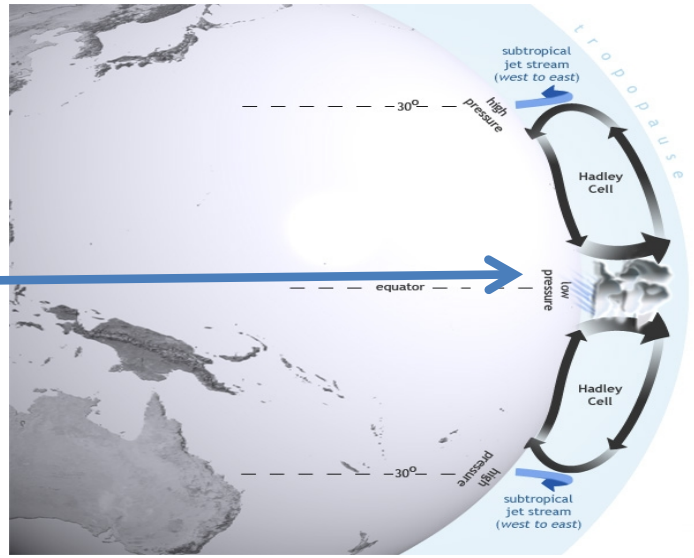

SNPP NUCAPS IR + MW All Terrain(Passed) - Sonde All Terrain
Temperature Bias (deg K)
Pressure (hPa)
deg K
2
1
0
-1
-2
UPGRADE
2/24/13
8/11/13
1/26/14
7/13/14
12/28/14
6/14/15
11/29/15
5/15/16
10/30/16
4/16/17

