Current SNPP Sounding Products from the Operational System and Way Forward for the JPSS-1 CrIS/ATMS Products

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OSPO, Sounding Products Area Lead
August 26, 2015

Outline

- NUCAPS Team Members
- NUCAPS System Requirements
- Unique CrIS ATMS Processing System (NUCAPS) - Operational Products
- JPSS Specification Performance Requirements
- NUCAPS Products on the OSPO Website (External Users)
- NUCAPS Online Product Monitoring (Internal Users)
- NUCAPS Data Distribution and Access (NDE/PDA)
- NUCAPS Users
- NUCAPS Major Accomplishments
- SNPP Looking Ahead
- Summary / NUCAPS Future Plans

NUCAPS Team Members

Team Members:

STAR: Mark Liu, Tony Reale, Walter Wolf, Thomas King, Nicholas Nalli, Bomin Sun, Letitia Soulliard, Mike Wilson, Kexin Zhang

STC: Chris Barnet, Antonia Gambacorta

OSPO: A.K. Sharma, Antonio Irving, Chris Sisko, Donna McNamara, Zhaohui Cheng, Jing Han, Oleg Roytburd, William OConnor, Sterling Spangler

OSGS (NDE project): Tom Schott, Geoff Goodrum, Dylan Powell

NUCAPS System Requirements

- The NUCAPS shall provide:
  - CrIS thinned radiance products for NWP center users. (product, functional)
  - CrIS full spatial resolution granule files containing all CrIS FOVs and FORs for all 1305 channels.
  - Trace gas profile products for U.S. users. (product, functional)
  - Atmospheric temperature and moisture profiles for AWIPS derived from CrIS/ATMS radiances.
  - Retrieval products for AWIPS in netCDF4 format.
  - CrIS Cloud-clear Radiance (CCR) products for NWP centers and CLASS. (product, operational)
  - Daily global products for system validation, maintenance, and development. (product, operational)
  - Data files for science quality monitoring of SDR and EDR data.
  - Granules available within 103 minutes of observation

Unique CrIS ATMS Processing System (NUCAPS) Operational Products

Objectives

Provide Products within 16 to 23 minutes of data receipt from IDPS to NWS and DOD.

Operational Products:

>> Spectrally and spatially thinned Radiances,

>> Retrieved products such as Temperature, moisture, pressure profiles

>> Cloud cleared radiances

>> Atmospheric trace gas products

>> Principal components

>>QA/QC Science products for Operational Monitoring

>>EDR Validation Products: Global Grids, Matchups, and Binaries

++ Not Validated

** Currently not yet declared operational

Retrieval Products

Cloud Cleared Radiances	660-750 cm-1 2200-2400 cm-1
Cloud fraction and Top Pressure **	660-750 cm-1
Surface temperature **	window
Temperature	660-750 cm-1 2200-2400 cm-1
Water Vapor	780 – 1090 cm-1 1200-1750 cm-1
O3 ++	990 – 1070 cm-1
CO ++	2155 – 2220 cm-1
CH4 ++	1220-1350 cm-1
N2O++	1290-1300cm-1 2190-2240cm-1
HNO3 **	760-1320cm-1
SO2 **	1343-1383cm-1

NUCAPS AWIPS Products

The retrieval product for AWIPS includes the following variables.

CrIS FOR
Latitude
View Angle
Topography
Skin Temperature
Pressure (at 100 levels)
Temperature (Kelvin at 100 levels)
O3 (ppb at 100 levels)
Ice/Liquid Flag (at 100 levels)
Stability parameters

Time
Longitude
Ascending/Descending Status
Surface Pressure
Quality Flag
Effective Pressure (at 100 levels)
H2O (g/Kg at 100 levels)
Liquid H2O (g/Kg at 100 levels)
SO2 (ppb at 100 levels)

- *See Session 7b on Thursday morning for AWIPS User Presentations.*

JPSS Specification Performance Requirements

- **NUCAPS Algorithm:** Unified **(**AIRS/IASI/CrIS) approach, multi-step iterative method, front-end regression
  - NUCAPS science code (100 layer)
  - – Operational product in Sept 2013

"Clear to Partly Cloudy" – ≤50% cloudiness

"Cloudy" – >50% cloudiness

- *"Cloudy"* – IR fails converge, MW-only retrieval
- *"Clear to Partly Cloudy"* – IR convergence

- L1RD Supp– Table 5.2.3.1, 5.2.3.2, 5.2.4.1, 5.2.4.2, 5.2.5, 5.2.6, 5.2.7, and 5.2.8

Atmospheric Vertical Temperature Profile (AVTP)
Measurement Uncertainty – Layer Average Temperature Error

PARAMETER	THRESHOLD
AVTP Clear, surface to 300 mb	**1.6 K / 1-km layer**
AVTP Clear, 300 to 30 mb	1.5 K / 3-km layer
AVTP Clear, 30 mb to 1 mb	1.5 K / 5-km layer
AVTP Clear, 1 mb to 0.5 mb	3.5 K / 5-km layer
AVTP Cloudy , surface to 700 mb	**2.5 K / 1-km layer**
AVTP Cloudy, 700 mb to 300 mb	1.5 K / 1-km layer
AVTP Cloudy, 300 mb to 30 mb	1.5 K / 3-km layer
AVTP Cloudy, 30 mb to 1 mb	1.5 K / 5-km layer
AVTP Cloudy, 1 mb to 0.5 mb	3.5 K/ 5-km layer

Atmospheric Vertical Moisture Profile (AVMP)
Measurement Uncertainty – 2-km Layer Average Mixing Ratio % Error

PARAMETER	THRESHOLD
AVMP Clear, surface to 600 mb	**Greater of 20% or 0.2 g/kg / 2-km layer**
AVMP Clear, 600 to 300 mb	Greater of 35% or 0.1 g/kg / 2-km layer
AVMP Clear, 300 to 100 mb	Greater of 35% or 0.1 g/kg / 2-km layer
AVMP Cloudy, surface to 600 mb	**Greater of 20% of 0.2 g/kg / 2-km layer**
AVMP Cloudy, 600 mb to 400 mb	Greater of 40% or 0.1 g/kg / 2-km layer
AVMP Cloudy, 400 mb to 100 mb	Greater of 40% or 0.1 g/kg / 2-km layer

NUCAPS - OSPO Websites (External/Internal)

- OSPO NUCAPS Sounding Products Webpages (Internet) for **external users**:
- NUCAPS Sounding Products

http://www.ospo.noaa.gov/Products/atmosphere/soundings/nucaps/

- NUCAPS/SNPP Global Granules Composite Images

http://www.ospo.noaa.gov/Products/atmosphere/soundings/nucaps/NUCAPS_composite.html

- NUCAPS/SNPP Global Gridded Products

http://www.ospo.noaa.gov/Products/atmosphere/soundings/nucaps/NUCAPS_gridded.html

- NUCAPS/SNPP Retrieval Statistics

http://www.ospo.noaa.gov/Products/atmosphere/soundings/nucaps/NUCAPS_stats.html

- NUCAPS Product Monitor Web links (Intranet) for **internal users**:

http://nucaps.espc.nesdis.noaa.gov/cgi-bin/NUCAPS/nucapsMonitor.pl (OSPO Oper)
http://nucaps.espc.nesdis.noaa.gov/cgi-bin/NUCAPS/nucapsPSmonitor.pl
http://nucaps.espc.nesdis.noaa.gov/cgi-bin/NUCAPS/globeStats.pl
http://nucaps.espc.nesdis.noaa.gov/cgi-bin/NUCAPS/yieldStats.pl
http://nucaps.espc.nesdis.noaa.gov/cgi-bin/NUCAPS/RetrStats.pl
http://nucaps.espc.nesdis.noaa.gov/cgi-bin/NUCAPS_DIFF/nucapsMonitor.pl
http://prodmonp.espc.nesdis.noaa.gov/mtool (NDE)

http://www.ospo.noaa.gov/Products/atmosphere/soundings/nucaps/NUCAPS_gridded.html

NUCAPS Sounding Products

SNPP Global Gridded 0.5 deg lat x 2 deg lon Images

Archives: Select a Date Go

Wednesday, August 19, 2015

	NUCAPS / SNPP
Temperature	0-24 Z
Mixing Ratio of Water Vapor (H2O)	0-24 Z
Mixing Ratio of Liquid H20	0-24 Z
Mixing Ratio of Ozone (O3)	0-24 Z
Mixing Ratio of Methane (CH4)	0-24 Z
Mixing Ratio of Carbon Dioxide (CO2)	0-24 Z
Mixing Ratio of Carbon Monoxide (CO)	0-24 Z
Mixing Ratio of Sulfur Dioxide (SO2)	0-24 Z
Mixing Ratio of Nitric Acid (HNO3)	0-24 Z
Mixing Ratio of Nitrous Oxide (N2O)	0-24 Z

NUCAPS Links
NUCAPS Overview
Global Gridded Images
Granule Composite Images
Retrieval Statistics

GOES Soundings
GGCP
GOES Skew-T
Satellite Cloud Product
Sounder DPI

POES Soundings
ATOVS: Profiles | vstats
IASI
MIRS
NUCAPS
POES skew-T

Related Soundings Links
Comprehensive Large Array-data Stewardship System
National Climatic Data Center
Polar Orbiter Data and NOAA KLM User's Guides
Satellite Health
Soundings Overview
Additional Product Information
2005 Workshop Presentations
Product List

