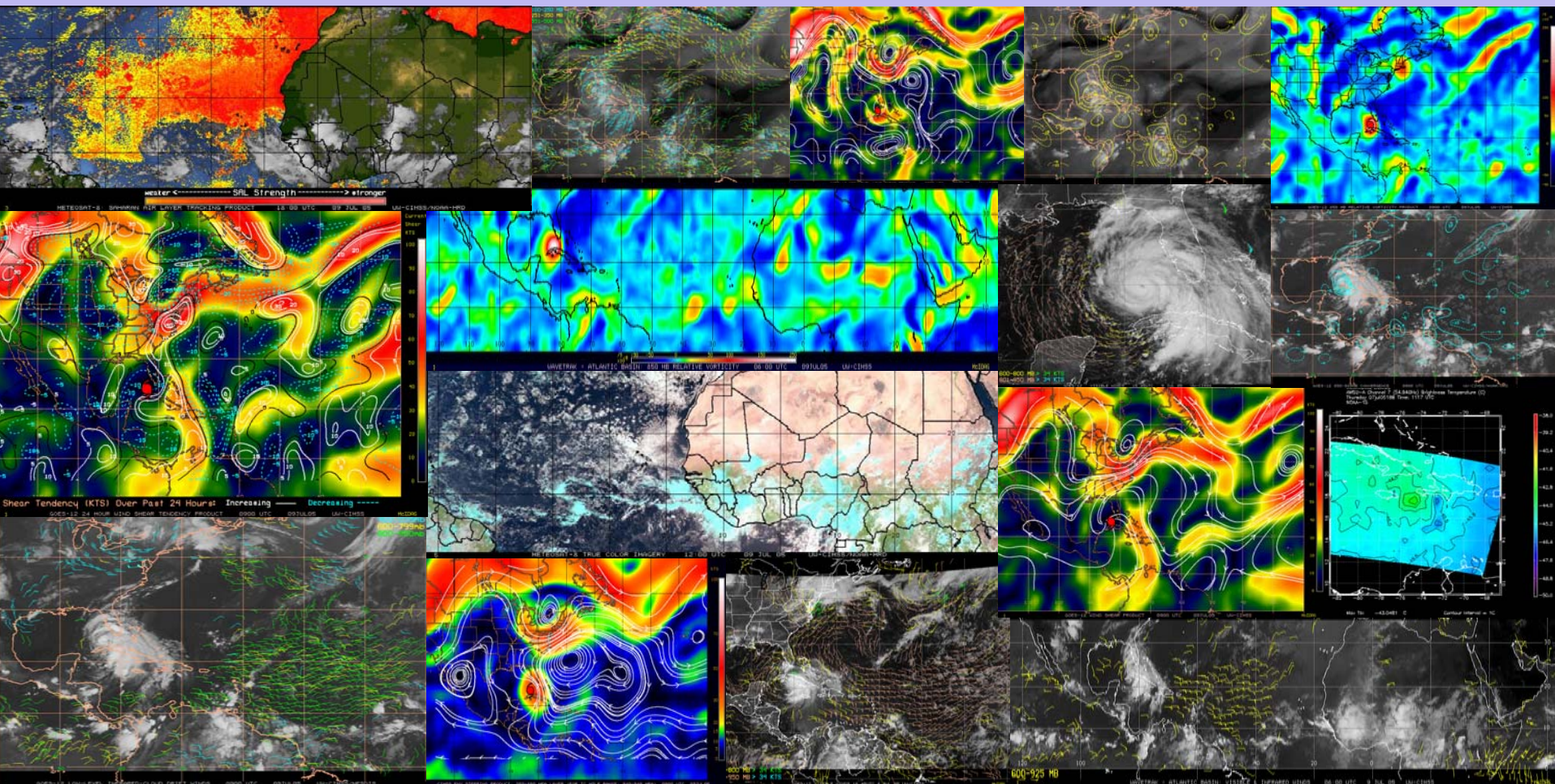