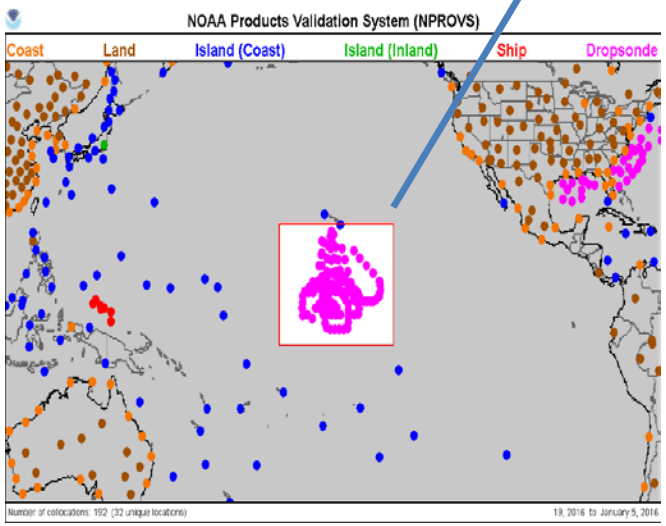
NARCS-LTM

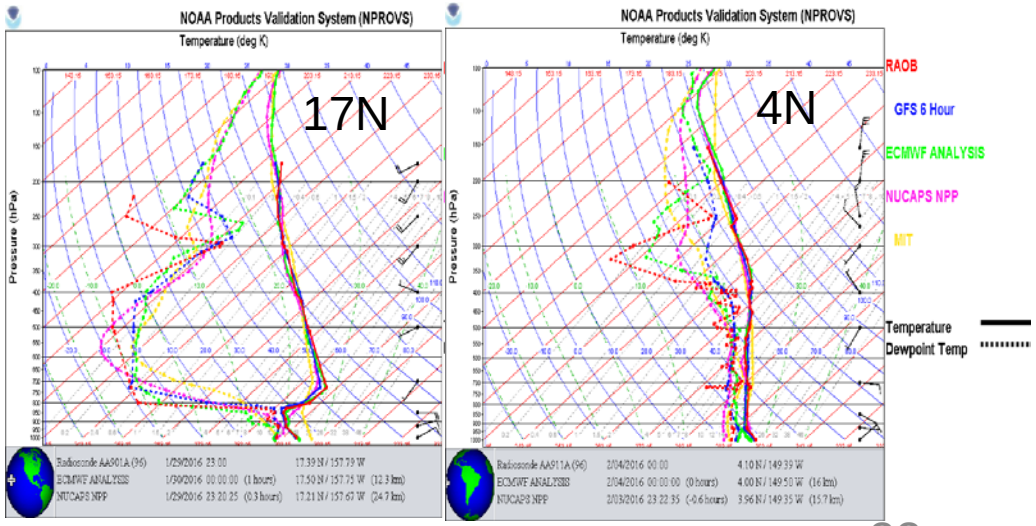

SNPP NUCAPS IR + MW All Terrain(Passed) - Sonde All Terrain
Temperature Bias (deg K)
Pressure (hPa)
5
10
17
27
41
58
80
99
121
155
195
241
293
351
399
450
506
565
650
741
814
1000
deg K
2
1
0
-1
-2
UPGRADE
Mar 2013
Aug 2013
Jan 2014
Jun 2014
Nov 2014
Apr 2015
Sep 2015
Feb 2016
Jul 2016
Dec 2016
May 2017

