Status Update of IMAPP and IPOPP The End-to-End Processing Package for EOS and future Polar Orbiting Satellite Systems

Allen Huang, Liam Gumley, Kathleen Strabala, Jun Li, Jun Huang, Elisabeth Weisz, Hal Woolf, Paolo Antonelli, and Tom Achtor

Cooperative Institute for Meteorological Satellite Studies
Space Science and Engineering Center
University of Wisconsin-Madison

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Status Update of IMAPP and IPOPP

IMAPP provides users with an EOS satellite Terra and Aqua direct broadcast system the capability to calibrate and navigate locally received satellite data and, from these data, to create environmental data products of significant regional interest. So far, more than 150 direct broadcast stations are using IMAPP for their daily routine direct broadcast processing from the raw data to the generation of end products and information.

CIMSS is currently funded by NASA to maintain and update IMAPP and to continue to support direct broadcast users, development for the NPOESS and its Preparatory Project (NPP) support by IPO/NASA is well underway. The processing package for NPP/NPOESS will be built on the foundation laid by IMAPP and the data processing element provided by the NPOESS prime contractor, working closely with NASA's Direct Readout Laboratory (DRL). In addition, International Polar Orbiter Processing Package (IPOPP) will also be extended to include the processing of METOP data. The IPOPP METOP component effort is to leverage EUMETSAT NWP Satellite Application Facility (SAF) located at UK Met office and its Meteo France partner. These SAF team members are jointly developing a new version of AAPP (ATOVS and AVHRR Pre-Processing Package) to perform level 1 processing on AMSU, MHS, HIRS, AVHRR and IASI (i.e. generate calibrated, geolocated radiances). Within IPOPP, specified level 2 retrieval algorithms to individually and/or synergistically process AMSU, MHS, AVHRR and IASI data to produce atmospheric products will also be developed and distributed.

This presentation is to highlight the current status and future prospects for IMAPP and its successor, IPOPP.

Overview of CIMSS Direct Broadcast (DB) Activities

- *Real time data processing and distribution*

- *Software development and distribution*

- *Remote sensing workshops*

Overview of CIMSS DB Activities

- *Real time data processing and distribution*
  - Real time direct broadcast web page
    - Archive of quick look data
    - Instrument data and products staged on anonymous ftp site, and available through McIDAS ADDE servers
  - Support of environmental monitoring and weather forecasting where quality and timeliness of data are vital
    - Images of events of public interest (Stoughton Tornado, Tire Fire, Dust Storm, Hurricanes)
    - Images for Great Lakes Coast watch, sea ice, marine animal migrations
    - High Resolution SST's for local NWP initialization
    - Polar Winds
    - PAW – PDA Animated Weather
    - IDEA – Infusing Satellite Data into Environmental Applications
    - NWS - AWIPS

Overview of Activities (cont.)

- *Software development and distribution*
  - IMAPP allows other users the ability to support their own real time data and processing systems
  - Testbed for MODIS/AIRS products
  - Support of our own research (total control of system from end to end)
    - AIRS data for ABI simulations
    - MODIS/AIRS combined products
    - MOD07 TPW / near-infrared validations
- *Remote sensing workshops*
  - Global outreach
    - Now that we have data and products, what do we do with them?

International MODIS/AIRS Processing Package (IMAPP)

Builds upon our previous experience with
• ITPP (International TOVS Processing Package) since 1985
• IAPP (International ATOVS Processing Package) since 1998

Purpose:
• The intention in developing IMAPP for processing direct broadcast MODIS and AIRS data is to help foster the rapid improvement of retrieval algorithms and other applications of EOS data in a variety of global weather, process studies, and climate applications, just as the ITPP and IAPP have done for TOVS and ATOVS data.

Available from:
http://cimss.ssec.wisc.edu/~gumley/IMAPP/

Current IMAPP Status

MODIS products – Level 1B and Geolocation

- cloud mask (MOD35), cloud properties (MOD06CT) - height, temperature, emissivity, phase
- atmospheric profiles (MOD07) T, q, tpw, total ozone, stability
- aerosol optical depth (MOD04)
- sea surface temperatures (Jim Davies)
- near-infrared water vapor (Peter Albert, Ralf Bennartz)

MODIS utilities

- creating true color images tutorial

AIRS products

- AIRS/AMSU/HSB Level 1 (with JPL)
- AIRS Level 2 profiles (both single pixel and 3x3)

AMSR-E products – RSS L1B software

- Rain rate, rain type (B05 algorithm)
- Soil Moisture (B03 algorithm)

IMAPP AIRS Clear Sky Retrieval at CIMSS

- **Principal Component Regression Retrieval performed for every AIRS FOV**
- **Retrieved Parameters: T, Q, O3 at 101 p levels, TPW, Total Ozone, Surface Emissivity and Reflectivity**
- **Training set: SEEBOR_V5 (July 2006), 15704 profiles, 10 emiss points**
- **Number of PCs used: 30**
- **SARTA version: V106 (sarta_apr05)**

Version 1.2 (July 2006)

- **Number of Channels: 1688 pristine channels ("p1688.txt")**
- **Separate Coefficients for 6 BT classes and 11 scanning angles**

Version 1.3 (Sept 2006)

- **Number of Channels: 1450 pristine channels (channels below 2400 cm^{-1})**
- **Separate Coefficients for 6 BT classes and 11 scanning angles and for land and ocean cases.**
- **Additional Predictors: surface pressure, solar zenith angle**
- **In retrieval using NCEP gdas1 surface pressure and AIRS L1B solar zenith information**

132 selected Prepqc Matchup profiles: RMS and Stdev of RAOB minus RTV

132 prepqc matchup profiles
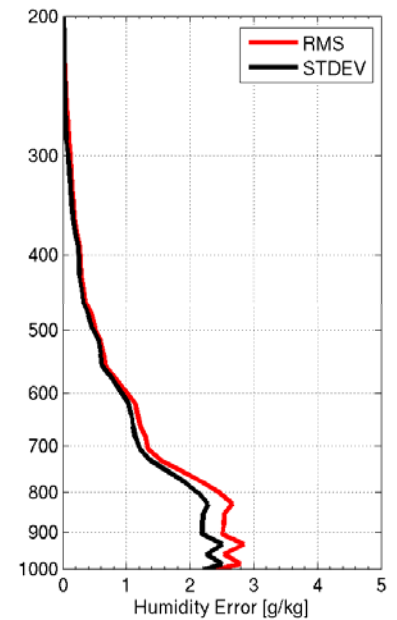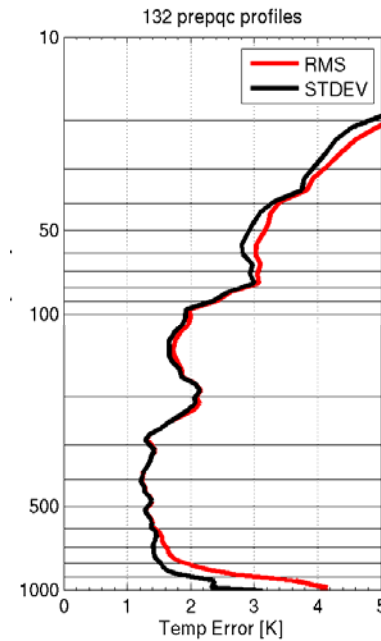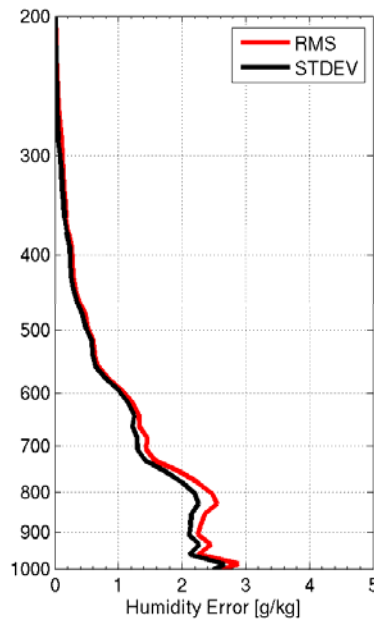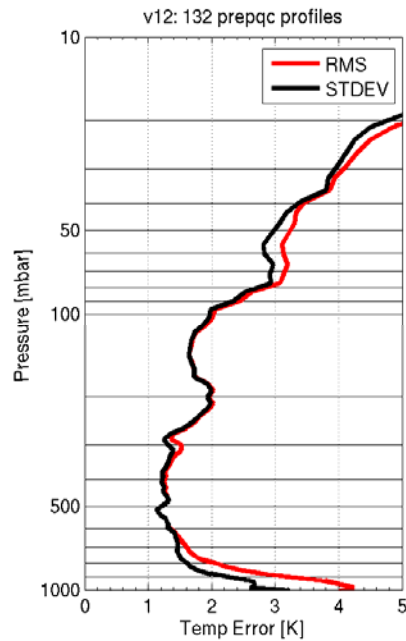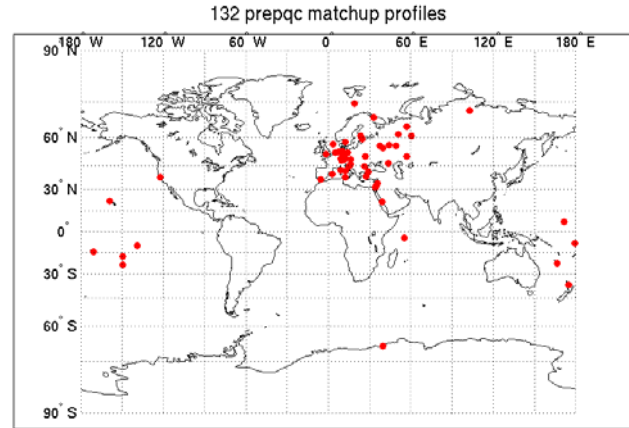
IMAPP RTV v1.2

IMAPP RTV v1.3

9

Selected Prepqc Matchup profiles: Temperature Profiles (day)
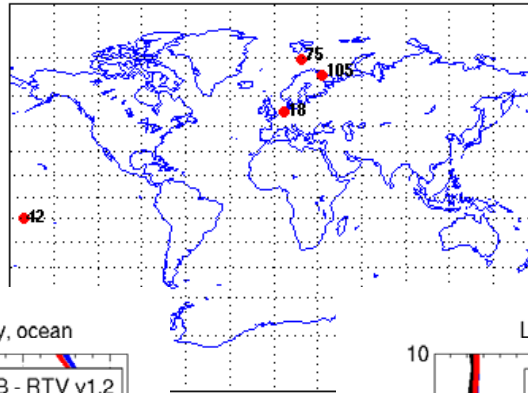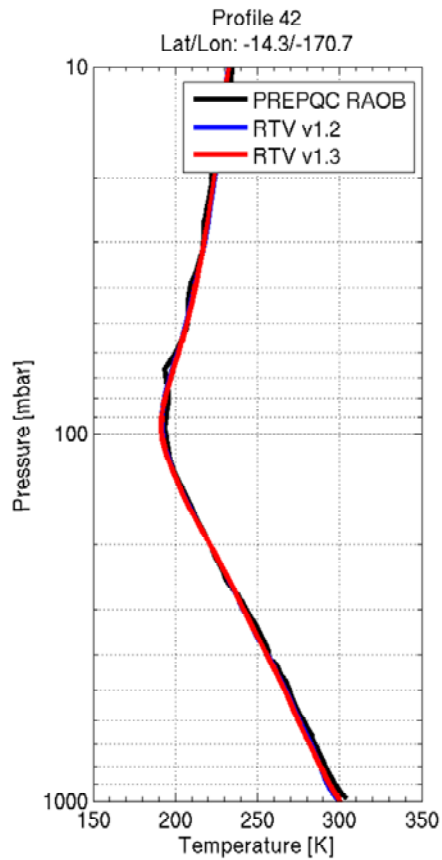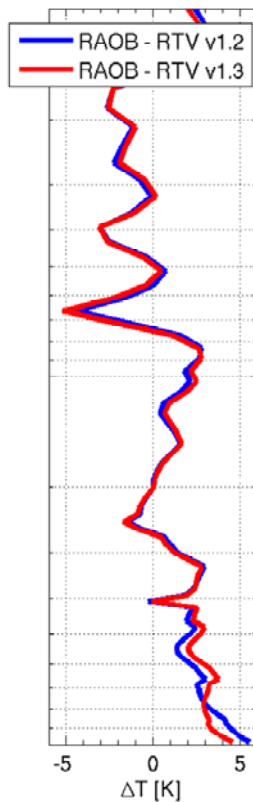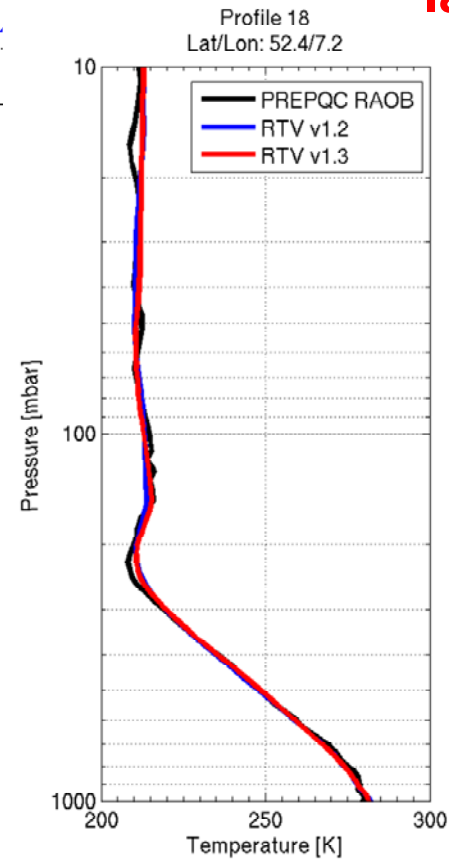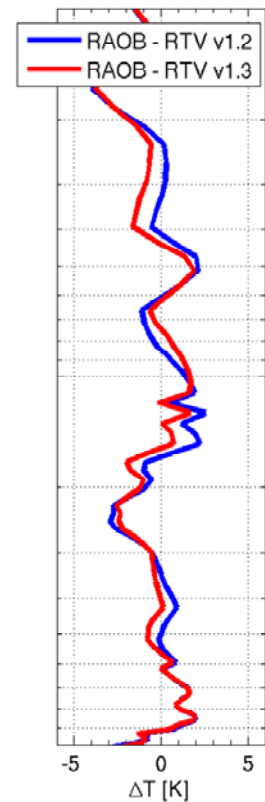
Selected Prepqc Matchup profiles: Temperature Profiles (night)
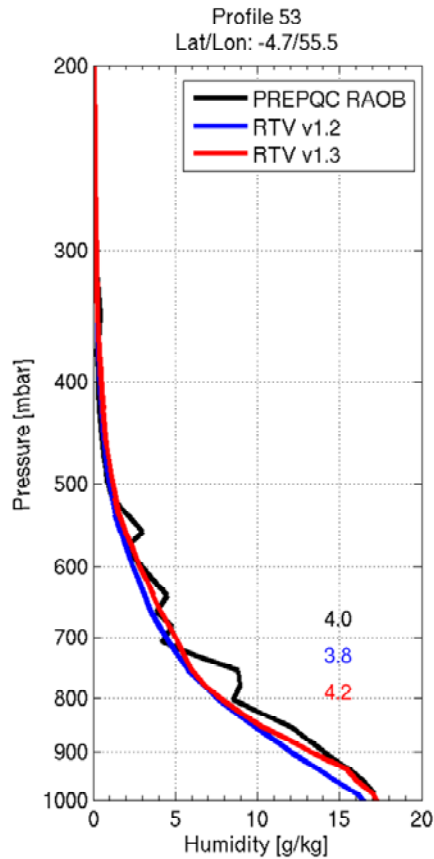
Selected Prepqc profiles
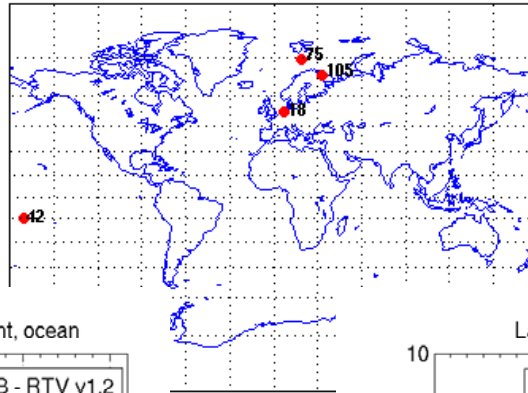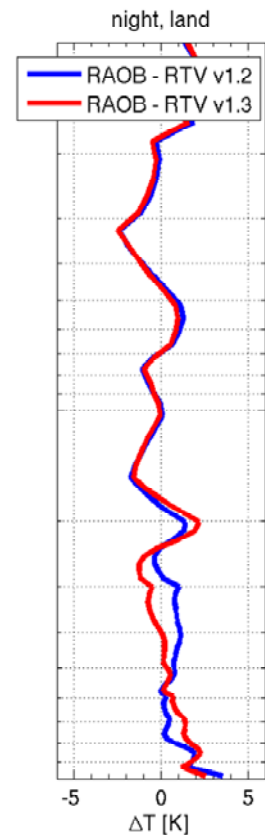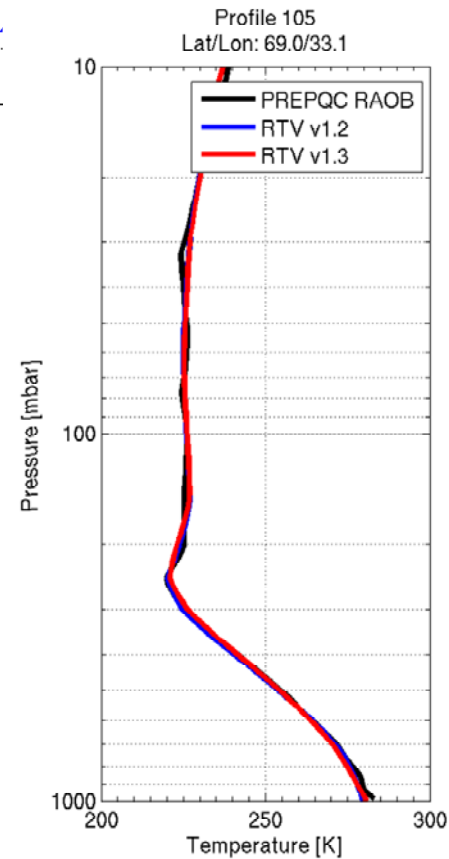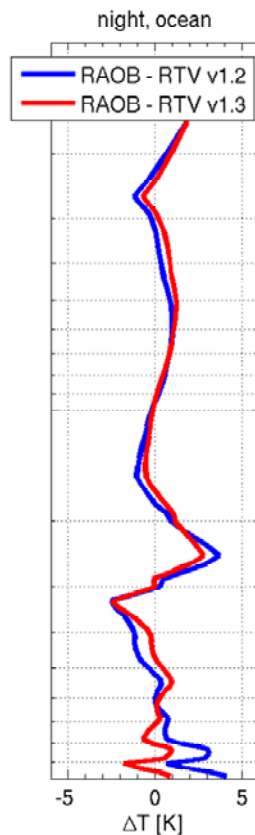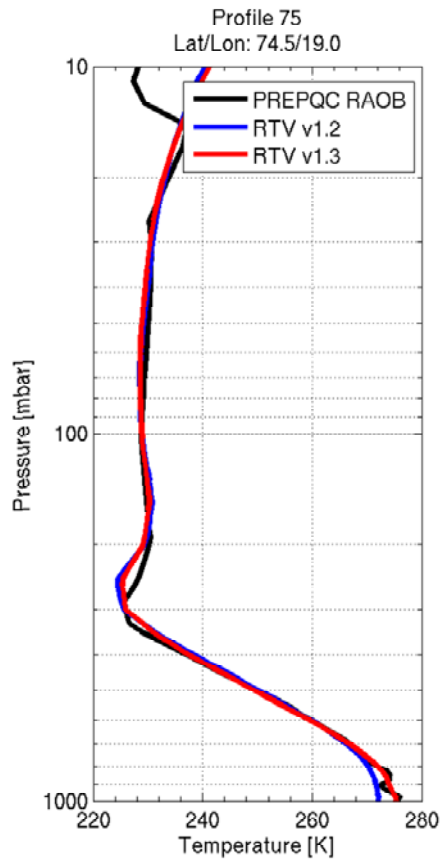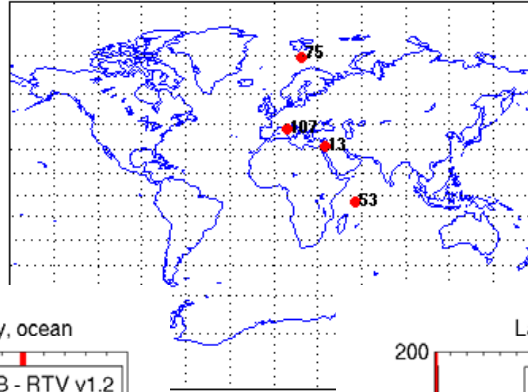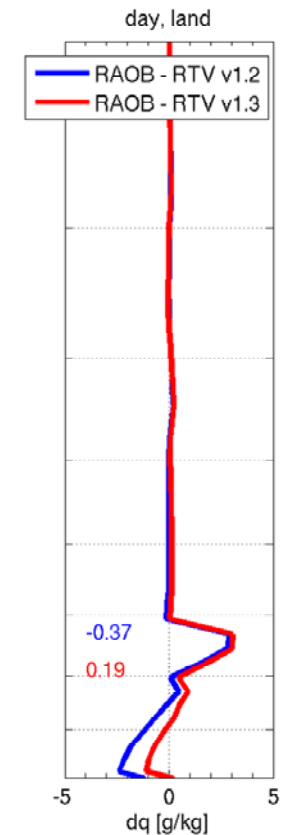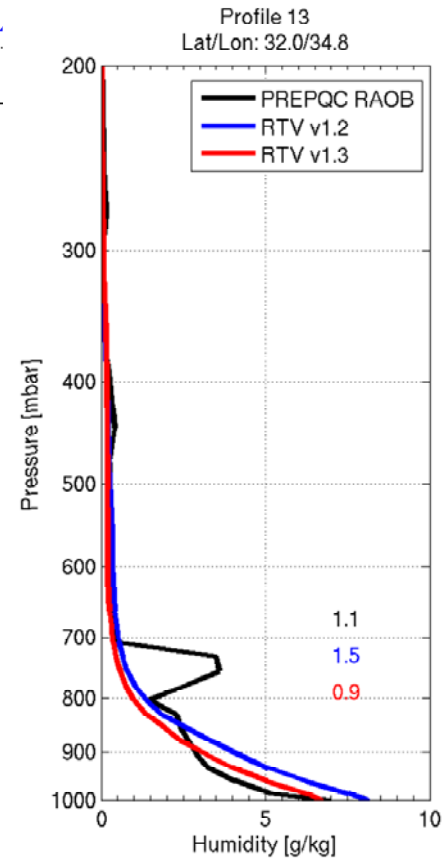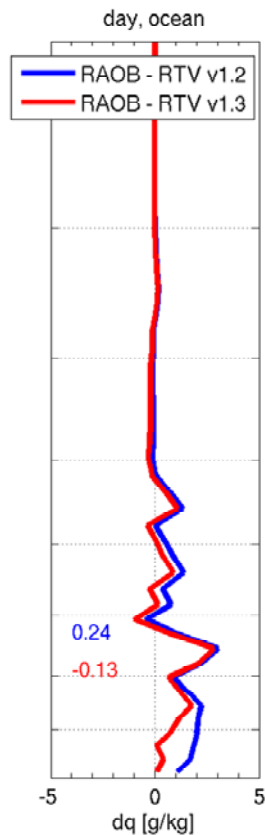
ocean

