

THE USE OF THE **RGB** PRODUCTS AT THE HPC, OPC, NHC, AND SAB PROVING GROUNDS

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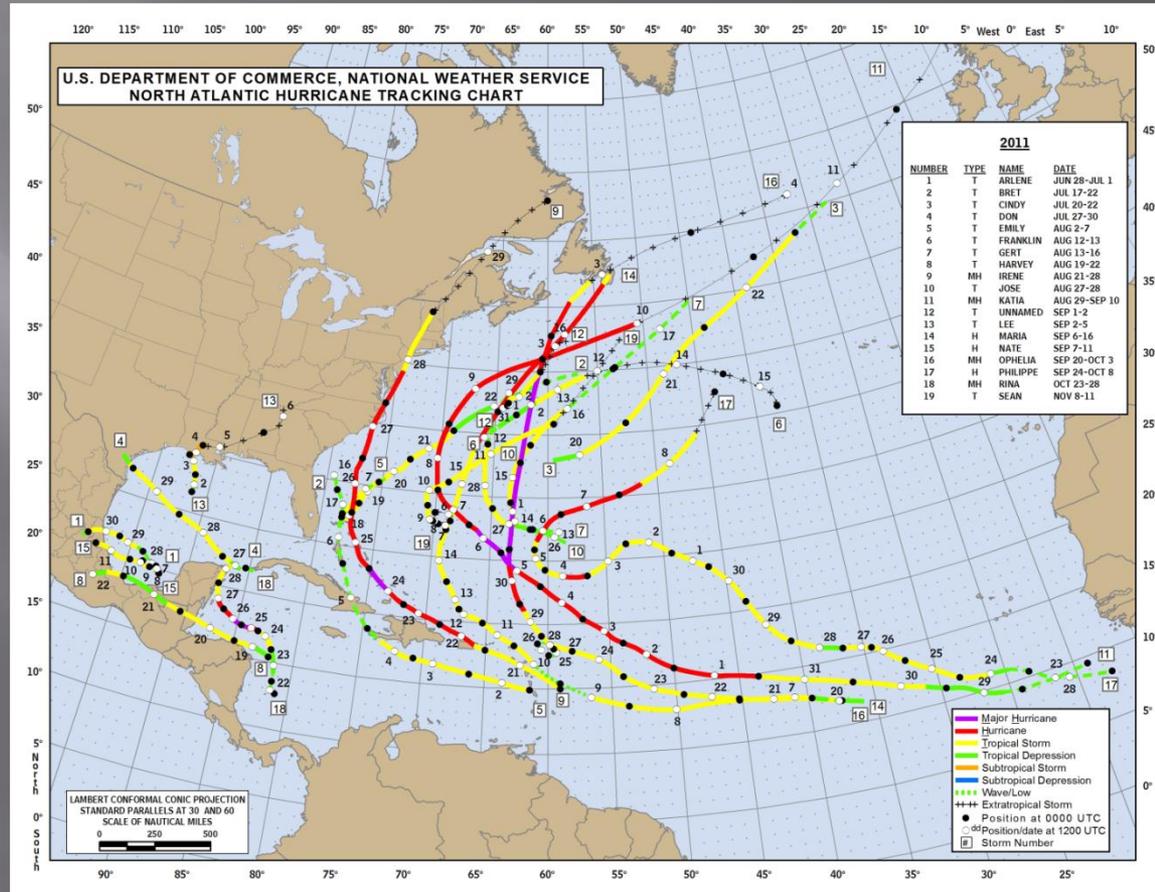
05/04/12

NOAA Satellite Science Week



RGB Products at NHC

- Use of RGB products increased during 2011 at NHC, as the airmass and dust products were available in N-AWIPS
- Most Atlantic TC activity in 2011 occurred in the western half of the basin, however several developing systems and transitioning TCs were captured by the MET-9 imagery
- Transitions of Irene and Lee also seen in GOES sounder airmass product



Tropical Analysis

RGB Dust Product

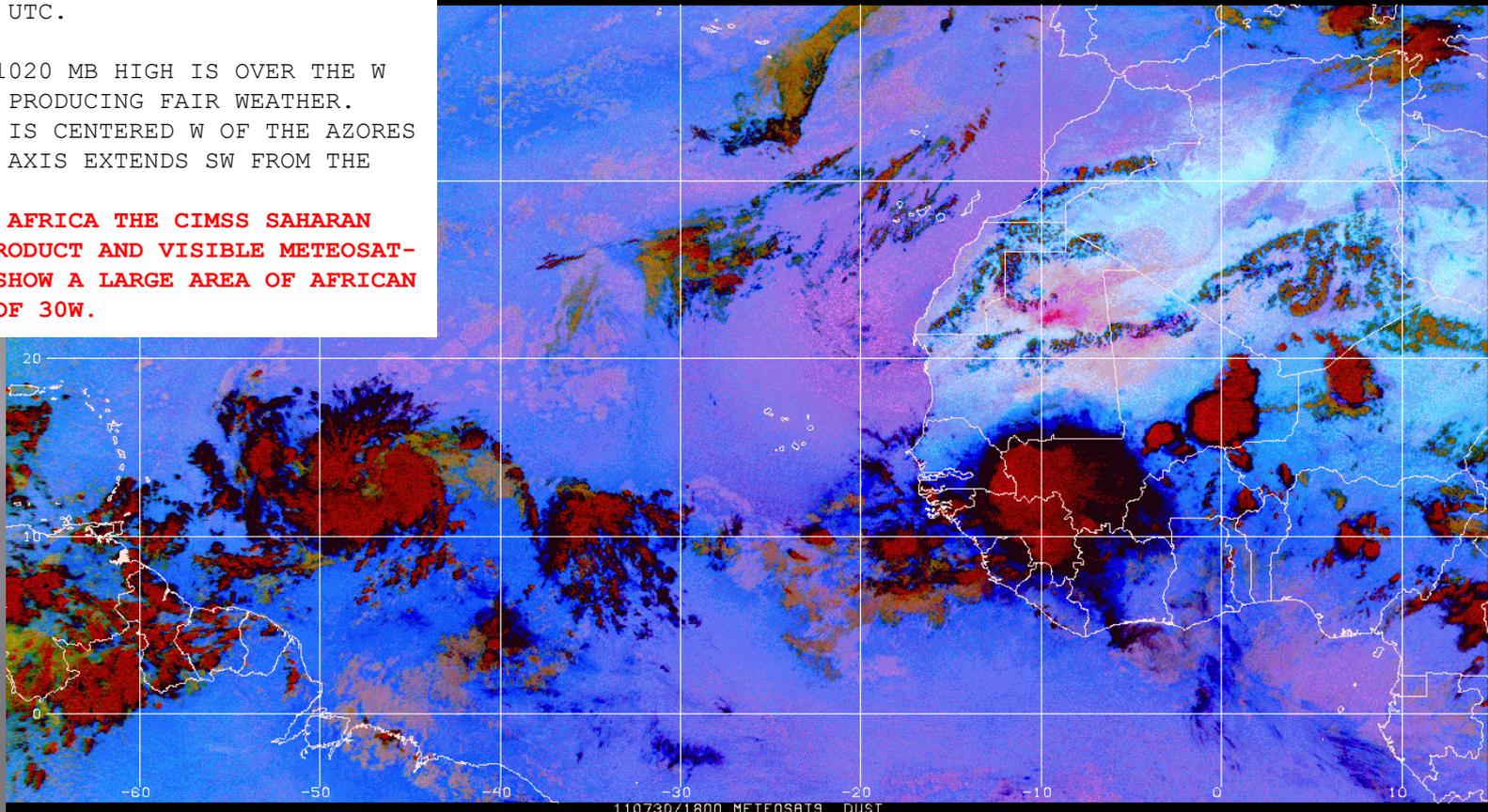
AXNT20 KNHC 302352
TWDAT

TROPICAL WEATHER DISCUSSION
NWS NATIONAL HURRICANE CENTER MIAMI FL
805 PM EDT SAT JUL 30 2011

BASED ON 1800 UTC SURFACE ANALYSIS AND SATELLITE
IMAGERY THROUGH 2315 UTC.