AWIPS-2 El-Nino Rapid Response 2016



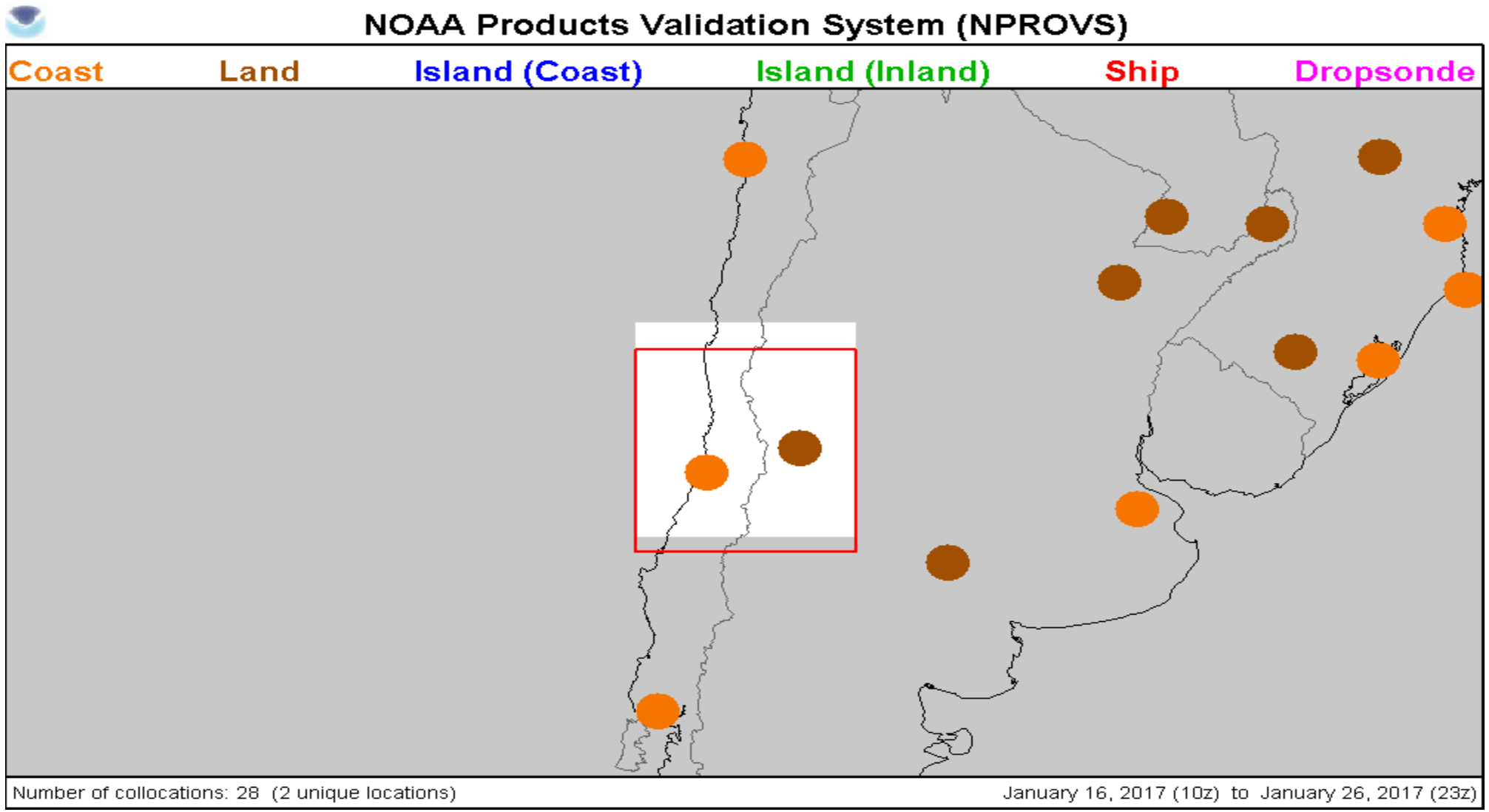






NUCAPS captures circulation regimes of the central pacific tropical/sub-tropical region

