NASA Langley Satellite Product Archive
Darwin 2014

Louis Nguyen, Patrick Minnis, Kris Bedka
Doug Spangenberg, Rabi Palikonda, and Thad Chee

NASA Langley Research Center
Hampton, VA, USA

Satellite Data Archive

- Darwin: MTSAT-1R, MTSAT-2
  - Every 10min (Mtsat-1), hourly (Mtsat2)
  - 5 channel: 0.75um, 3.75um, 6.75um, 10.8um, 12um
- Cayenne: MSG (15min), GOES-East (30min)

Format:

- Satellite Data: McIDAS Areafiles and GIF
- Cloud Products: NetCDF, GIF, and ASCII

http://www-pm.larc.nasa.gov

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

+ NASA Portal
+ Preferences

Search: Keywords + GO

− Minnis Group Home | + Cloud Products | + Satellite Imagery | + Field Experiments | + Related References

+ NASA Home
+ NASA LaRC Home
+ Science Directorate
+ Minnis Group Home

High Ice Water Content (HIWC)

+ High Ice Water Content (HIWC) Research Official Home

Cloud Products
+ Darwin MT2
+ RapidScan MTSAT-1R
+ GOES-13
+ GOES-13 Cayenne

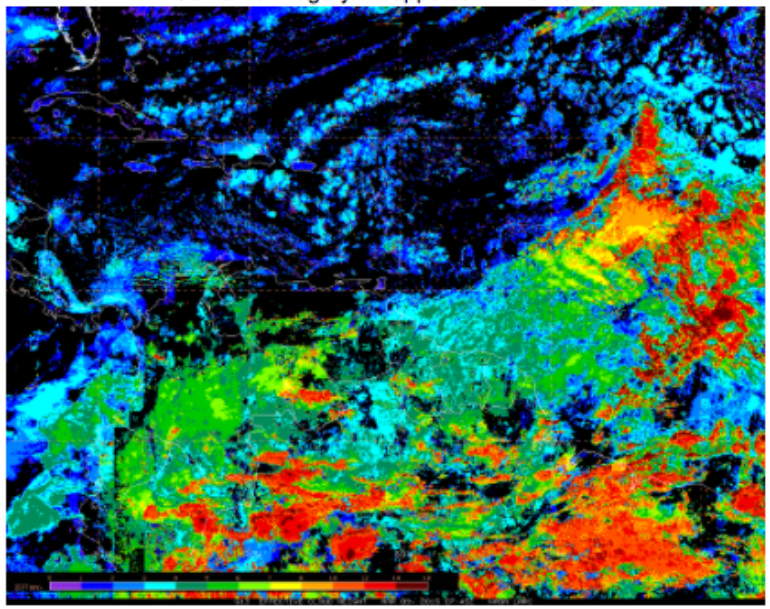
Satellite Imagery
+ G13 Costa Rica
+ Darwin MTS1
+ GOES-13
+ GOES-13 Cayenne
+ MSG Cayenne

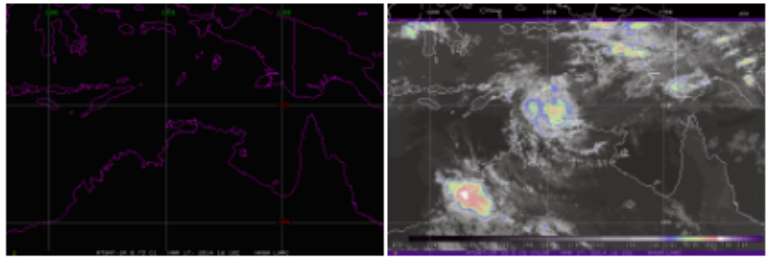
Flight Track Overlay
+ Falcon - Sat Imagery
+ Falcon - Product Imagery

Cloud Products Along Track
+ Falcon

Langley Satellite Support for High Ice Water Content (HIWC) Research

Latest Satellite Imagery & Products for HIWC field experiment
GOES-13 Imagery in support of HIWC-2015





MTSAT-2 Cloud Products
(larger domain)

Quick Links

Satellite Imagery
+ C01, C2RC
+ C02, C04

Cloud Products
+ Cld Top Height
+ Cld Bot Height
+ RGB
+ ICING
+ DEFF
+ REFF
+ TAU
+ IWP
+ LWP
+ Overshoot. Top

