



Planning and Opportunities for Community Participation in the NPP Measurement Validation Activities

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What is the NPP Mission?



- Support 5 instrument payload suite
 - ATMS, CERES & OMPS (Nadir and Limb) (1553 serial databus interface)
 - CrIS & VIIRS (1394 serial databus interface)
- Orbit: 824 km, sun-synch ($i=98.7$ deg), 13:30 Ascending Node
- Spacecraft by Ball in Boulder, sensors by Raytheon, ITT, Ball and NG (Azusa and Redondo Beach)
- X-band Stored Mission Data (SMD) downlink
- X-band High Rate Data (HRD) direct broadcast of mission data



- **All products start with quality Level 1 (Sensor Data Records - SDR)**
- **NPP is now quasi-operational**
 - Apply operational expectations without formal designation as an operational program
- **Insight and understanding of the SDR is essential for community participation in the NPP Program**
- **Existing Operational Monitoring tools will be used for the mission**
- **Objective of this presentation is to point you to the locations of these tools**

Large disparity in numbers of legacy missions



- **OMPS (Nadir) traces back to Nimbus 4 buv in 1969**
- **CERES traces to ERBE in ERBS mission**
- **VIIRS evolved from MODIS (1999) and from AVHRR**
- **ATMS traces to MSU (1979) and AMSU (1995)**
- **CrIS traces to AIRS (2002)**
- **Disparity in heritage evident in maturity of existing trending tools**

OMPS Trending Tools



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Satellite Integrated Calibration / Validation System (ICVS)

NOAA SBUV/2 Products - Operational

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Daily Zonal Mean Final Residual Channel 1-3 <input type="button" value="Display"/>	Daily Zonal Mean Final Residual STDEV Channel 1-3 <input type="button" value="Display"/>
Daily Zonal Mean Total O₃ Pair Diff Tropical AB <input type="button" value="Display"/>	Daily Zonal Mean Total O₃ Diff Column - Profile <input type="button" value="Display"/>
Monthly O₃ Retri-Apriori Profile Diff December, 2010 <input type="button" value="Display"/>	Weekly Mean 1 Percentile Reflectivity Min: Top & Max: Bottom <input type="button" value="Display"/>

GOME Trending Products



NOAA's Comprehensive Large Array-data Stewardship System

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Global Ozone Monitoring Experiment-2 Daily Data (GOME_DAILY) >>GO

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There are 0 (GOME_DAILY) items in your shopping cart. The shopping cart limit is 500. Currently you have 16 hits out of 978 entries.