land

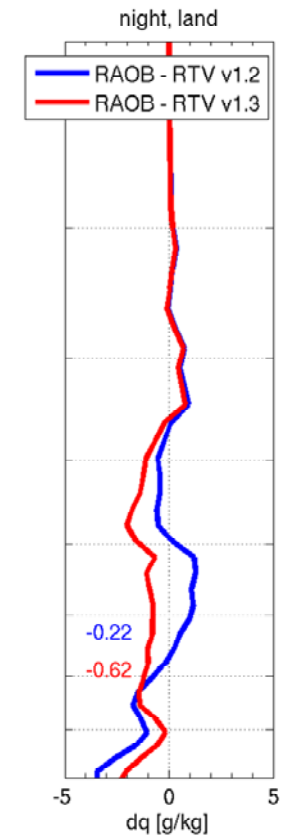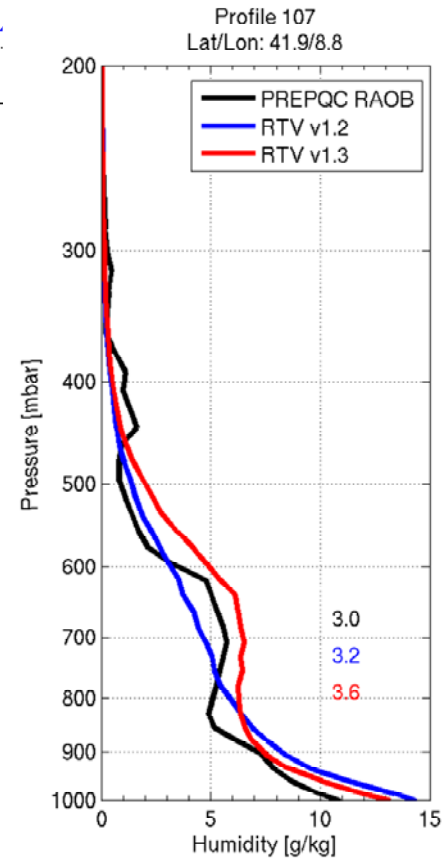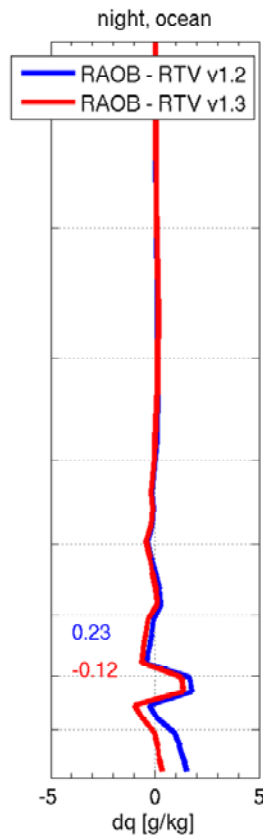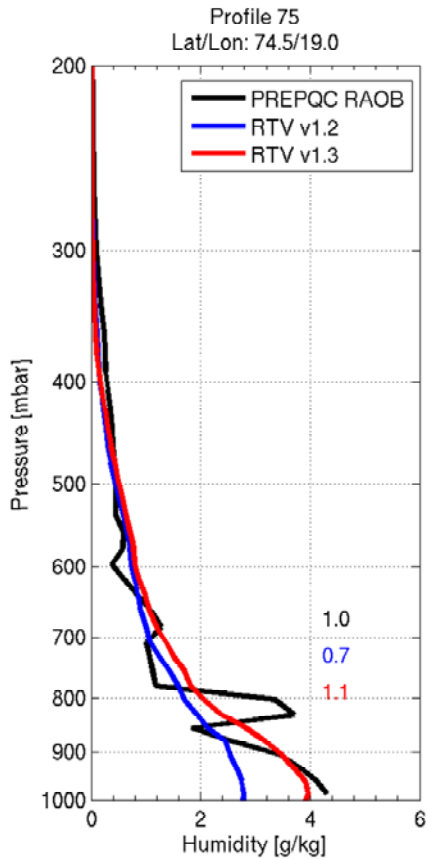# Selected Prepqc Matchup profiles: Humidity Profiles (night)

Selected Prepqc profiles
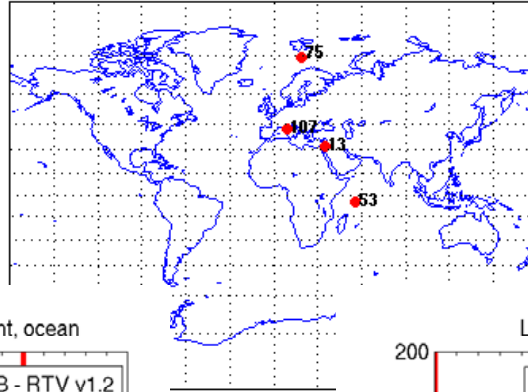
ocean

land

Granule 192, Sept-02, 2003 (daytime, ascending)

BT [K] at 920 cm^{-1}

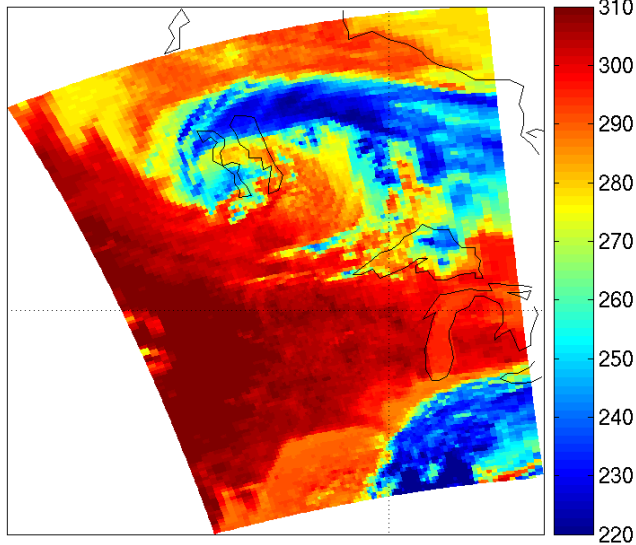Granule 192, 09-02-2003
Brightness Temperature [K] at 919.83 cm^{-1}
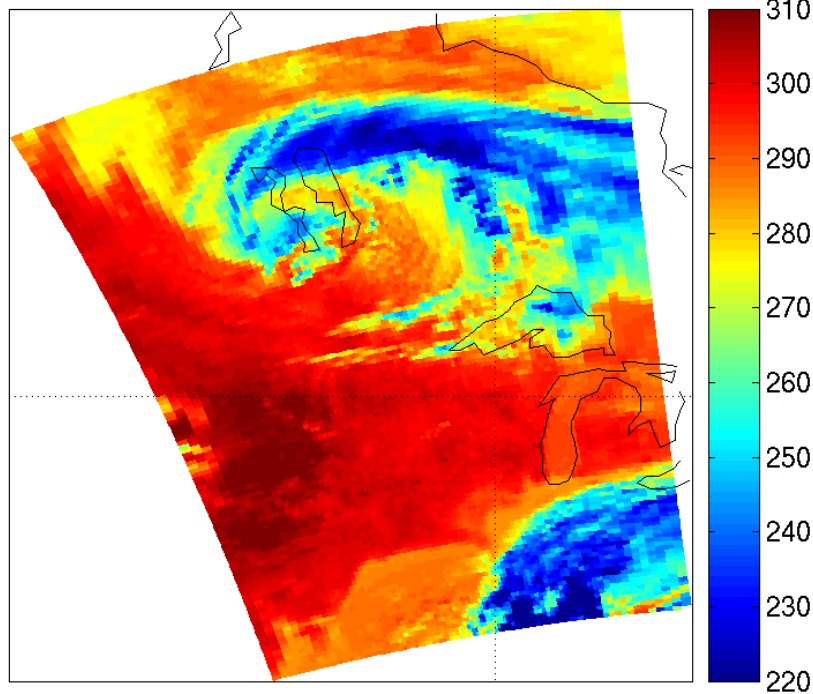
Granule 192, 09-02-2003
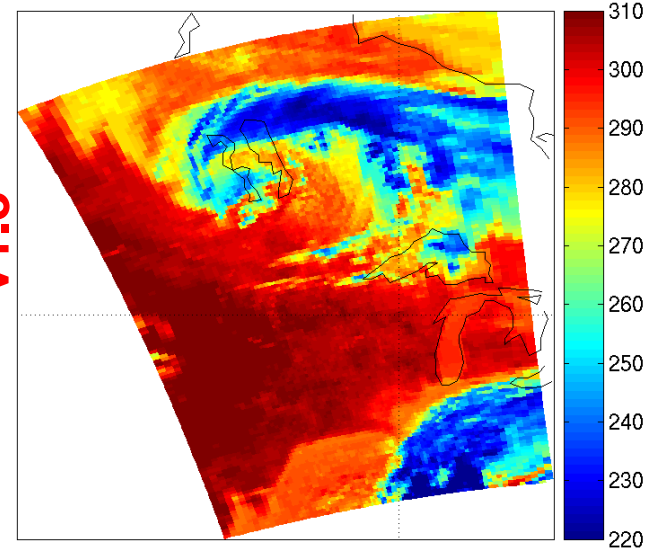Brightness Temperature [K] at 919.83 cm^{-1}
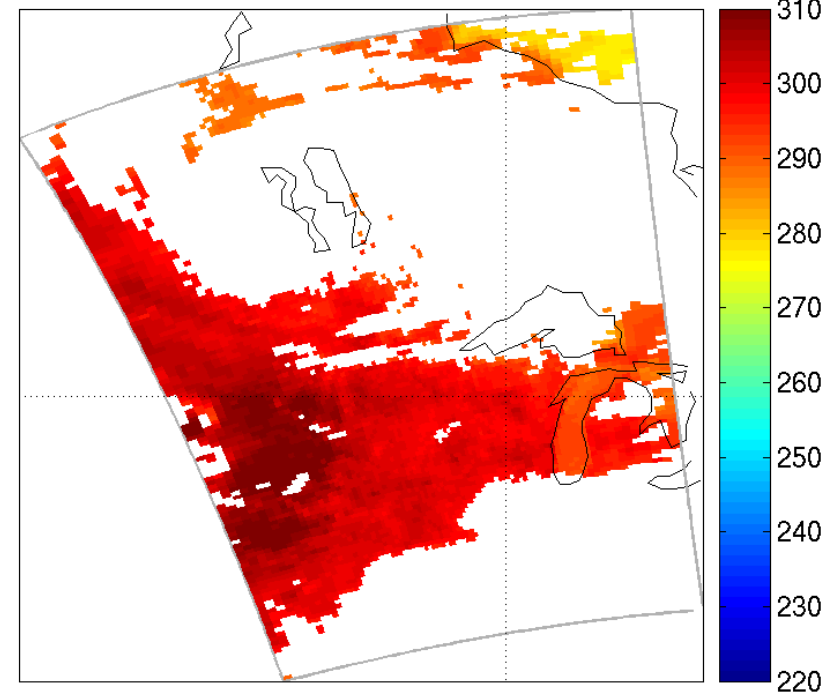
Surface Skin Temperature