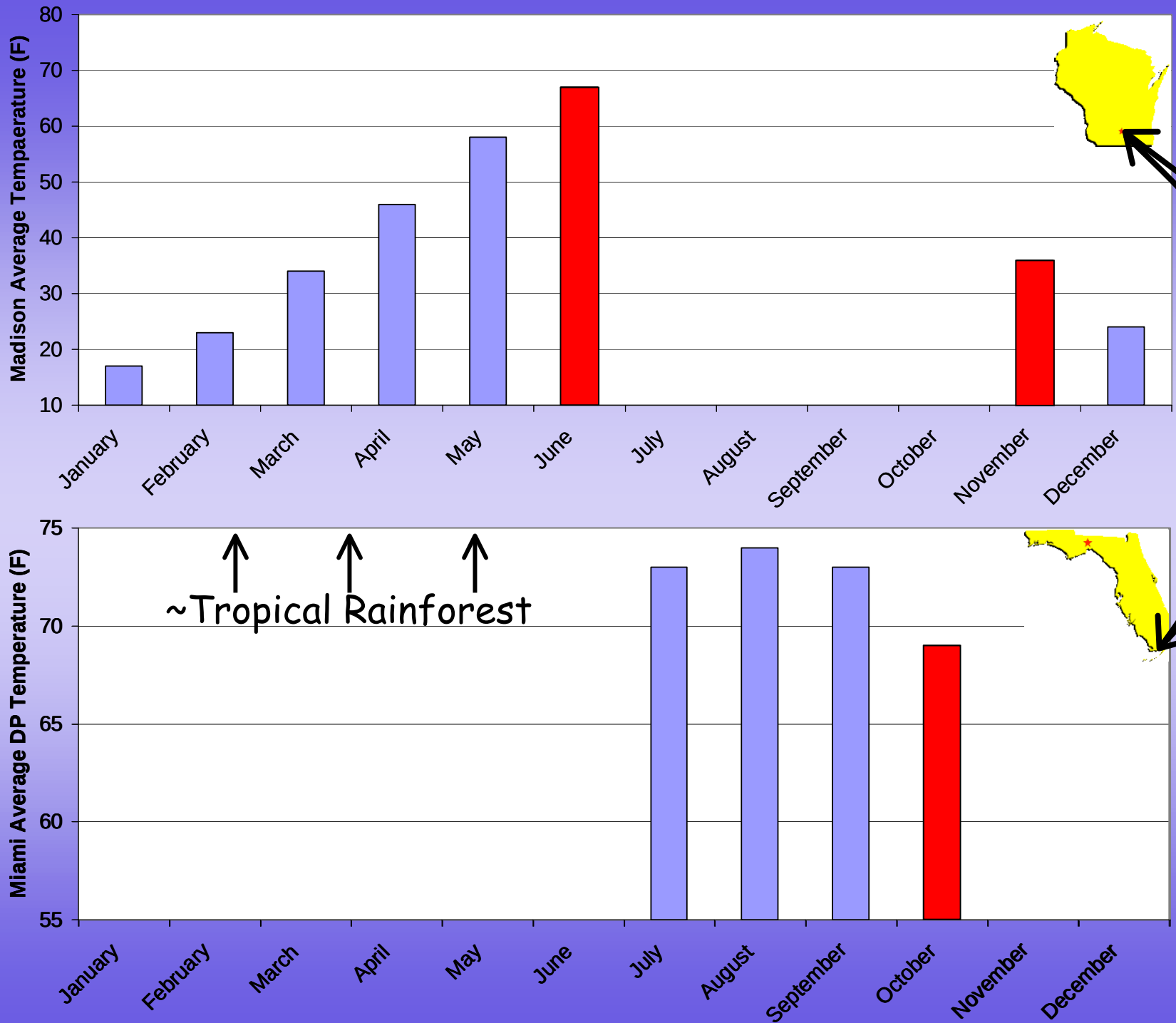
University of Wisconsin/CIMSS