NUCAPS Gridded Temperature

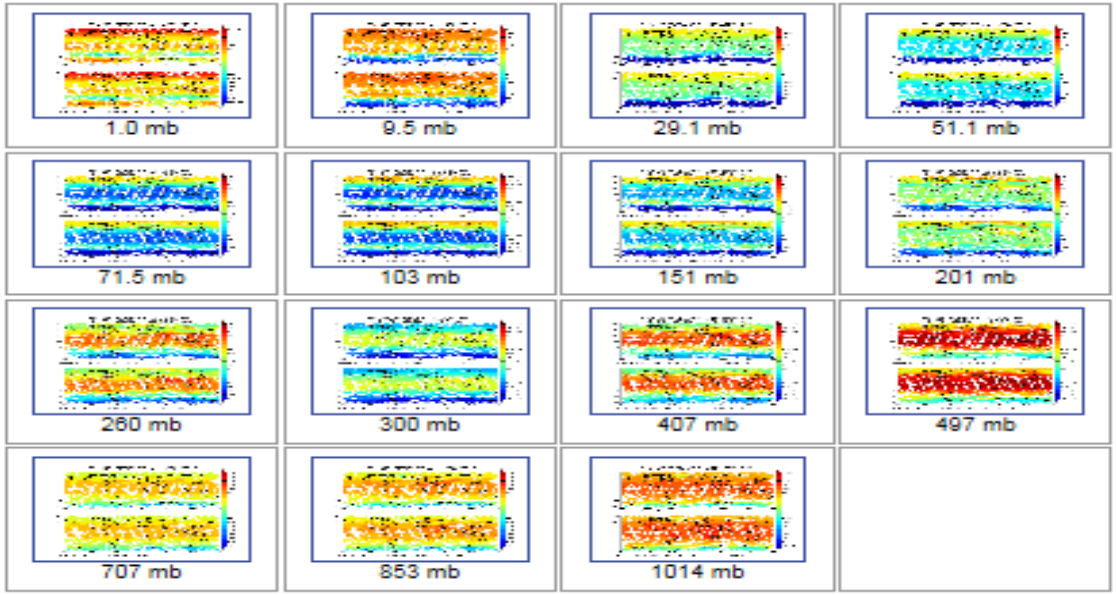
NOAA OFFICE OF SATELLITE AND PRODUCT OPERATIONS
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE

NUCAPS: Temperature

SNPP Global Gridded 0.5 deg lat x 2 deg lon Images

Archives: Select a Date Go

Wednesday, August 19, 2015 0-24Z



NUCAPS Links
NUCAPS Overview
Global Gridded Images
Granule Composite Images
Retrieval Statistics

GOES Soundings
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POES Soundings
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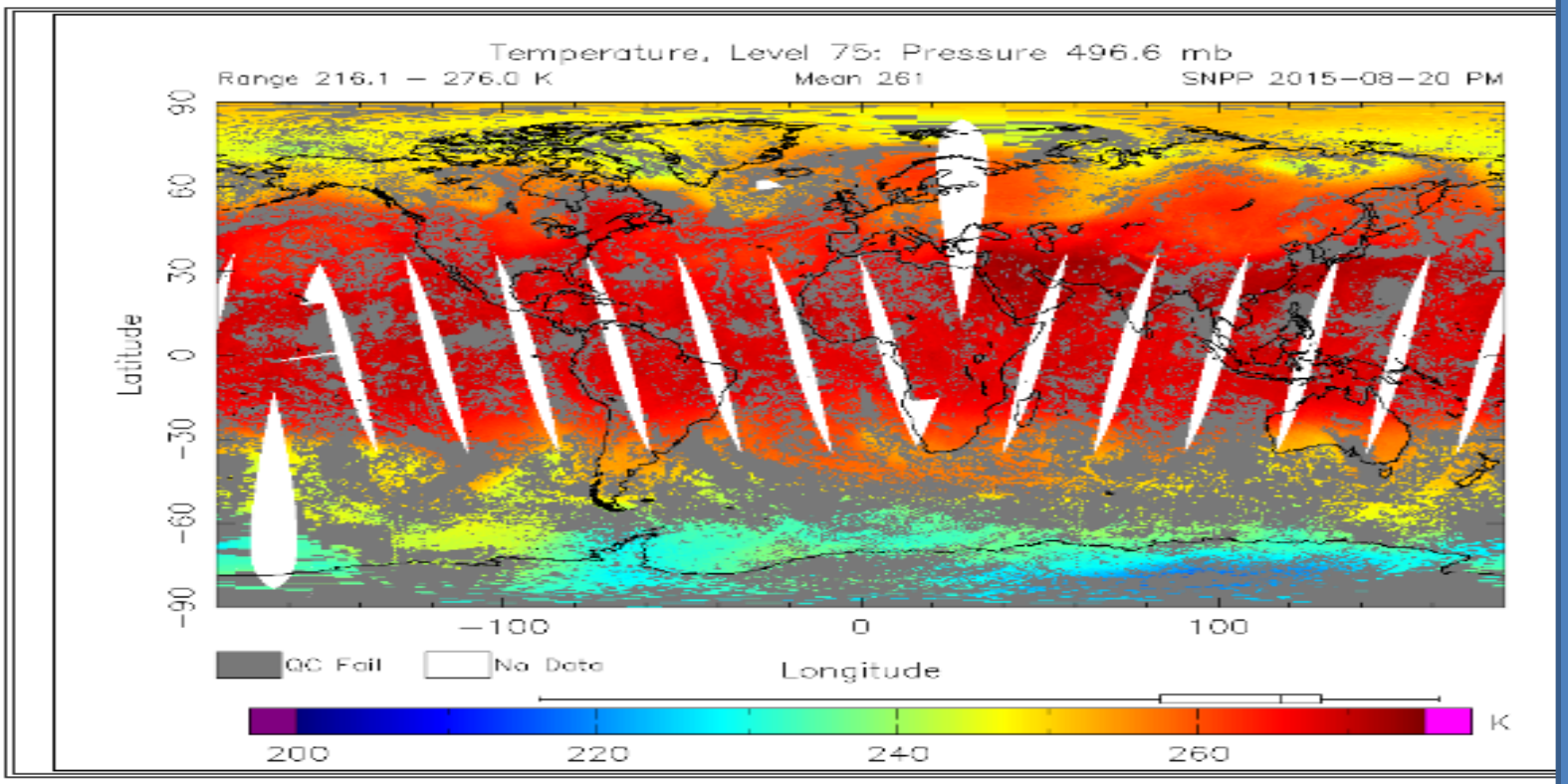
http://www.ospo.noaa.gov/Products/atmosphere/soundings/nucaps/gg/gg_temp.html

http://www.ospo.noaa.gov/Products/atmosphere/soundings/nucaps/NUCAPS_composite.html

Return to NUCAPS Main Page

NUCAPS/SNPP Granule Composite Images

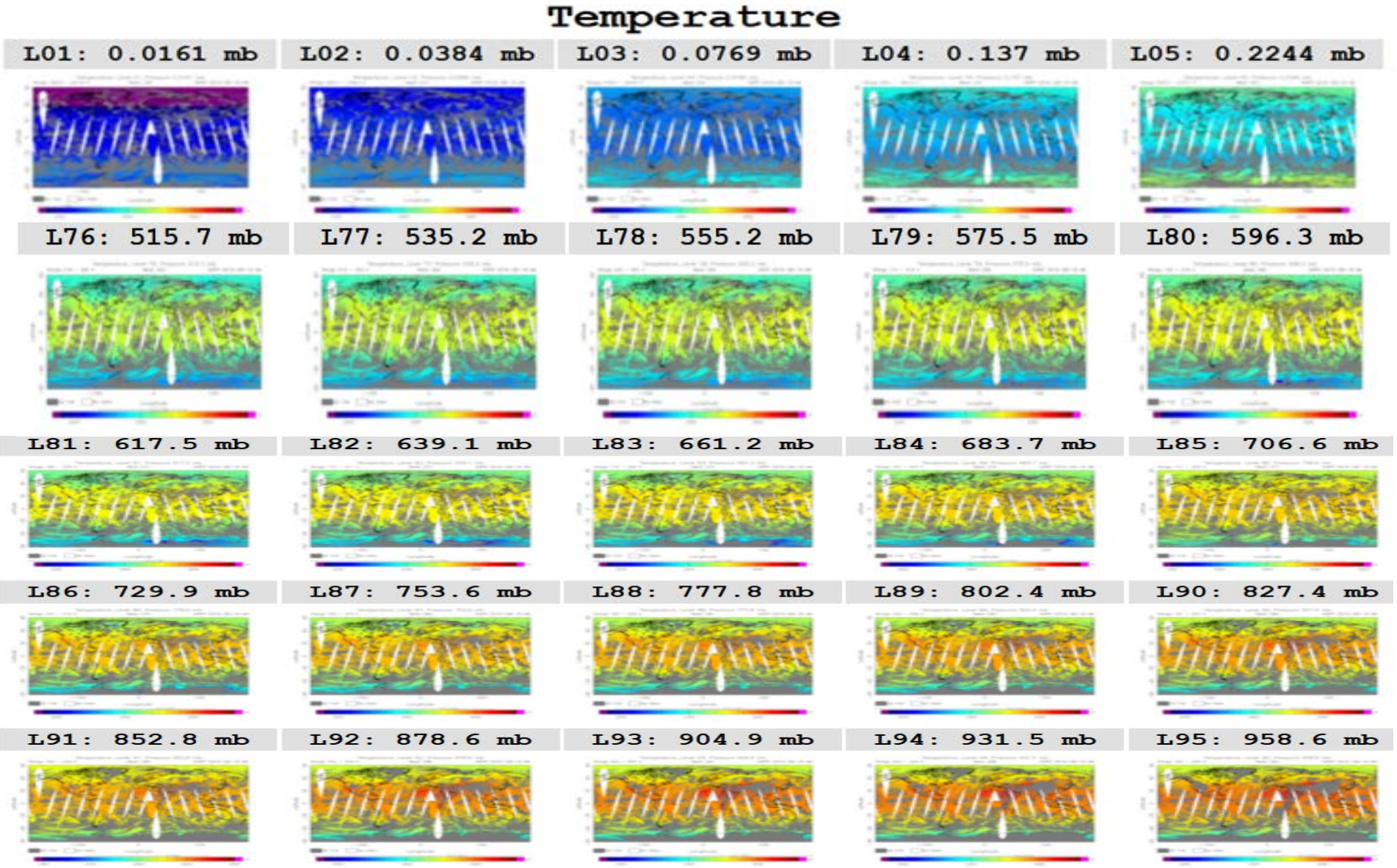
Product: Temperature | Pressure Level: 497 mb | Day and Time: D1 T1 | Day 1, T1, 497 mb | Start | Stop | << Prev | Next >>