IMAPP AIRS Retrieval v1.2: G192, 09-02-2003
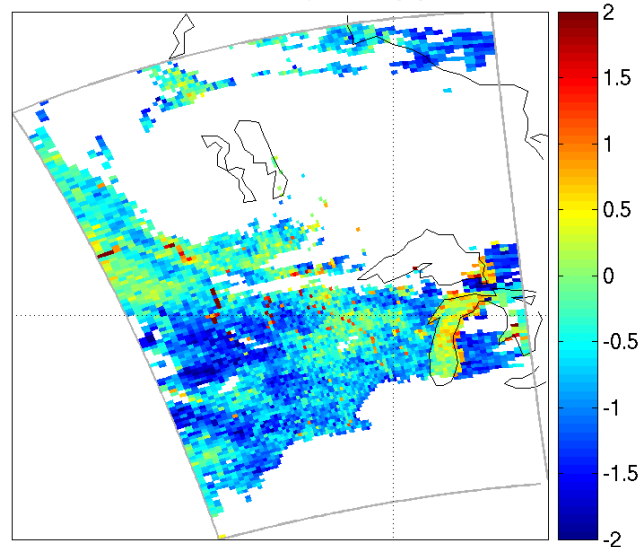Surface Skin Temperature [K]

IMAPP AIRS RTV v1.2

IMAPP AIRS Retrieval: G192, 09-02-2003
Surface Skin Temperature [K]

IMAPP AIRS RTV v1.3

RTV v1.2 minus RTV v1.3
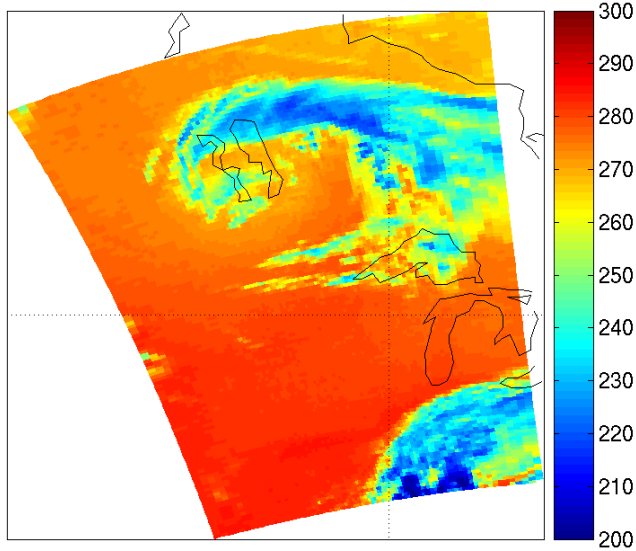Surface Skin Temperature [K]

RTV v1.2 minus v1.3
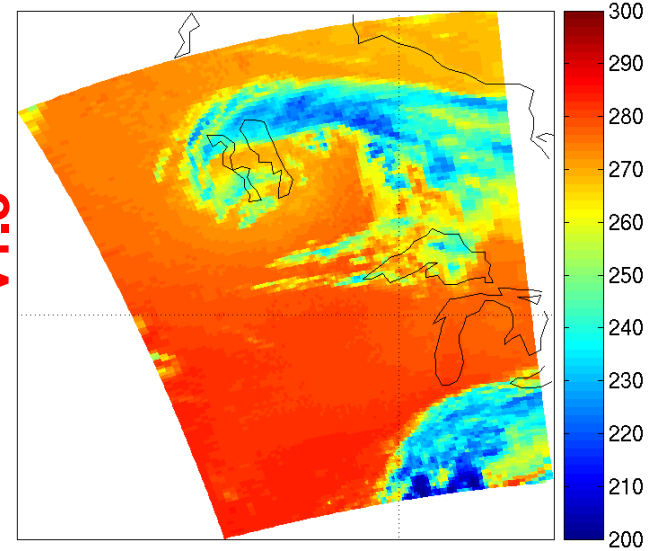
Temperature at 700 mbar

IMAPP AIRS RTV v1.2

IMAPP AIRS Retrieval v1.2: G192, 09-02-2003
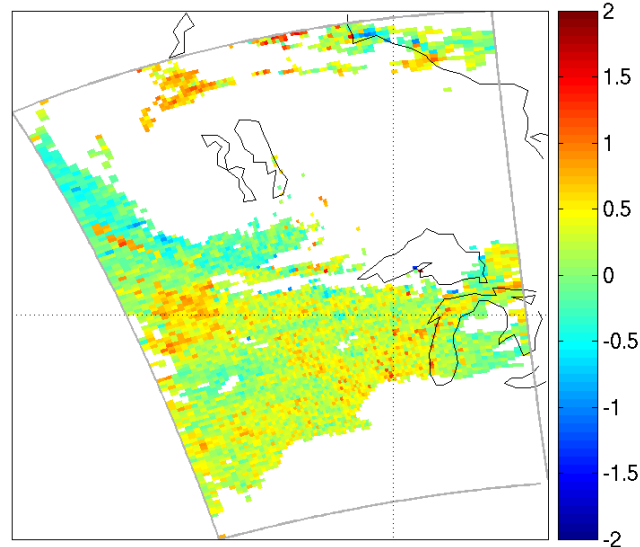Temperature [K] at 706.565 mbar

IMAPP AIRS RTV v1.3

IMAPP AIRS Retrieval: G192, 09-02-2003
Temperature [K] at 706.565 mbar

RTV v1.2 minus v1.3

RTV v1.2 minus RTV v1.3
Temperature [K] at 706.565 mbar
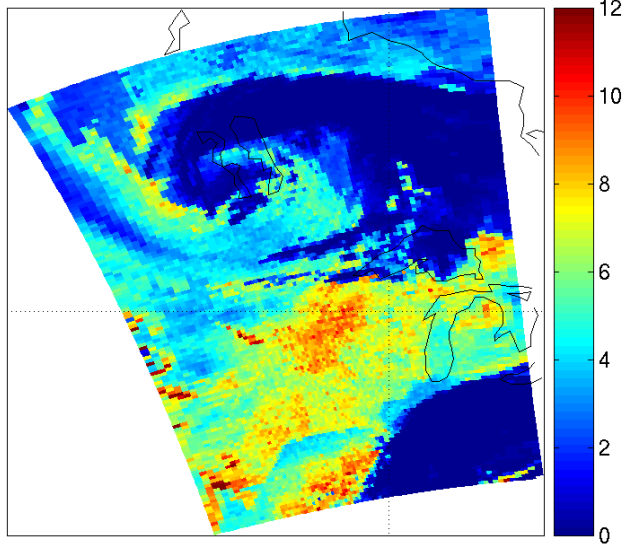
Humidity at 850 mbar
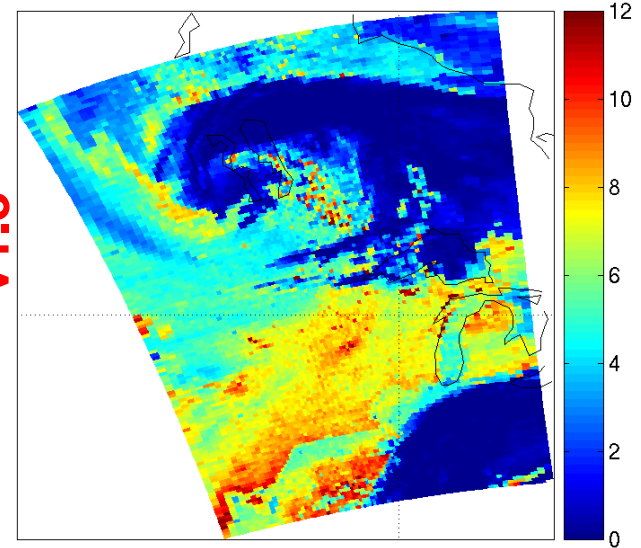
IMAPP AIRS Retrieval v1.2: G192, 09-02-2003
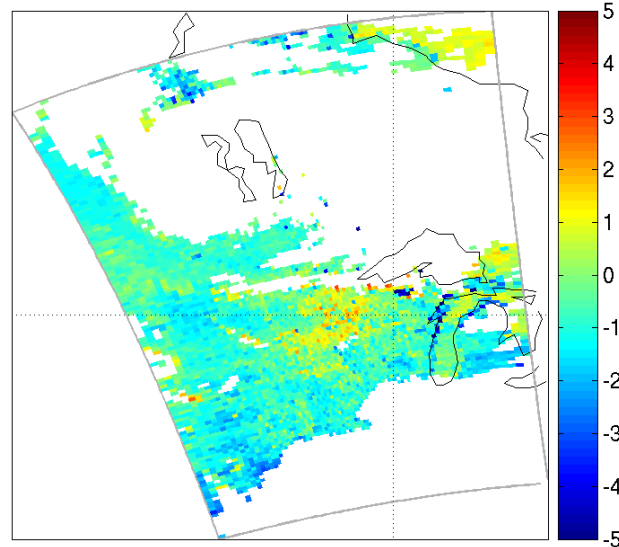Humidity [g/kg] at 852.788 mbar

IMAPP AIRS Retrieval: G192, 09-02-2003
Humidity [g/kg] at 852.788 mbar

IMAPP AIRS RTV v1.2

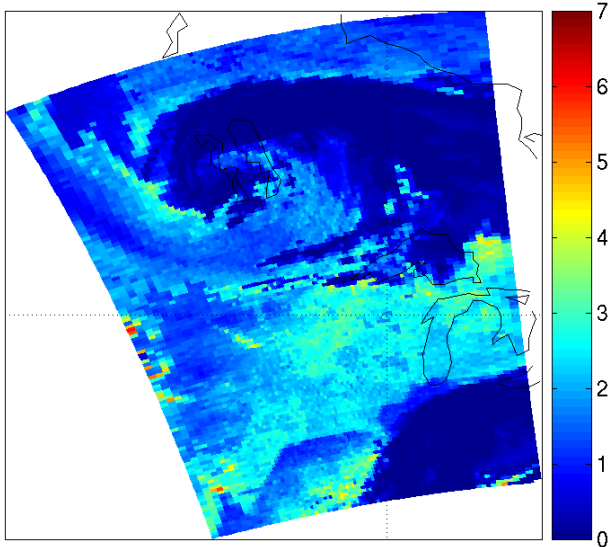**IMAPP AIRS RTV v1.3**

RTV v1.2 minus RTV v1.3
Humidity [g/kg] at 852.788 mbar
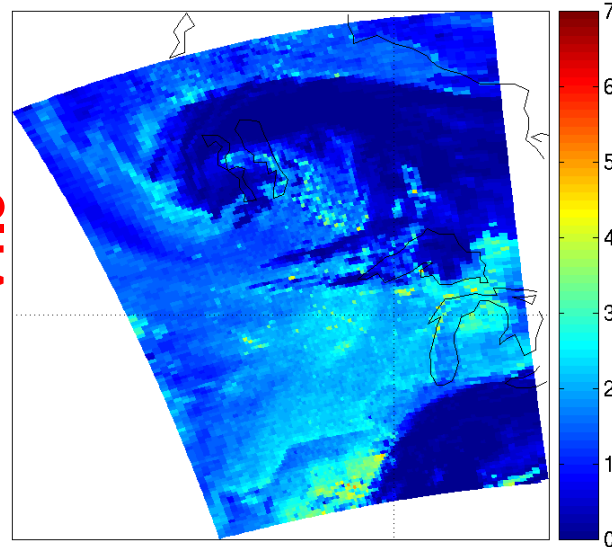
RTV v1.2 minus v1.3

17

Total Precipitable Water

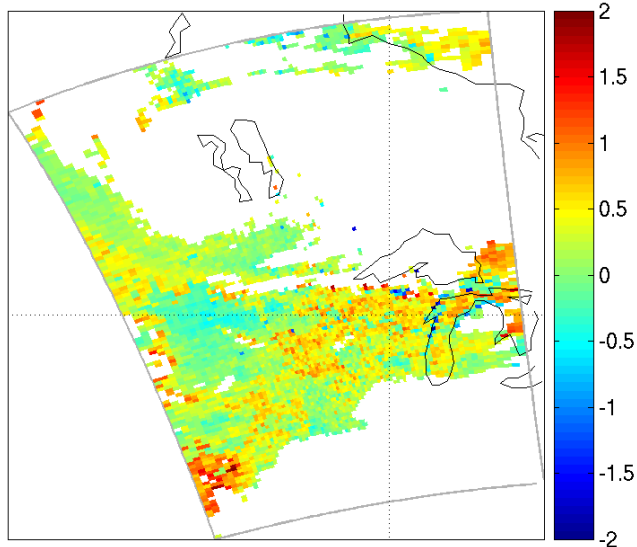IMAPP AIRS Retrieval v1.2: G192, 09-02-2003
TPW [cm]

IMAPP AIRS Retrieval: G192, 09-02-2003
TPW [cm]

IMAPP AIRS RTV v1.2

IMAPP AIRS RTV v1.3

RTV v1.2 minus RTV v1.3
TPW [cm]

RTV v1.2 minus v1.3

18

Ozone at 10 mbar

IMAPP AIRS RTV v1.2
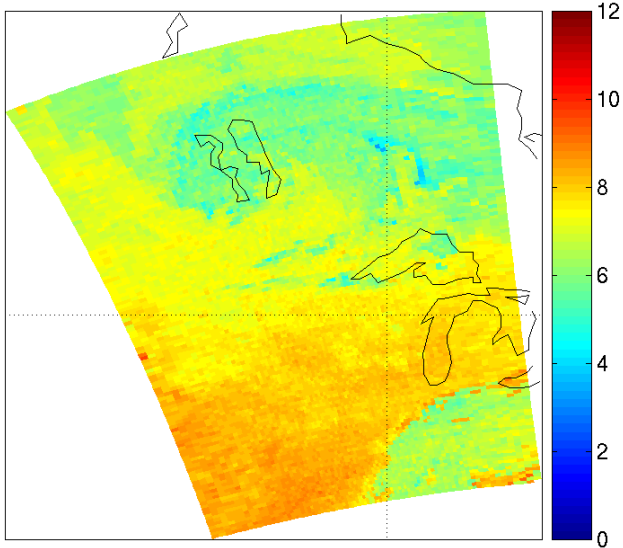
IMAPP AIRS RTV v1.3

RTV v1.2 minus v1.3

Total Ozone

IMAPP AIRS Retrieval v1.2: G192, 09-02-2003
Total Ozone [dobsons]
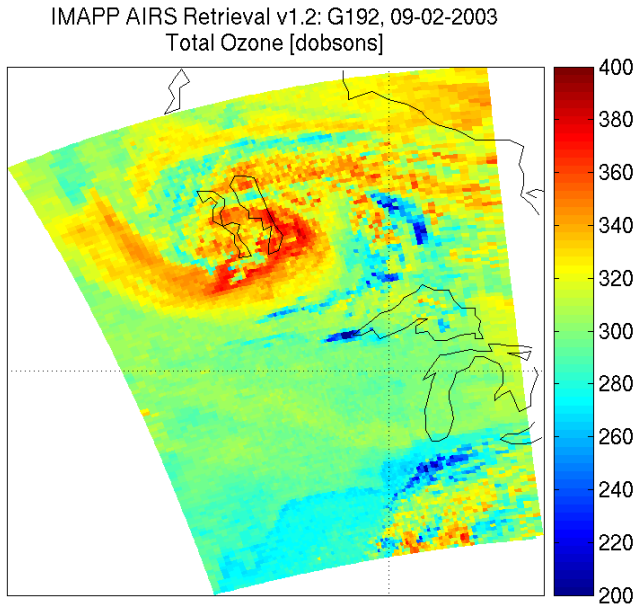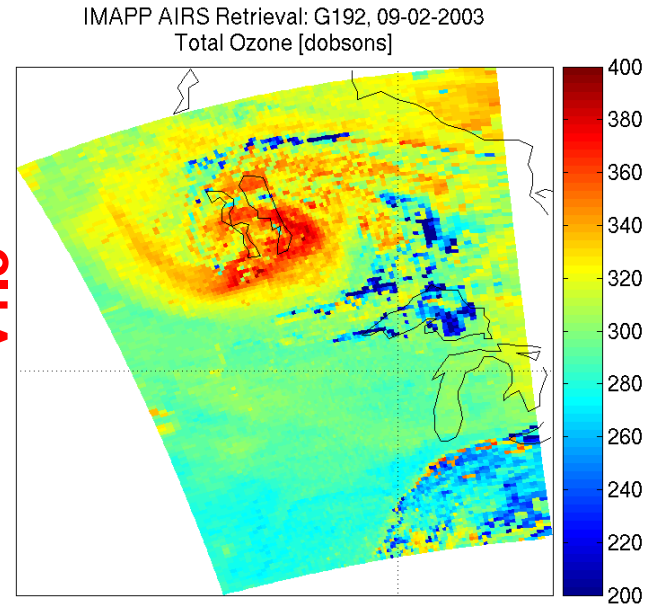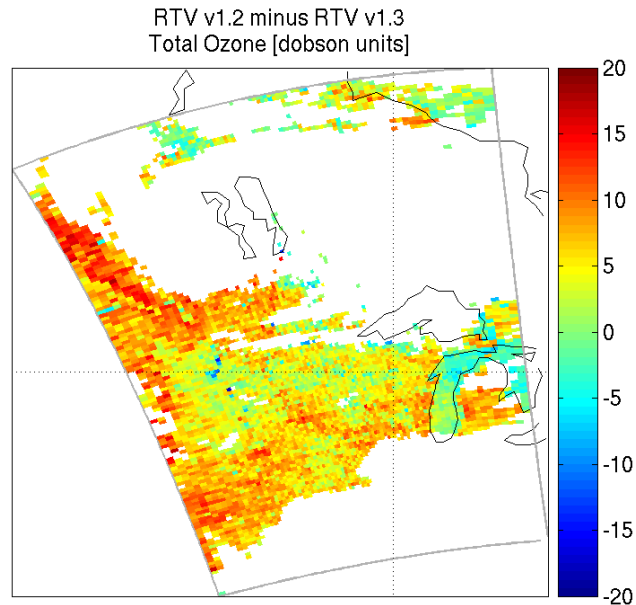
IMAPP AIRS RTV v1.2