Recent Contributions to Tropical Cyclone Research & Forecasting

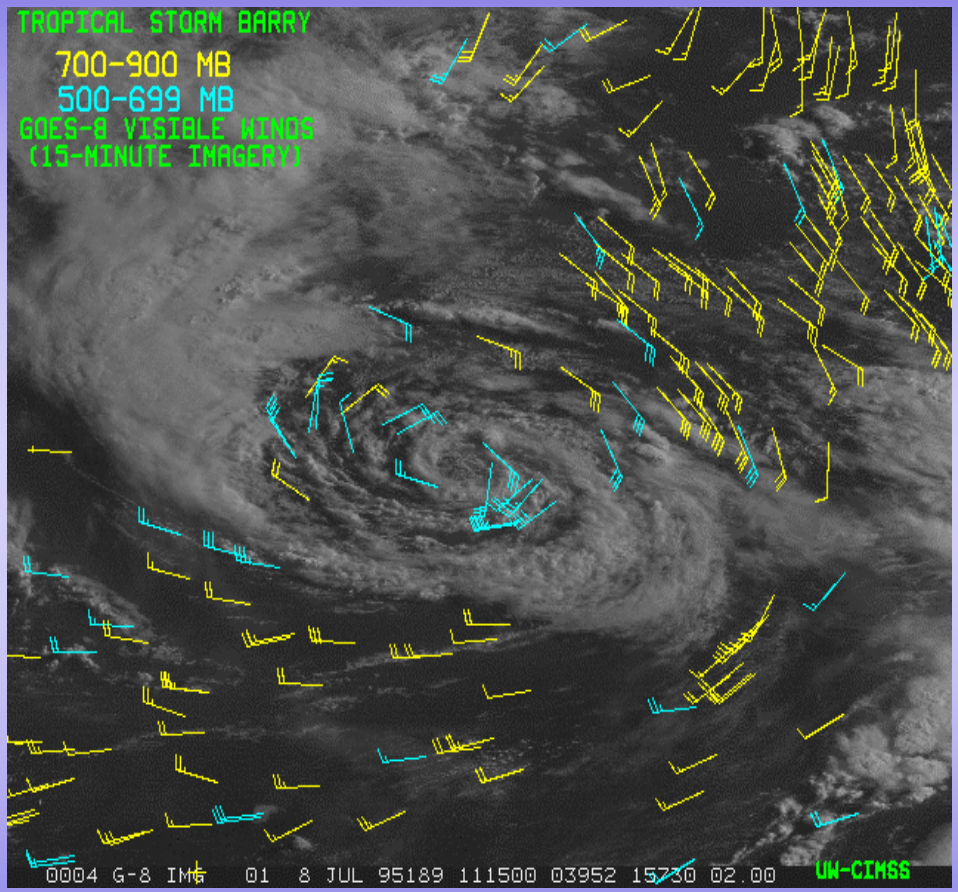
Jason P. Dunion
University of Miami/RMSAS/CIMAS- NOAA/AOML/Hurricane Research Division