ATLANTIC OCEAN... A 1020 MB HIGH IS OVER THE W
ATLANTIC NEAR 29N77W PRODUCING FAIR WEATHER.
ANOTHER 1032 MB HIGH IS CENTERED W OF THE AZORES
NEAR 39N35W. A RIDGE AXIS EXTENDS SW FROM THE

**ALONG THE COAST OF W AFRICA THE CIMSS SAHARAN
AIR LAYER TRACKING PRODUCT AND VISIBLE METEOSAT-
9 SATELLITE IMAGERY SHOW A LARGE AREA OF AFRICAN
DUST FROM 16N-30N E OF 30W.**

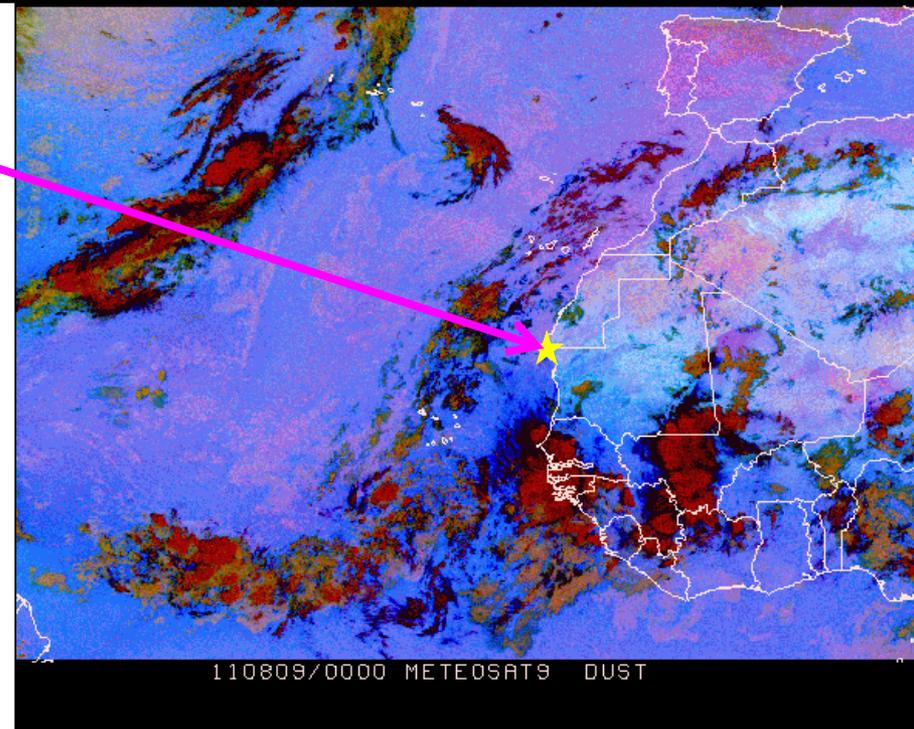
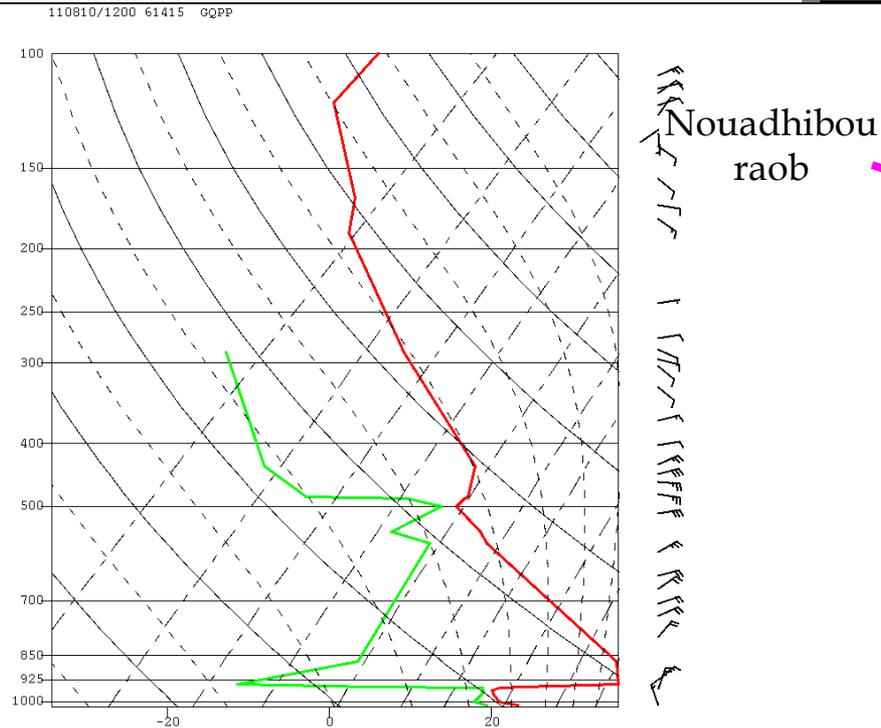