IMAPP AIRS Retrieval: G192, 09-02-2003
Total Ozone [dobsons]
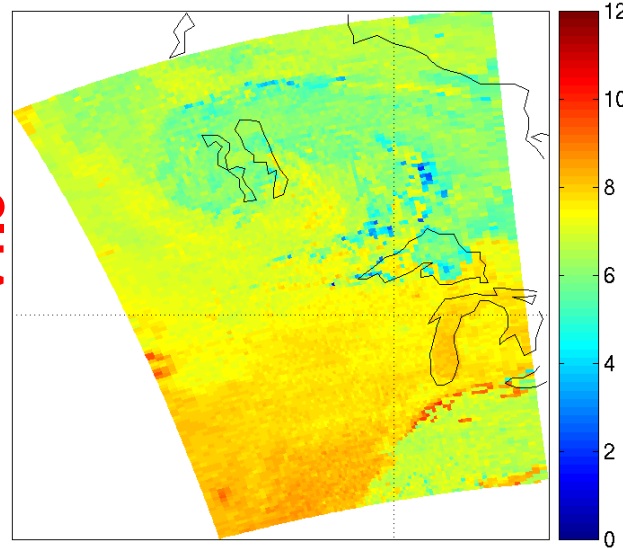
IMAPP AIRS RTV v1.3

RTV v1.2 minus RTV v1.3
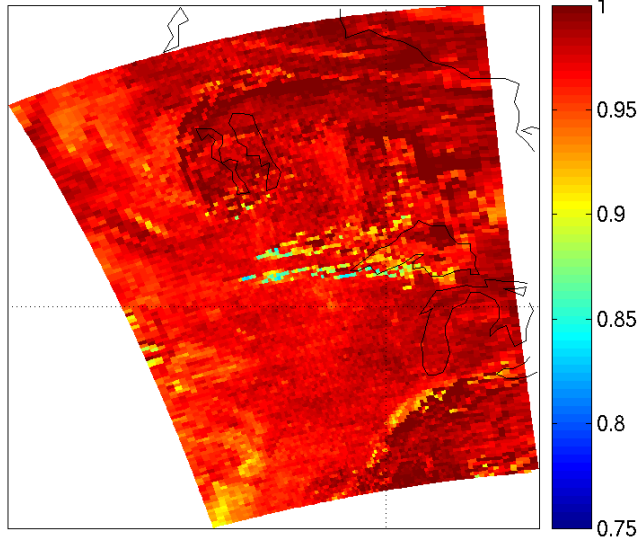Total Ozone [dobson units]

RTV v1.2 minus v1.3

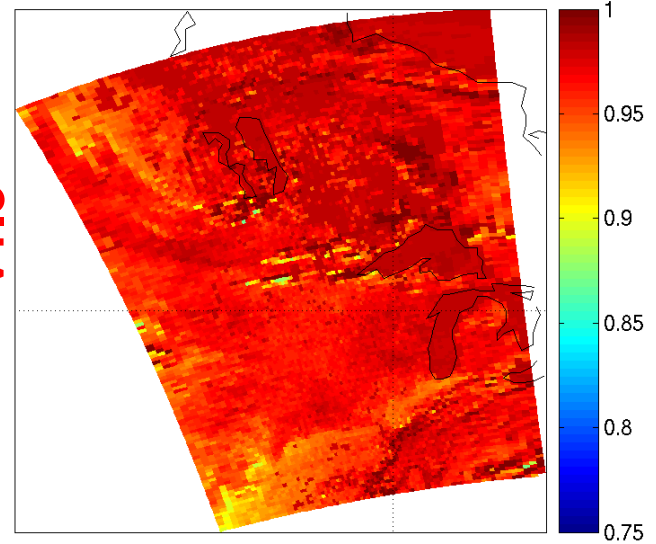# Surface Emissivity at 1204 cm^{-1}

IMAPP AIRS Retrieval v1.2: G192, 09-02-2003
Surface Emissivity at 1204.82 cm^{-1}

IMAPP AIRS RTV v1.2

IMAPP AIRS Retrieval: G192, 09-02-2003
Surface Emissivity at 1204.82 cm^{-1}

IMAPP AIRS RTV v1.3

RTV v1.2 minus RTV v1.3
Surface Emissivity at 1204.82 cm^{-1}

RTV v1.2 minus v1.3

Surface Reflectivity at 2325 cm^{-1}

IMAPP AIRS Retrieval v1.2: G192, 09-02-2003
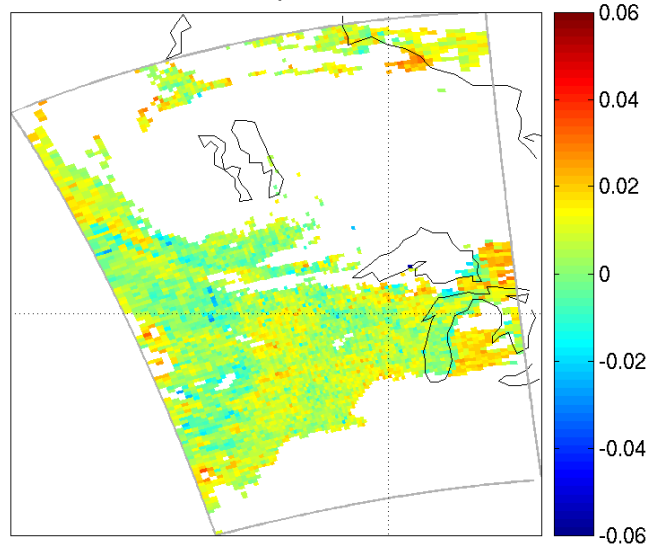Surface Reflectivity at 2325.58 cm^{-1}
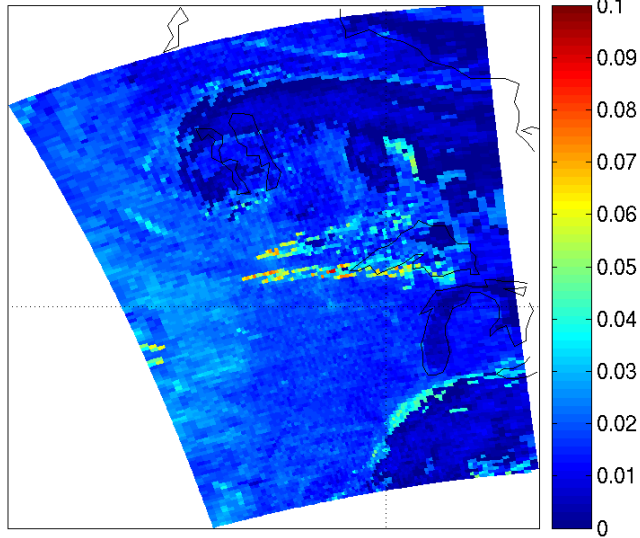
IMAPP AIRS RTV v1.2

IMAPP AIRS Retrieval: G192, 09-02-2003
Surface Reflectivity at 2325.58 cm^{-1}

IMAPP AIRS RTV v1.3
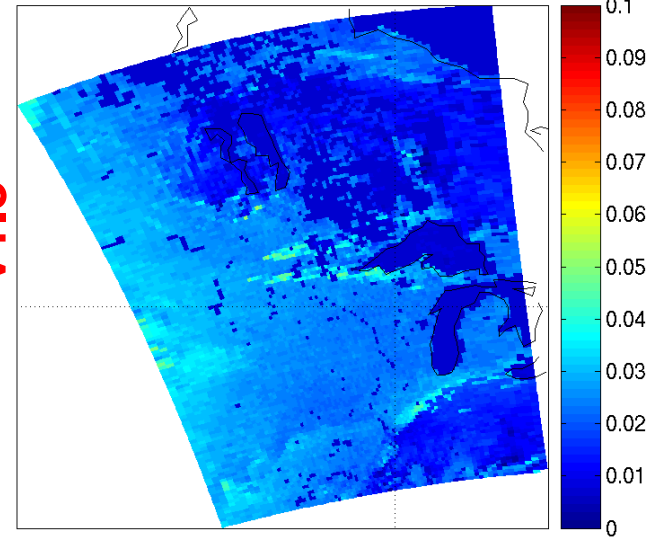
RTV v1.2 minus RTV v1.3
Surface Reflectivity at 2325.58 cm^{-1}

RTV v1.2 minus v1.3
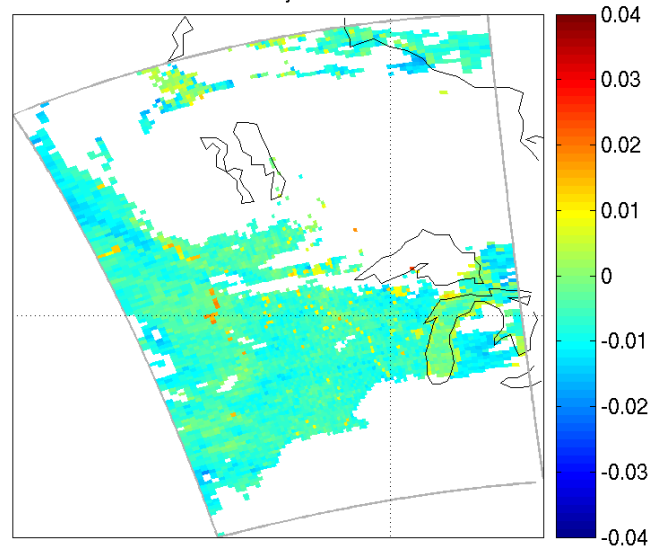
Granule 11, Sept-08, 2004 (nighttime, descending)

BT [K] at 1217 cm⁻¹
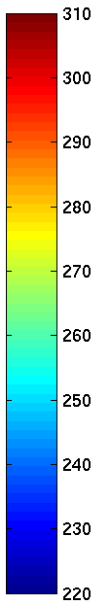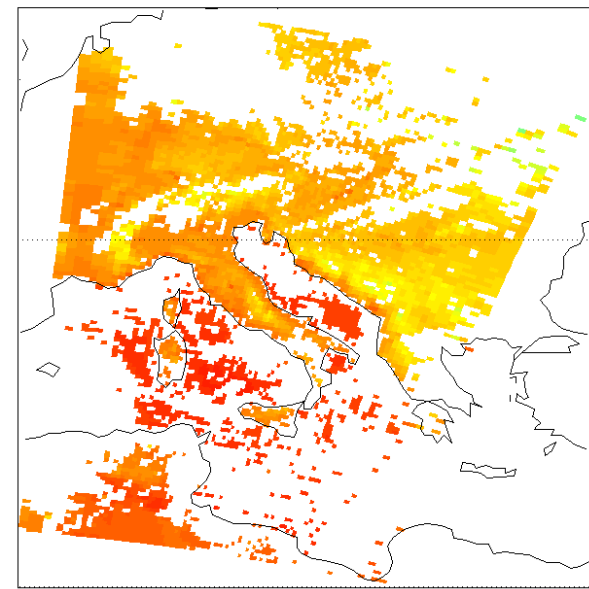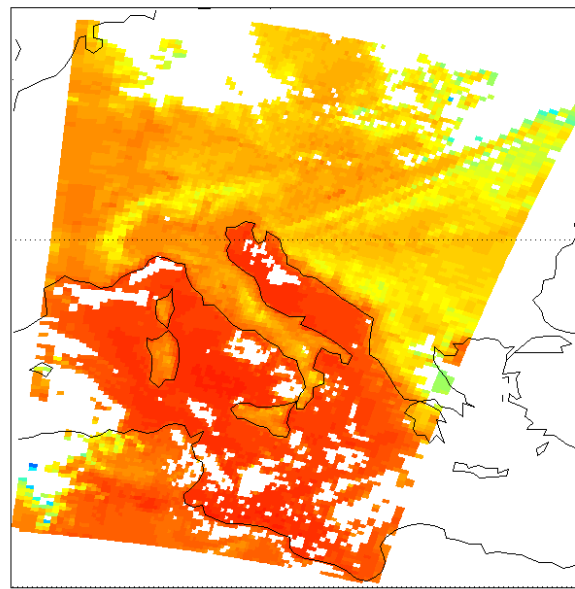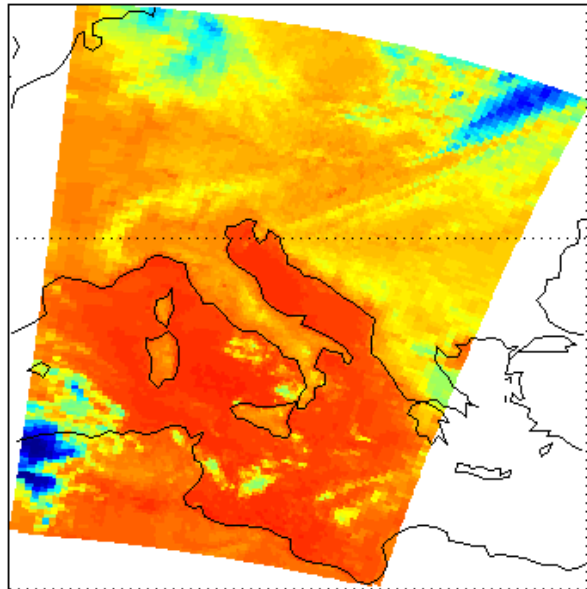
Clear and partially cloudy pixels

Clear pixels

Surface Skin Temperature

IMAPP AIRS Retrieval v1.2: G011, 09-08-2004
Surface Skin Temperature [K]

IMAPP AIRS RTV v1.2

IMAPP AIRS Retrieval: G011, 09-08-2004
Surface Skin Temperature [K]

IMAPP AIRS RTV v1.3

RTV v1.2 minus RTV v1.3
Surface Skin Temperature [K]