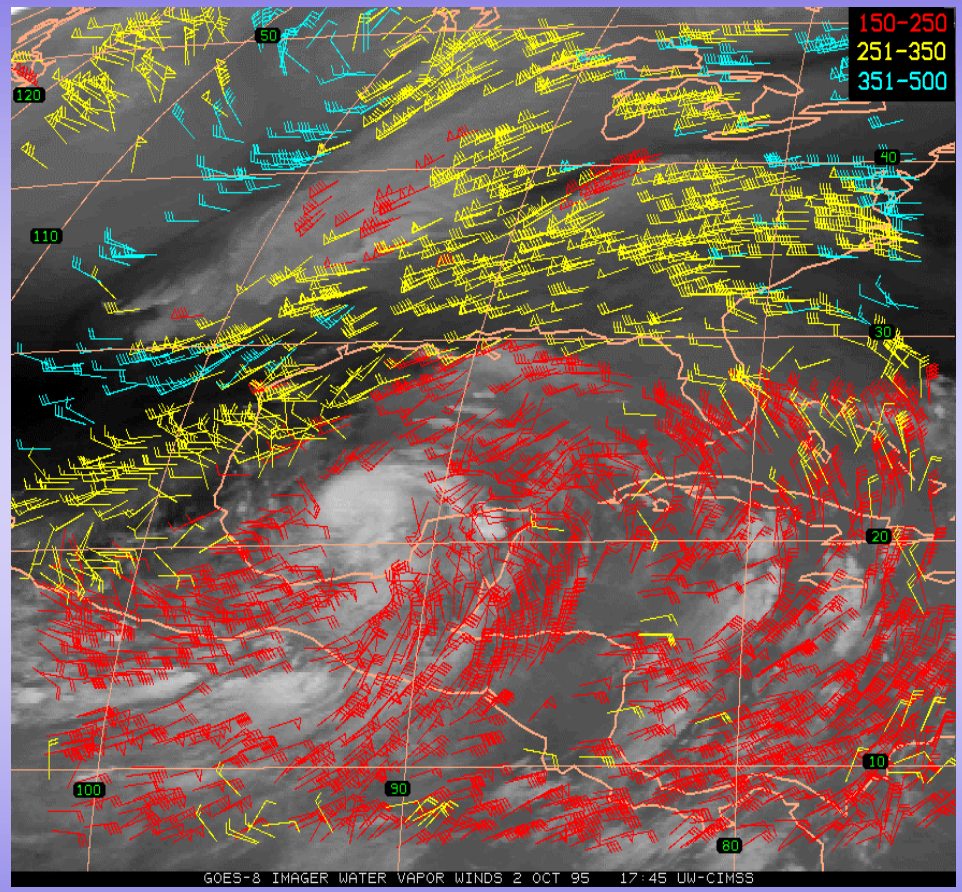

Madison Average Tempaerature (F)
80
70
60
50
40
30
20
10
January
February
March
April
May
June
July
August
September
October
November
December
Miami Average DP Temperature (F)
75
70
65
60
55
~Tropical Rainforest
January
February
March
April
May
June
July
August
September
October
November
December

CIMSS TC Web Page Products (1995)

1994: CIMSS TC Web Page Begins (one of the first online "tropical" sites)



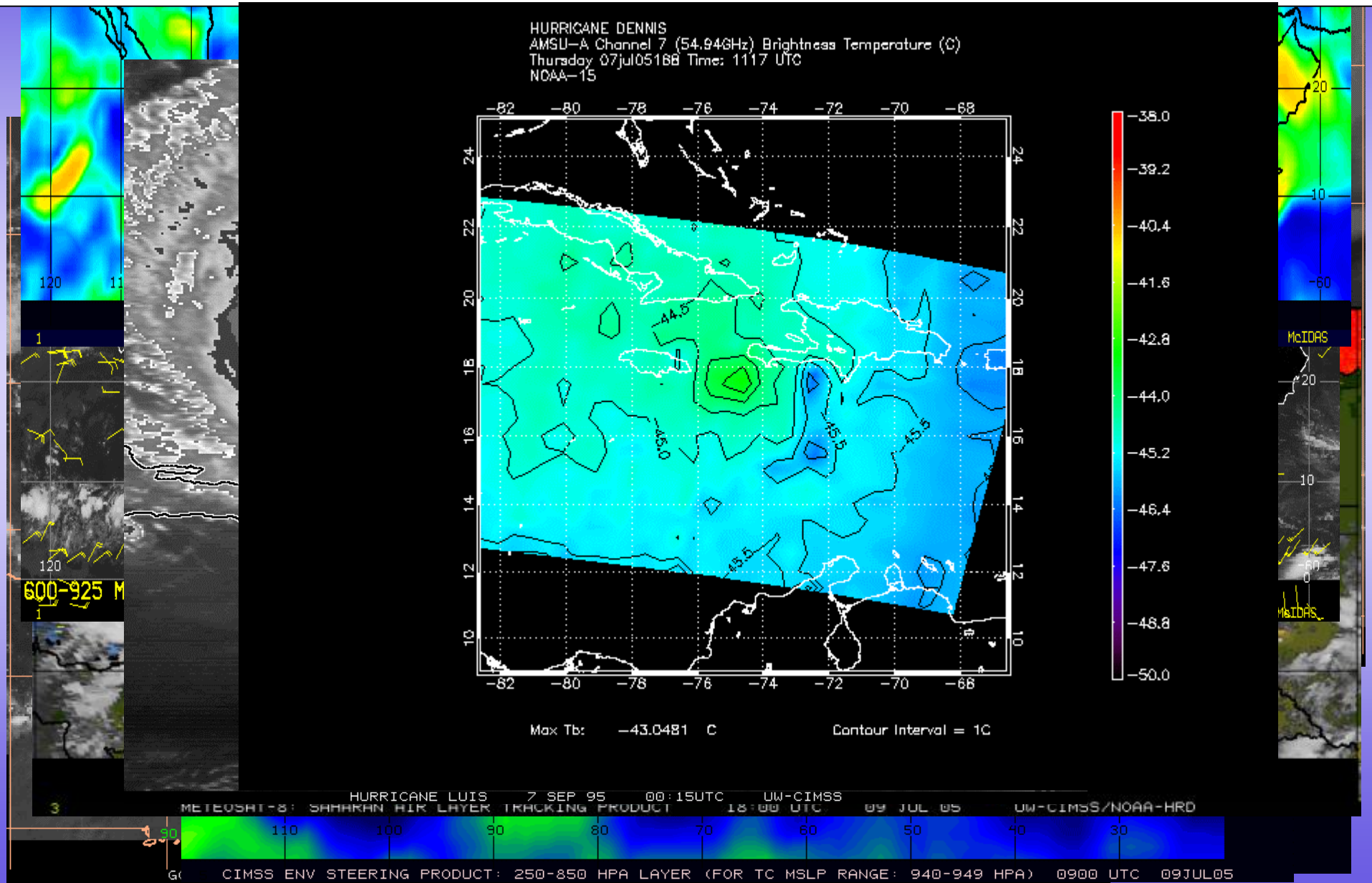
TS Barry
(GOES Cloud-Drift Winds)