PDISP



AWIPS Chile Fire Support January 2017

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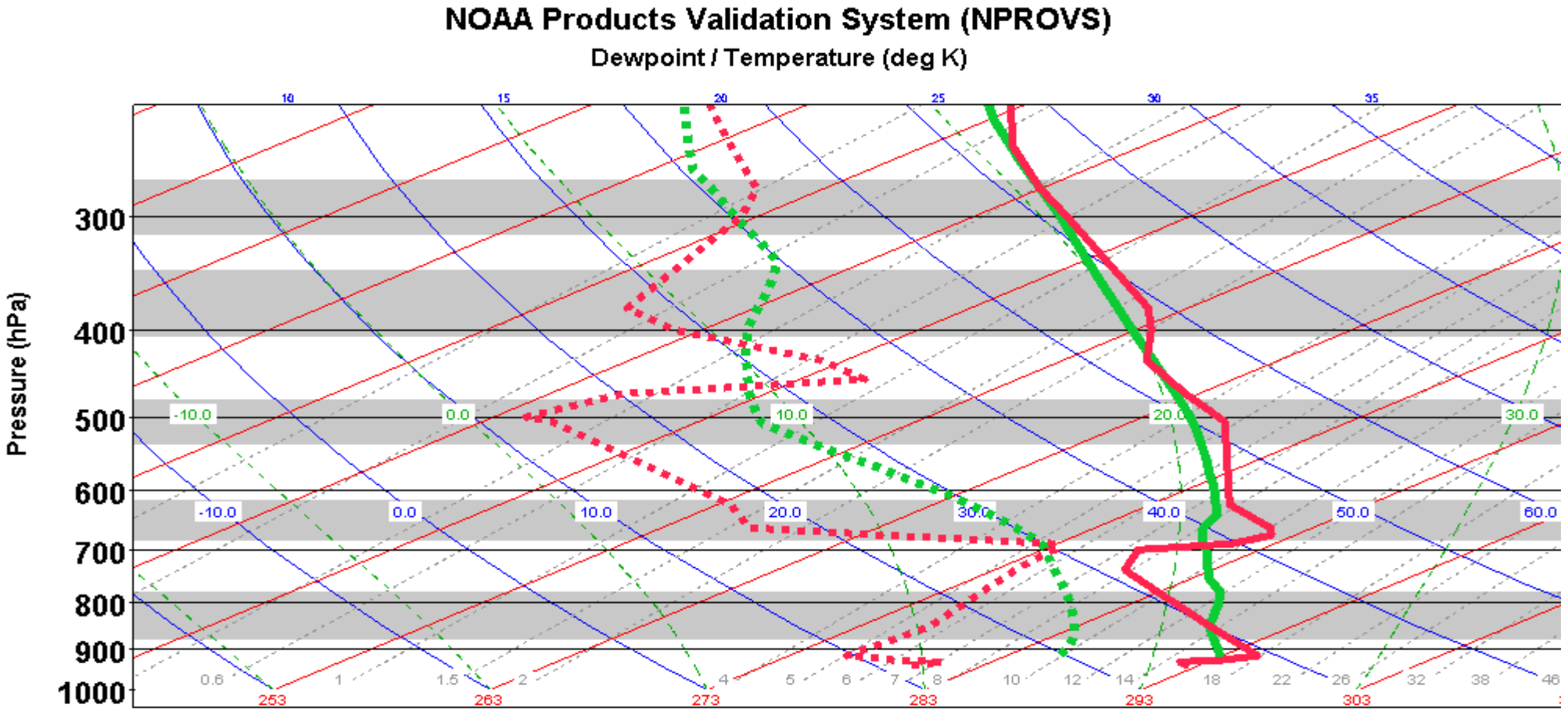
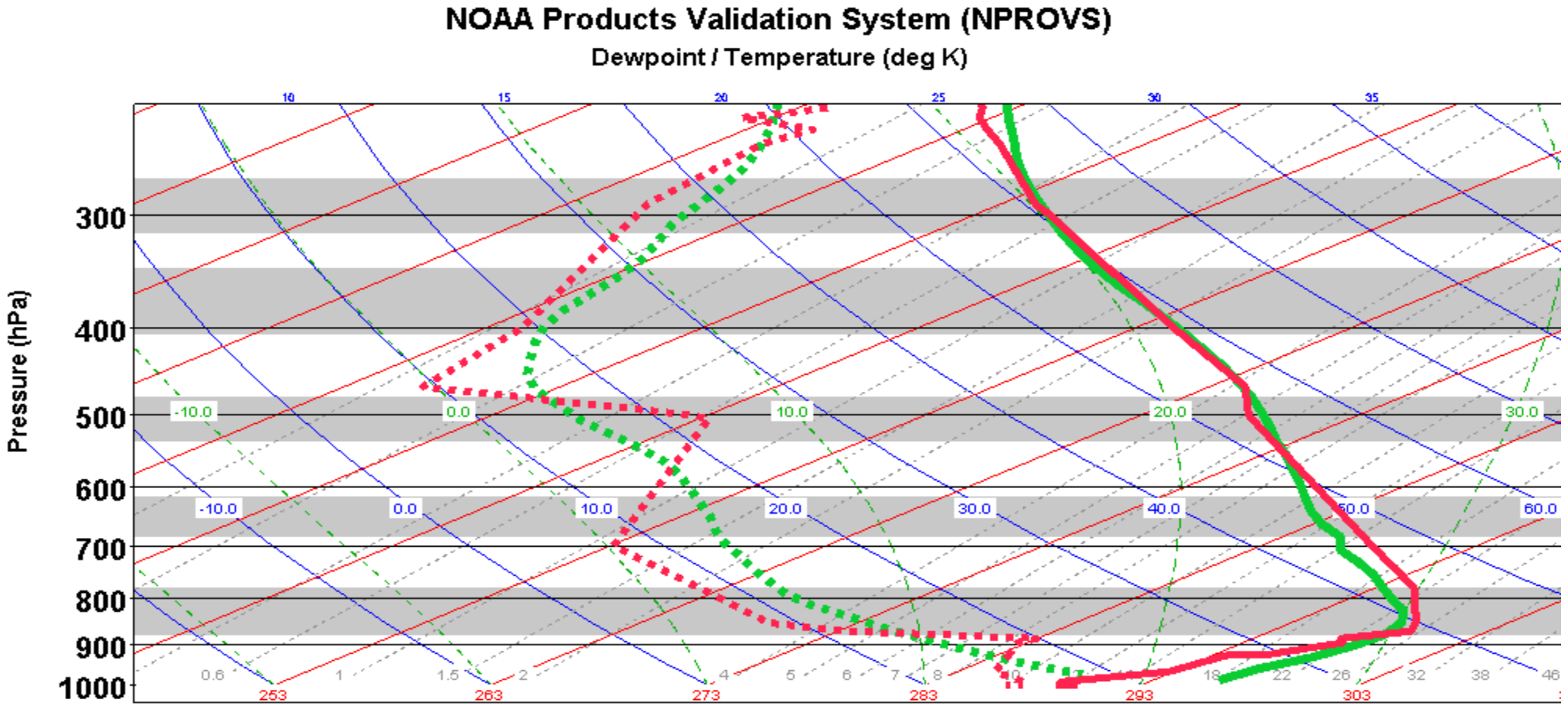
PDISP