Archive
+ MTSAT-2R Cloud Products
+ MTSAT-1R Cloud Products

Satellite Cloud Products

+ NASA Home
+ NASA LaRC Home
+ Science Directorate
+ Minnis Group Home

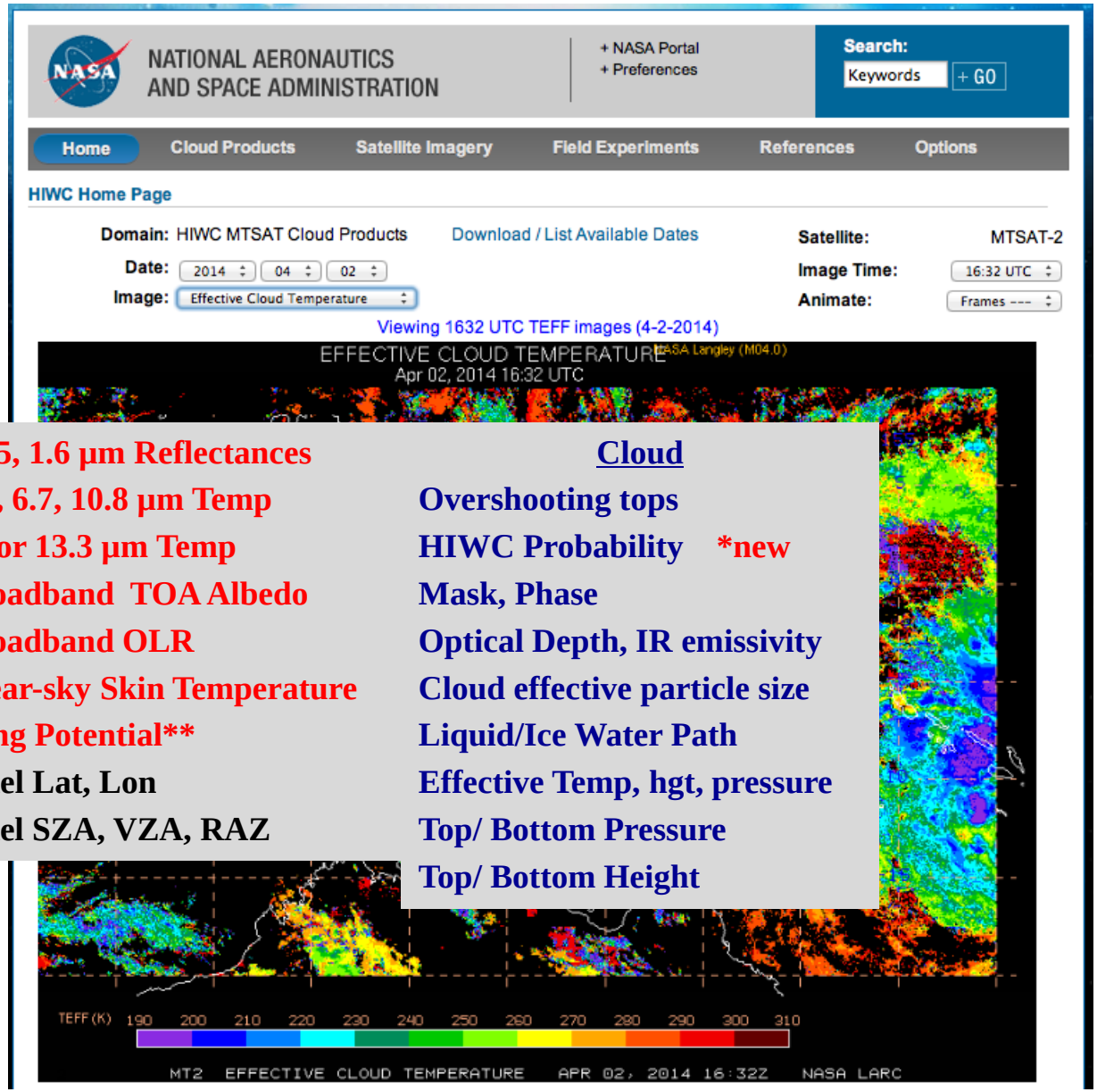
High Ice Water Content (HIWC)

+ High Ice Water Content (HIWC) Research Official Home

Cloud Products
+ Darwin MT2
+ RapidScan MTSAT-1R
+ GOES-13
+ GOES-13 Cayenne

Satellite Imagery
+ G13 Costa Rica
+ Darwin MTS1
+ GOES-13
+ GOES-13 Cayenne
+ MSG Cayenne