110730/1800 METEOSAT9 DUST

Tropical Cyclogenesis Applications

RGB Dust Product 9–13 August 2011

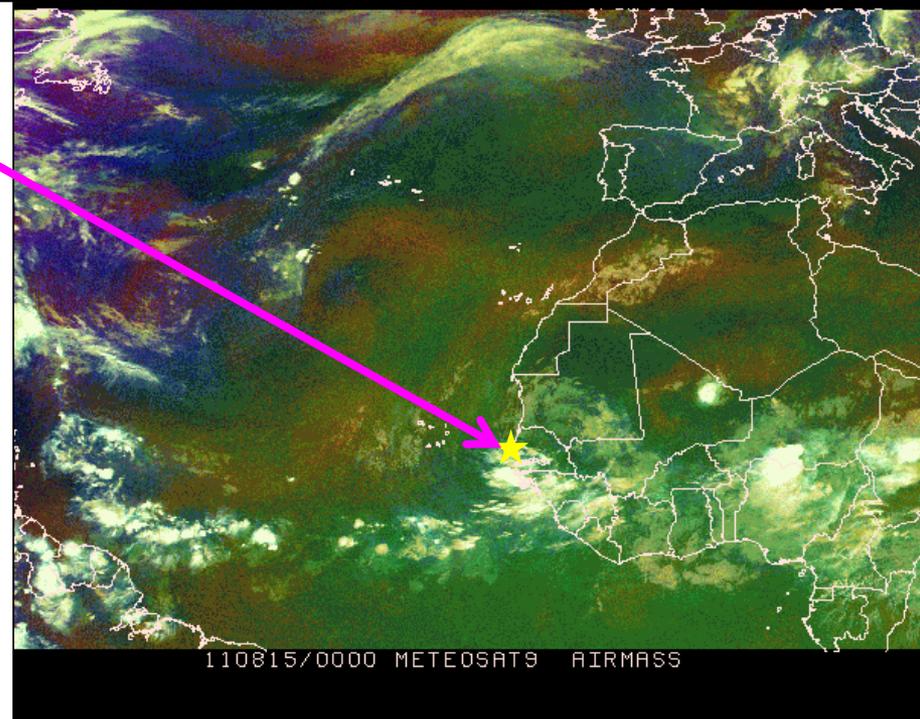
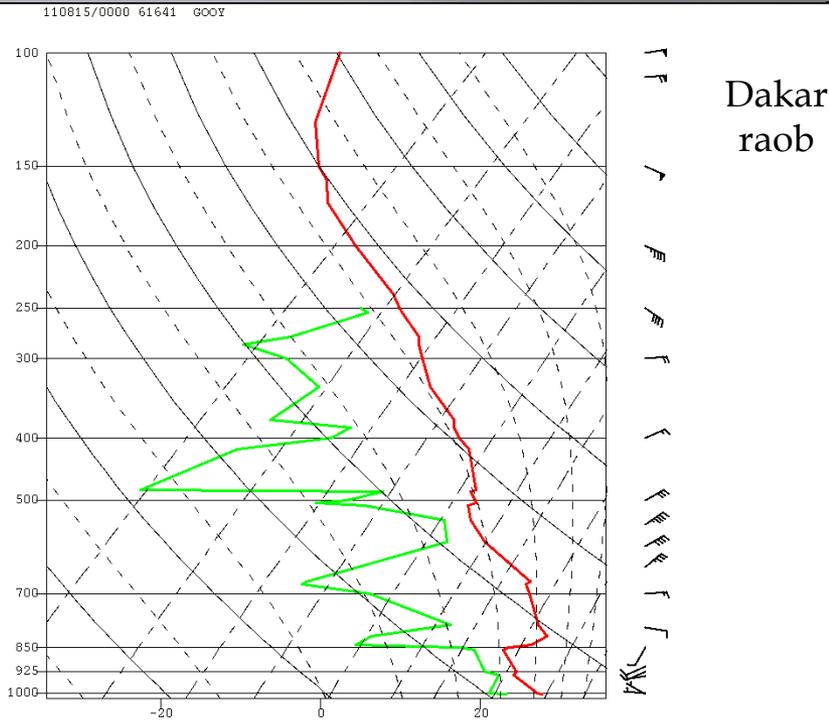
SATELLITE IMAGERY SUGGESTS THE SYSTEM MAY CURRENTLY BE ENCOUNTERING A DRIER AND MORE STABLE AIR MASS.



- RGB dust product showed large area of dust moving off the coast of Africa to the north of two successive disturbances from 9-12 August
- Imagery shows that these disturbances were embedded in a generally unfavorable environment in the eastern Atlantic
- Genesis probabilities only reached the medium category before decreasing

Tropical Cyclogenesis Applications

RGB Airmass Product 15–20 August 2011

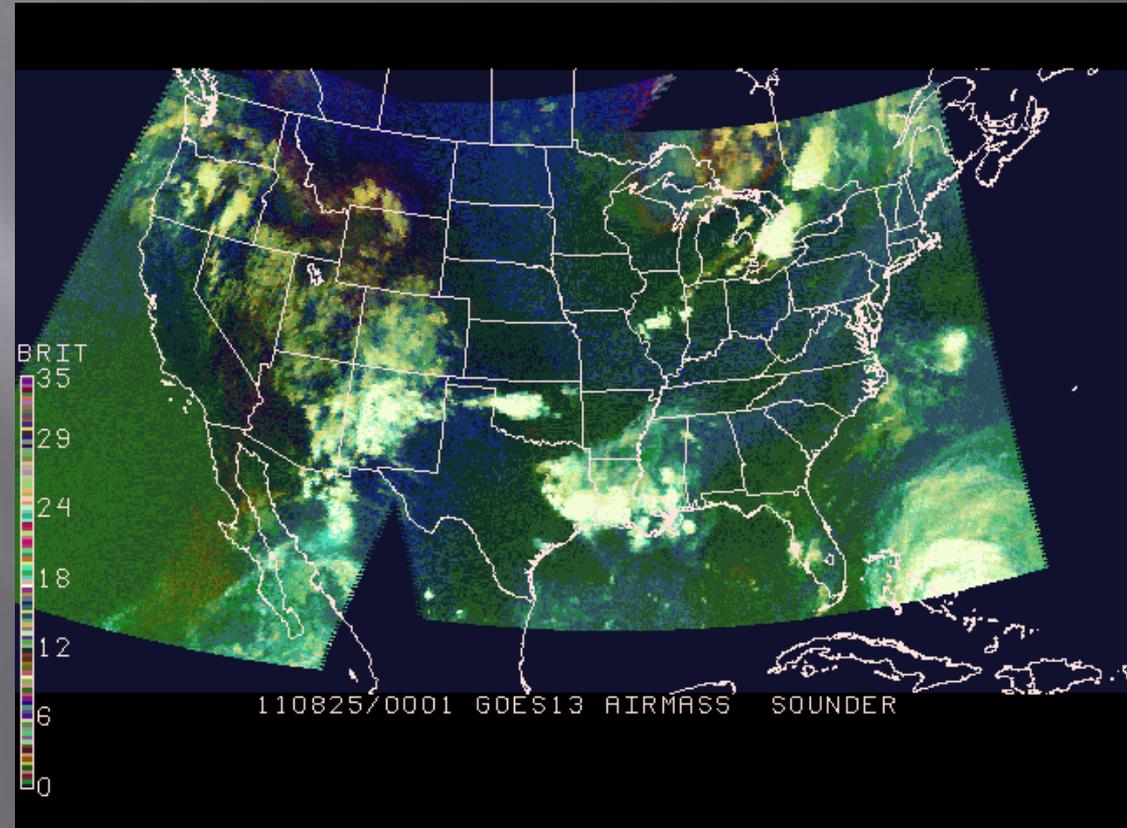


- RGB airmass product showed that the pre-Irene disturbance was surrounded by a dry airmass – suggesting that genesis was unlikely as the system initially entered the tropical Atlantic
- As Irene approached the Lesser Antilles, the environment moistened on 18-19 August, and genesis occurred on 21 August

Transitioning Cyclones

Irene

- Sounder airmass product shows the extratropical transition of Irene as it moved into the northeastern U.S. on 29 August
- An earlier push of cool, dry air into the circulation of Irene is also seen early on 28 August, as precipitation begins to decrease south of the center