Temperature (deg K), Water Vapor Mixing Ratio (g/Kg), Liquid Water Mixing Ratio (g/Kg), Ozone Mixing Ratio (ppb), Methane Mixing Ratio (ppb), Carbon Dioxide dry mixing ratio (ppm), Carbon Monoxide Mixing Ratio (ppb), Sulfur Dioxide mixing ratio (ppb), Nitric Acid Mixing Ratio (ppb), and Nitrous Oxide Mixing Ratio (ppb) at 15 fixed air pressure levels/layers twice a day

NUCAPS Level Temperatures

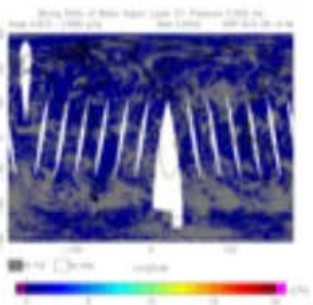
Temperature Images for 2015-08-18 AM - SNPP



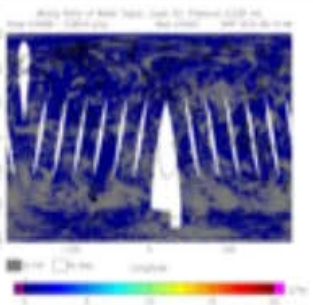
Mixing Ratio of Water Vapor Images for 2015-08-19 AM - SNPP

Mixing Ratio of Water Vapor

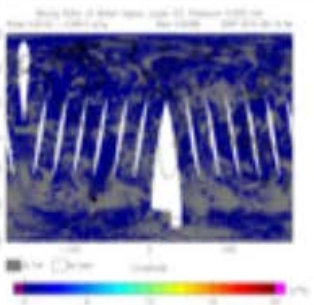
L01: 0.009 mb



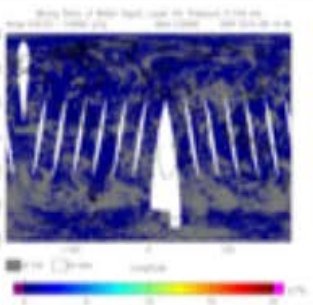
L02: 0.026 mb



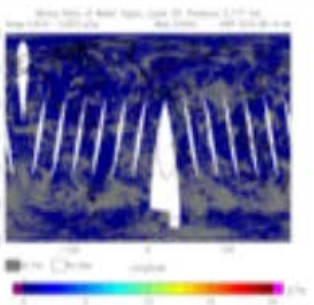
L03: 0.055 mb



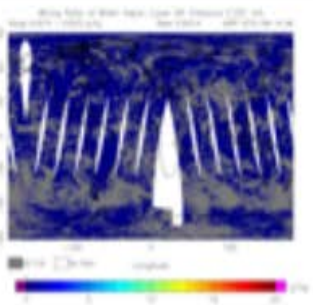
L04: 0.104 mb



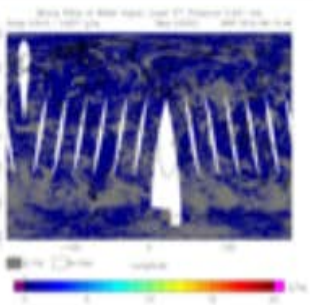
L05: 0.177 mb



L06: 0.281 mb



L07: 0.421 mb



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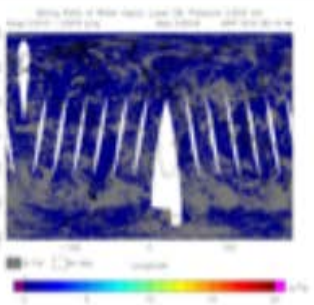
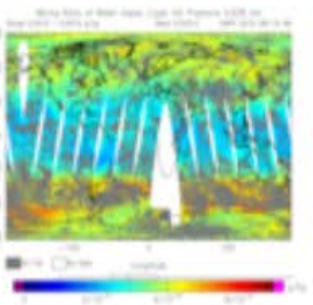
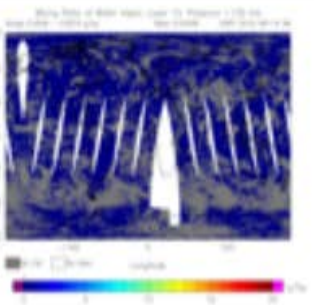


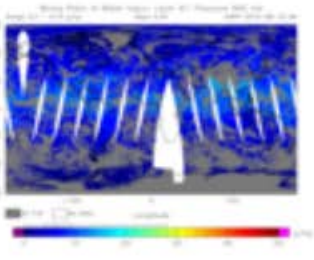
L09: 0.838 mb



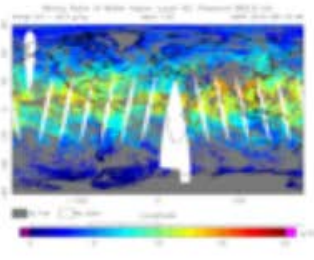
L10: 1.129 mb



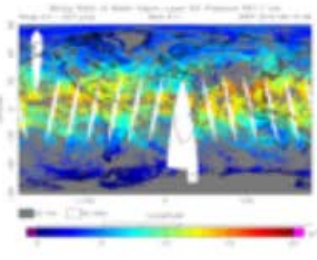
L91: 840 mb



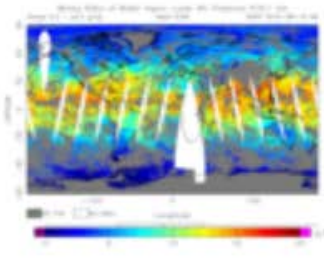
L92: 865.6 mb



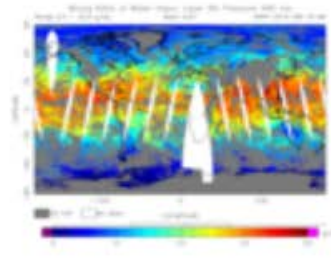
L93: 891.7 mb



L94: 918.1 mb



L95: 945 mb



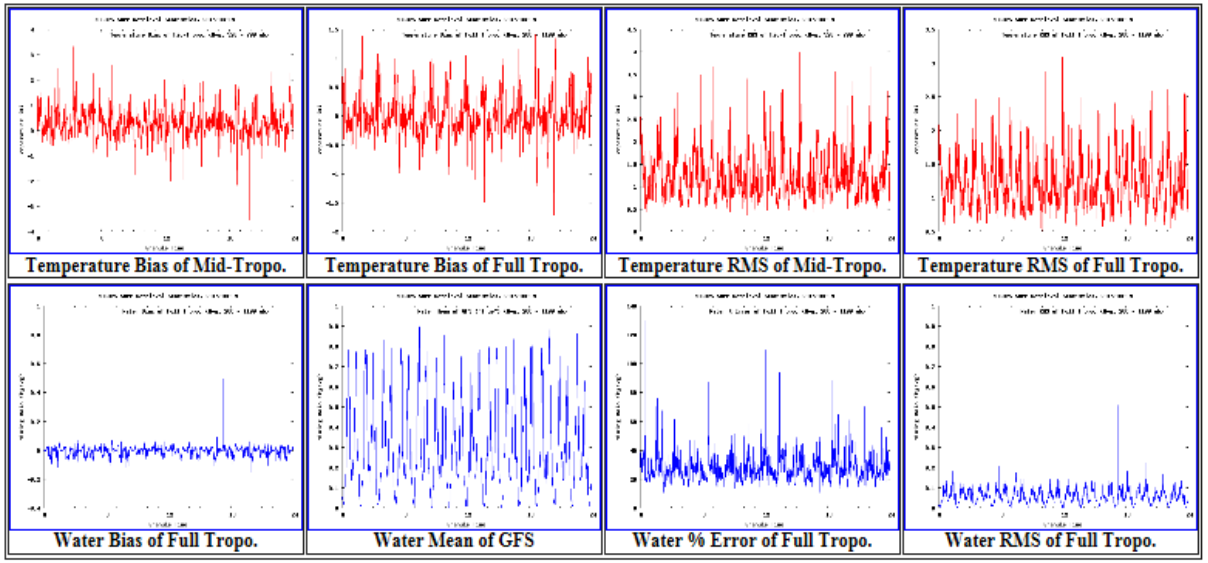
http://www.ospo.noaa.gov/Products/atmosphere/soundings/nucaps/NUCAPS_stats.html