RTV v1.2 minus v1.3

24
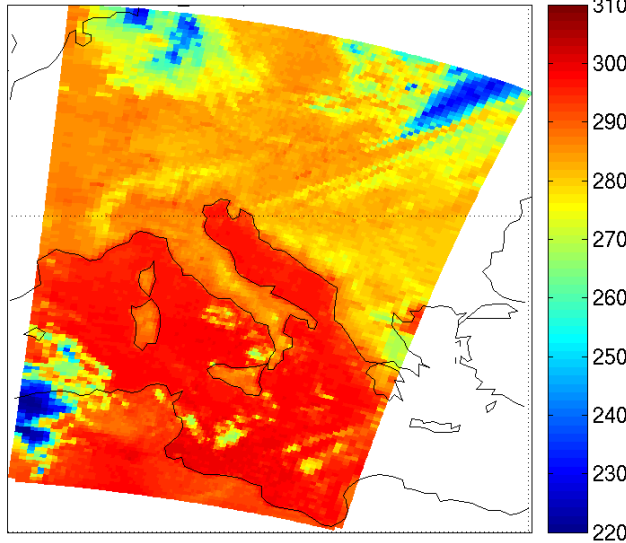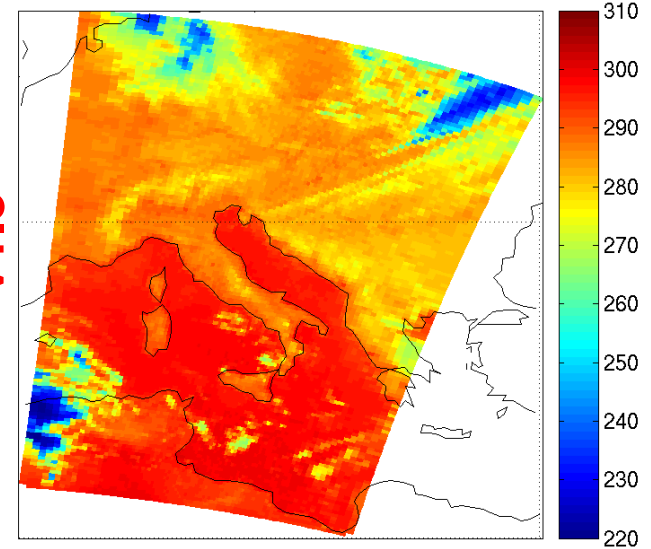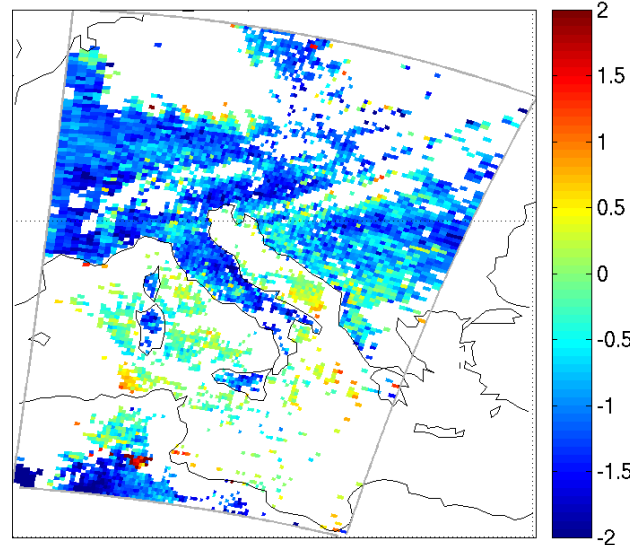
Surface Skin Temperature

IMAPP AIRS RTV v1.2

IMAPP AIRS Retrieval v1.2: G011, 09-08-2004
Surface Skin Temperature [K]
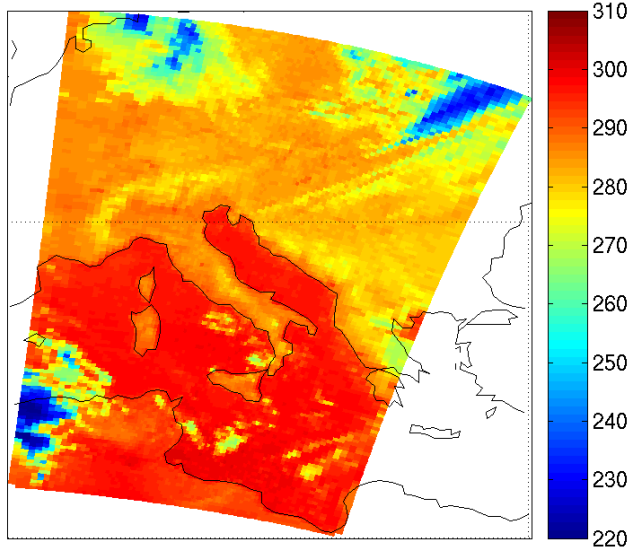
IMAPP AIRS RTV v1.3

IMAPP AIRS Retrieval: G011, 09-08-2004
Surface Skin Temperature [K]
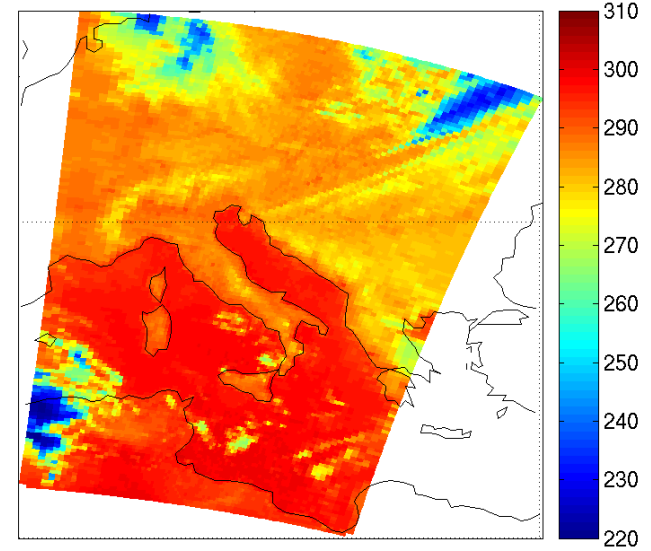
ECMWF Analysis

ECMWF.2004.09.08.T00Z.uad_HGrbF00.A04255061959
Surface Skin Temperature [K]
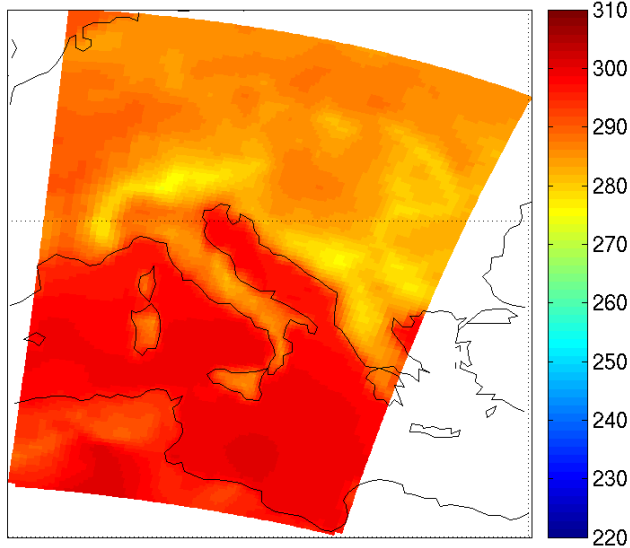
Standard Physical Retrieval

AIRS.2004.09.08.011.L2.RetStd.v4.0.9.0.G05172060145.hdf
Surface Temperature [K]

Surface Emissivity at 1204 cm^{-1}

IMAPP AIRS RTV v1.2

IMAPP AIRS RTV v1.3

RTV v1.2 minus v1.3

Surface Emissivity at 1204 cm^{-1}

IMAPP AIRS Retrieval v1.2: G011, 09-08-2004
Surface Emissivity at 1204.82 cm^{-1}

IMAPP AIRS Retrieval: G011, 09-08-2004
Surface Emissivity at 1204.82 cm^{-1}

IMAPP AIRS RTV v1.2

IMAPP AIRS RTV v1.3

Operational Standard Physical Retrieval Product

AIRS.2004.09.08.011.L2.RetStd.v4.0.9.0.G05172060145.hdf
Surface Emissivity at wavenumber 1204.82

27

Surface Reflectivity at 2325 cm^{-1}

IMAPP AIRS Retrieval v1.2: G011, 09-08-2004
Surface Reflectivity at 2325.58 cm^{-1}

IMAPP AIRS Retrieval: G011, 09-08-2004
Surface Reflectivity at 2325.58 cm^{-1}

IMAPP AIRS RTV v1.2
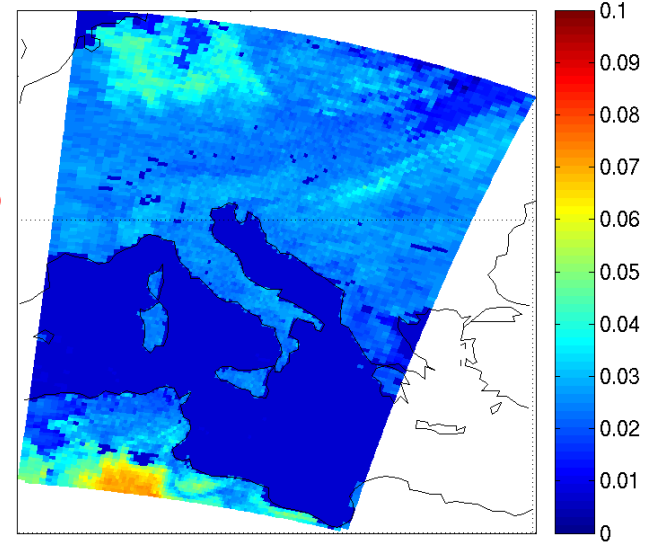
IMAPP AIRS RTV v1.3

RTV v1.2 minus RTV v1.3
Surface Reflectivity at 2325.58 cm^{-1}

RTV v1.2 minus v1.3
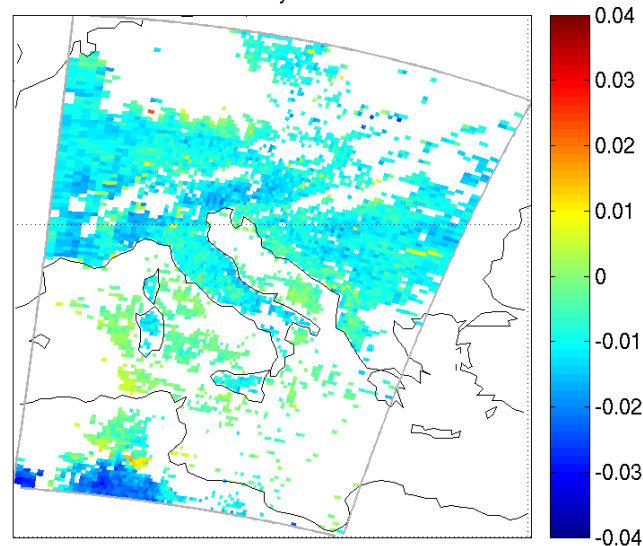
Surface Reflectivity at 2325 cm^{-1}

IMAPP AIRS Retrieval v1.2: G011, 09-08-2004
Surface Reflectivity at 2325.58 cm^{-1}

IMAPP AIRS Retrieval: G011, 09-08-2004
Surface Reflectivity at 2325.58 cm^{-1}

IMAPP AIRS RTV v1.2

IMAPP AIRS RTV v1.3

AIRS.2004.09.08.011.L2.RetStd.v4.0.9.0.G05172060145.hdf
Surface Reflectivity at wavenumber 2325.58

Operational Standard Physical Retrieval Product
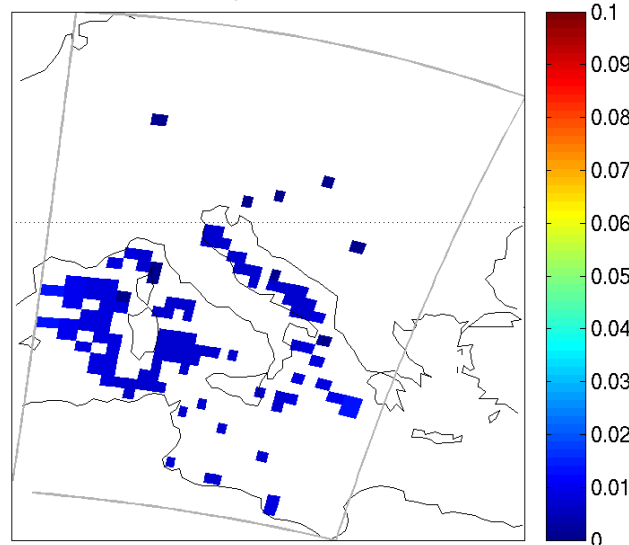
29

Real Time Data Processing and Distribution

http://eosdb.ssec.wisc.edu/modisdirect/

Liam Gumley, Jerrold Robaidek, Rosanne Spangler, Douglass Ratcliff, Alison Krautkramer

IMAPP Terra/Aqua MODIS Level 2 Products

Automatic Production at SSEC

Latest Terra MODIS University of Wisconsin Direct Broadcast Daytime Products

Other Product Pages:

Terra Daytime | Terra Nighttime | Aqua Daytime | Aqua Nighttime | Archive
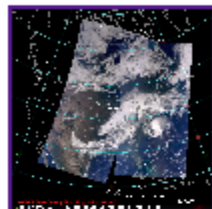
Natural Color (R: .65 micron, G: .55 micron, B: .45 micron)
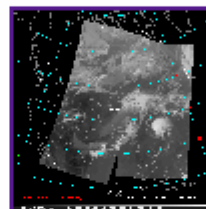
Band 20 (3.7 micron)

Cloud Mask Product

Cloud Phase

Aerosol Optical Depth

Band 26 (1.38 micron)

Band 31 (11 micron)
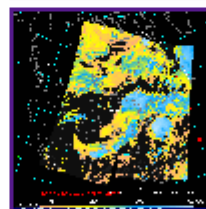
Cloud Top Pressure
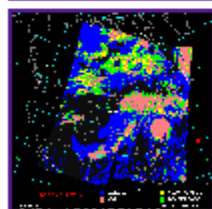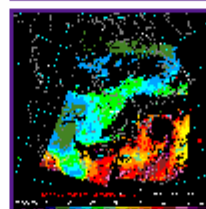
Total Preciptable Water Vapor
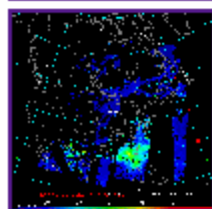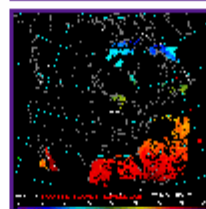
Sea Surface Temperatures

Hurricane Rita 19:20 UTC 21 September 2005 UW/SSEC

AMSR-E Rain Rate Product
28 August 2005 0722 UTC

Hurricane Katrina

AMSR-E Instantaneous Rain Rate (in/hr)