Transitioning Cyclones

Lee's transition from Tropical → Subtropical → Extratropical

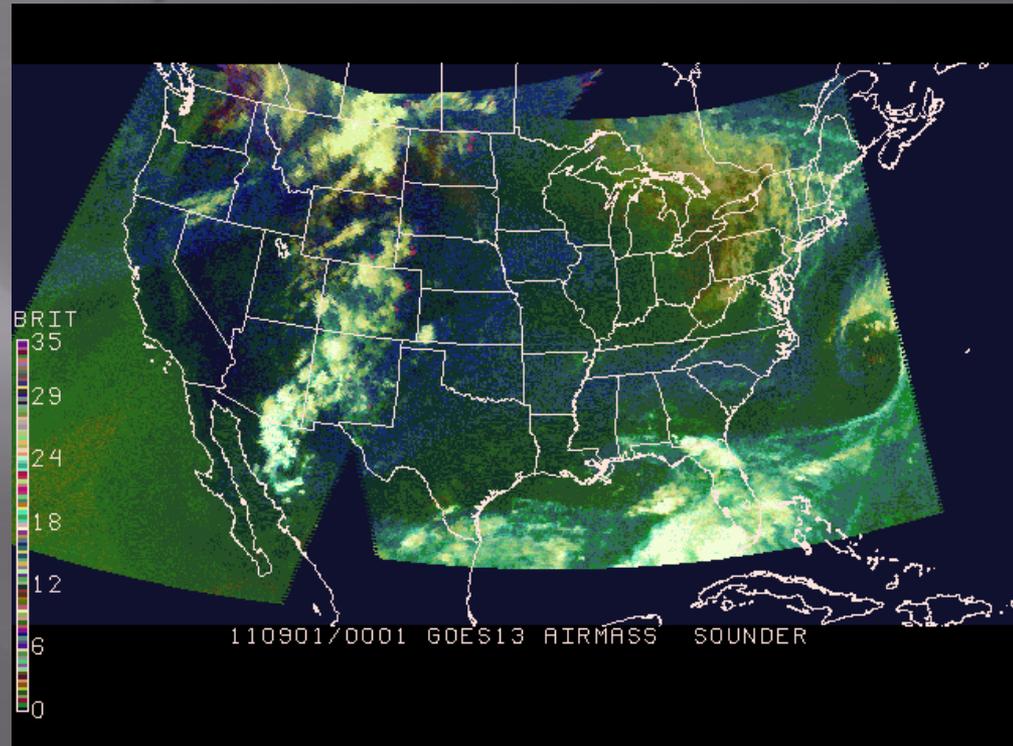
TROPICAL DEPRESSION LEE DISCUSSION NUMBER 14
NWS NATIONAL HURRICANE CENTER MIAMI FL AL132011
1000 PM CDT SUN SEP 04 2011

LAND INTERACTION AND CONTINENTAL AIR SEEN IN THE GOES SOUNDER AIRMASS PRODUCT WRAPPING INTO THE WESTERN SIDE OF THE CIRCULATION HAVE TAKEN A TOLL ON LEE THIS EVENING.

DECREASED BOTH NEAR THE CENTER AND OFFSHORE AND WINDS HAVE STEADILY DECREASED BELOW TROPICAL STORM FORCE...EVEN AT THE ELEVATED OIL PLATFORMS OVER THE NORTHERN GULF OF MEXICO. THEREFORE THE INITIAL INTENSITY HAS BEEN REDUCED TO 30 KT... WITH THESE WINDS FOUND ONLY WELL SOUTH AND EAST OF THE CENTER OVER WATER.

LEE IS ALREADY BEGINNING TO LOSE TROPICAL CHARACTERISTICS WITH WARM/COASTAL FRONTOGENESIS UNDERWAY EAST OF THE CENTER AND THE SURFACE CENTER BECOMING ELONGATED FROM SOUTHWEST TO NORTHEAST IN THE PRESSURE AND WIND FIELDS.

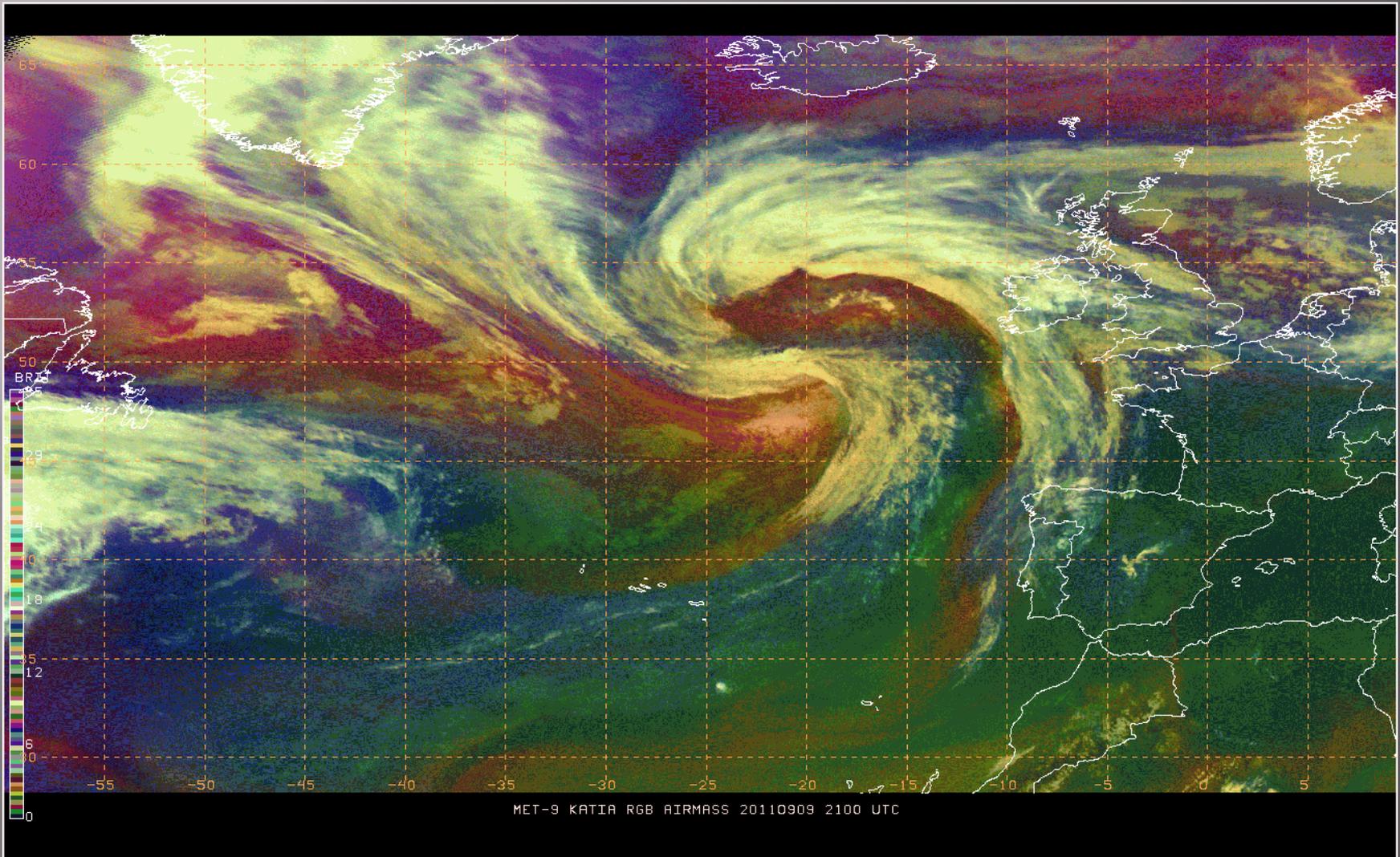
THE CYCLONE BEGINS TO INTERACT WITH AN UNUSUALLY STRONG MID/UPPER-LEVEL TROUGH DIGGING INTO THE MISSISSIPPI VALLEY...LEE SHOULD BE EXTRATROPICAL BY 24 HOURS WHEN GLOBAL MODELS SHOW THE LOW EMBEDDED IN A LOW-LEVEL BAROCLINIC ZONE AND THE CIRCULATION MERGING WITH A MID-LATITUDE SHORTWAVE TROUGH.