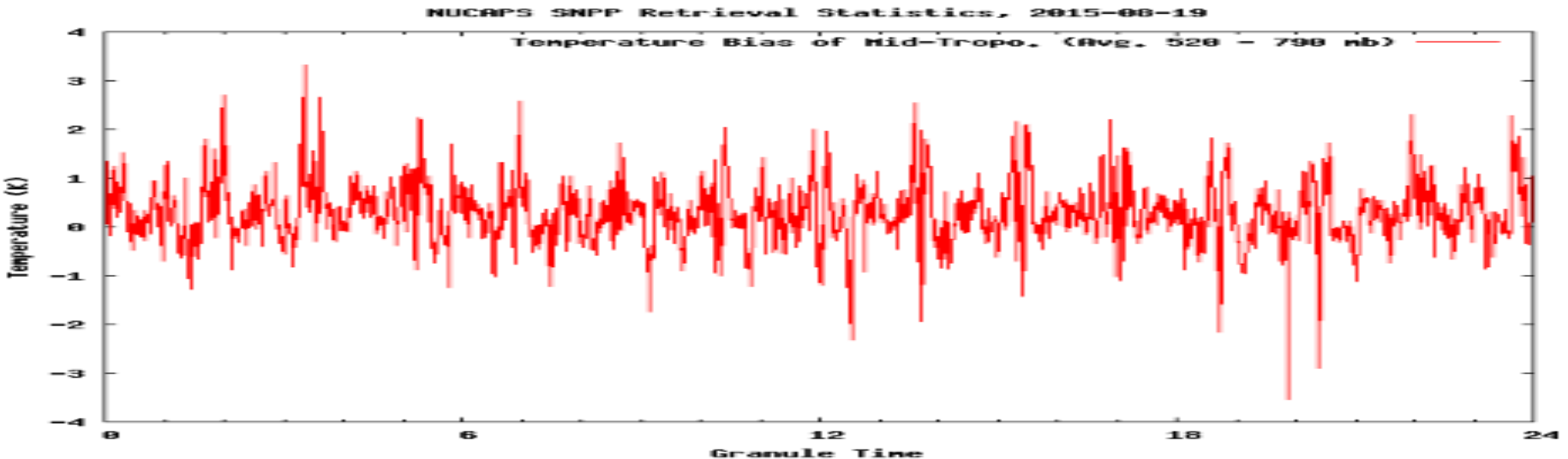
ORGANIZATION | SERVICES | PRODUCTS | OPERATIONS

NUCAPS/SNPP Retrieval Statistics

2015-08-19	2015-08-18	2015-08-17	2015-08-16	2015-08-15
2015-08-14	2015-08-13	2015-08-12	2015-08-11	2015-08-10
2015-08-09	2015-08-08	2015-08-07	2015-08-06	2015-08-05
2015-08-04	2015-08-03	2015-08-02	2015-08-01	2015-07-31
2015-07-30	2015-07-29	2015-07-28	2015-07-27	2015-07-26
2015-07-25	2015-07-24	2015-07-23	2015-07-22	2015-07-21

NUCAPS Retrieval Statistics - SNPP 2015-08-19





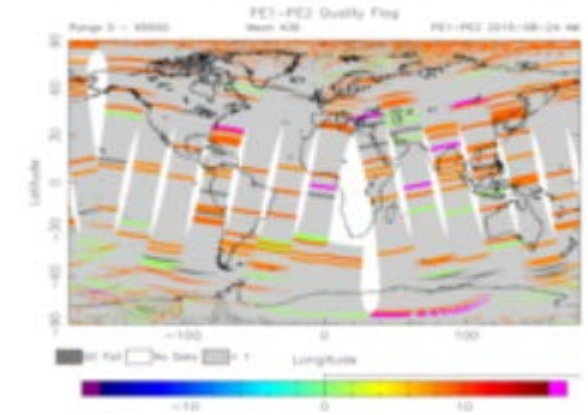
NUCAPS Phase 3

- The NUCAPS Phase 3 has the following updates:
- New retreival regression
- CrIS OLR (granules and global grids)
- CrIS/VIIRS collocation (for CrIS SDR BUFR)
- Major preprocessor updates
- Bug fixes to retrieval and preprocessor codes
- CF-compliance updates for netCDF4 output files
- Port to GNU compiler
- Update to handle VIIRS CM IP or EDR (for IDPS 2.0 testing)
- Turned off many of the NUCAPS global products (only running L2 and OLR grids)
- SNPP hardcoding is removed from scripts (for using J1 filenames)
- NUCAPS Phase 3 ARR planned on Sept 3, 2015

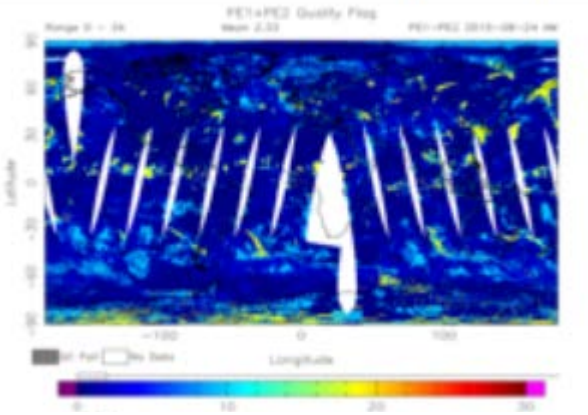
NUCAPS EDR Images for 2015-08-24 AM - PE1-PE2

Internal links: [Single Level Parameters] [MR of Water Vapor Diff. PE1-PE2] [Temperature Diff. PE1-PE2]

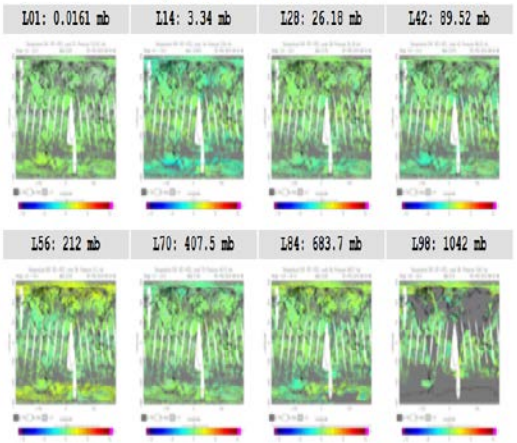
PE1-PE2 Quality Flag

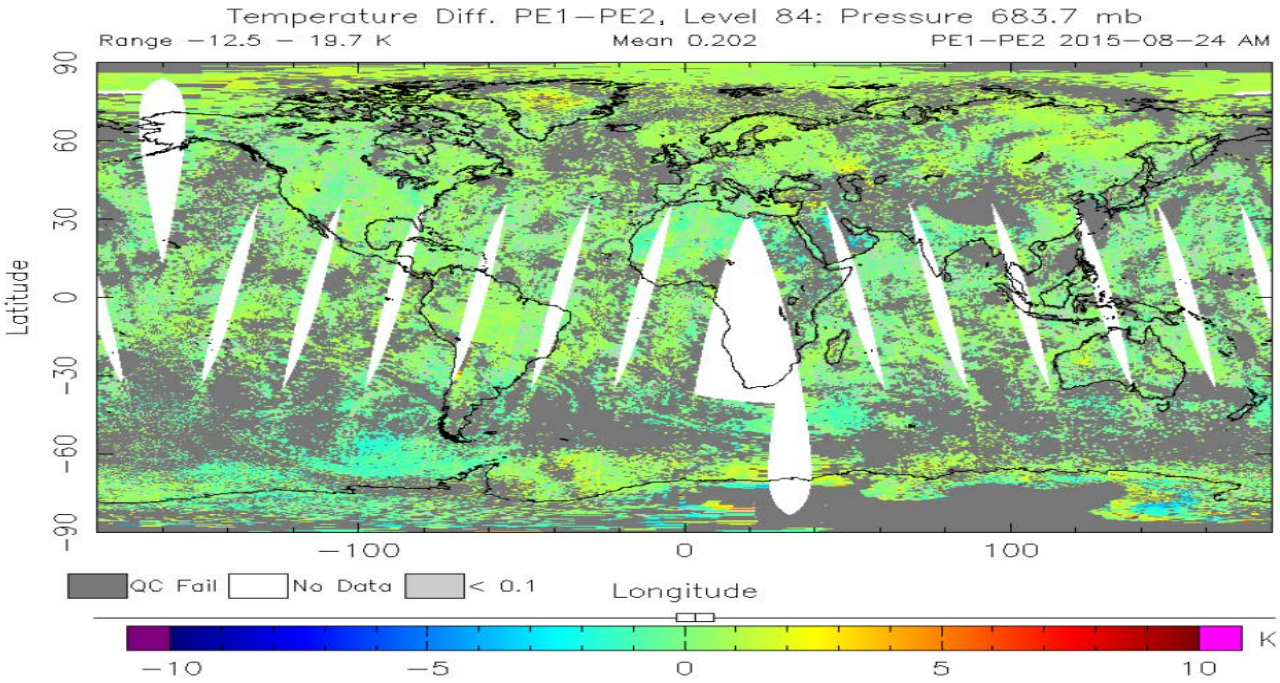


PE1+PE2 Quality Flag

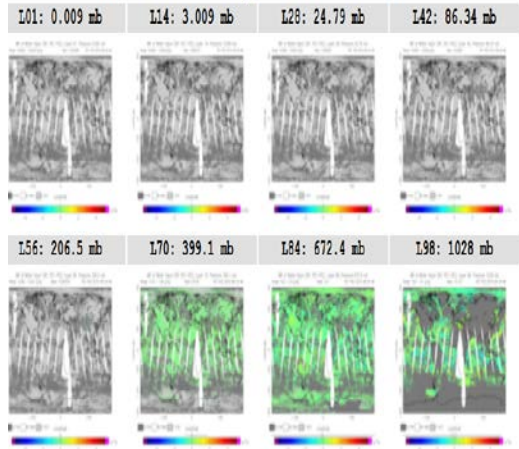


Temperature Diff. PE1-PE2





MR of Water Vapor Diff. PE1-PE2



NUCAPS SNPP Global Statistics – Dynamically Generated

Time	○ **Absolute**	**Start**			**End**		
		Year	**Month**	**Day**	**Year**	**Month**	**Day**
		2015	Aug	20	2015	Aug	20
	◉ **Relative**	Week ending yesterday					
Granularity	○ Half Day ◉ Day ○ Week						
Output	◉ Bar chart (PNG) ○ HTML table ○ Comma-separated values ○ Tab-separated values						
Quality	Discard periods whose statistics cover an average of less than 0 % of Earth's surface every 12 hours.						
Statistic	☑ Mean ☐ Variance ☐ Maximum ☐ Minimum ☐ Median* ☐ Lower quartile* ☐ Upper quartile* * Only available for half-day granularity						