Hurricane Opal
(GOES Water Vapor Winds)

CIMSS TC Web Page Products (2005)

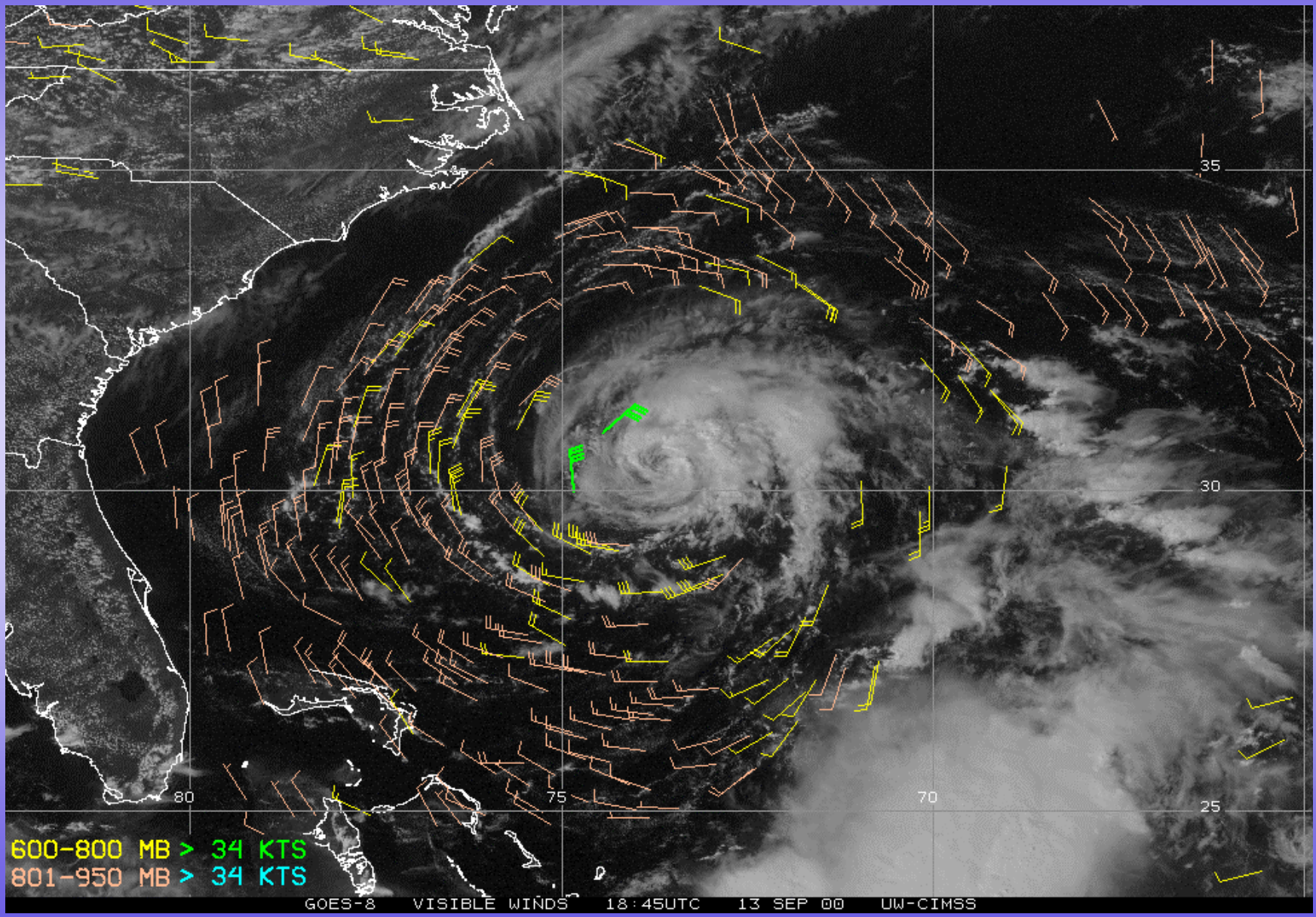
During a typical hurricane event in the North Atlantic (Dennis), over 250 CIMSS satellite products are produced each day.