- GOES Sounder airmass imagery showed the transition of Lee from a tropical to subtropical cyclone as it merged with an upper-level low and Lee's transition to an extratropical cyclone

Transitioning Cyclones

Katia - Extratropical Transition



Summary

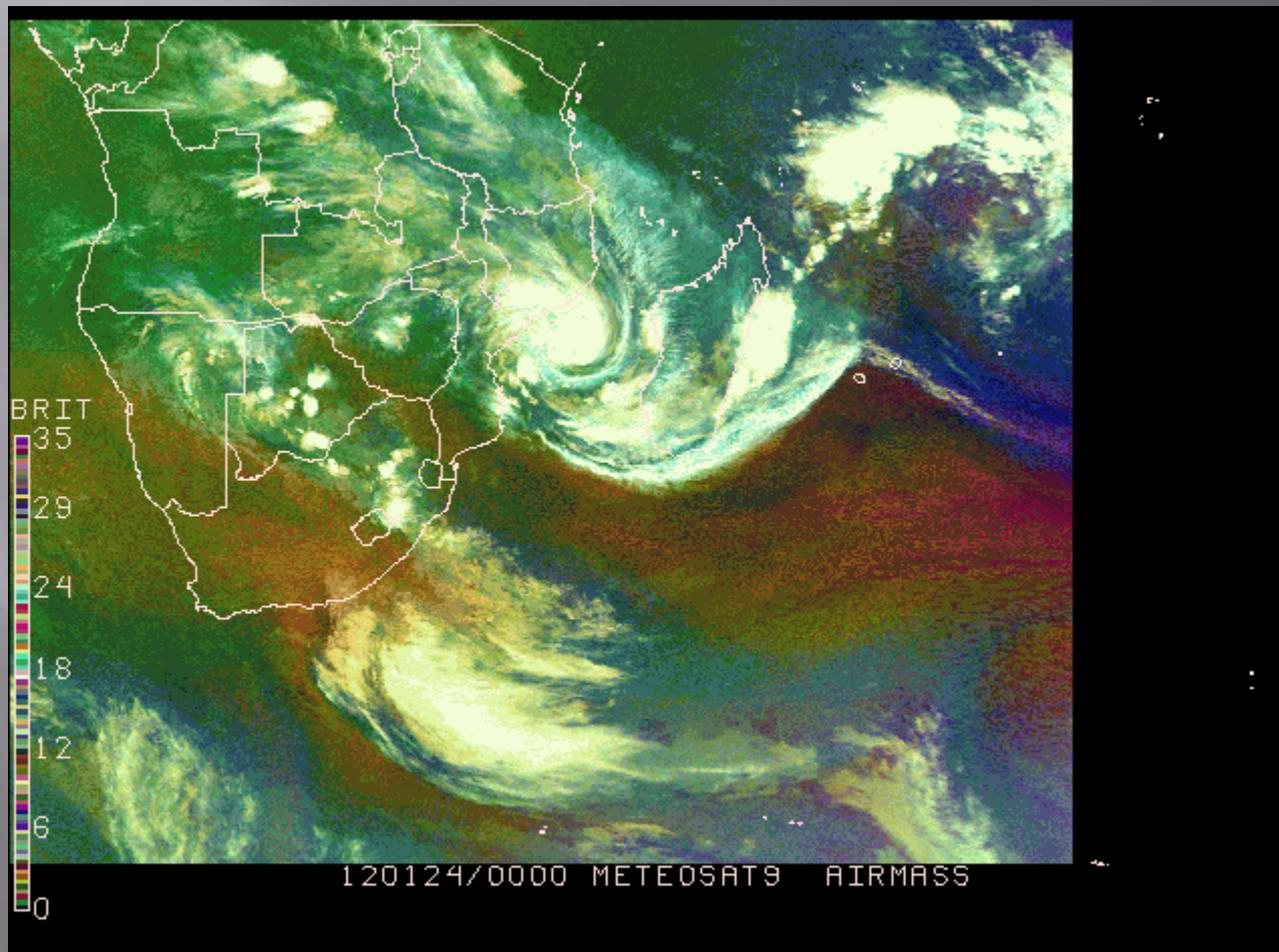
- ▣ Use of RGB products at NHC continues to increase as forecasters become more familiar with products
- ▣ Introduction of airmass and dust products into N-AWIPS was a key step forward
- ▣ Hope to provide additional products in N-AWIPS in 2012 and eventually in AWIPS II

HPC, OPC, and SAB Applications

- ▣ Tropical Cyclone to Extratropical Cyclone transitions
- ▣ Rapid intensification of extratropical cyclones and identifying areas of possible high winds (OPC)
- ▣ Model diagnostics – overlaying NWP 500 mb and 300 mb absolute vorticity fields along with the 400 mb relative humidity field (OPC, HPC)
- ▣ Locating subtle shortwaves in weak flow that could lead to MCS development (OPC, HPC, SAB)
- ▣ Identifying fires and dust outbreaks (TAFB, SAB)
- ▣ Possible use for SO₂ release near active volcanoes (OPC, TAFB, SAB)