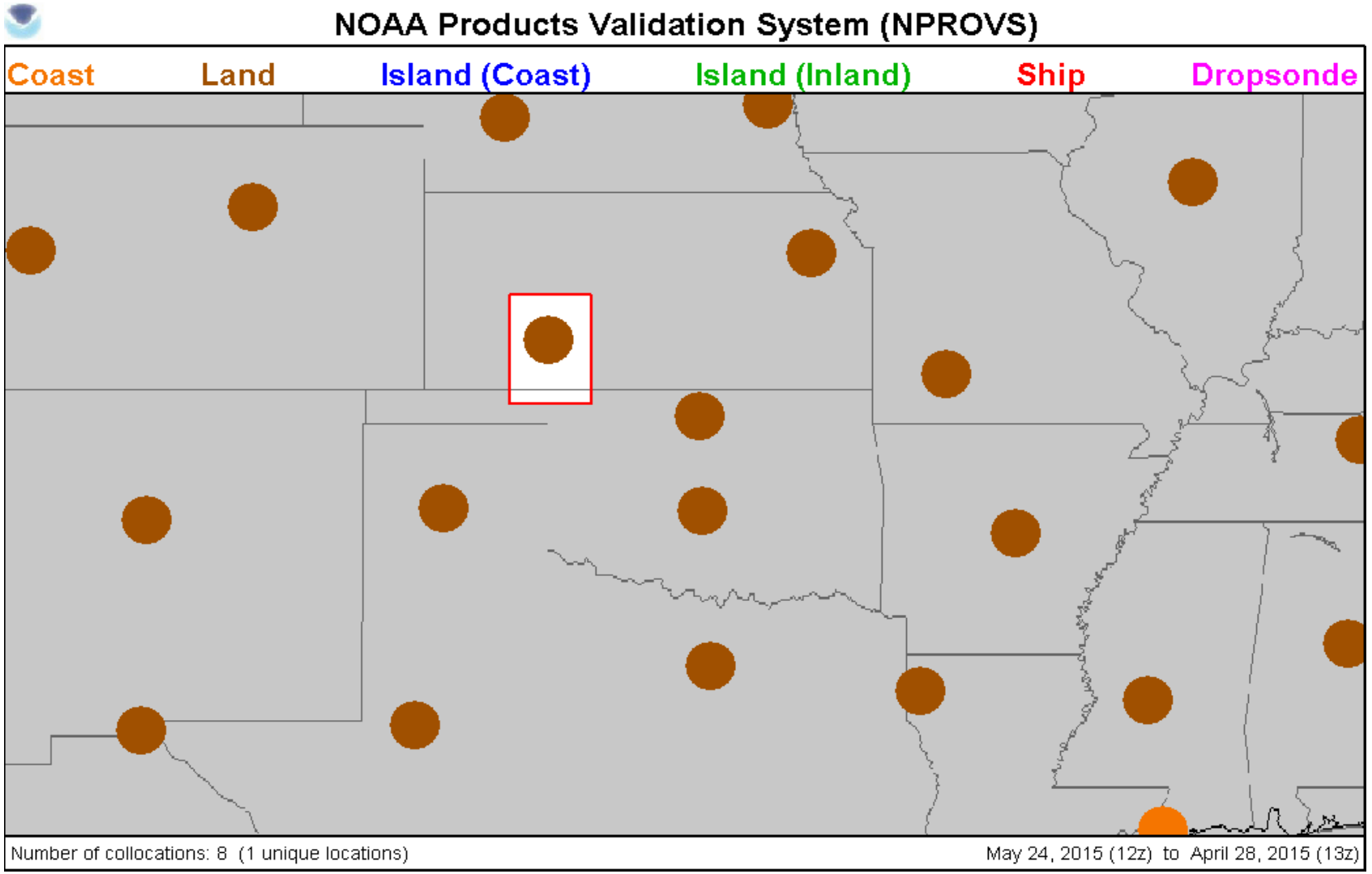
SONDE 87418 (177) SONDE 1/26/2017 11:02:00Z 32.8 S / 68.8 W

NUCAPS NPP 1/26/2017 5:31:07Z (-5.5 hours) 33.1 S / 68.6 W (32.7 km)