Shopping Cart: Goto Cart Update SelectAll DeselectAll Page 1 Jump To Page Next

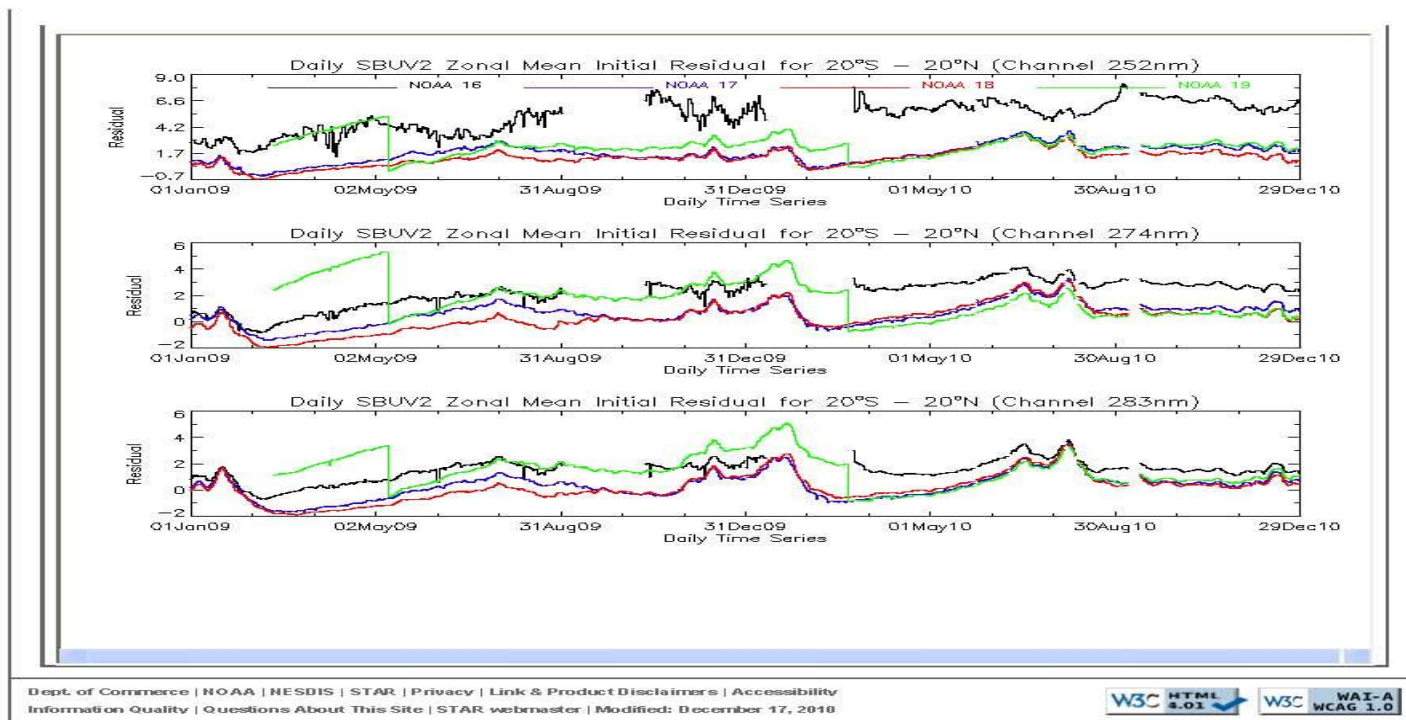
View Details	Shopping Cart	Inventory ID	Datatype	Start Time	End Time	Satellite	Dataset Name
1	<input type="checkbox"/>	148307973	Global Ozone Monitoring Experiment-2 (GOME-2) Daily Magnesium II Index Data (GOMEMGII)	2011-01-04 00:00:00.000	2011-01-04 00:00:00.000	M02	GOME_M02_MGII_201101_04
2	<input type="checkbox"/>	148394493	Global Ozone Monitoring Experiment-2 (GOME-2) Level 3 Daily Gridded Data (GOMETO3DAY)	2011-01-04 00:00:00.000	2011-01-04 00:00:00.000	M02	GOME_M02_STO3_201101_04.ASC
3	<input type="checkbox"/>	148398669	Global Ozone Monitoring Experiment-2 (GOME-2) Daily Magnesium II Index Data (GOMEMGII)	2011-01-05 00:00:00.000	2011-01-05 00:00:00.000	M02	GOME_M02_MGII_201101_05
4	<input type="checkbox"/>	148492323	Global Ozone Monitoring Experiment-2 (GOME-2) Level 3 Daily Gridded Data (GOMETO3DAY)	2011-01-05 00:00:00.000	2011-01-05 00:00:00.000	M02	GOME_M02_STO3_201101_05.ASC
5	<input type="checkbox"/>	148492493	Global Ozone Monitoring Experiment-2 (GOME-2) Daily Magnesium II Index Data (GOMEMGII)	2011-01-06 00:00:00.000	2011-01-06 00:00:00.000	M02	GOME_M02_MGII_201101_06
6	<input type="checkbox"/>	148589203	Global Ozone Monitoring Experiment-2 (GOME-2) Level 3 Daily Gridded Data (GOMETO3DAY)	2011-01-06 00:00:00.000	2011-01-06 00:00:00.000	M02	GOME_M02_STO3_201101_06.ASC
7	<input type="checkbox"/>	148597073	Global Ozone Monitoring Experiment-2 (GOME-2) Daily Magnesium II Index Data (GOMEMGII)	2011-01-07 00:00:00.000	2011-01-07 00:00:00.000	M02	GOME_M02_MGII_201101_07
8	<input type="checkbox"/>	148704043	Global Ozone Monitoring Experiment-2 (GOME-2) Level 3 Daily Gridded Data (GOMETO3DAY)	2011-01-07 00:00:00.000	2011-01-07 00:00:00.000	M02	GOME_M02_STO3_201101_07.ASC
9	<input type="checkbox"/>	148711203	Global Ozone Monitoring Experiment-2 (GOME-2) Daily Magnesium II Index Data (GOMEMGII)	2011-01-08 00:00:00.000	2011-01-08 00:00:00.000	M02	GOME_M02_MGII_201101_08
10	<input type="checkbox"/>	148807563	Global Ozone Monitoring Experiment-2 (GOME-2) Level 3 Daily Gridded Data (GOMETO3DAY)	2011-01-08 00:00:00.000	2011-01-08 00:00:00.000	M02	GOME_M02_STO3_201101_08.ASC