0   0.25   0.50   0.75   1   1.25   1.50   1.75   2

0001 AMSR-RAIN 1 28 AUG 05240 072200 02286 09521 02.00

AMSR-E Soil Moisture

DB version

MODIS True Color Images Requests

Averages ~2 per month (Jen O'Leary and Terri Gregory)
Diverse requests

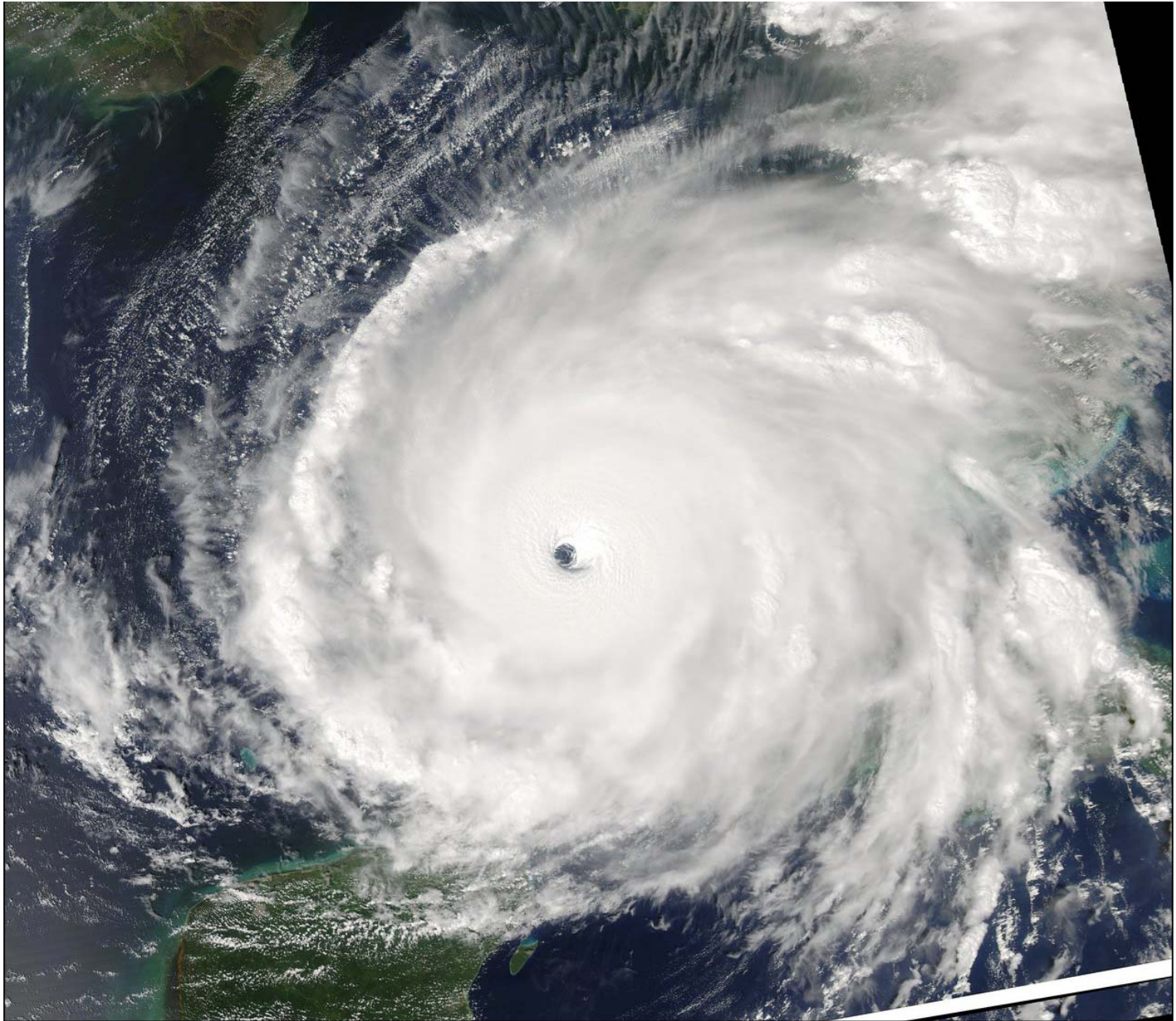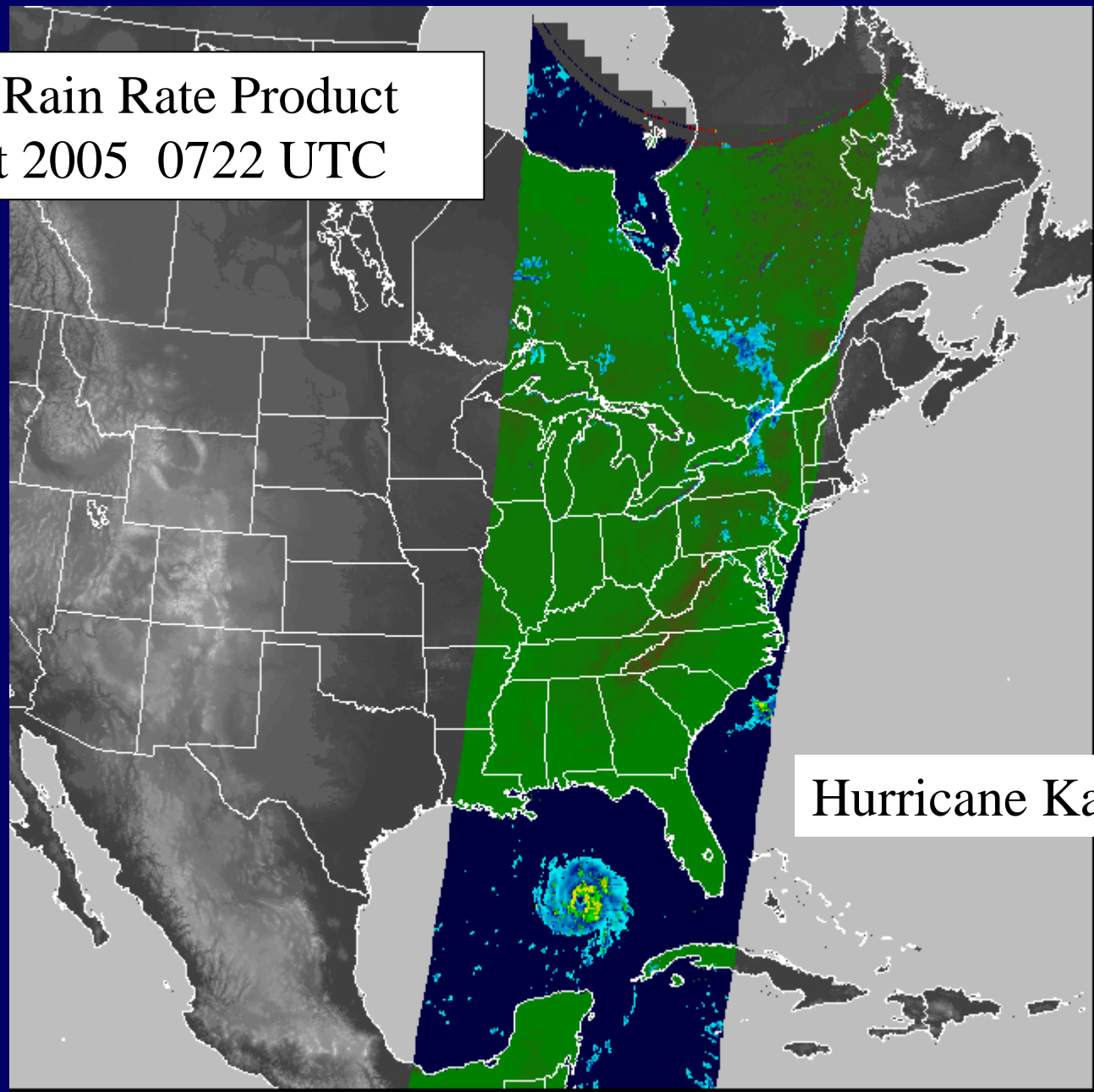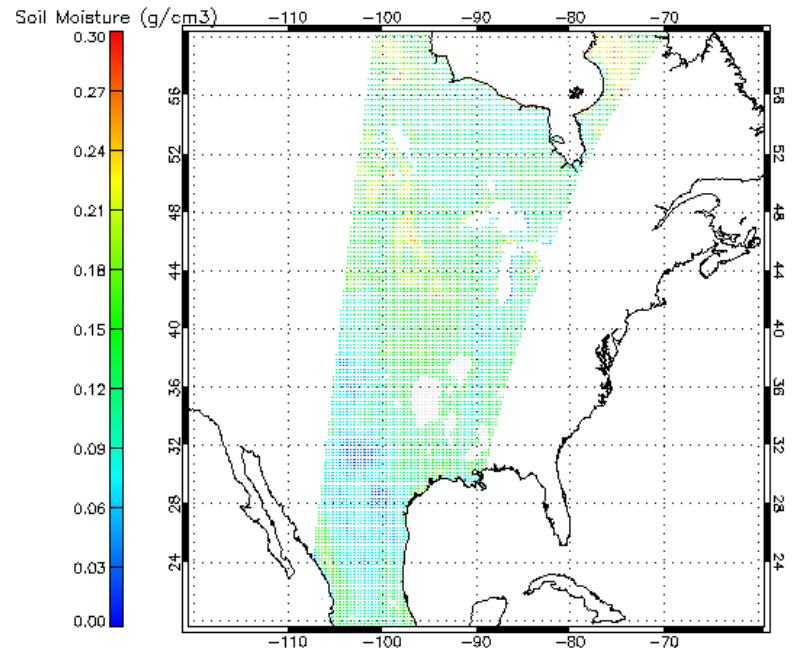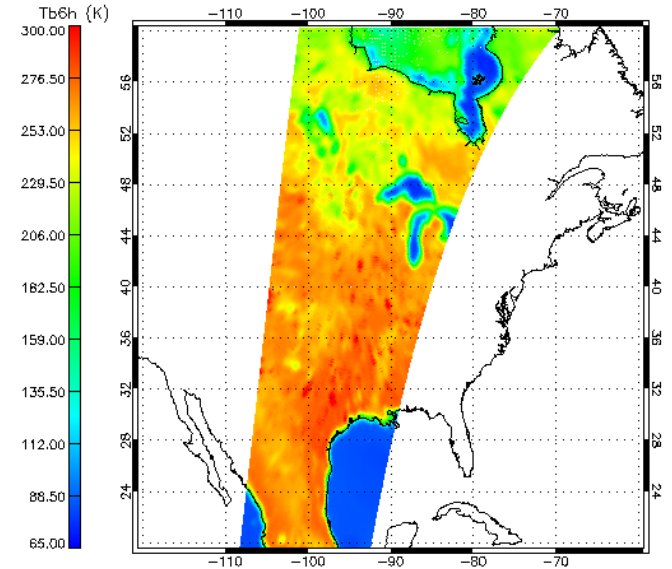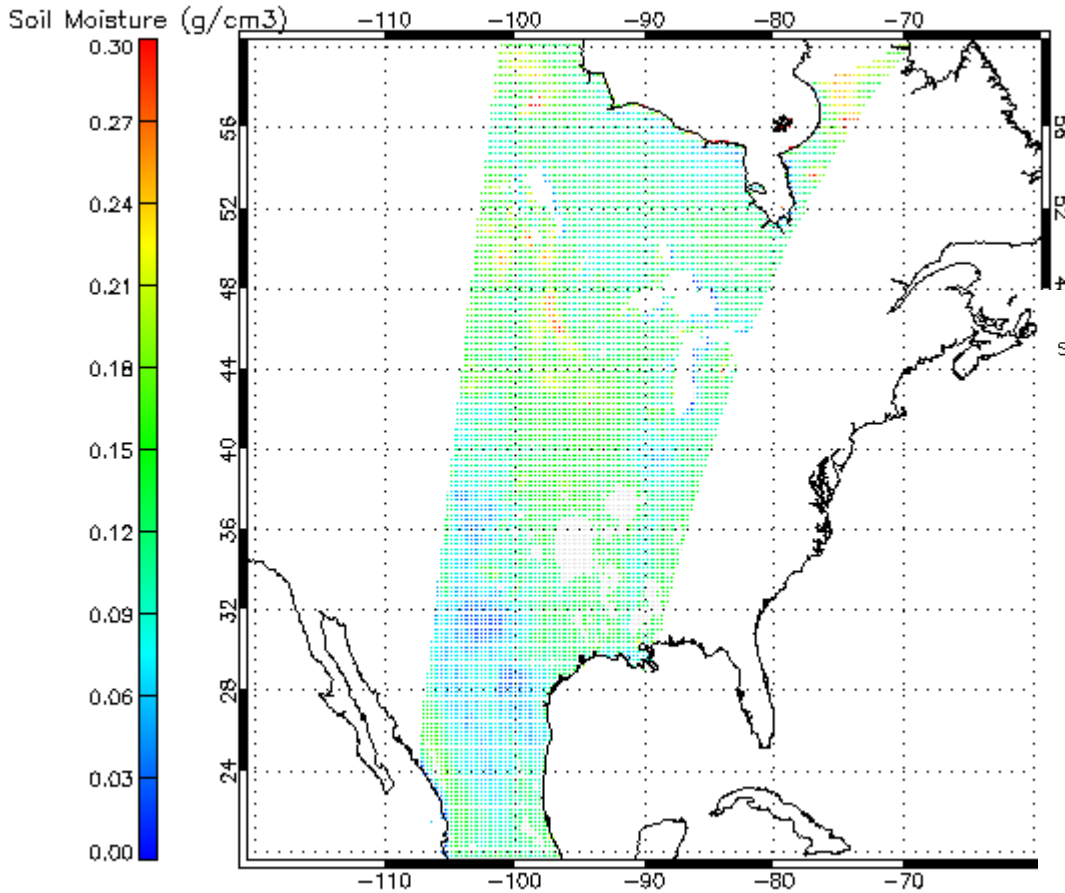|	A	B	C	D	E
1	Image Description	Date	Purpose (if applicable	Organization/Person	Website (if applicable)
2	Blowing dust affects Mexico and US	4/15/2003 (aquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
3	Snow across the Western US	11/29/2004 (aquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
4	Hurricane Ivan	14 September 2004 (aquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
5	Autum in WI and MI	6&10 October 2003 (aquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
6	Rocky Mountain Fires	11 June 2002 (aquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
7	Code Red Air over Mid-Atlantic States	1 June 2002 (acquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
8	Fog Plumes over the Great Lakes	16 April 2002 (acquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
9	Gulf Stream's Brightness Temp	2 May 2001 (acquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
10	Mississippi River Sediment Plume	5 March 2001 (aquired	n/a	Earth Observatory	http://earthobservatory.nasa.g
11	Winter in northeastern US	4 March 2001 (acquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
12	Ash plume from Cleveland Volcano	19 Februrary 2001 (acquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
13	Clouds in color by altitude	February 2001 (published)	for an article about "new generation of satellites zooms in on a familiar planet	Air & Space	n/a
14	Snowcover in Midwest	2 January 2001 (acquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
15	US East Coast	11/1/2000 (aquired)	for a calendar	SeaSpace	n/a
16	Nyamuragira Volcano Erupts	26 July 2002 (aquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
17	Fires in Shenandoah National Park	1 November 2000 (acquired)	n/a	Earth Observatory	http://earthobservatory.nasa.g
18	Watertown, WI tire fire smoke	23 July 2005 (published)	article about detrimental effects of tire fire	Wisconsin State Journal	http://www.madison.com/arch
19	Hurricane Katrina	(upcoming)	to illustrate a movie honoring hurricane rescue workers	Helicopter Association Inten	n/a
20	Hurricane Katrina	(upcoming)	for a documentary about Hurricane Katrina	The DII Company	n/a
21	Hurricane Katrina	(upcoming)	for a report	American Society of Civil En	n/a
22	algal bloom	(unknown 2005)	for a presentation	Elizabeth Malloy	n/a
23	hurricane imagery	spring 2006 (published)	article about hurricane season predictions	Orlando Sentinel	n/a
24	brightness temps in Gulf Stream	November 2005 (start of exhibit	Use image in an exhibit titled "Benjamin Franklin: In Search of a Better World"	Charlotte County Historic	n/a
25	Hurricane Katrina	September 1, 2006 (published)	for annual report	Louisiana School for the D	n/a
26	Hurricane Lilli	(unknown 2005)	for annual report	BUND Heidelberg	n/a
27	Hurricane Lilli	(unknown 2006)	used in documentary called "Who Killed the Electric Car?"	Sony Pictures Classics	n/a
28	Summer 2002 Southwest Fires	Jul-02	used in 50+ media outlets inc. CBS Evening and Morning News and its Early Show, C	various (see previous cell	http://www.ssec.wisc.edu/me
29	Hurricane Wilma	2006	cover of an annual report	Lions of Florida	n/a
30	winter in Wisconsin	Jan-05	featured in blog	David Medarias, Isthmus	n/a
31	Autum in WI and MI	6&10 October 2003 (aquired)	Albuquerque, NM and on WKOW TV Channel 27 and WMTV channel 15 in Madison, V	multiple (see previous cell)	http://www.ssec.wisc.edu/me
32	(various)	November 2003 (published)	"create the future" video for potential university donors	UW Foundation	n/a
33	Mississippi River Sediment Plume	5 March 2001 (acquired)	display about the Mississisppi	Itasca State Park's Jacob	n/a
34	Hurricane Ivan	September 14, 2003 (acquired)	n/a	NASA	n/a
35	Tropical Storm Isidore	October 9, 2002 (published)	article about SSEC's research	Wisconsin Week	n/a
36	Ship tracks over the North Atlantic	11-May-05	n/a	Earth Observatory	http://earthobservatory.nasa.g
37	Southwestern dust in midwest	16 December 2003 (aquired)	article about the dust from New Mexico that was carried by the wind to Wisconsin	WISCTV	http://www.channel3000.com/
38					

http://coastwatch.glerl.noaa.gov/

Q- "canadian ice service" mc

Apple   .Mac   Amazon   eBay   Yahoo!   News ▾

What's New

CW Overview

AVHRR Imagery

GLSEA

Contour Maps

GOES Imagery

RADARSAT

MODIS Imagery

Ocean Color

Image Products

In Situ Data

GLFS

Statistics

JAVA GIS

Image Archive

Software

Documentation

Validation

Welcome to the NOAA CoastWatch
Great Lakes Node

CoastWatch

Great Lakes CoastWatch Node
NOAA/Great Lakes Environmental
Research Laboratory
2205 Commonwealth Blvd.
Ann Arbor, MI 48105-2945
Fax: 734-741-2055
http://coastwatch.glerl.noaa.gov

George A. Leshkevich,
Manager

Songzhi Liu,
Operations Assistant

Canadian Ice Service integrates MODIS into operational data stream for ice monitoring

CIS data suite includes RadarSat and Envisat (SAR); AMSR, QuikScat and SSM/I (microwave); MODIS, OLS, NOAA and GOES (visible images).

• MODIS supplements SAR data in clear sky conditions.

• 250 meter resolution true color GeoTIFF images are obtained daily from SSEC for Great Lakes, Hudson Bay, Labrador coast, and Gulf of St. Lawrence.