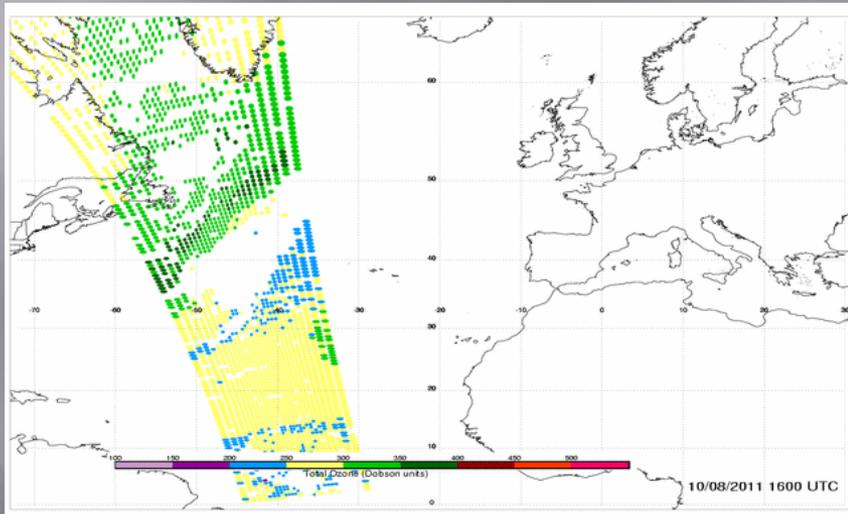
Tropical Cyclone Funso 2012

SEVIRI (MSG) RGB Airmass Product



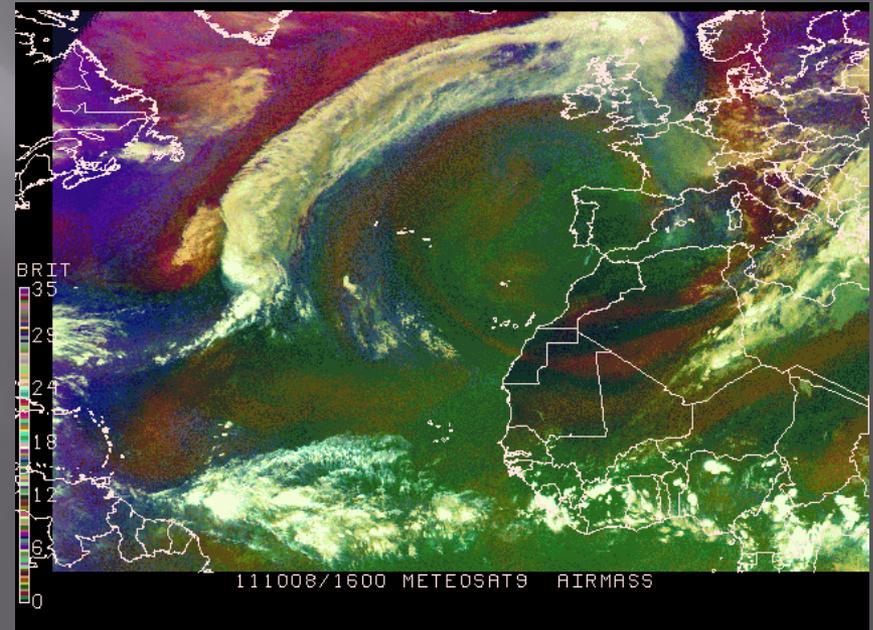
Hurricane Philippe 2011

AIRS TOTAL COLUMN
OZONE RETRIEVAL



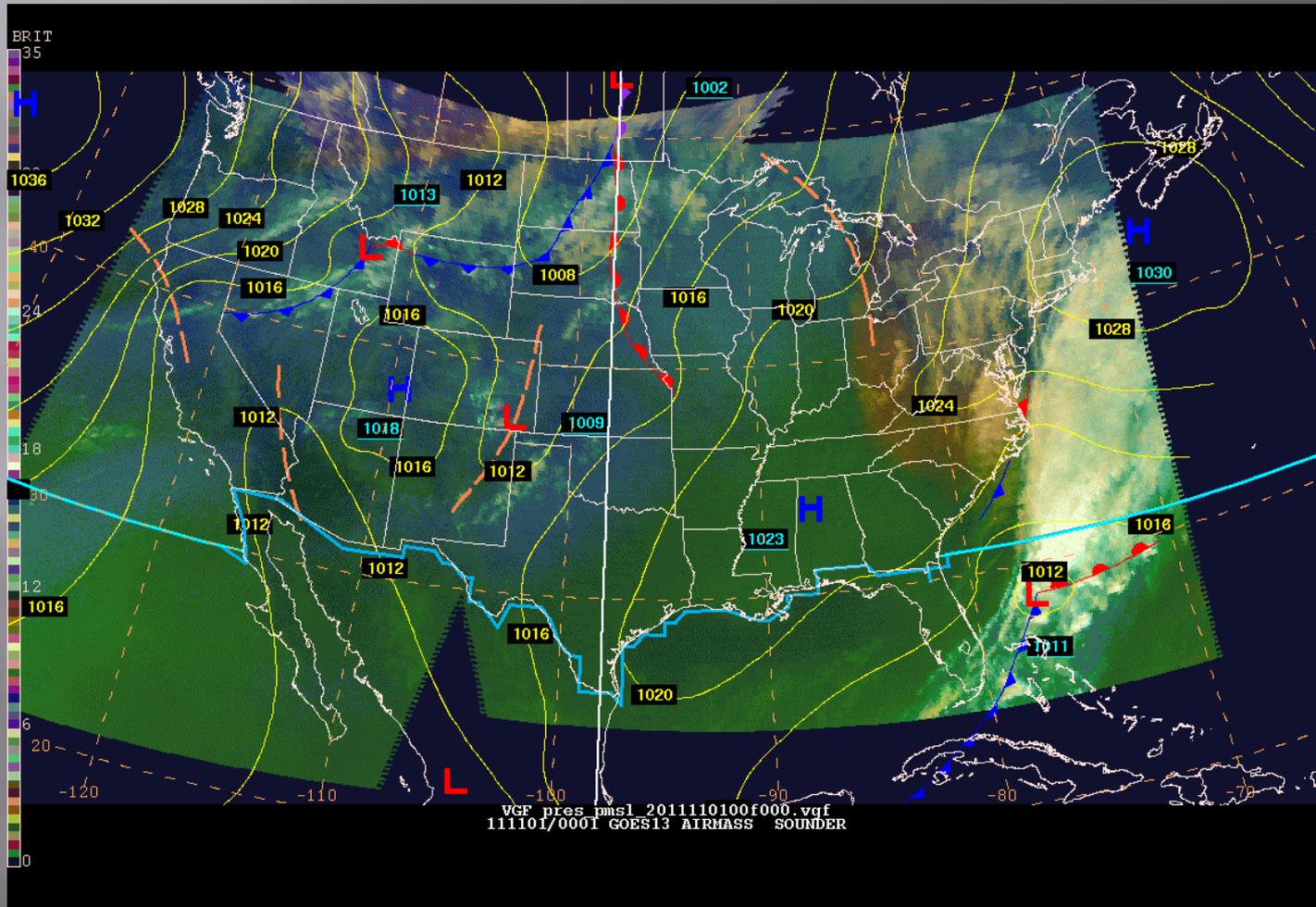
Courtesy of Brad Zavadsky - NASA SPoRT

SEVIRI RGB AIRMASS



Tropical Storm Sean 2011

GOES-Sounder RGB Airmass

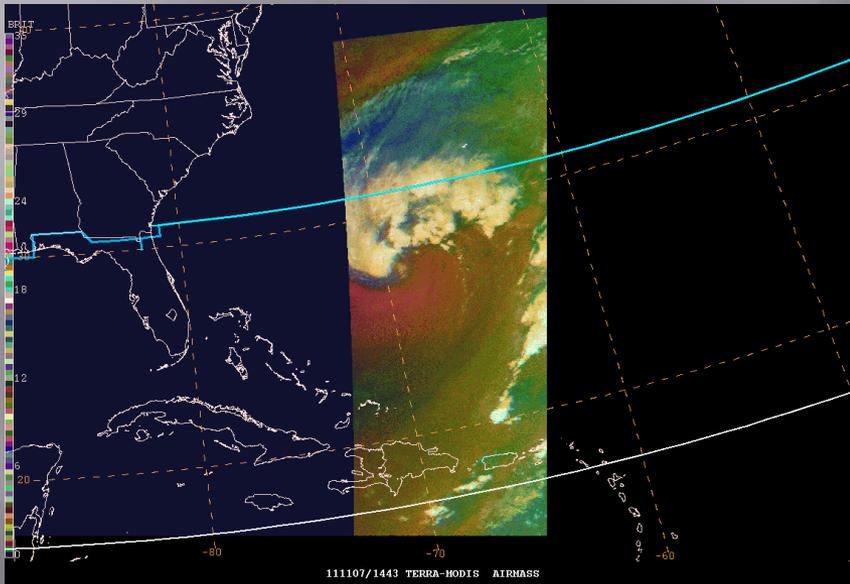


Tropical Storm Sean 2011

MODIS RGB Airmass Products