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GOME Trending Products



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CERES Instrument Working Group SDR Performance Tracking Portal

<http://asd-www.larc.nasa.gov/Instrument/intro.html>

Responsible Official : Dr. Kory Priestley

INSTRUMENT WORKING GROUP
CLOUDS AND THE EARTH'S RADIANT ENERGY SYSTEM

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INTRODUCTION

**Welcome to the
Instrument Working Group**

CERES FM5 on the NPP spacecraft.

News Article

(Click on image to see a larger view.)

SITE INDEX

CERES Instruments			
Platform	Launch	Model	Status
TRMM	27 Nov 1997	PFM	Inactive
Terra	18 Dec 1999	FM1	Active
		FM2	Active
		FM3	Active
Aqua	4 May 2002	FM4	Active (SW Channel Anomaly)
		NPP	Oct 2011 (TBR)
JPSS C1	(TBR)	FM6	In Development

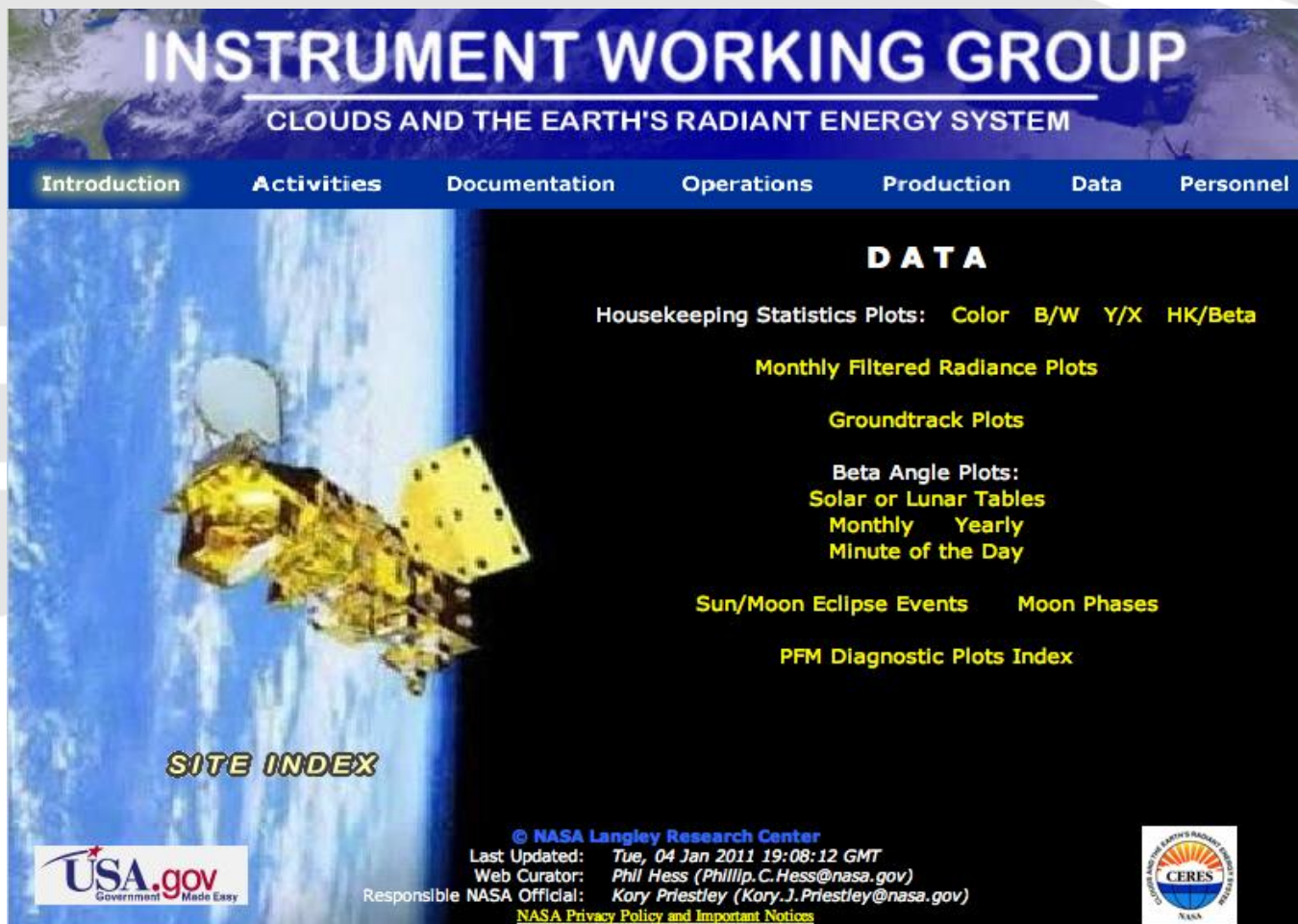
PFM=Proto-Flight Model, FMx=Flight Model x