NUCAPS EDR

- ☐ Bottom Level Index
- ☐ Ice Liquid Flag, Layer 01: Pressure 0.009 mb
- ☐ Ice Liquid Flag, Layer 14: Pressure 3.009 mb
- ☐ Ice Liquid Flag, Layer 28: Pressure 24.79 mb
- ☐ Ice Liquid Flag, Layer 42: Pressure 86.34 mb
- ☐ Ice Liquid Flag, Layer 56: Pressure 206.5 mb
- ☐ Ice Liquid Flag, Layer 70: Pressure 399.1 mb
- ☐ Ice Liquid Flag, Layer 84: Pressure 672.4 mb
- ☐ Ice Liquid Flag, Layer 98: Pressure 1028 mb
- ☐ Mixing Ratio of Carbon Dioxide, Layer 01: Pressure 0.009 mb
- ☐ Mixing Ratio of Carbon Dioxide, Layer 14: Pressure 3.009 mb
- ☐ Mixing Ratio of Carbon Dioxide, Layer 28: Pressure 24.79 mb
- ☐ Mixing Ratio of Carbon Dioxide, Layer 42: Pressure 86.34 mb
- ☐ Mixing Ratio of Carbon Dioxide, Layer 56: Pressure 206.5 mb
- ☐ Mixing Ratio of Carbon Dioxide, Layer 70: Pressure 399.1 mb
- ☐ Mixing Ratio of Carbon Dioxide, Layer 84: Pressure 672.4 mb
- ☐ Mixing Ratio of Carbon Dioxide, Layer 98: Pressure 1028 mb

- ☐ Mixing Ratio of Liquid Water, Layer 01: Pressure 0.009 mb
- ☐ Mixing Ratio of Liquid Water, Layer 14: Pressure 3.009 mb
- ☐ Mixing Ratio of Liquid Water, Layer 28: Pressure 24.79 mb
- ☐ Mixing Ratio of Liquid Water, Layer 42: Pressure 86.34 mb
- ☐ Mixing Ratio of Liquid Water, Layer 56: Pressure 206.5 mb
- ☐ Mixing Ratio of Liquid Water, Layer 70: Pressure 399.1 mb
- ☐ Mixing Ratio of Liquid Water, Layer 84: Pressure 672.4 mb
- ☐ Mixing Ratio of Liquid Water, Layer 98: Pressure 1028 mb
- ☐ Mixing Ratio of Methane, Layer 01: Pressure 0.009 mb
- ☐ Mixing Ratio of Methane, Layer 14: Pressure 3.009 mb
- ☐ Mixing Ratio of Methane, Layer 28: Pressure 24.79 mb
- ☐ Mixing Ratio of Methane, Layer 42: Pressure 86.34 mb
- ☐ Mixing Ratio of Methane, Layer 56: Pressure 206.5 mb
- ☐ Mixing Ratio of Methane, Layer 70: Pressure 399.1 mb
- ☐ Mixing Ratio of Methane, Layer 84: Pressure 672.4 mb
- ☐ Mixing Ratio of Methane, Layer 98: Pressure 1028 mb

- ☐ Quality Flag
- ☐ Surface Height
- ☐ Temperature, Level 01: Pressure 0.0161 mb
- ☐ Temperature, Level 14: Pressure 3.34 mb
- ☐ Temperature, Level 28: Pressure 26.18 mb
- ☐ Temperature, Level 42: Pressure 89.52 mb
- ☐ Temperature, Level 56: Pressure 212 mb
- ☐ Temperature, Level 70: Pressure 407.5 mb
- ☐ Temperature, Level 84: Pressure 683.7 mb
- ☐ Temperature, Level 98: Pressure 1042 mb

FOR ALL NUCAPS Products and Parameters

NUCAPS SNPP Granule Monthly Processing Statistics for 2015

Date	TD#	SD#	Avg. EDR Delay	RGsdr#	EPsdr%	TPsdr%	RGedr#	SGedr#	APedr%	EPedr%	Tfov#	Sfov#	Yield%
201501	31	31	01:15:26	83607	99.89	99.89	83607	83204	99.52	99.41	10032840	9984480	99.52
201502	28	28	01:14:28	75516	99.89	99.89	75488	75488	99.96	99.85	9058560	9058560	100.00
201503	31	31	01:18:35	83607	99.89	99.89	83607	83607	100.00	99.89	10032840	10032840	100.00
201504	30	30	01:19:36	80880	99.85	99.85	80730	80730	99.81	99.67	9694800	9687600	99.93
201505	31	31	01:16:16	83514	99.78	99.78	83514	83514	100.00	99.78	10021680	10021680	100.00
201506	30	30	01:15:56	80850	99.81	99.81	80850	80790	99.93	99.74	9702000	9694800	99.93
201507	31	31	01:14:03	83483	99.74	99.74	83483	83483	100.00	99.74	10017960	10017960	100.00

- Date: The date, year/month
- TD#: Number of days in this month
- SD#: Number of days with good retrievals in this month
- Avg. EDR Delay: Avg. EDR processing delay (latency), hh:mm:ss
- RGsdr#: Number of SDR granules received
- EPsdr%: SDR expected percentage: RGsdr# / (SD# * (Max gran. per day))
- TPsdr%: SDR total percentage: RGsdr# / (TD# * (Max gran. per day))
- RGedr#: Number of EDR granules received
- SGedr#: Number of EDR granules marked as good retrievals
- APedr%: Actual percentage for EDR/SDR: SGedr#/RGsdr#
- EPedr%: EDR expected percentage: SGedr# / (SD# * (Max gran. per day))
- Tfov#: Total FOVs: (FOV per gran.) * (Tot. number of retrievals)
- Sfov#: Total FOVs marked as good retrievals
- Yield%: Yield percentage: Sfov#/Tfov#

NDE Product Monitoring

Products	Variables to Monitor
NUCAPS	Mean & Std PCS of each FOV and each band, number of accepted cases, Bias and RMS of water vapor profiles, mean GFS water vapor (truth), % water vapor error, Layer Bias and RMS of temperature profile

Product Monitor

Plot Generator

Product Group: NUCAPS_Ret

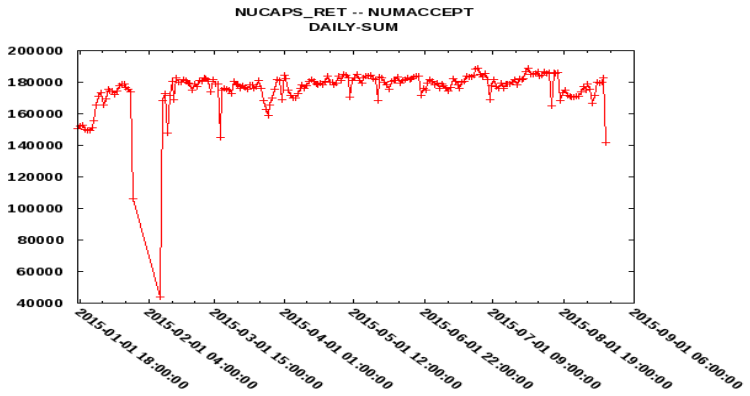
Product Name: nucaps_ret

Data Name: numaccept daily-sum

Date/Time	Year	Month	Day	Hour	Minute	Second
Start	2015	1	1	00	00	00
End	2015	8	20	00	00	00

Submit (Year=NULL means start/end at first/last available data point.)

Graphing Options: ☑ Draw line ☐ Invert y-axis



Product Monitor

gs NUCAPS_Rad 2014-01-24 13:00:00

ual Plotting Tool

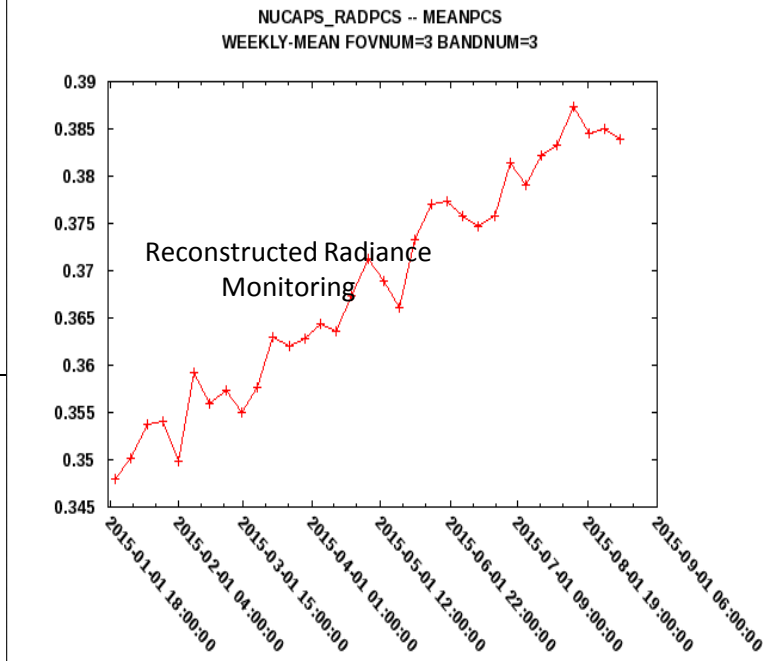
sage Counts -- Good: 287 Warning: 10 Bad: 0 Show Messages