ET PHASE
1443Z ON 11/07/11

TS PHASE
0310Z 11/10/11



Mid-Latitude Extratropical Storm 1845z on 02/03/12

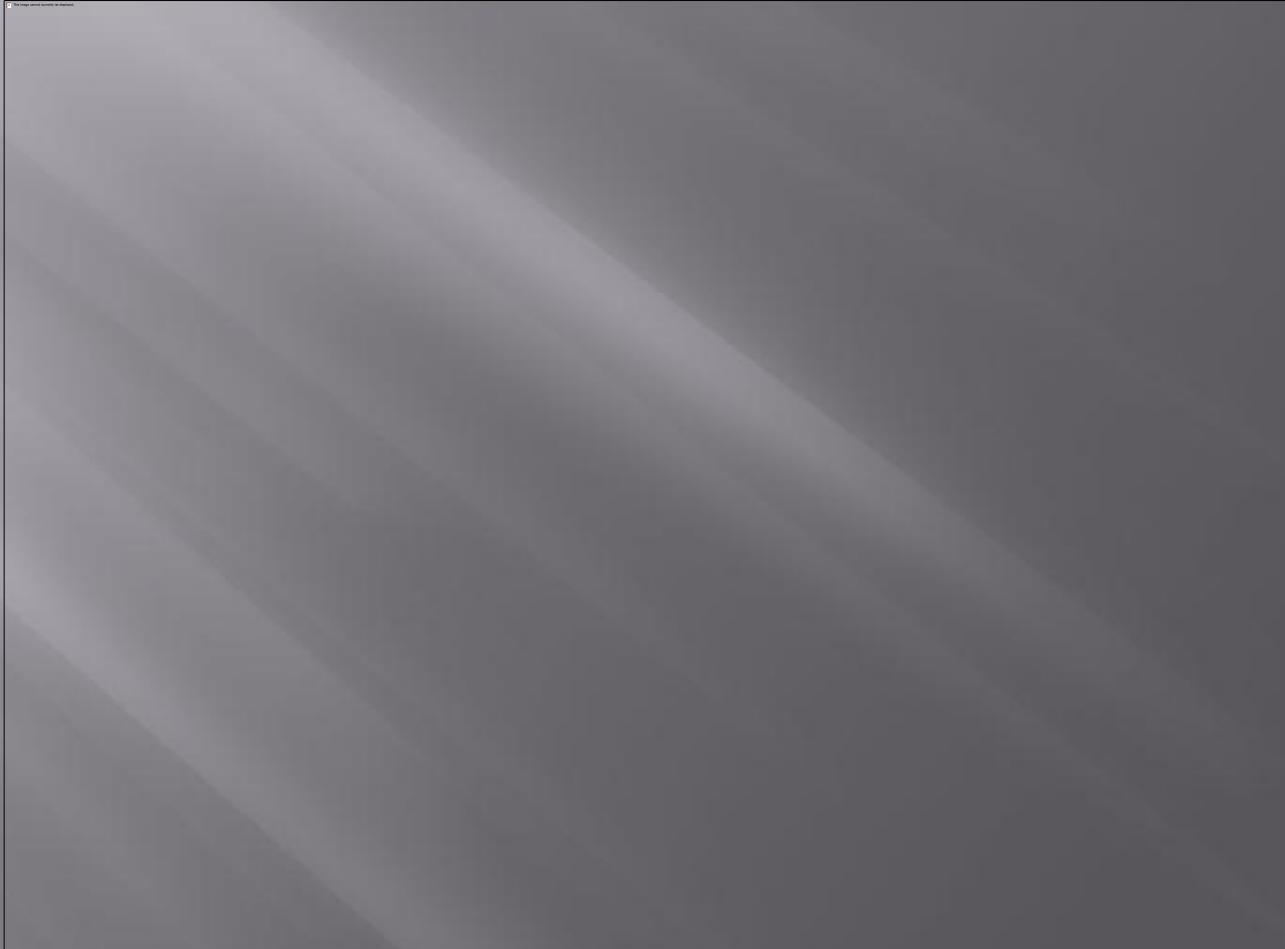
GOES-13 VIS

SEVIRI RGB AIRMASS



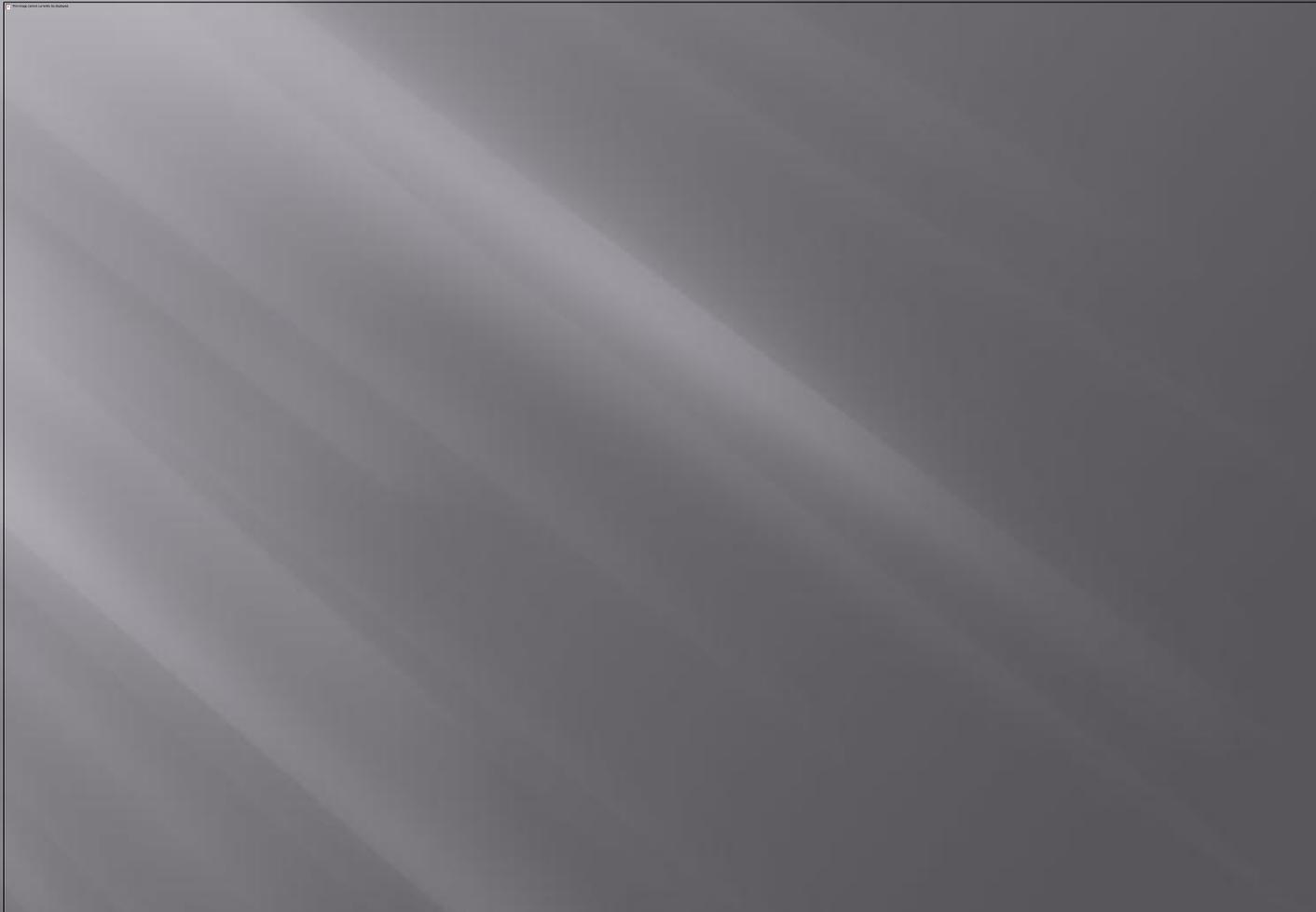
Mid-Latitude Extratropical Storm

SEVIRI RGB Airmass on 02/29/12



Strong Cut-off Low on 04/26/12

GOES-Sounder RGB Airmass overlaid with GFS 500 mb
ABSV



Courtesy of Andrew Orrison (HPC - Satellite Focal Point)