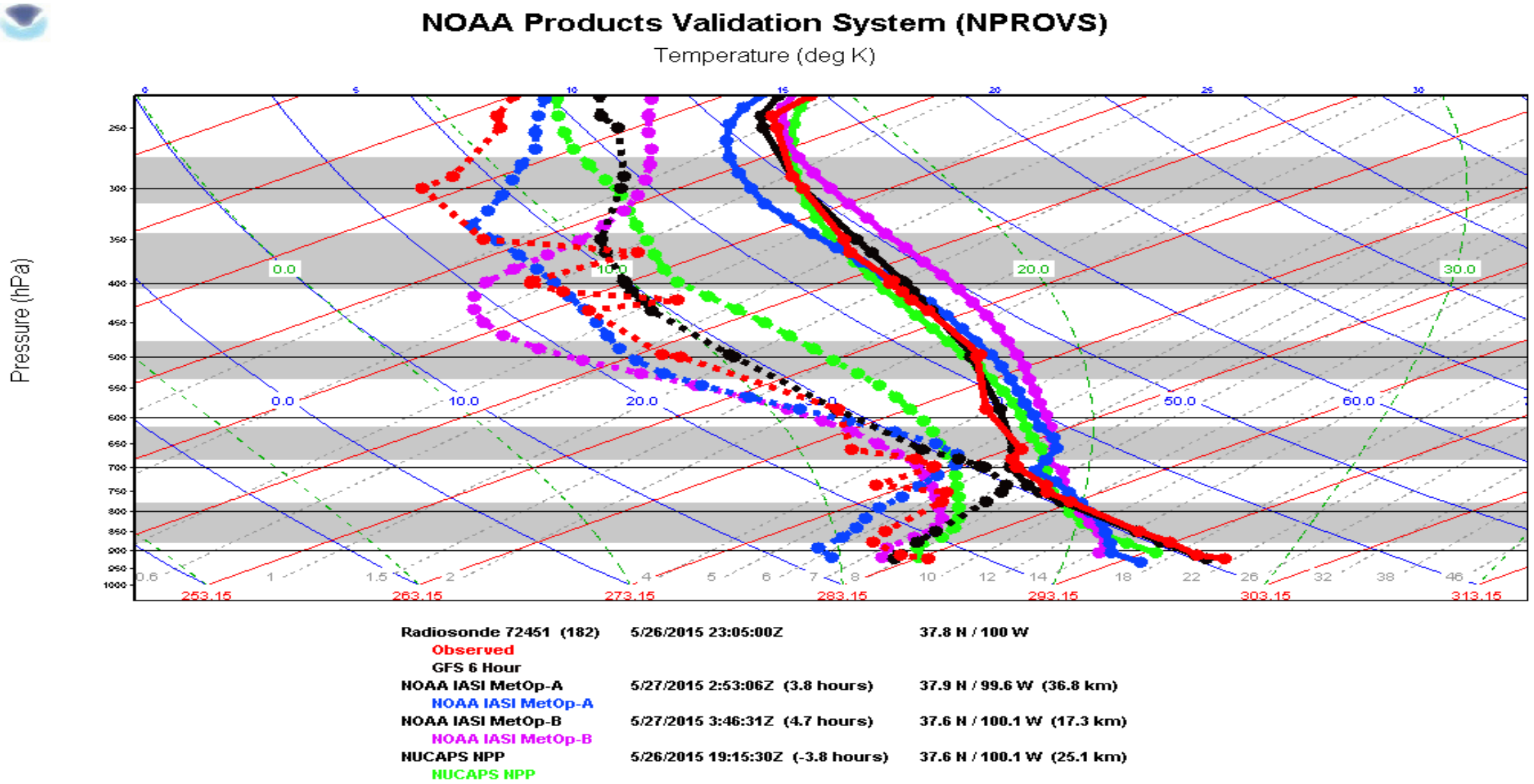
AWIPS Chile Fire Support January 2017



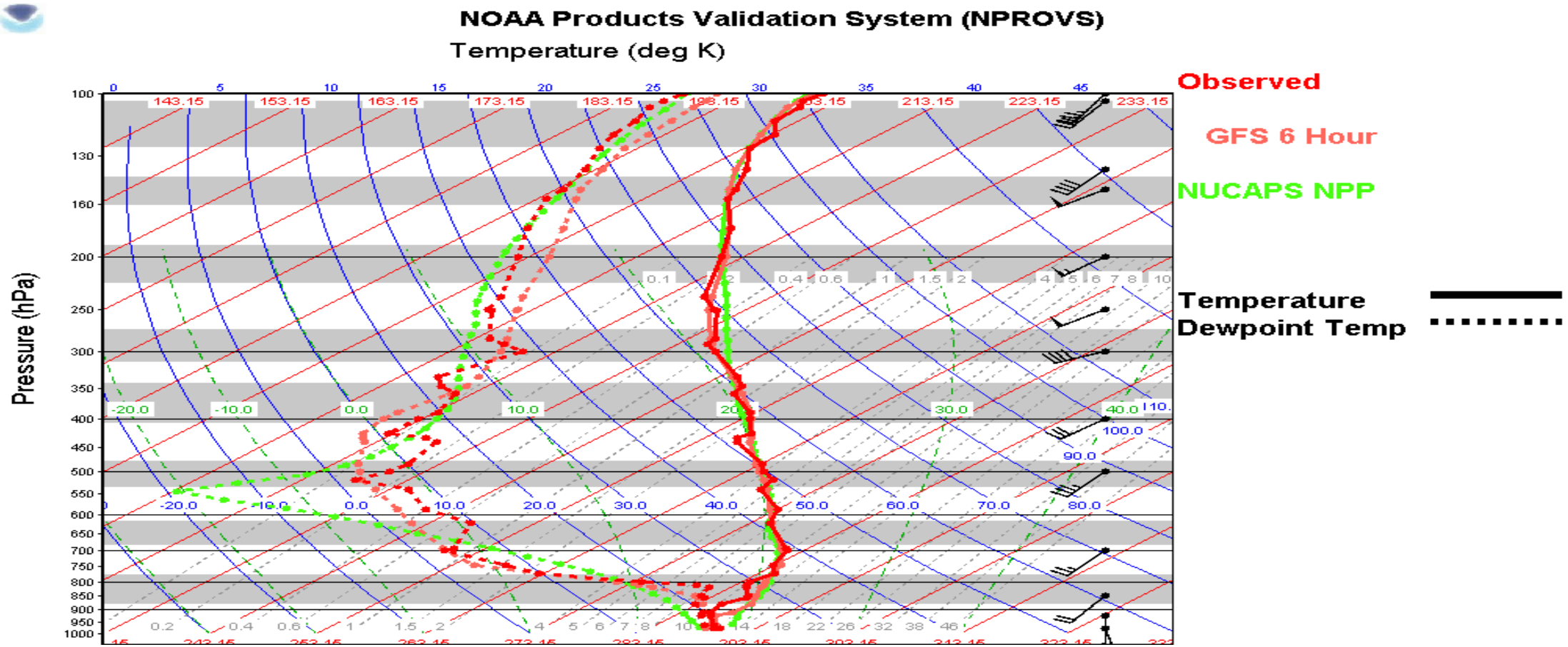
AWIPS Chile Fire Support January 2017



AWIPS-2 Dodge City Convective Case May 2015



AWIPS-2 Dodge City Convective Case May 2015



Norman, OK.

RAOB 11/4/2015 1105Z NUCAPS 0855Z 46.3 km

Summary

- **NPROVS provides "Enterprise Validation" … same validation datasets for different sounding product suites**
- ***Restores semblance of Sounding Product Oversight Panel (SPOP)***
- **Provides assessments using either conventional or "special" (JPSS funded dedicated, GRUAN)**
- **NUCAPS FSR provide almost 25% increase in "IR+MW" sounding yield with no degradation in product integrity … IR-only and Microwave-only need more work**
- **AWIPS-2 users benefit from NUCAPS …**

Path Forward

❖ **Integrate dual RS41 and RS92 launches from RIVAL that are collocated with satellite overpass (focus on J1) into NPROVS+**

❖ **Append SDR for "dedicated" selected NPROVS+ collocations (JPSS, RIVAL and GRUAN) and include SDR to facilitate "re-retrieval" in support of algorithm development assessment**

❖ **Support of GRUAN/GSICS "sensor assessments" feasibility studies**

❖ **Continue AWIPS-2 support**