our Plots
our time series: Mean PCS for Band 1 FOV 5
our time series: Standard deviation of PCS for Band 1 FOV 5
our time series: Mean PCS for Band 2 FOV 5
our time series: Standard deviation of PCS for Band 2 FOV 5
our time series: Mean PCS for Band 3 FOV 5
our time series: Standard deviation of PCS for Band 3 FOV 5

ay Plots
lots Available (30 day)

ay Plots
ay time series: Mean PCS for Band 1 FOV 5
ay time series: Standard deviation of PCS for Band 1 FOV 5
ay time series: Mean PCS for Band 2 FOV 5
ay time series: Standard deviation of PCS for Band 2 FOV 5
ay time series: Mean PCS for Band 3 FOV 5
ay time series: Standard deviation of PCS for Band 3 FOV 5

r Plots
lots Available (other)



http://prodmonp.espc.nesdis.noaa.gov/mtool

NDE 1.0 (PE1) Summary – Today's Operations

- NDE system has been operational for 23 months and the system is performing as expected. Production Generation is > 99.9 %
- Oversubscription is causing significant strain on the infrastructure.
- Over 80% of the current NDE system will be utilized in NDE 2.0; therefore, from a support and system perspective we expect the product generation portion to be very stable going into the ground segment upgrade (NDE 2.0, PDA and JPSS Block 2.0).

	Sep 2013 (initial operations)	**Today** (July 2015)
Number of users (subscriptions)	3 (12)	29 (310)
Average Data Ingest*	~70 TB	~109 TB
Production Success*	> 99.9%	> 99.9%
Distribution Success*	> 99.5%	> 99.9%
Average Data Distributed*	~10 TB	~27 TB

NUCAPS Data Distribution and Access (NDE/PDA)

- JPSS NDE / PDA Transition
  - Today, NDE does product generation and provides its own distribution mechanism.
  - After JPSS Block 2.0 goes operational (in the 2016 time frame), JPSS products (S-NPP, JPSS-1, JPSS-2 and GCOM-W1) will be provided to users via the PDA interface.
  - For 30-45 days, NDE 1.0 (current operational NDE system) will remain online to facilitate an orderly transition to PDA – NASA's Network Adapter Box will permit both NDE 1.0 and NDE 2.0 to serve out the same content.
  - Under the PDA paradigm, the top priority will be given to the operational users with a demonstrated real-time data need.
- Other sources of data for research groups:
  - GRAVITE (in near real-time under Block 2.0)
  - CLASS

NUCAPS Data Distribution and Access (PDA)

- Future Contingency Operations Note
  - In the event of an outage at the primary Facility (NSOF in Suitland, MD), PDA access is transferred to the Consolidated Back-up in Fairmont, West Virginia, to support only the JPSS/S-NPP mission.
  - Fail-over requirement (JPSS/S-NPP) is under 12 hours
  - Just the JPSS primary mission sensor data will be available - the backup system is smaller scale than the operational system at NSOF.
  - Supports a full failover to CBU and a split failover scenario:
    - i.e. GOES-R can be nominal at NSOF while JPSS is failed over to CBU
    - This backup flexibility requires different network addresses at both NSOF and CBU; therefore, pull users will need to change to CBU or incorporate smart logic into their scripts.

NUCAPS Users

- **U.S. Users:**
  - NOAA NCEP (John Deber, Andrew Collard, Dennis Keyser)
  - NOAA CPC (OLR)
  - NASA GMAO (Emily Liu)
  - NOAA AWIPS II [Atmospheric stability condition for severe storms, Nowcasting, Alaska (cold core)]
  - NOAA STAR (Tony Reale, Mark Liu, Nicholas Nalli, Kexin Zhang, Jonathan Smith)
  - NOAA CLASS (Phil Jones)
- **International Users:**
  - EUMETSAT (Simon Elliott)
    - UK Met Office (Nigel Atkinson)
    - ECMWF (Tony McNally)
    - DWD (Reinhold Hess)
    - Meteo-France (Lydie Lavanant)
    - Plus other EUMETSAT members states
  - CMC (Louis Garand)
  - EC (Sylvain Heilliette)
  - JMA (Hidehiko Murata)
  - BOM (John Le Marshall)

NUCAPS Accomplishments

- NUCAPS QA/QC Near-Real-Time Tools were developed and used for monitoring the products (EDRs and SDRs)
- STAR Enterprise Product Lifecycle (EPL) process was used for NUCAPS system Development
- NUCAPS code met the Satellite Product and Services Review Board (SPSRB) software standards and OSPO security standards
- NUCAPS system successfully transition to ESPC operation

SNPP Looking Ahead

- NUCAPS Phase 3.0 implementation
  - Operationalize Outgoing long-wave radiation (OLR) EDR
  - CrIS ozone algorithm improvement
- NUCAPS upgrades including CrIS full-spectral data
- Improvement of Trace gas EDRs (CO, CO2, CH4)
- Participation in the Aircraft, satellite, dedicated radiosonde campaign for NUCAPS validation

SUMMARY
NUCAPS Future Plans

- **Ongoing optimization study includes channels, perturbation functions, first guess and damping parameter.**

- **Use dedicated cal/val field campaign in situ measurements to fully assess NUCAPS retrieval performance of temperature, water vapor, cloud cleared radiance, cloud parameters and trace gases.**

- **Leverage ongoing scientific collaborations (low cost activities for NOAA) to perform trace gas validation.**

- **CrIS OLR development and implementation for ESPC operation.**

- **Full Resolution RDR's for CrIS SW and MW bands to support carbon products.**

- **Improve the Quality of CO, CO2, and CH4 by employing the full-resolution.**

- **Enhancement of real time NUCAPS Quality Monitoring System for JPSS-1 products validation.**

- **NPROVS can be operationalized for JPSS-1 for validating the products.**

- **Plan for JPSS-1 Algorithm Updates and Validation using existing tools developed at OSPO**

- **PDA Future Activities for JPSS –**
  - Continue Integration users & Testing of PDA systems.
  - Determine the optimal method for supporting the PDA OGC / AWIPS DD interface for AWIPS2 users (169 sites) given resource constraints – KPP/critical products are supported 24x7 and all other data is best effort.
  - Conduct Operational Readiness Review (ORR) currently scheduled for Mar 2016 time frame.
  - Conduct Operations at NSOF (all missions*) and CBU (limited to JPSS).

BACKUP

NUCAPS Retrieved Products

NUCAPS Cloud Cleared Radiances	NUCAPS Principal Components
NUCAPS Methane CH4 Profile	NUCAPS Convective Available Potential Energy
NUCAPS Cloud Fraction	NUCAPS Level 1 Radiances
NUCAPS Clear Sky OLR	NUCAPS Reconstructed Radiances
NUCAPS Carbon Monoxide CO Profile	NUCAPS Surface Emissivity
NUCAPS Carbon Dioxide CO2 Profile	NUCAPS Sulfur Dioxide SO2 Profile
NUCAPS Cloud Top Pressure	NUCAPS Sea Surface Temperature
NUCAPS Water Vapor Profile	NUCAPS Atmospheric Temperature Profile
NUCAPS Nitric Acid HNO3 Profile	NUCAPS Thinned Radiances
NUCAPS Nitrous Oxide N2O Profile	NUCAPS Total Ozone
NUCAPS Ozone Profile	NUCAPS Cloud Cleared Radiances - for archiving
NUCAPS Outgoing Longwave Radiation	

NUCAPS SNPP System Monitoring

[Granule Processing Status] [Global statistics] [Yield Statistics] [Retrieval Stats]

NUCAPS EDR, SNPP

Globe Images

[2015-08-20 AM*] [2015-08-19 AM PM] [2015-08-18 AM PM] [2015-08-17 AM PM]
[2015-08-16 AM PM] [2015-08-15 AM PM] [2015-08-14 AM PM] [2015-08-13 AM PM]
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[2015-08-08 AM PM] [2015-08-07 AM PM] [2015-08-06 AM PM] [2015-08-05 AM PM]
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[2015-07-31 AM PM] [2015-07-30 AM PM] [2015-07-29 AM PM] [2015-07-28 AM PM]

NUCAPS_DIFF PE1-PE2 System Monitoring

[Global statistics] [Retrieval Stats Differences]