GOES Winds

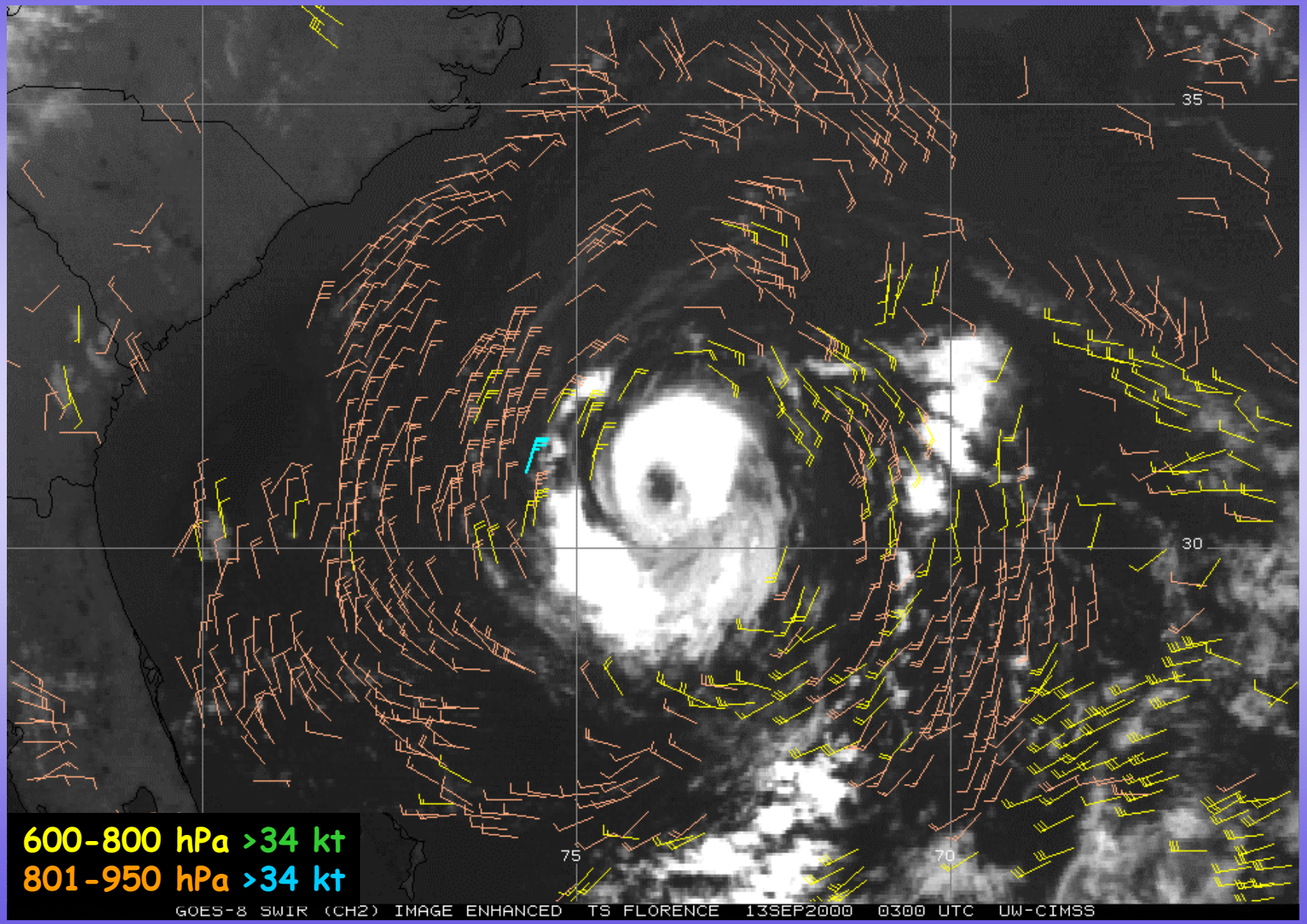
Tropical Storm Florence 13 Sep 2000 1900 UTC