MODIS helps to define ice boundary along southern Prince Edward Island
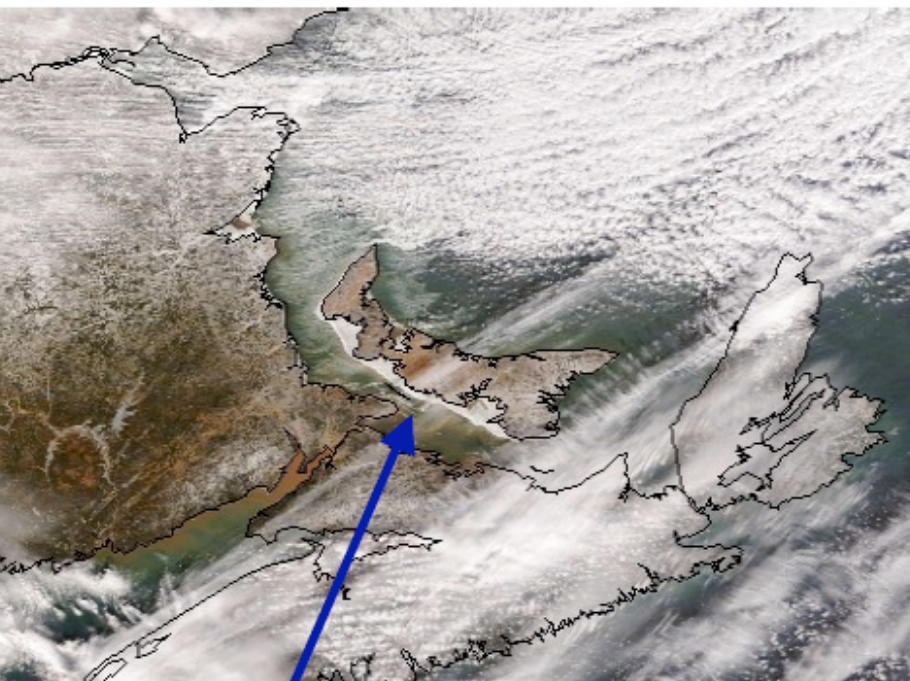
MODIS DB image 2006/02/18 15:26 UTC
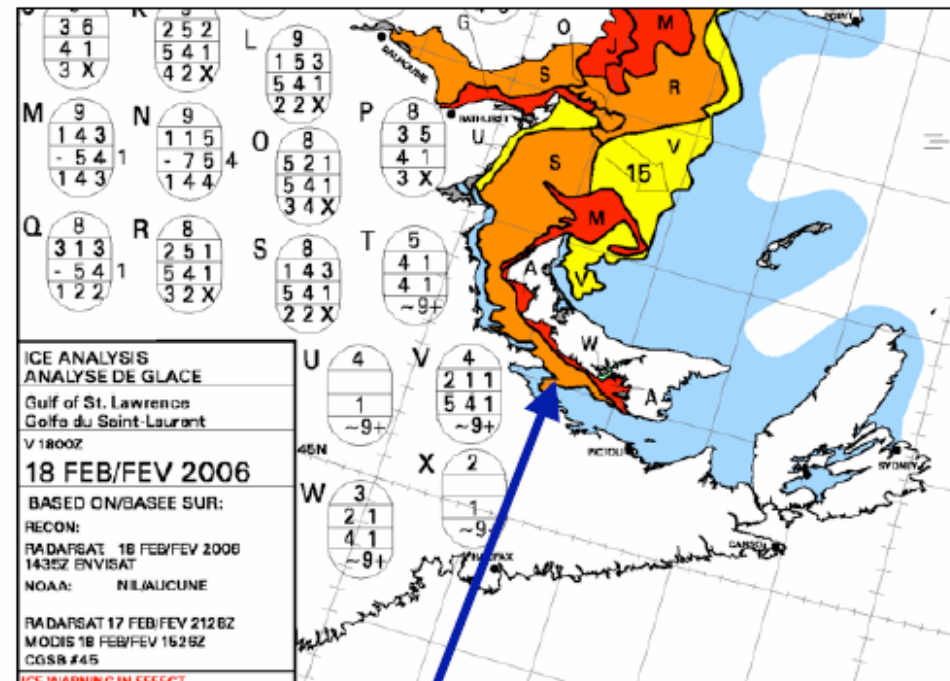
CIS Ice Analysis 2006/02/18

Real Time Sea Surface Temperatures SST's
Steve Ackerman, Tom Whittaker, Jim Davies

- Supports Turtle Migration Studies in Delaware Bay
  - http://whale.wheelock.edu/whalenet-stuff/stop_cover

- Roll over values through web site (Java Applet)

- http://cimss.ssec.wisc.edu/db_products/SST/

MODIS Polar Wind Vectors can be derived automatically
Jeff Key, Chris Velden, Dave Santek

Wind vectors are generated using automatic feature tracking software developed for GOES.

6.7 μm heights are assigned based on forecast atmospheric profile.

11.0 μm heights are assigned based on window brightness temperature or CO_2 cloud height.

Winds are automatically quality controlled.
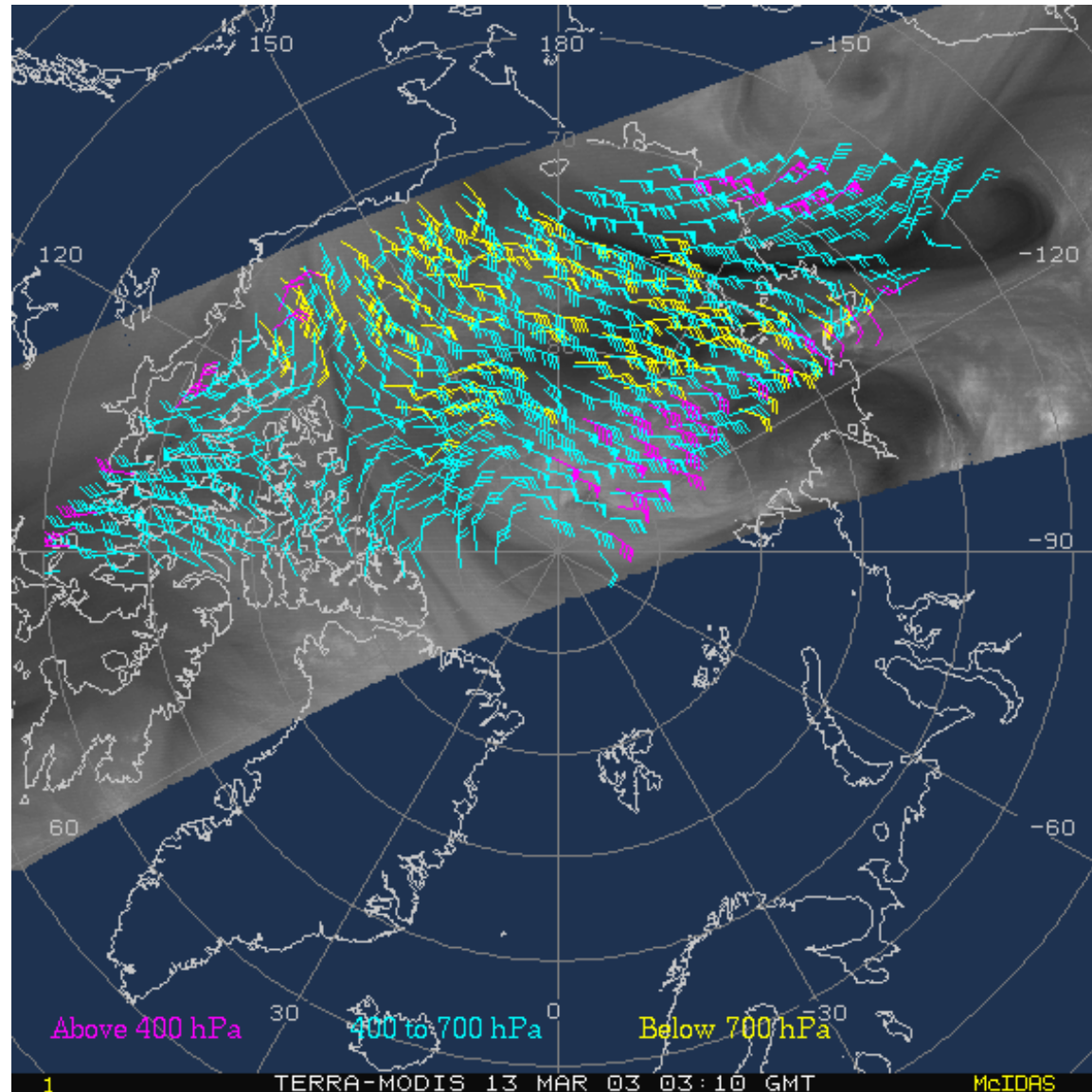
Terra MODIS 6.7 μm (band 27) 2003/03/13

Positive impact on forecast demonstrated by ECMWF
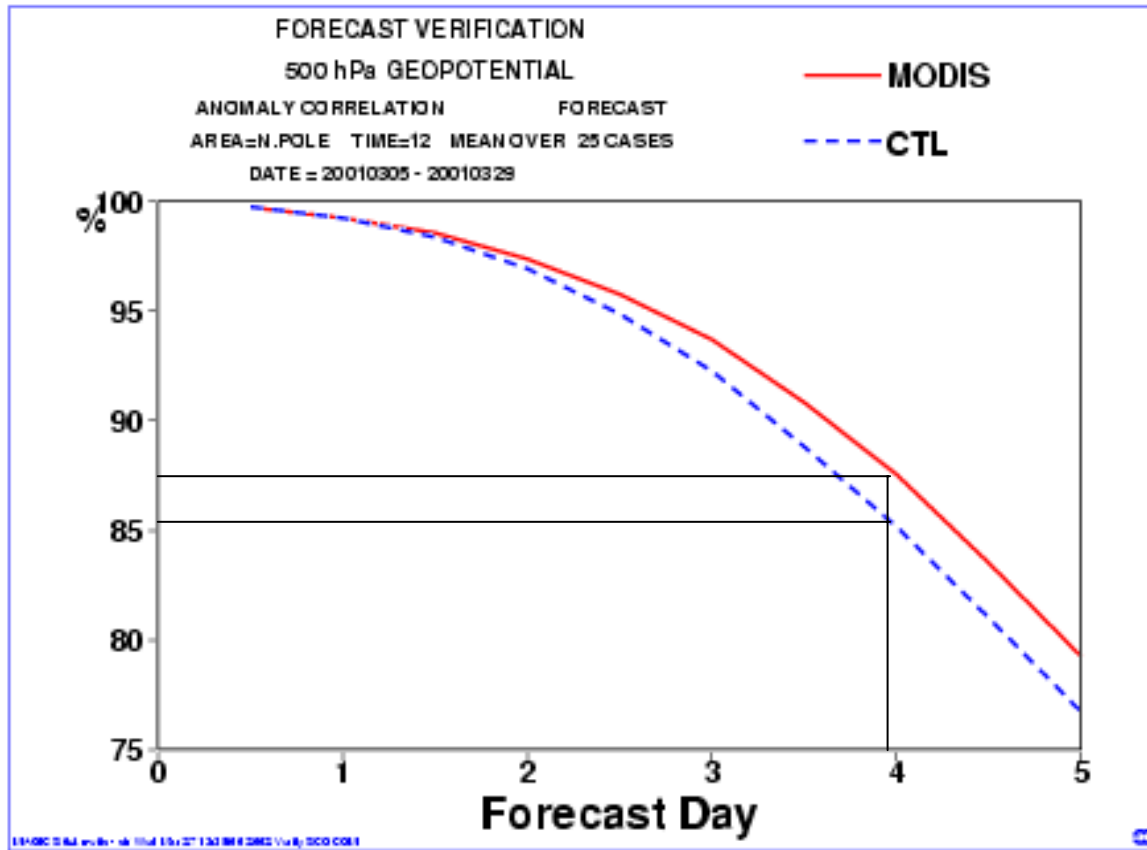
NWP Centers using MODIS Polar Winds Operationally:

ECMWF, GMAO, JMA, CMC, FNMOC, UKMO, DWD, NCEP/EMC

Global .5 degree SST

MODIS 1842 UTC SST
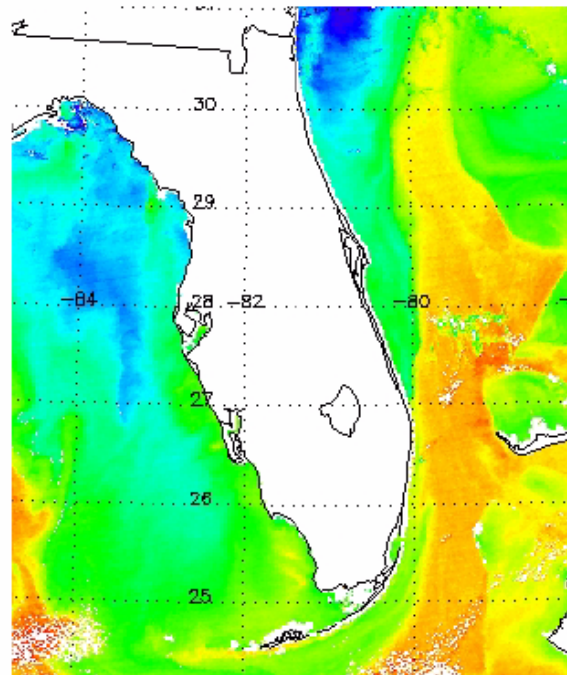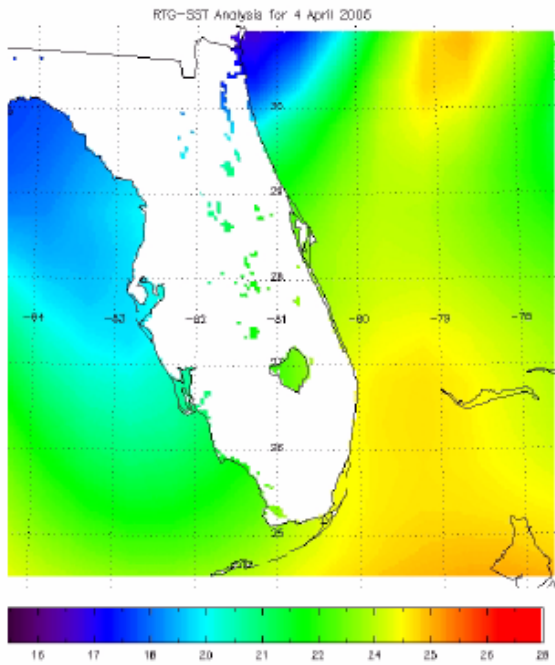
Sea Surface Temperatures

4 April 2005
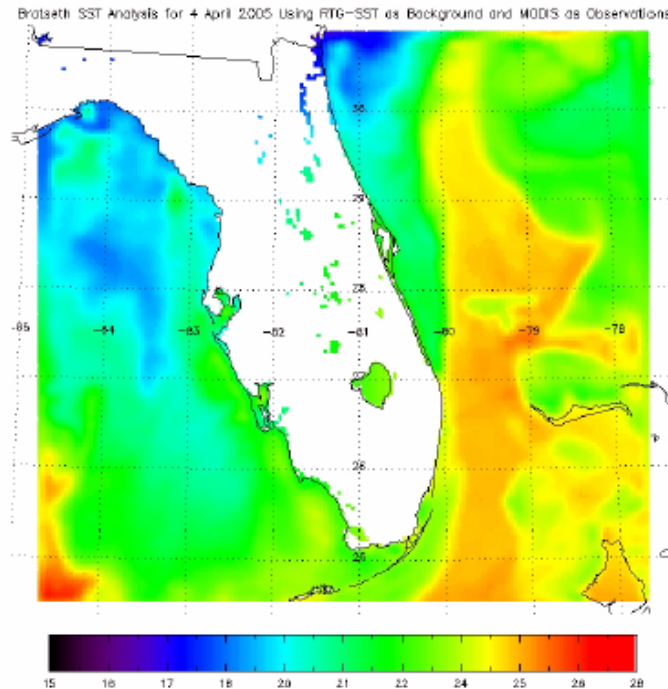
Bratseth analysis combining the RTG-SST and MODIS data.

MODIS Real-Time Images for PDAs (Russ Dengel)

Satellite images, radar loops, forecasts, road conditions are reformatted for PDA size displays and made available in real-time.

MODIS True Color images are created from every daytime pass in PDA format; latest image is always available.