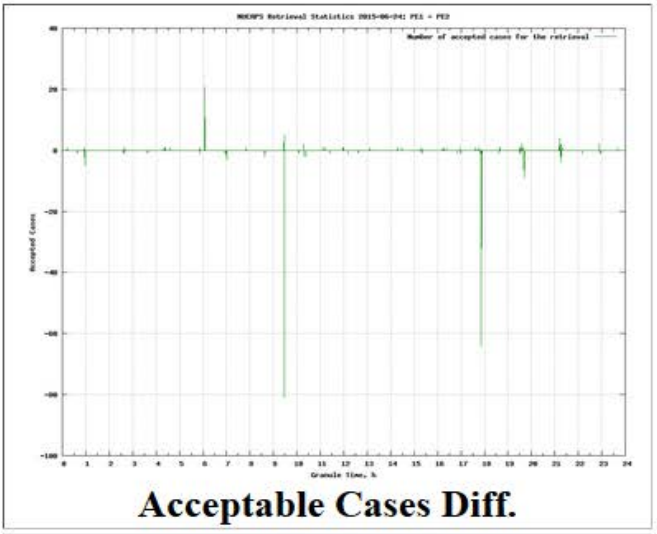
NUCAPS EDR, PE1-PE2

Globe Images

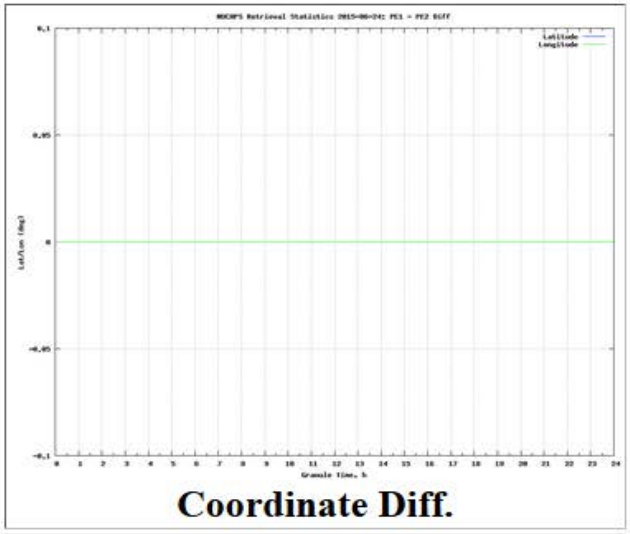
[2015-06-25 AM*] [2015-06-24 AM] [2015-06-23 AM PM] [2015-06-22 AM PM] [2015-06-21 AM PM]
[2015-06-10 AM] [2015-06-09 AM PM] [2015-06-08 AM PM] [2015-06-07 AM PM] [2015-06-06 AM PM]

* Some or all images may not be ready yet.

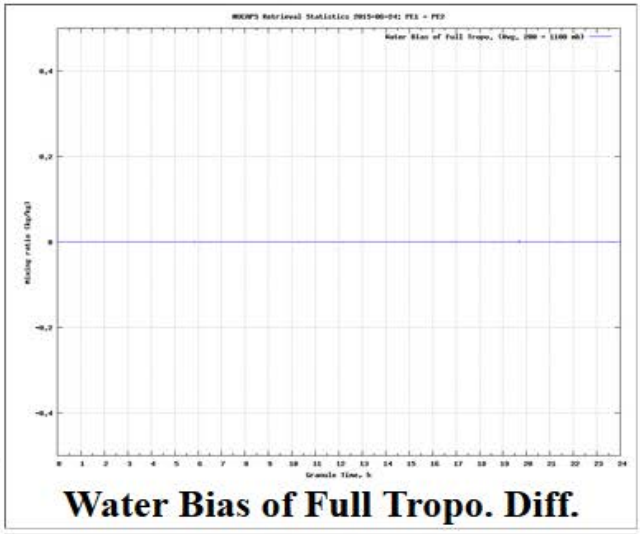
NUCAPS_DIFF PE1-PE2 Retrieval Statistics Graphics: 2015-06-24



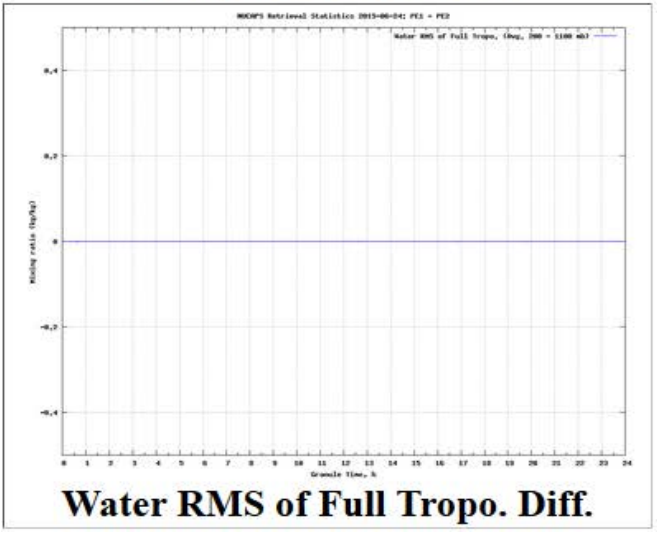
Acceptable Cases Diff.



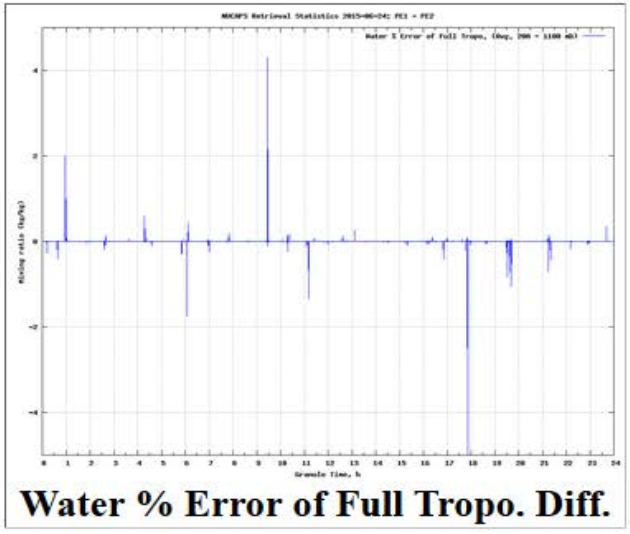
Coordinate Diff.



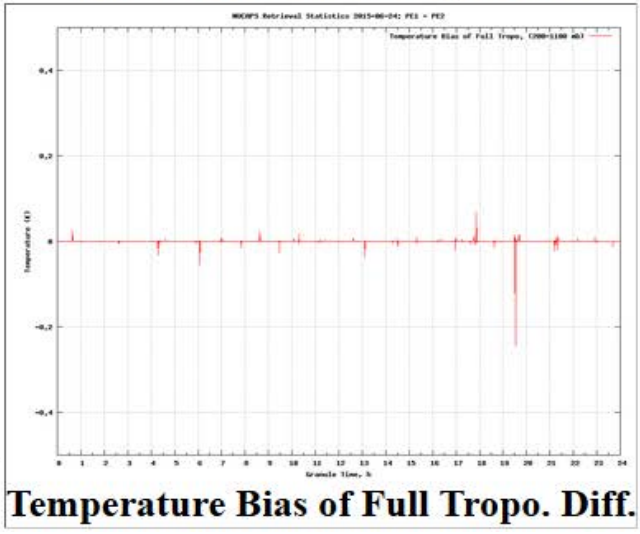
Water Bias of Full Tropo. Diff.



Water RMS of Full Tropo. Diff.

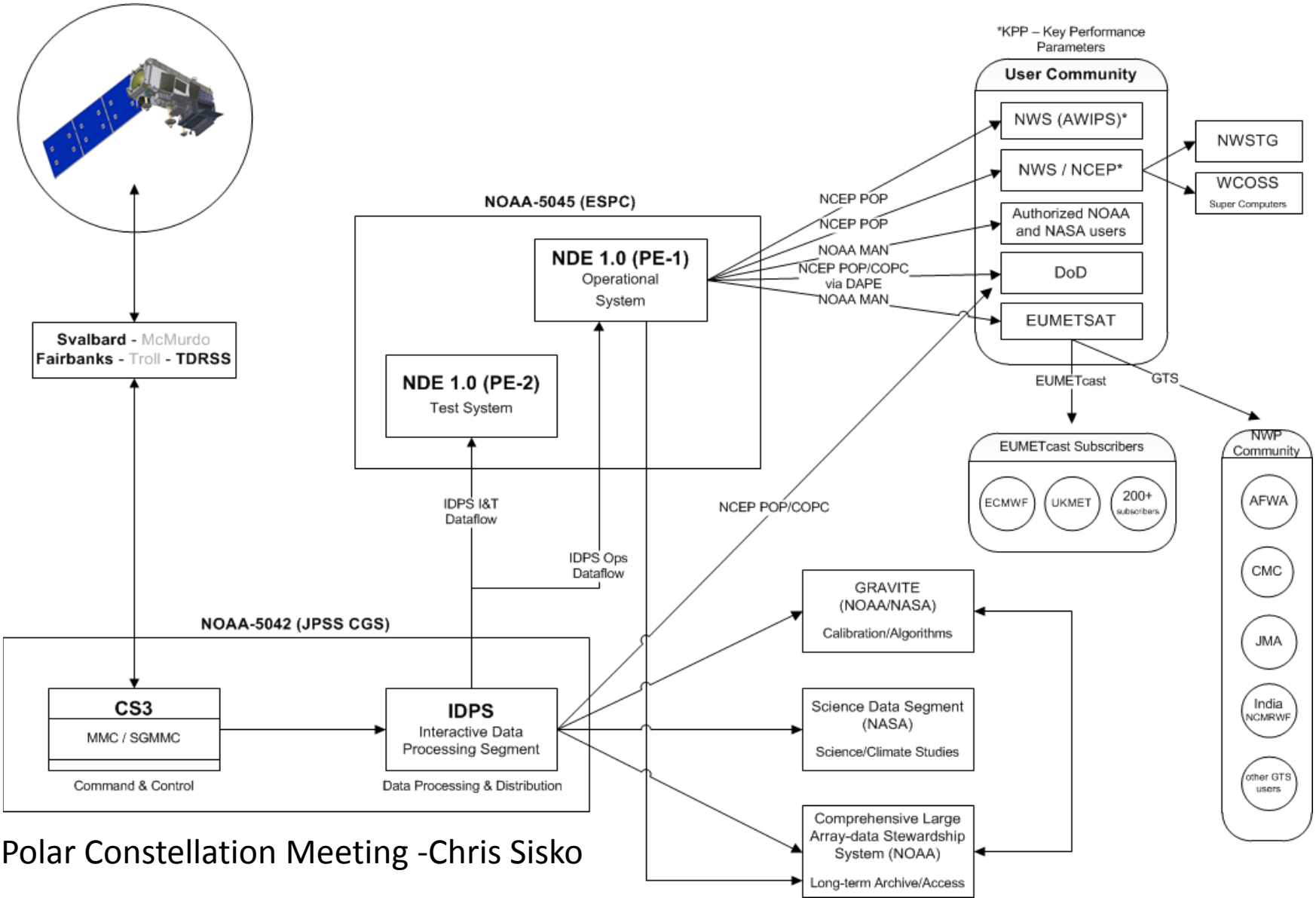


Water % Error of Full Tropo. Diff.