Flight Track Overlay
+ Falcon - Sat Imagery
+ Falcon - Product Imagery

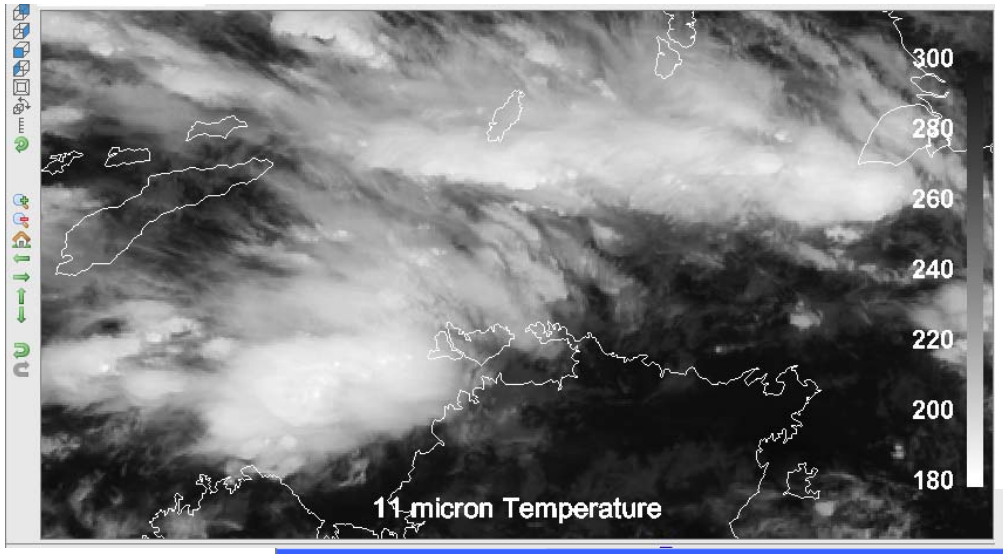


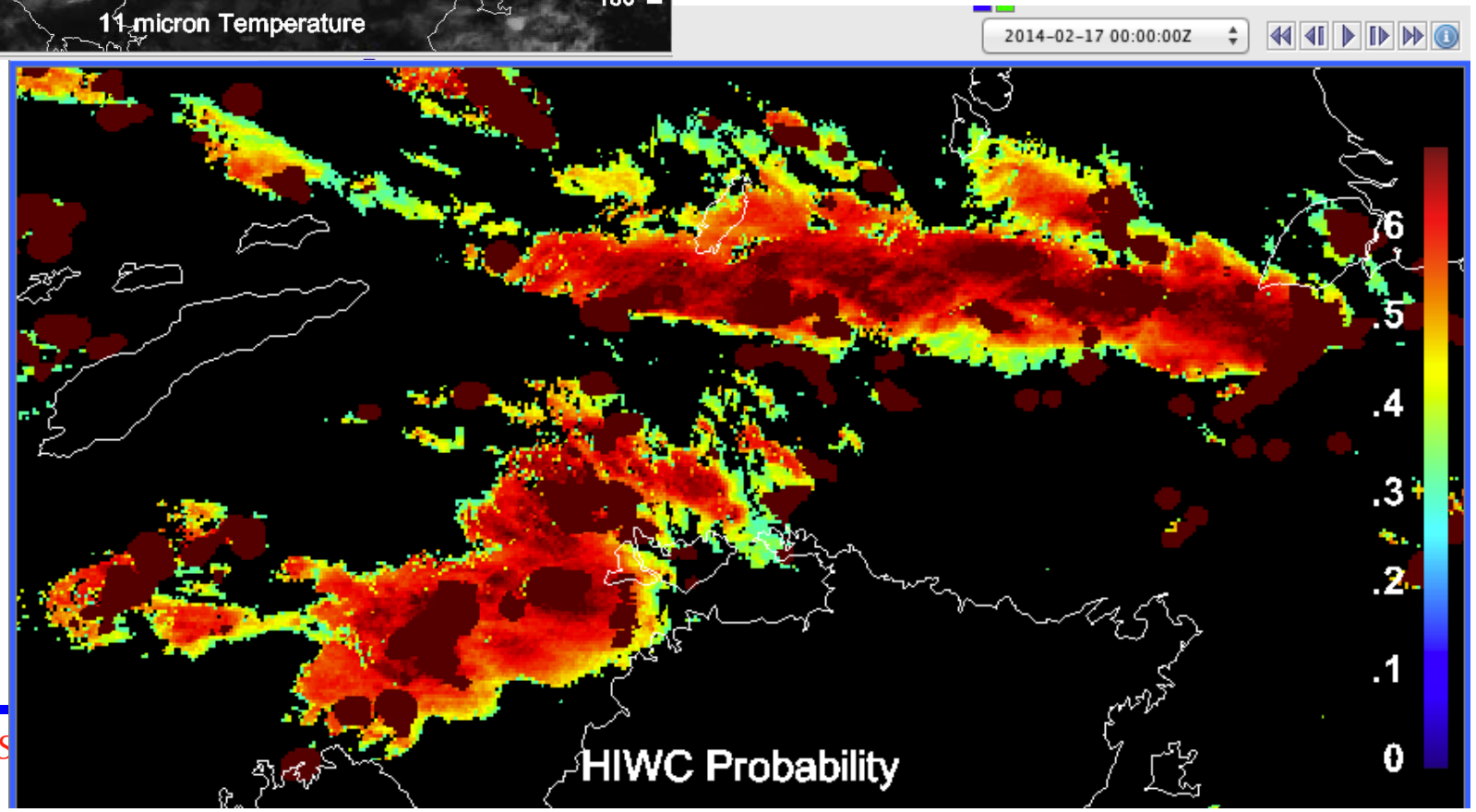
0.65, 1.6 µm Reflectances
3.7, 6.7, 10.8 µm Temp
12 or 13.3 µm Temp
Broadband TOA Albedo
Broadband OLR
Clear-sky Skin Temperature
Icing Potential**
Pixel Lat, Lon
Pixel SZA, VZA, RAZ

Cloud
Overshooting tops
HIWC Probability ***new**
Mask, Phase
Optical Depth, IR emissivity
Cloud effective particle size
Liquid/Ice Water Path
Effective Temp, hgt, pressure
Top/ Bottom Pressure
Top/ Bottom Height

HIWC Probability

- Reprocess Darwin MTSAT
- Available for Cayenne and PR





Satellite Imagery

+ NASA Home
+ NASA LaRC Home
+ Science Directorate
+ Minnis Group Home

High Ice Water Content (HIWC)

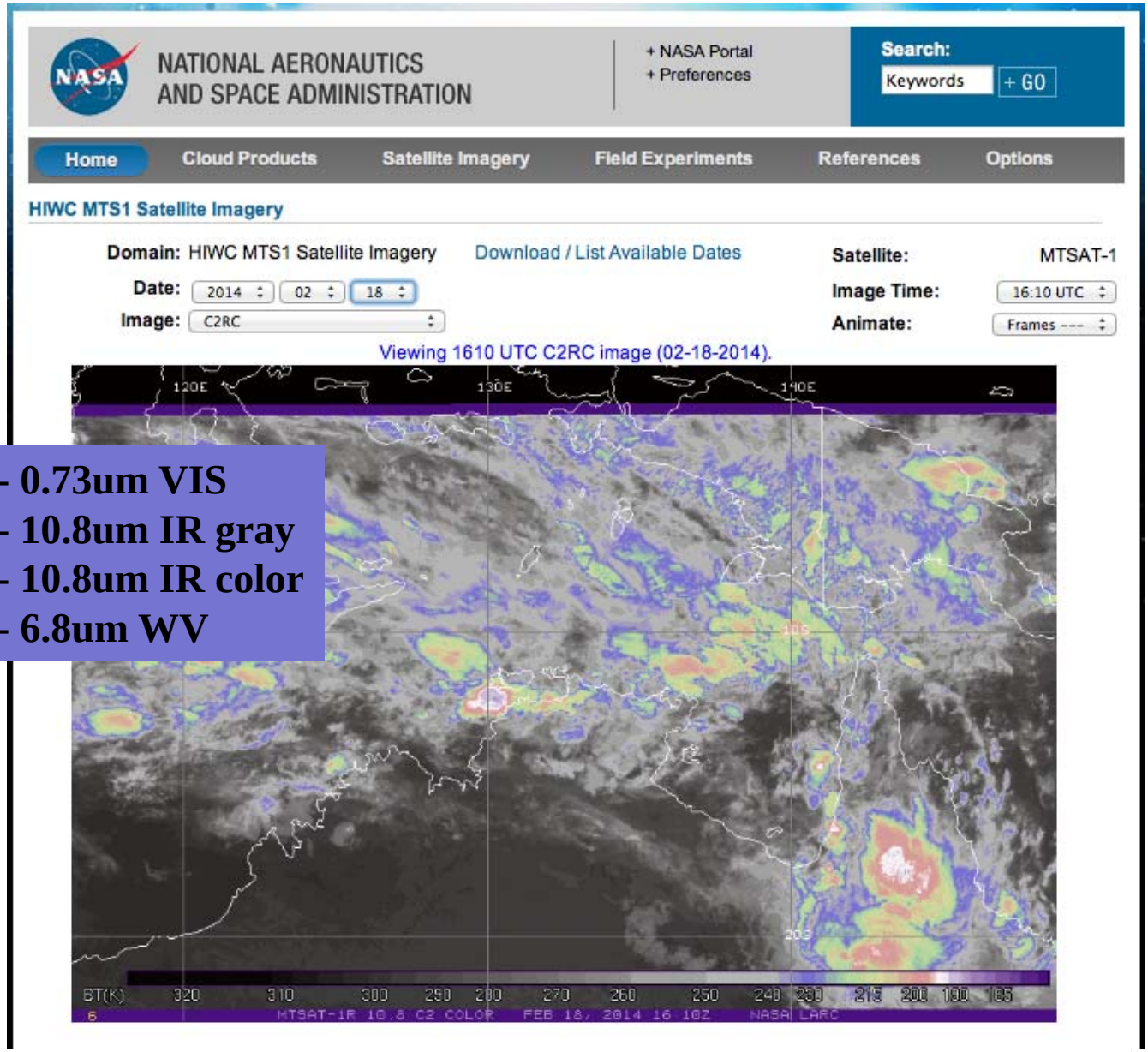
+ High Ice Water Content (HIWC) Research Official Home