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CERES Instrument Working Group Data Portal

<http://asd-www.larc.nasa.gov/Instrument/data.html>

Responsible Official : Dr. Kory Priestley



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DATA

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CERES Instrument Working Group Housekeeping Data Portal

http://earth-www.larc.nasa.gov/ceresweb/PFM_QC/plotting/housekeeping_stats_yr_col.html

Responsible Official : Dr. Kory Priestley

CERES Yearly Housekeeping Statistics and Limits Plot (Color) Display

Start Year:	<input type="text" value="2000"/>	End Year:	<input type="text" value="2015"/>
Start Month:	<input type="text" value="JANUARY"/>	End Month:	<input type="text" value="DECEMBER"/>

Data Types:	Statistic Plot Options:	Y-axis Scaling Options:	Enter Y-min:	Enter Y-max:
Engineering:	<input type="text" value="Mean Only"/>	<input type="text" value="Automatic"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Limit:	<input type="text" value="None"/>	<input type="text" value="Automatic"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

Parameters (BCU Acronym): Items marked with an * do not have Samples Within Limits (Edited) Files Analogs (listed first) / Digitals (listed second)

Select Non-Edited or Edited Data Sets:	Select an Instrument:
<input checked="" type="radio"/> All Samples (Non-Edited)	<input type="radio"/> PFM (data begins 12/1997)
<input type="radio"/> Samples Within Limits (Edited)	<input checked="" type="radio"/> FM1 (data begins 12/1999)
	<input type="radio"/> FM2 (data begins 12/1999)
	<input type="radio"/> FM3 (data begins 5/2002)
	<input type="radio"/> FM4 (data begins 5/2002)
	<input type="radio"/> FM5 (N/A)

Note: Plotting will open in a new window and may be slow to plot.



VIIRS, ATMS and CRIS Trending

NOAA STAR Website Provide Long-Term Monitoring Data for AVHRR



http://www.star.nesdis.noaa.gov/smcd/spb/icvs/satMonitoring_n19_ghrr.php

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NOAA-19 AVHRR (GAC) Instrument Performance Monitoring

Please select the instrument performance index & press 'Display' Button

GAC NEΔT/Gain Past 7-Day Snapshot <input type="button" value="Display"/>	GAC Space/BB View Count Past 7-Day Snapshot <input type="button" value="Display"/>	GAC Ramp Count Past 7-Day Snapshot <input type="button" value="Display"/>
Telemetry Statistics PRT Temperature <input type="button" value="Display"/>	Instrument Temperature Instrument Temperature - 1 <input type="button" value="Display"/>	Frame Sync. Delta Count Frame Sync. Delta <input type="button" value="Display"/>
GHRR Status Weekly Orbit Status <input type="button" value="Display"/>		