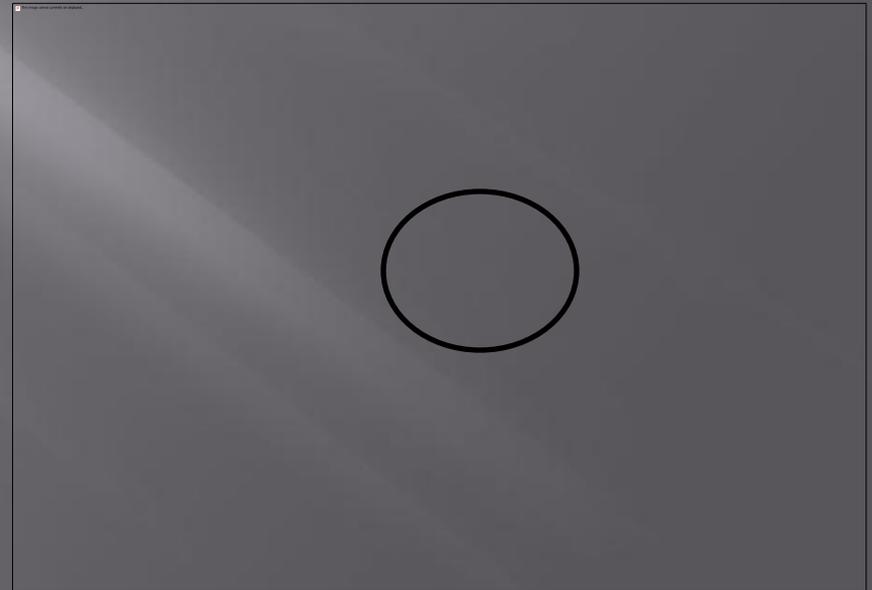
North TX / Southwest OK

Dust Storm on 01/22/12

MODIS (TERRA) IMAGE
OF DUST STORM IN TX



MODIS RGB DUST IMAGE
OF DUST STORM IN TX

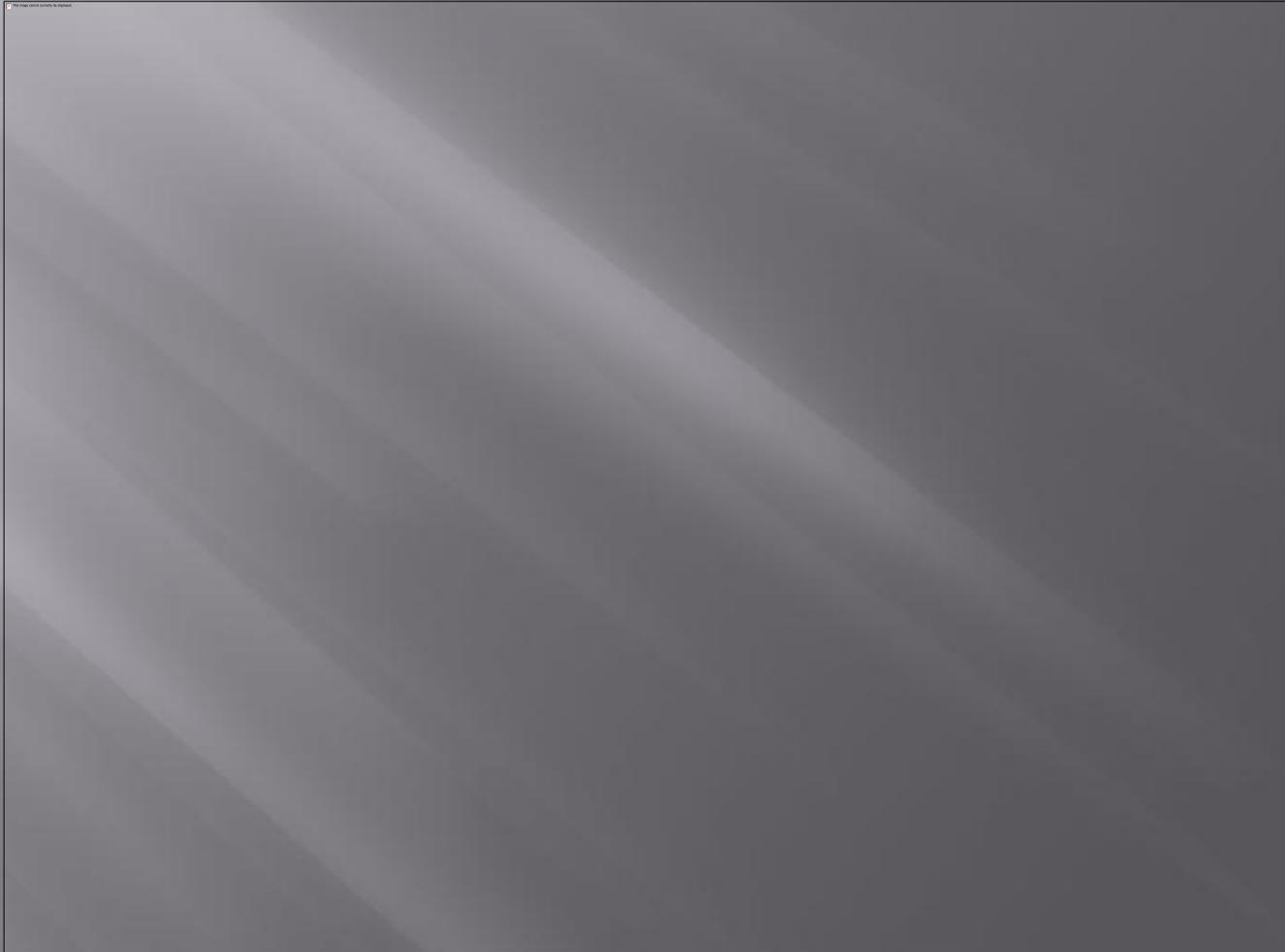


Lessons Learned and Future Plans

- ▣ The RGB Airmass products provide a more complete description of the airmasses that surround and interact with tropical cyclones. The products proved valuable in understanding and diagnosing the tropical to extratropical transitions by highlighting the cooler airmasses and possible stratospheric intrusions.
- ▣ The RGB Dust product aided in the identification of SAL outbreaks that interacted with African Easterly Waves. The relative height of the dust can be determined based on the shades of pink and purple, which could be useful in differentiating SAL from other types of events.
- ▣ These RGB products will be evaluated again during the 2012 NHC Proving Ground activities and will be provided year-round for TAFB inclusion in the HPC/OPC/SAB Proving Ground.

Additional Case Studies

NASA SPoRT Blog



Questions?