Cloud Products
+ Darwin MT2
+ RapidScan MTSAT-1R
+ GOES-13
+ GOES-13 Cayenne

Satellite Imagery
+ G13 Costa Rica
+ Darwin MTS1
+ GOES-13 PR
+ GOES-13 Cayenne
+ MSG Cayenne

Flight Track Overlay
+ Falcon - Sat Imagery
+ Falcon - Product Imagery

- 0.73um VIS
- 10.8um IR gray
- 10.8um IR color
- 6.8um WV



+ NASA Home
+ NASA LaRC Home
+ Science Directorate
+ Minnis Group Home

High Ice Water Content (HIWC)

+ High Ice Water Content (HIWC) Research Official Home

Cloud Products
+ Darwin MT2
+ RapidScan MTSAT-1R
+ GOES-13
+ GOES-13 Cayenne

Satellite Imagery
+ G13 Costa Rica
+ Darwin MTS1
+ GOES-13
+ GOES-13 Cayenne
+ MSG Cayenne

Flight Track Overlay
+ Falcon - Sat Imagery
+ Falcon - Product Imagery

Cloud Products Along Track
+ Falcon

Langley Satellite Support for High Ice Water Content (HIWC) Research

High Ice Water Content (HIWC) Home → Calendar

Flight track calendar from 2014-01-16 to 2014-03-15

January

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				16 (16)	17 (17)	18 (18)
19 (19)	20 (20)	21 (21)	22 (22)	23 (23)	24 (24)	25 (25)
26 (26)	27 (27)	28 (28)	29 (29)	30 (30)	31 (31)	

February

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 (32)
2 (33)	3 (34)	4 (35)	5 (36)	6 (37)	7 (38)	8 (39)
9 (40)	10 (41)	11 (42)	12 (43)	13 (44)	14 (45)	15 (46)
16 (47)	17 (48)	18 (49)	19 (50)	20 (51)	21 (52)	22 (53)
23 (54)	24 (55)	25 (56)	26 (57)	27 (58)	28 (59)	