Users: Firefighters, Police, Pilots, Commuters…

www.ssec.wisc.edu/data/paw/
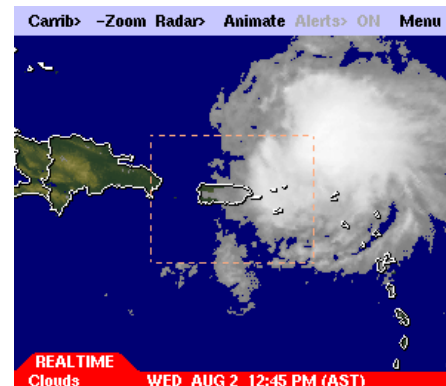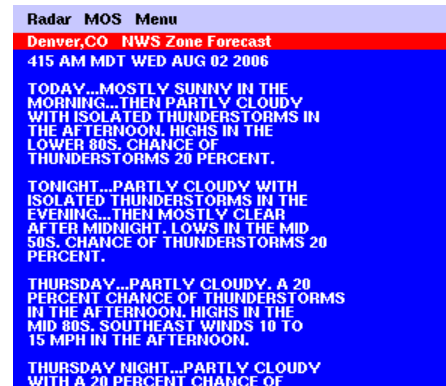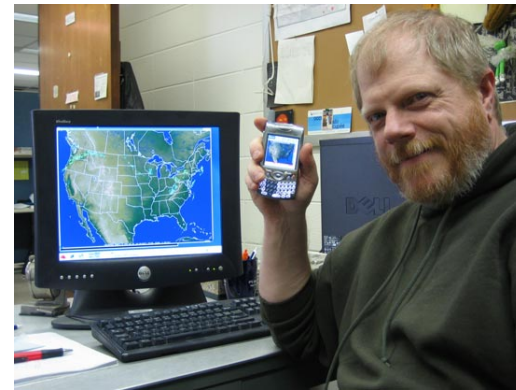
Infusing Satellite Data into Environmental Applications (IDEA)

Tony Wimmers, Brad Pierce, Chieko Kittaka, Liam Gumley, Scott Bachmeir, Scott Lindstrom, Jerry Robaidek, Bill Bellon

- Direct Broadcast MODIS data used to initialize aerosols for trajectory forecasts to improve air quality assessment, management and prediction

- Moved processing to CIMSS due to real-time availability of MODIS data and central location of antenna providing CONUS coverage

- http://idea.ssec.wisc.edu/

IDEA: Trajectory forecasting

MODIS 2005/06/23 AOD/COT & AOD Trajectories on 2005/06/23 15Z

AOD   0.0 0.2 0.4 0.6 0.8 1.0
Trajectory Pressure (mb)   1000 800 600 400 200 0
COT   0 10 20 30 40 50 60 70
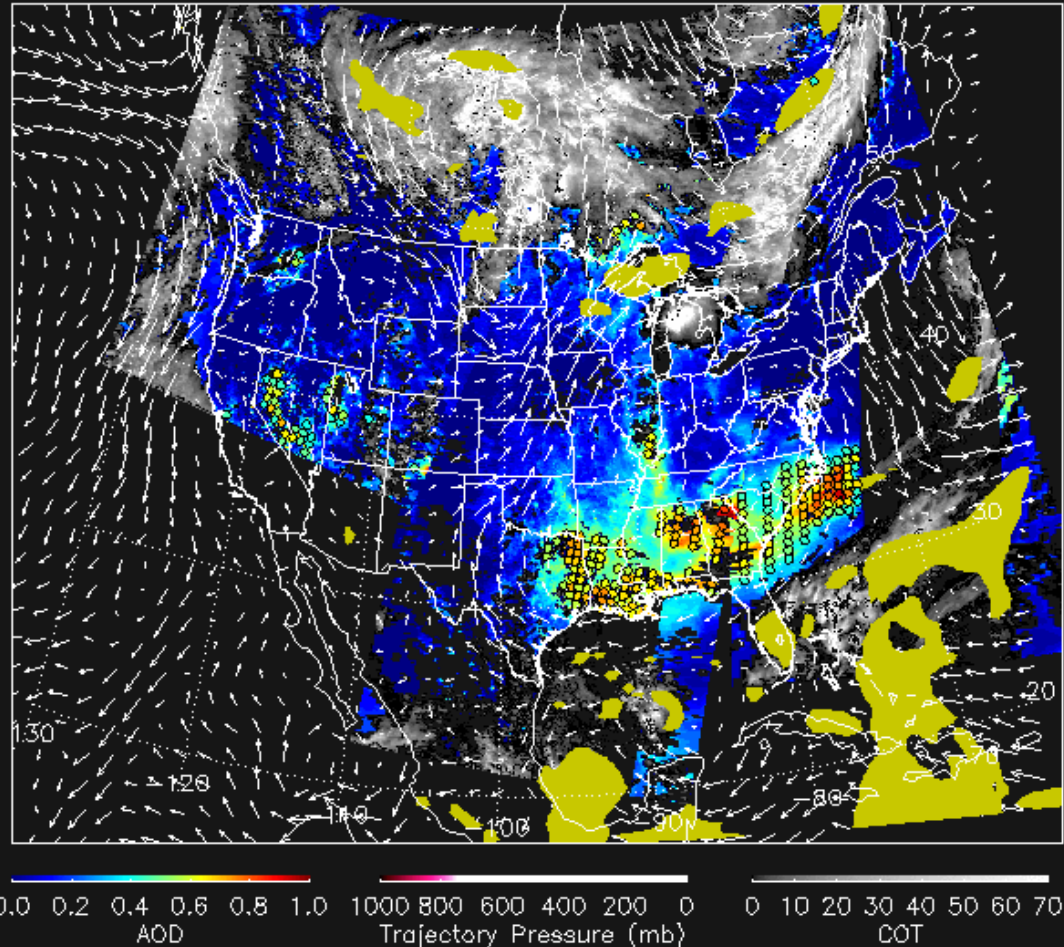
IDEA features a 48-hour trajectory forecast of boundary-layer aerosols. In this example, heavily aerosol-laden air is forecast to move to the north. Trajectories are color-coded to distinguish which aerosols affect the surface. The trajectories in this example are free of forecast precipitation (yellow patches) which shows areas where aerosols will "wash out" in the near future.

MODIS into Advanced Weather Interactive Processing System (AWIPS)

Steve Wanzong, Jordan Gerth, Russ Dengel, Gary Wade,
Scott Bachmeier, Scott Lindstrom, Jerry Robaidek, TomWhittaker

- *Support of SPORT (Short-term Prediction Research and Transition) Center at NASA MSFC*
 - Aim is to improve short term (0-24hr) weather forecasts
  - SSEC DB MODIS and AMSR-E Products distributed to 6 NWS sites in the Southern Region

- *CIMSS began routine insertion into AWIPS central region data feed on 30 June 2006*
  - Current feed consists of
    - MODIS L1B Bands 1 (.86 micron), 7 (2.1 micron), 26 (1.38 micron), 20 (4.0 micron), 27 (6.7 micron) and 31 (11 micron)
    - Products – Cloud Phase, TPW, Cloud Top Temperatures, Fog, SST
  - Keys to success
    - Provide something better or new to forecasters (ie, higher spatial resolution)
    - Must be placed in format that can be accepted by AWIPS
    - Must have a person at the forecast offices to champion the data (SOO – Dan Baumgardt – ARX   Jordan Gerth – MKX)

Software Development and Distribution

EOS Direct Broadcast Sites
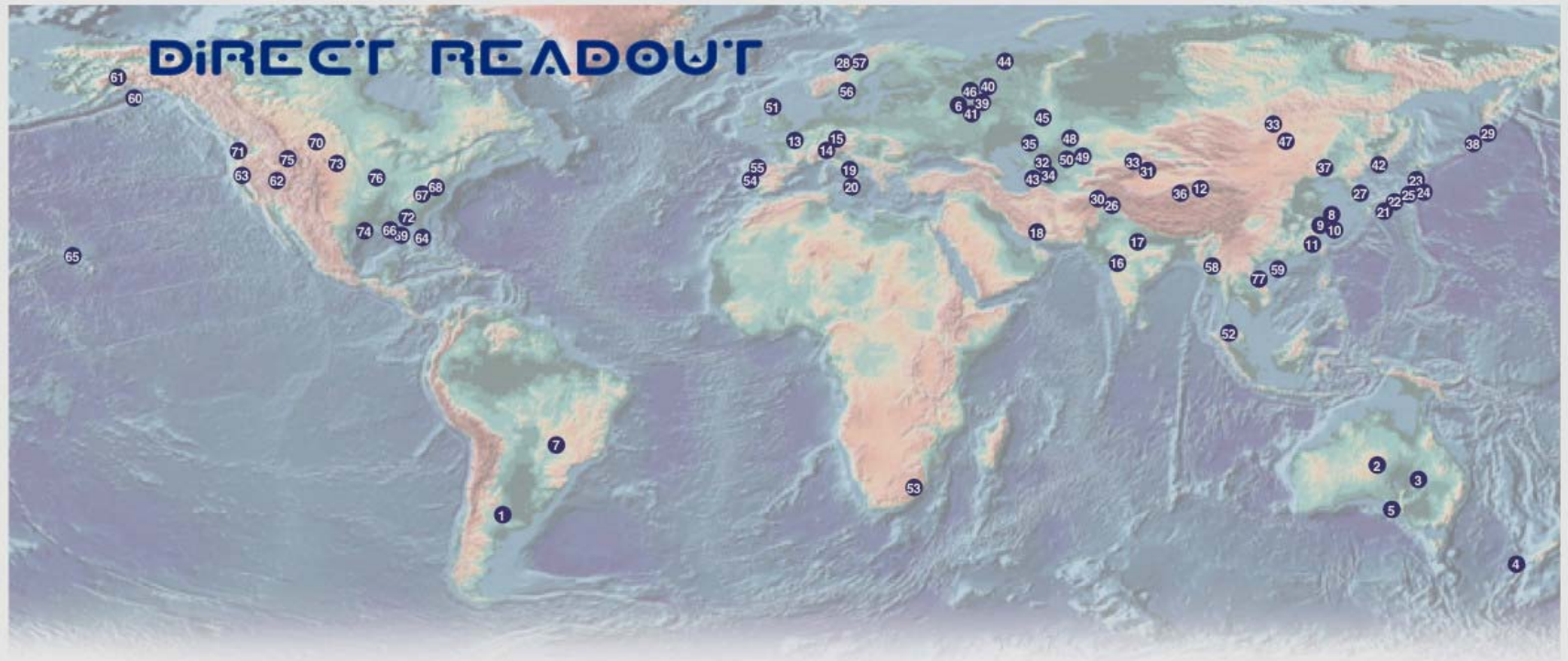
More than 150 ground stations around the world

(not all are shown on this map from Nov. 2003)

Current Products at McMurdo
 Jeff Key, Willian Straka
(all MODIS):
Winds
Cloud mask*
Cloud pressure*
Cloud phase*
Total precipitable water*
Inversion strength
Inversion depth
Ice/snow surface temperature
Ice/snow albedo

Planned products:
Ice motion (MODIS + AMSR-E)
Ice age
Cloud optical properties

IMAPP/MODIS Science Team products

http://stratus.ssec.wisc.edu/db/mcmurdo

Remote Sensing Workshops

Paul Menzel, Allen Huang, Liam Gumley, Paolo Antonelli, Tom Rink, Jeff Key, Steve Dutcher and Kevin Baggett

2004 – Nanjing, China

2004 – Perth, Australia

2005 – Taipei, Taiwan

2005 – Beijing, China

2006 – Andenes, Norway

2006 – Pretoria, South Africa

2007 – India & South America

- Teach Principles of Environmental Remote Sensing
  - building on the work of Paul Menzel
- Promote use of Aqua and Terra Data and Products
  - Lectures On Topics Determined by Student Interest
  - Labs (Practical hands on use – learn strengths and weaknesses of algorithms)
- Foster collaborations and international relations (We learn a great deal)

Nanjing 2004

Hydra Visualization Tool

http://www.ssec.wisc.edu/hydra/
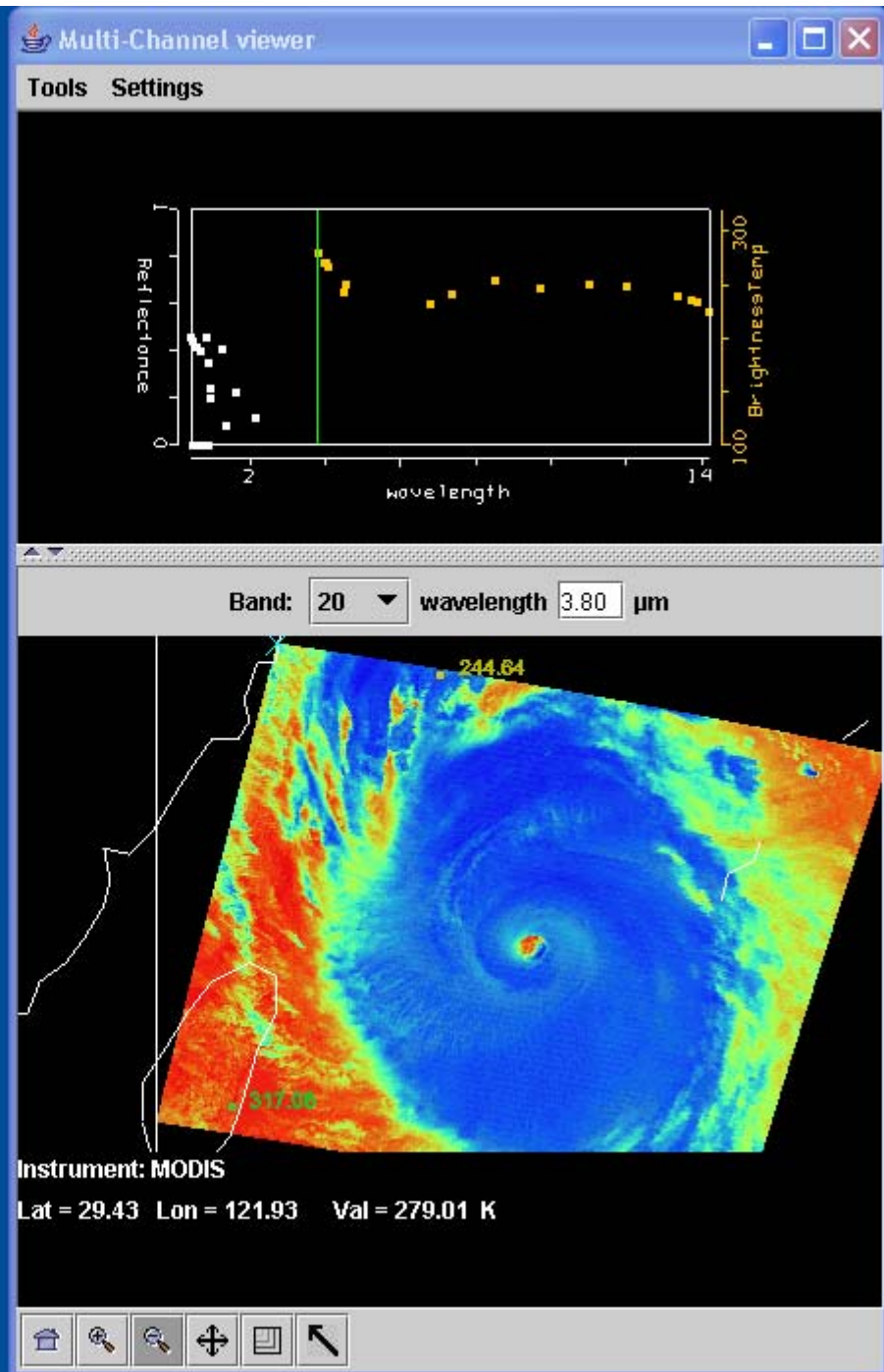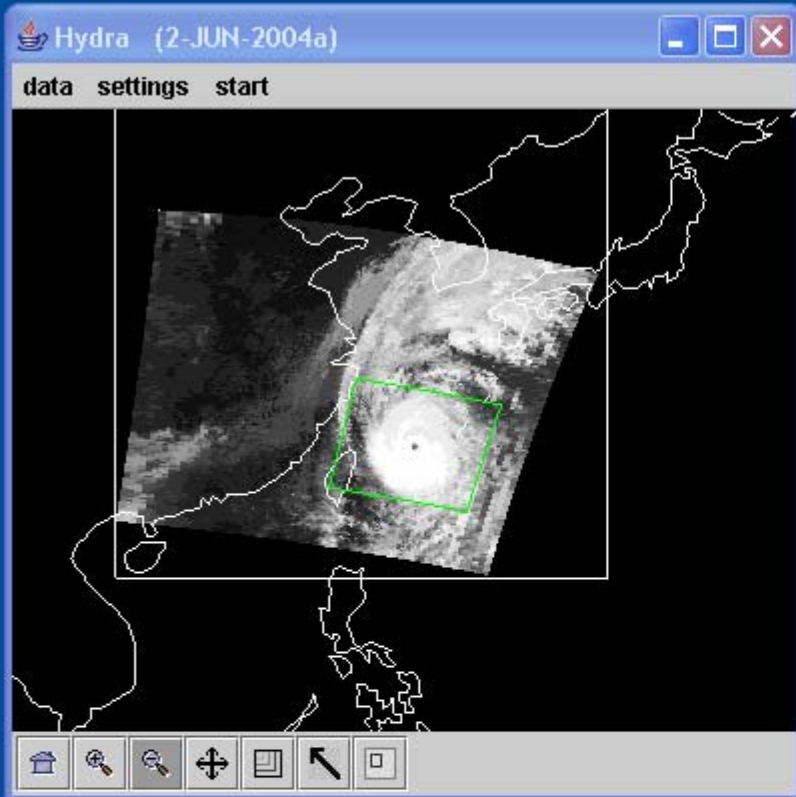
Tom Rink, Kevin Baggett, Paul Menzel

Future IMAPP applications

AIRS Sounding System Software:

- Cloud Detection
- Cloud Properties (Height, Emissivity)
- Cloud Liquid Water
- AMSU Precipitation
- Combined MODIS/AIRS products

MODIS L2 products:

- Surface Reflectance
- Suspended Sediment Concentration
- Cloud Optical Properties
- Scene Classification
- Snow Cover/Lake Ice

Future IMAPP applications (Continued)

AMSR-E:
- Ocean Products (SST and Wind Speed)
- Snow/Water Equivalent

Utilities:
- Utility to visualize L1B and L2 IMAPP products
  - Hydra / IDV
  - McIDAS binaries (supplement to McLITE)
  - Utilities to share data with other users
    - DODS server
    - ADDE server
- Utilities to collocate MODIS/AIRS pixels

Workshops:
- More IMAPP remote sensing workshops planned
  - India 2007, Russia?

Summary

• Aqua and Terra Direct Broadcast support a wide range of activities at CIMSS

• Real time generation of images and products is vital to the support of environmental monitoring

• Support for global DB users will continue in the form of :
  • Production Software (L1b and L2 products)
  • Processing Scripts (Including cluster processing – Steve Dutcher)
  • Visualization Tools
  • Tutorials
  • Workshops

• We intend to follow on from Terra and Aqua to NPP and NPOESS via the International Polar Orbiter Processing Package (IPOPP)

Other related Presentations/Posters

5.5 Paolo Antonelli - Training Workshop

A13 Tom Achtor - IAPP

A14 Tom Achtor- NPP PEATE

A15 Kathleen Strabala – Direct Broadcast