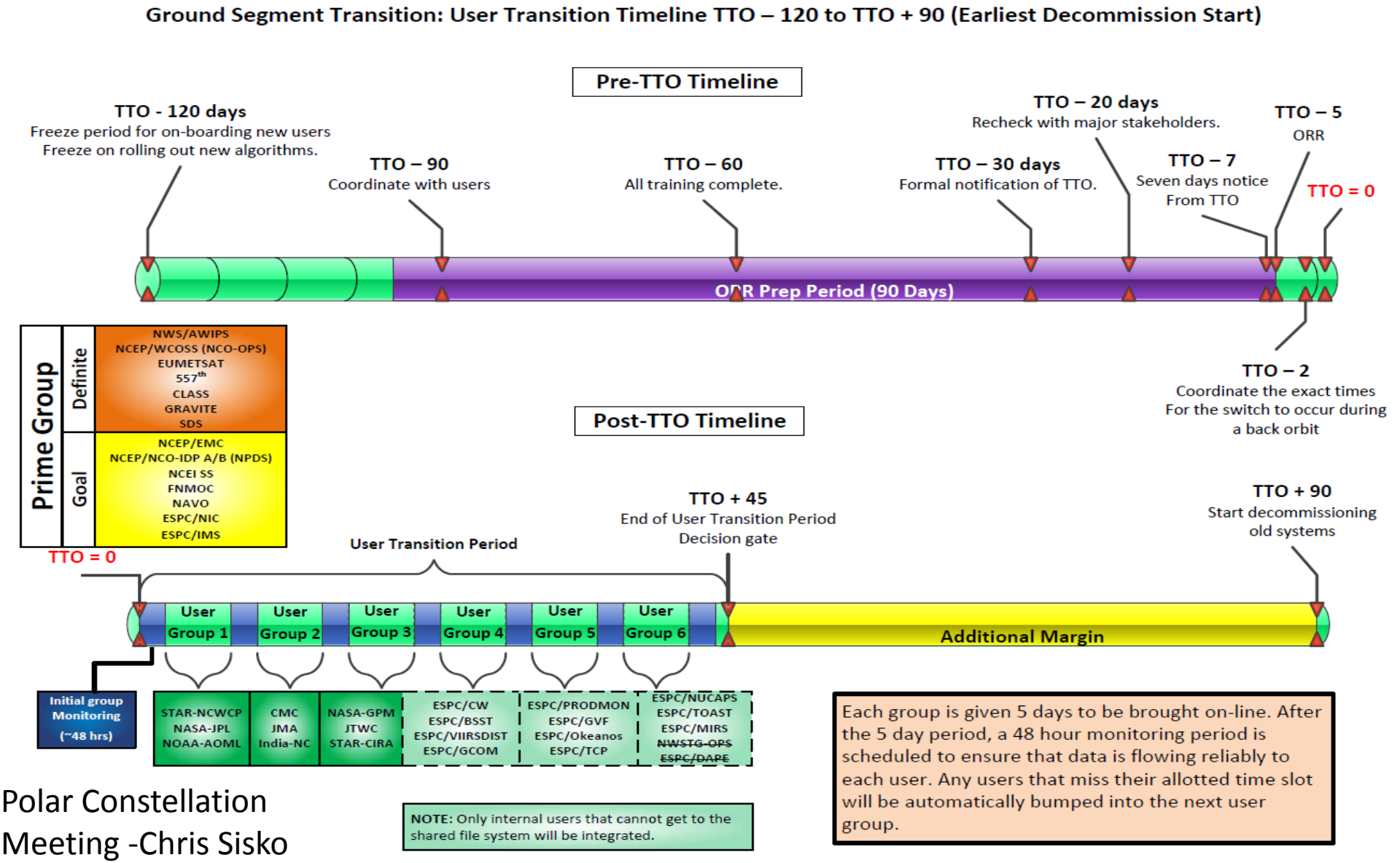
Temperature Bias of Full Tropo. Diff.

NUCAPS Data Distribution and Access (NDE)



Polar Constellation Meeting -Chris Sisko

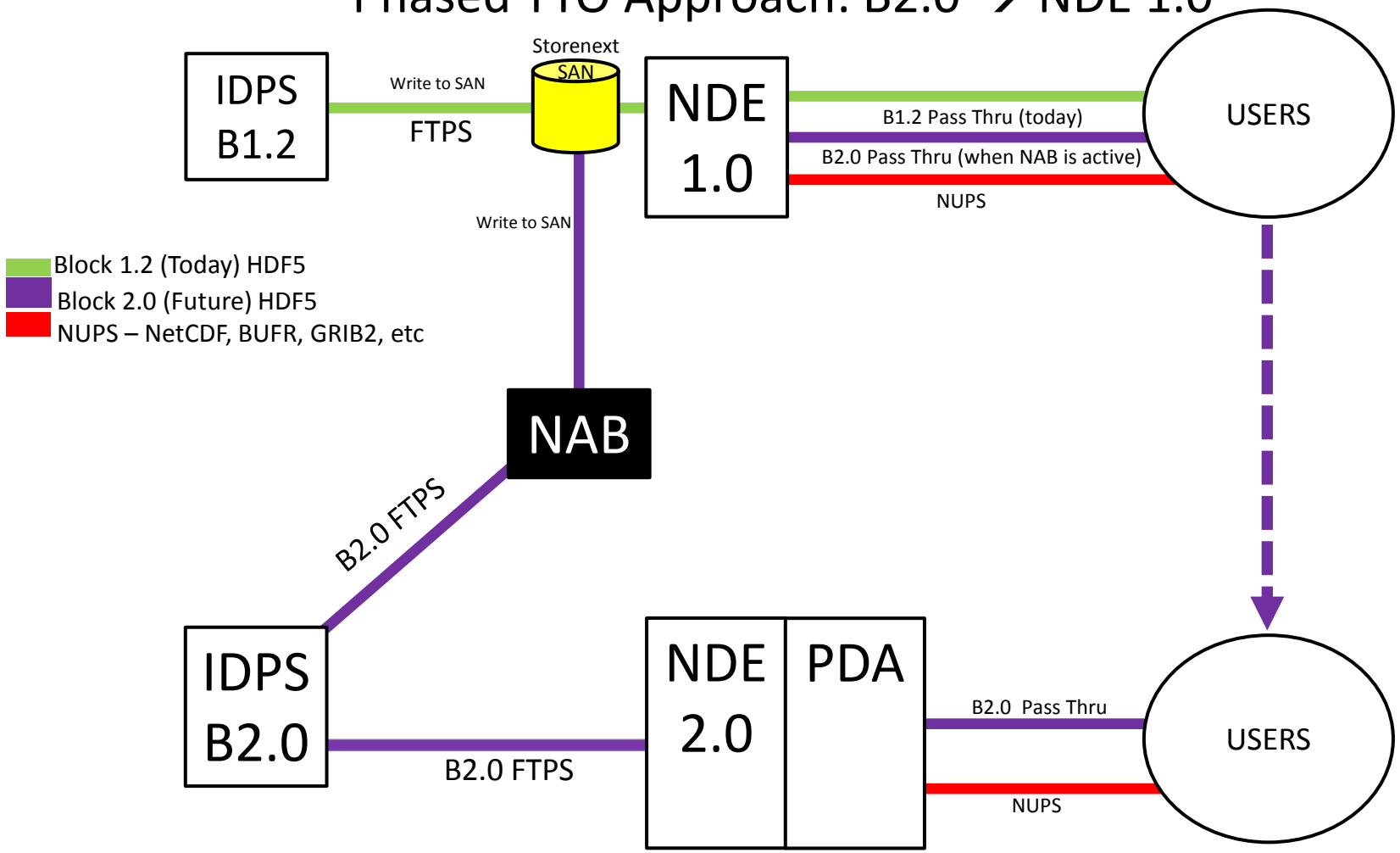
Ground Segment Transition - PDA



Polar Constellation Meeting -Chris Sisko

Phase Transition to Operation - PDA

Phased TTO Approach: B2.0 → NDE 1.0



Polar Constellation Meeting -Chris Sisko

Processing and Distribution (near Future) - PDA

Purpose of the **Production Distribution and Access (PDA)** system is to serve as the NESDIS enterprise distribution system for our near real-time users.

- All near real-time distribution except for McIDAS will be migrated to PDA – phased approach (new missions and then current missions).
- McIDAS ADDE access will remain on GEODIST systems for the foreseeable future.
- GOES-R products will be provided to AWIPS2/Satellite Broadcast Network (SBN), GOES Re-Broadcast (GRB) and the primary PDA system at NSOF.
- S-NPP/JPSS products will be provided via PDA.
- PDA is being developed for OSPO by the Office of Satellite Ground Services (OSGS).

<u>PDA Distribution Service Improvements:</u>

- User managed subscriptions
- User managed search and tailoring
- Enhanced security controls / transfer protocols
- Enhanced reporting and control for system optimization
- Ability to handle large data volumes