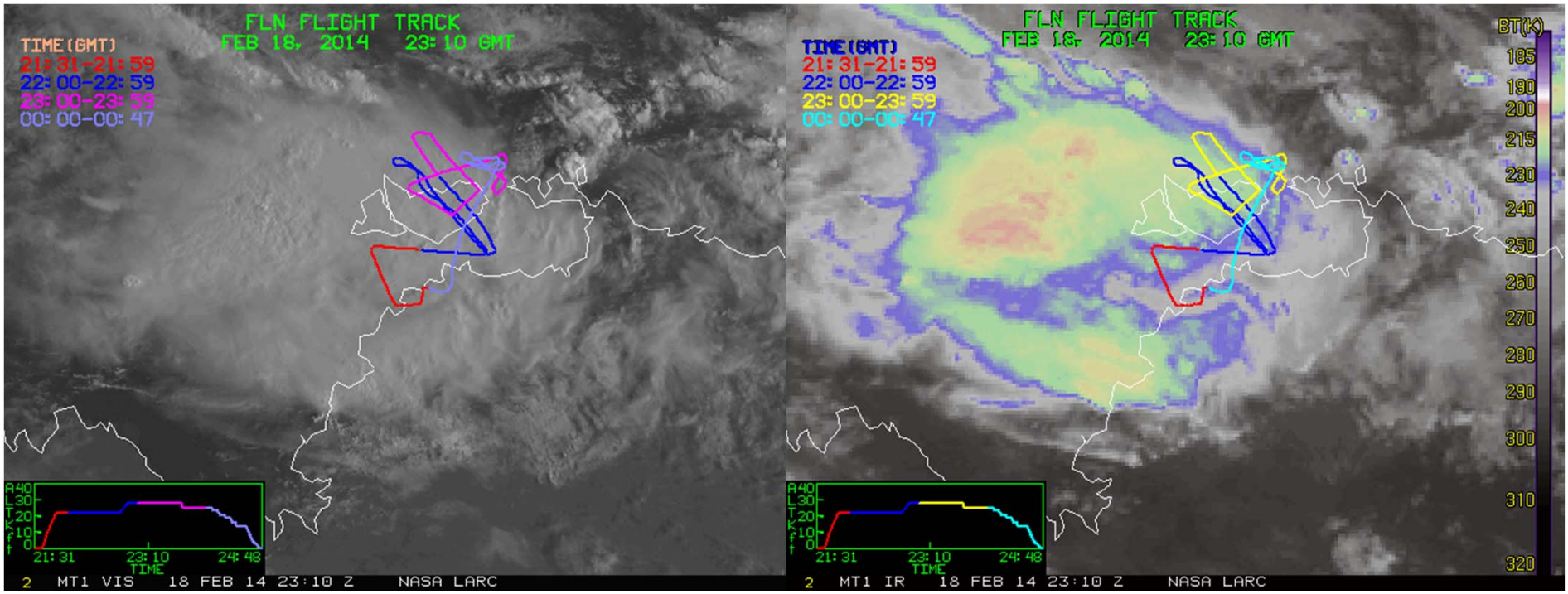
March

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 (60)
2 (61)	3 (62)	4 (63)	5 (64)	6 (65)	7 (66)	8 (67)
9 (68)	10 (69)	11 (70)	12 (71)	13 (72)	14 (73)	

Flight Track Overlay Satellite Imagery

January						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				16 (16)	17 (17)	18 (18)
19 (19)	20 (20)	21 (21)	22 (22)	23 (23)	24 (24)	25 (25)
26 (26)	27 (27)	28 (28)	29 (29)	30 (30)	31 (31)	

February						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 (32)
2 (33)	3 (34)	4 (35)	5 (36)	6 (37)	7 (38)	8 (39)
9 (40)	10 (41)	11 (42)	12 (43)	13 (44)	14 (45)	15 (46)
16 (47)	17 (48)	18 (49)	19 (50)	20 (51)	21 (52)	22 (53)
23 (54)	24 (55)	25 (56)	26 (57)	27 (58)	28 (59)	

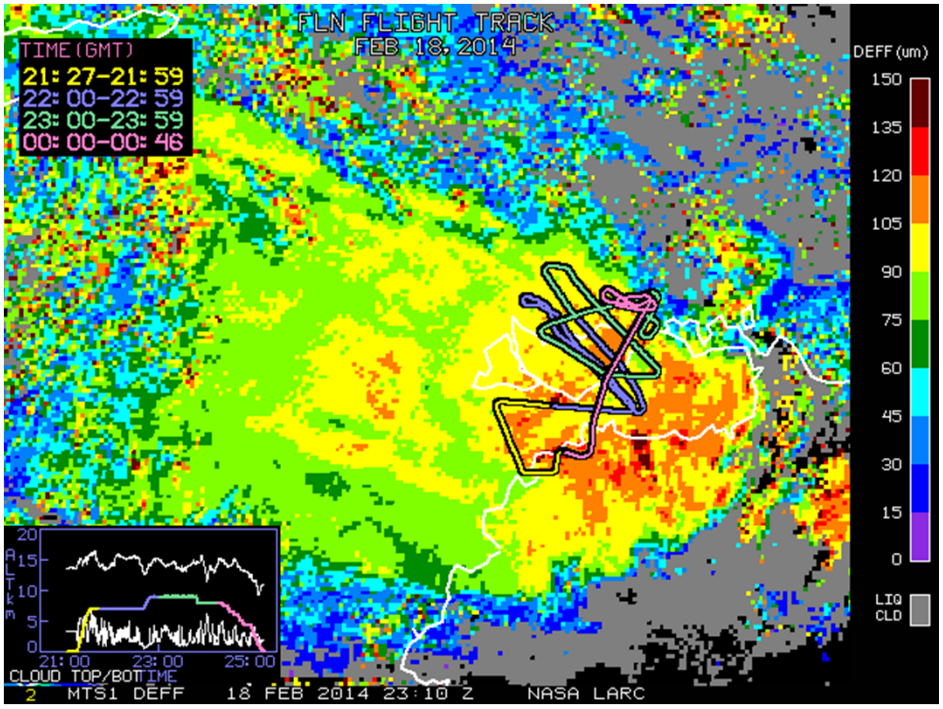


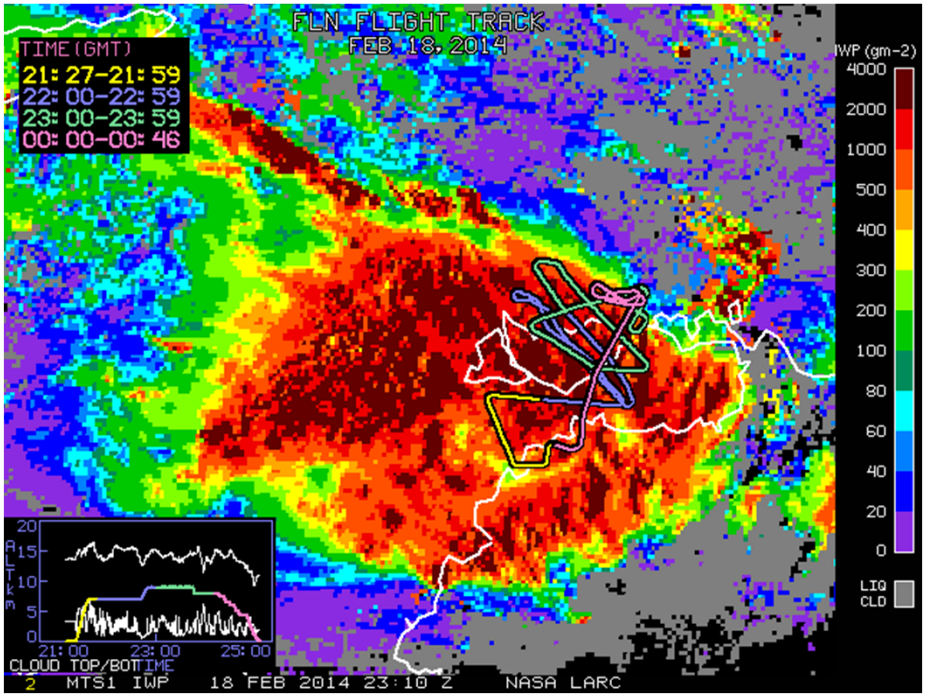
Flight FS140023 Feb 18, 2014 Visible and IR Loop