NOAA-19 AVHRR (GAC) NEΔT/Gain

*** = Specification XXX = Pre-Launched

NEΔT - Ch. 3B
Gain - Ch. 3B
NEΔT - Ch. 4
Gain - Ch. 4

Key Parameters Monitored for VIIRS and VIIRS Heritage Instruments



Parameter Category	AVHRR	MODIS	VIIRS (planned)
Radiometric	NEdT, Gain, SV/ BB counts	SNR, NEdT, Gain, Offsets, SV/BB/SD counts, SD BRDF scale factor	SNR, NEdT, Gain, Offsets, SV/BB/SD counts, SD BRDF scale factor
Geometric/Scan	Frame Sync Delta	Encoder counts	RTA/HAM sync, encoder counts
Telemetry	Instrument temp's, calibrator temp's	Instrument temp's, calibrator temp's biases, currents	Instrument temp's, calibrator temp's, biases, currents
Quality	Data quality flag statistics	Data quality flag statistics	Data quality flag statistics

Specific Telemetry Parameters To Be Monitored On-Orbit for VIIRS: 183 Points Trended During Testing



Raytheon Trended Engineering Parameters (1)

2001	ETP_BB_1	1110	V_AP_SM_FIXED_BIAS_2
22002	ETP_BB_2	1111	V_AP_SM_VR_CLAMP
2003	ETP_BB_3	1112	V_AP_SM_VI_CLAMP
2004	ETP_BB_4	1113	V_AP_SM_VPO
22005	ETP_BB_5	1114	V_AP_SM_VNA
2006	ETP_BB_6	1115	V_AP_SM_VND
22009	ETP_BB_AVG_TEMP	1116	V_AP_SM_VN_STAT
1101	V_AP_LW_VDET_COM1	1117	V_AP_VN_VDET_COM1
1102	V_AP_LW_VDET_COM2	1118	V_AP_VN_VDET_COM2
1103	V_AP_LW_VR_CLAMP	1119	V_AP_VN_VR_CLAMP
1104	V_AP_LW_VI_CLAMP	1120	V_AP_VN_VI_CLAMP
1105	V_AP_LW_VPO	1121	V_AP_VN_VPO
1106	V_AP_LW_VNA	1122	V_AP_VN_VNA
1107	V_AP_LW_VND	1123	V_AP_VN_VND
1108	V_AP_LW_VN_STAT	1124	V_AP_VN_VN_STAT
1109	V_AP_SM_VNRST		

Descriptions and details provided in VIIRS Command, Telemetry, Science & Engineering Data Description (EDD), Raytheon document EDD154640-104



ATMS LEGACY SENSORS TRENDED

AMSU-A (NOAA-18, NOAA-19, MetOp-A)

MHS (NOAA-18, NOAA-19, MetOp-A)

SSMIS (DMSP F-16, F-17, F-18)

NPP ATMS Sensor Parameters to be Tracked



- **NE Δ T**
- **Gain**
- **Space view and ICT counts**
- **ICT temperature**
- **Sensor temperatures (73 values)**
- **Local equator crossing time**
- **Other parameters TBD (voltages, scan position, etc.)**

Examples include:

- **Noise (NeDN) and Radiance errors**
- **Scan baffle temperature**
- **Detector temperatures**
- **Scan angle biases, spectral source stability and spectral shifts**
- **Data Quality Flags**
- **Fringe count errors**
- **Values include such quantities as DS spectral stability, cumulative fringe count error, ICT spectral stability, ICT temperature stability etc. (12 values)**

Acknowledgements



- **Special thanks to the NPOESS Sensor Science team (Bill Blackwell/ATMS/MIT-LL, Kory Priestley CERES/LaRC NASA, Gail Bingham/CrIS/SDL at Utah State University, Glen Jaross/OMPS/SSAI, and Frank DeLuccia/VIIRS/Aerospace Corp)**
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