Flight Track Overlay Cloud Products

January						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				16 (16)	17 (17)	18 (18)
19 (19)	20 (20)	21 (21)	22 (22)	23 (23)	24 (24)	25 (25)
26 (26)	27 (27)	28 (28)	29 (29)	30 (30)	31 (31)	

February						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 (32)
2 (33)	3 (34)	4 (35)	5 (36)	6 (37)	7 (38)	8 (39)
9 (40)	10 (41)	11 (42)	12 (43)	13 (44)	14 (45)	15 (46)
16 (47)	17 (48)	18 (49)	19 (50)	20 (51)	21 (52)	22 (53)
23 (54)	24 (55)	25 (56)	26 (57)	27 (58)	28 (59)	





Flight FS140023 Feb 18, 2014, Effective Ice Diameter (left) and Ice Water Path (Rt)

Cloud Product Along Flight Track

Cloud Matching Tool

- Cloud Products
  - + Darwin MT2
  - + RapidScan MTSAT-1R
  - + GOES-13
  - + GOES-13 Cayenne
- Satellite Imagery
  - + G13 Costa Rica
  - + Darwin MTS1
  - + GOES-13
  - + GOES-13 Cayenne
  - + MSG Cayenne
- Flight Track Overlay
  - + Falcon - Sat Imagery
  - + Falcon - Product Imagery
- Cloud Products Along Track
  - + Falcon
- Downloads
  - + HIWC Cloud Products
  - + RapidScan MTSAT-1R
  - + GOES-13 Puerto Rico
  - + HIWC 2015 KML Files
- Viewers / Tools
  - + Satellite Prediction Tool

VISST Derived Cloud Products Along the Aircraft Track

VISST Derived Cloud Products are computed from the individual aircraft files, where the cloud retrieval parameter is based on the weighted average of 4 imager pixels centered on the aircraft location. The (spatial) standard deviation is based on a weighted distribution of the closest pixel and the 8 surrounding pixels.

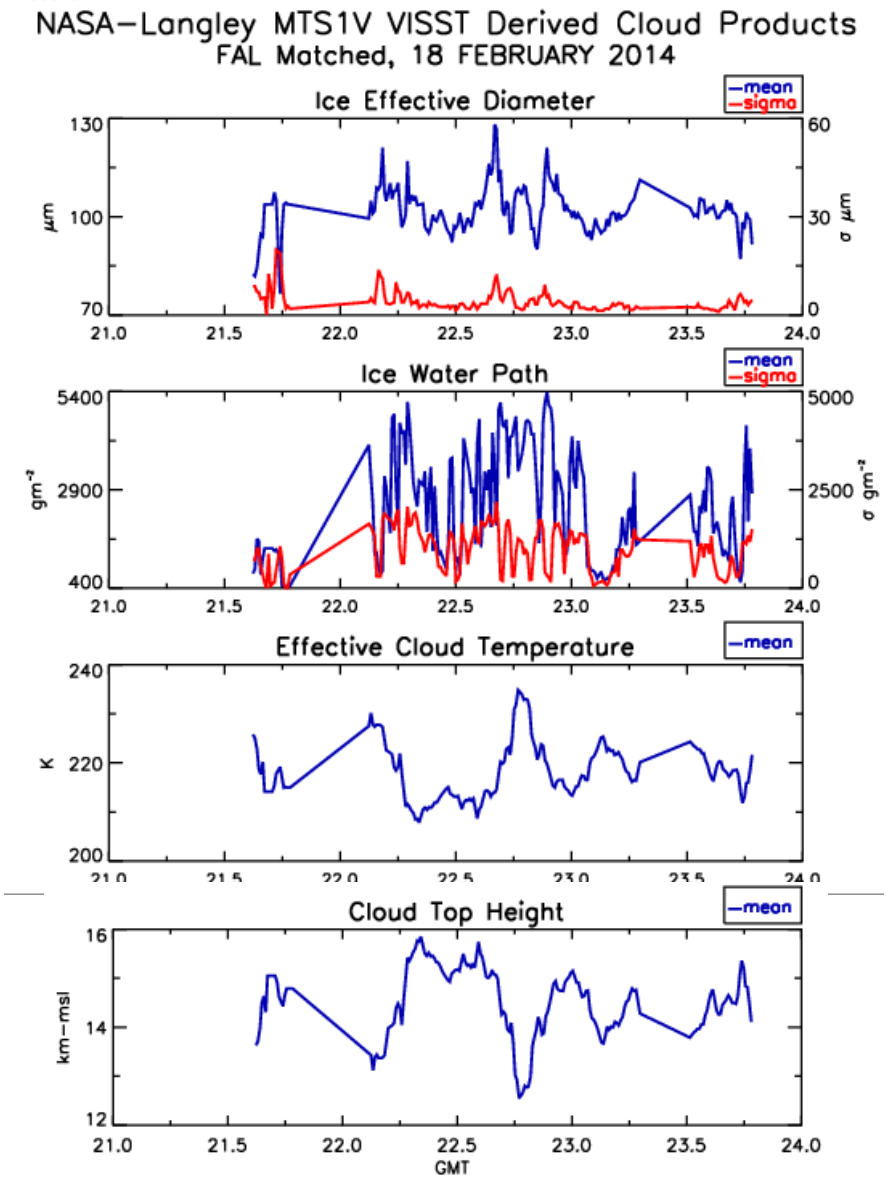
Select 4 Cloud Parameters	σ Plot	Aircraft/Sat.	Flight Days	Start/End Hour	
Effective Ice Dia.	☑	Falcon	2014-02-18	00.0	24.0
Ice Water Path	☑	MTSat-1			
Effective Cloud Temp.	☑		PLOT		
Cloud Top Ht.	☑				

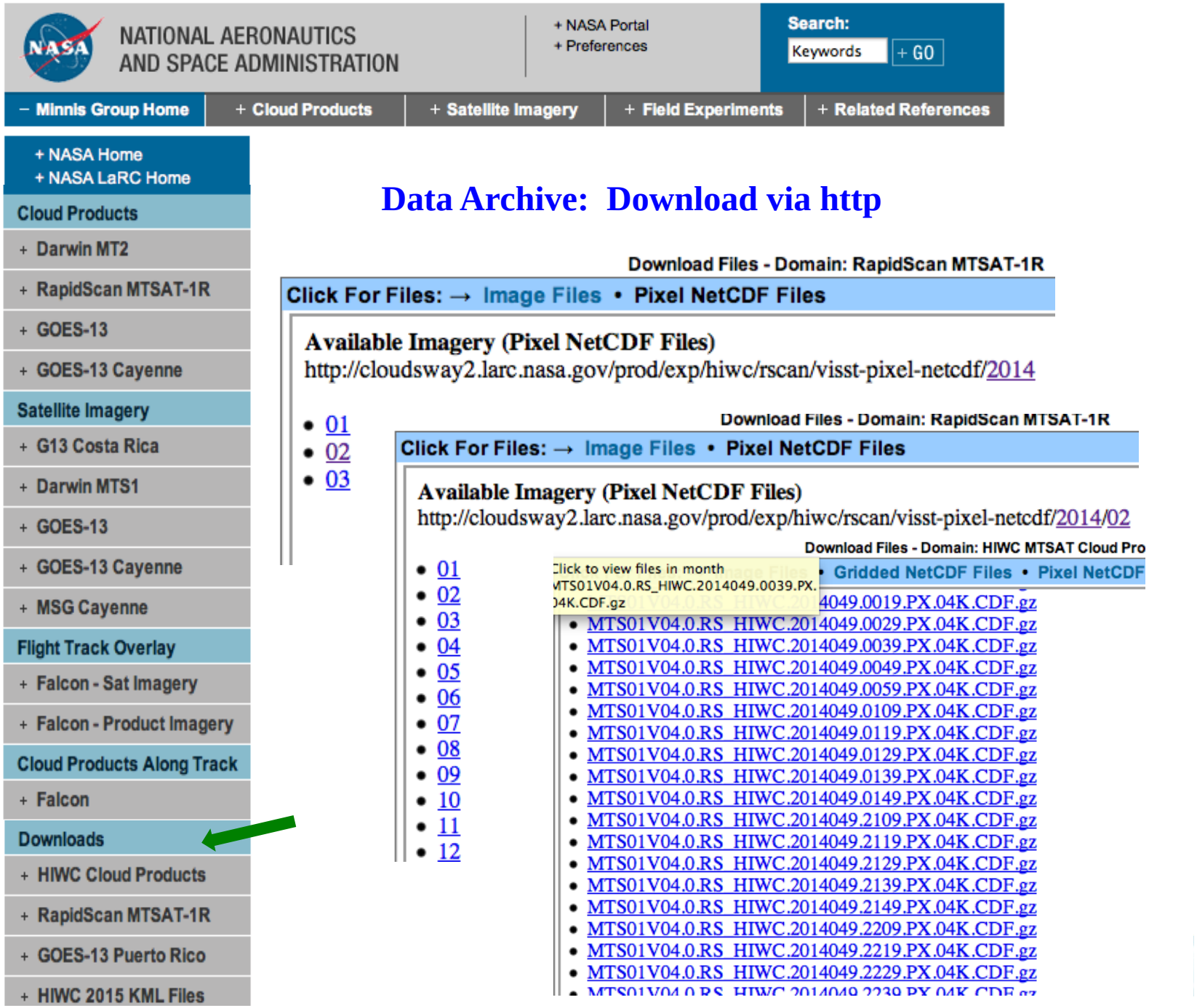
Cloud Product Along Flight Track

- Cloud Products
  - + Darwin MT2
  - + RapidScan MTSAT-1R
  - + GOES-13
  - + GOES-13 Cayenne
- Satellite Imagery
  - + G13 Costa Rica
  - + Darwin MTS1
  - + GOES-13
  - + GOES-13 Cayenne
  - + MSG Cayenne
- Flight Track Overlay
  - + Falcon - Sat Imagery
  - + Falcon - Product Imagery
- Cloud Products Along Track
  - + Falcon
- Downloads
  - + HIWC Cloud Products
  - + RapidScan MTSAT-1R
  - + GOES-13 Puerto Rico
  - + HIWC 2015 KML Files
- Viewers / Tools
  - + Satellite Prediction Tool

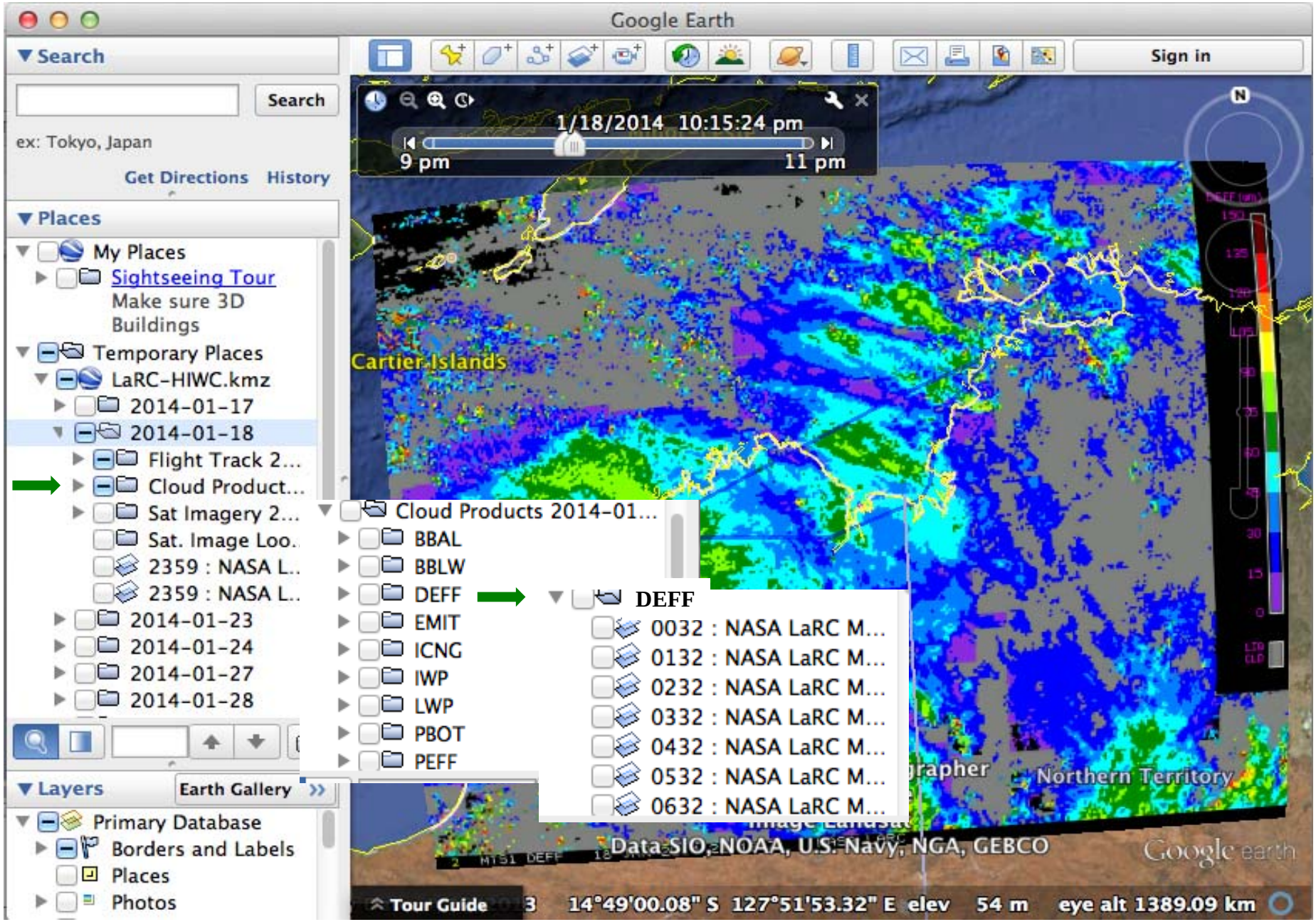
ASCII File • Plot • Full Data File

Results:




NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
+ NASA Portal
+ Preferences
Search:
Keywords
+ GO
– Minnis Group Home
+ Cloud Products
+ Satellite Imagery
+ Field Experiments
+ Related References
+ NASA Home
+ NASA LaRC Home
Cloud Products
+ Darwin MT2
+ RapidScan MTSAT-1R
+ GOES-13
+ GOES-13 Cayenne
Satellite Imagery
+ G13 Costa Rica
+ Darwin MTS1
+ GOES-13
+ GOES-13 Cayenne
+ MSG Cayenne
Flight Track Overlay
+ Falcon - Sat Imagery
+ Falcon - Product Imagery
Cloud Products Along Track
+ Falcon
Downloads
+ HIWC Cloud Products
+ RapidScan MTSAT-1R
+ GOES-13 Puerto Rico
+ HIWC 2015 KML Files
Data Archive: Download via http
Download Files - Domain: RapidScan MTSAT-1R
Click For Files: → Image Files • Pixel NetCDF Files
Available Imagery (Pixel NetCDF Files)
http://cloudsway2.larc.nasa.gov/prod/exp/hiwc/rscan/visst-pixel-netcdf/2014
01
02
03
Download Files - Domain: RapidScan MTSAT-1R
Click For Files: → Image Files • Pixel NetCDF Files
Available Imagery (Pixel NetCDF Files)
http://cloudsway2.larc.nasa.gov/prod/exp/hiwc/rscan/visst-pixel-netcdf/2014/02
Download Files - Domain: HIWC MTSAT Cloud Pro
Click to view files in month
MTS01V04.0.RS_HIWC.2014049.0039.PX.
04K.CDF.gz
Gridded NetCDF Files • Pixel NetCDF
01
02
03
04
05
06
07
08
09
10
11
12
MTS01V04.0.RS_HIWC.2014049.0019.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.0029.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.0039.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.0049.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.0059.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.0109.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.0119.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.0129.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.0139.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.0149.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.2109.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.2119.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.2129.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.2139.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.2149.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.2209.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.2219.PX.04K.CDF.gz
MTS01V04.0.RS_HIWC.2014049.2229.PX.04K.CDF.gz

Satellite Products on Google KML/KMZ



Conclusion

- New HIWC probability product
- Reprocess Darwin dataset
  - MTSAT1 rapidscan and MTSAT2
- Google Earth kml/kmz updated with archive imagery
- Website: www-pm.larc.nasa.gov

Feedback for Request:

Contact: L.Nguyen@nasa.gov

Backup Slides

Standard, Single-Layer VISST/SIST

0.65, 1.6 µm Reflectances
3.7, 6.7, 10.8 µm Temp
12 or 13.3 µm Temp
Broadband Albedo
Broadband OLR
Clear-sky Skin Temperature
Icing Potential**
Pixel Lat, Lon
Pixel SZA, VZA, RAZ

Cloud

Mask, Phase
Optical Depth, IR emissivity
Effective droplet Radius or ice crystal Diameter
Liquid/Ice Water Path
Effective Temp, height, pressure
Top/ Bottom Pressure
Top/ Bottom Height

Multi-Layer, CIRT, CO_2 channel only

Upper & lower cloud

Multilayer ID (single or 2-layer)

effective temperature	**optical depth, thickness**
effective particle size	**ice or liquid water path**
height, top/base height	**pressure**