visible cloud-drift winds



Tropical Storm Florence 13 Sep 2000 0300 UTC

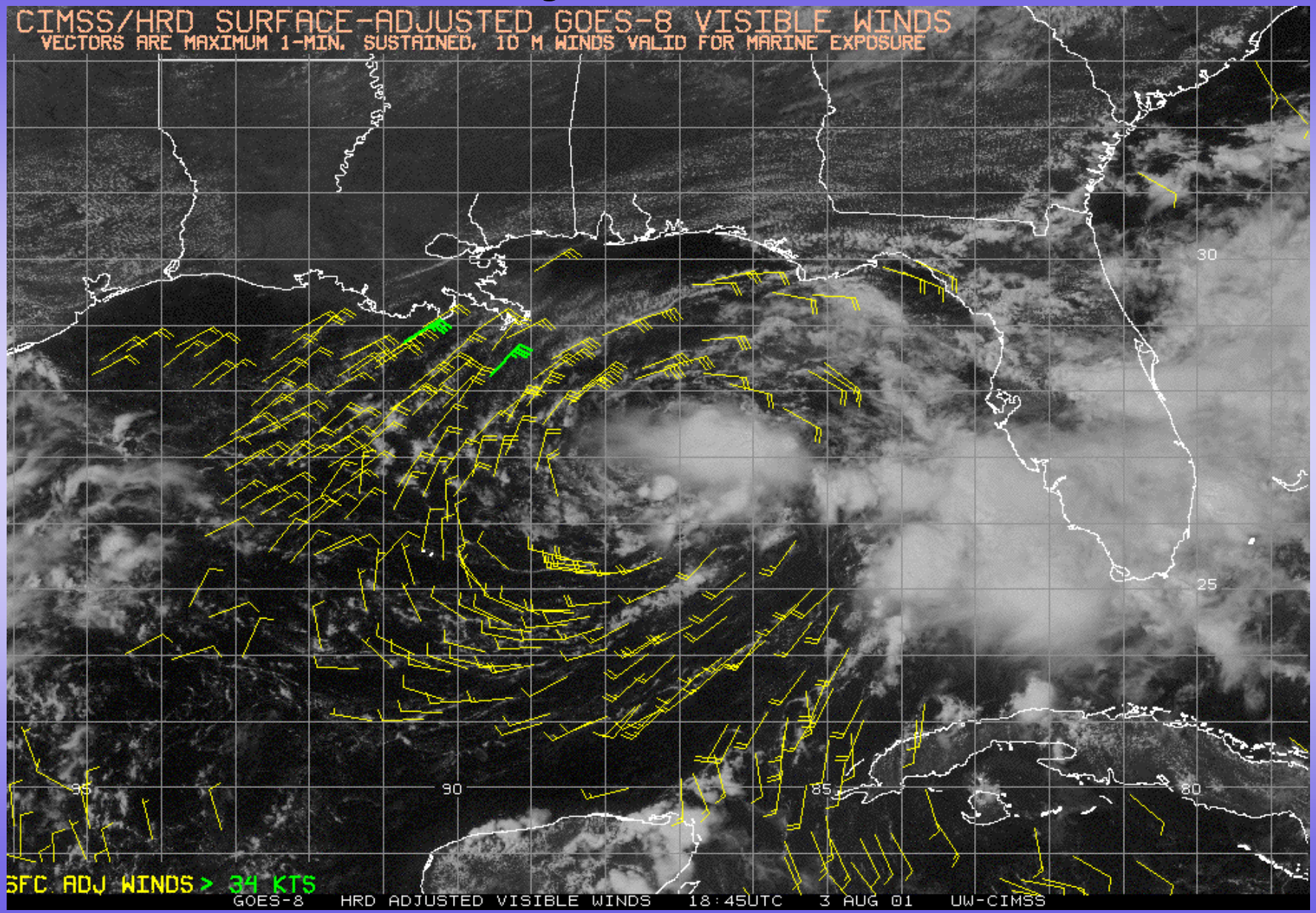
LWIR vs SWIR cloud-drift winds



Surface Adjusted GOES Winds

GOES Low-Level & Surface Adjusted Cloud-Drift Winds

03 Aug 2001 1845 UTC



CIMSS Surface Adjusted Cloud Drift Winds

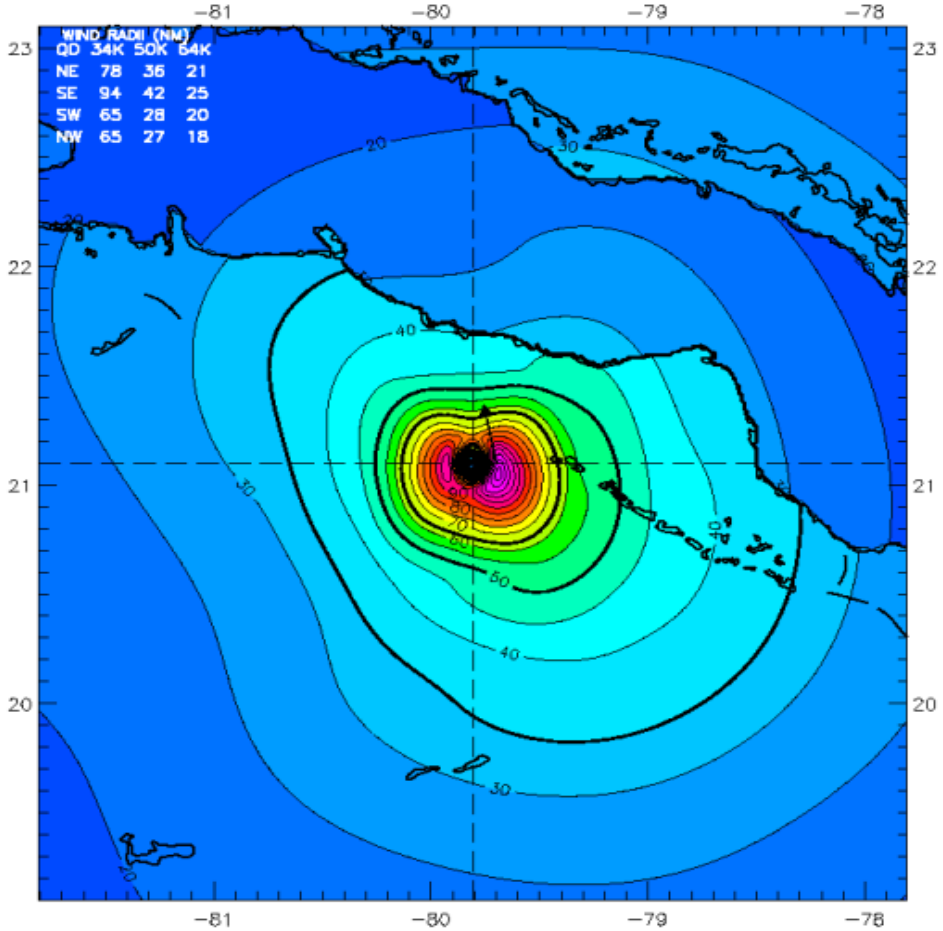
Application to NOAA/HRD's TC Surface Wind Analyses

Hurricane Dennis 1330 UTC 08 JUL 2005

Max 1–min sustained surface winds (kt) for marine exposure

Analysis based on ASOS_LD_TO from 0923 – 1253 z; QSCAT from 1006 – 1148 z; GPSSONDE_MBL from 1205 – 1205 z; GPSSONDE_WL150 from 1205 – 1205 z; CMAN from 0900 – 1300 z; GOES_SWIR from 1002 – 1002 z; SHIP from 1045 – 1312 z; MOORED_BUOY from 0909 – 1250 z; AFRES adj. to surface from mean height 3130 m from 1129 – 1312 z;

1330 z position extrapolated from 1200 z ATCF wind center using 305 deg @ 14 kts; mslp = 941.0 mb



Observed Max. Surface Wind: 117 kts, 6 nm NE of center based on 1157 z AFRES sfc measurement

Analyzed Max. Wind: 118 kts, 7 nm SE of center

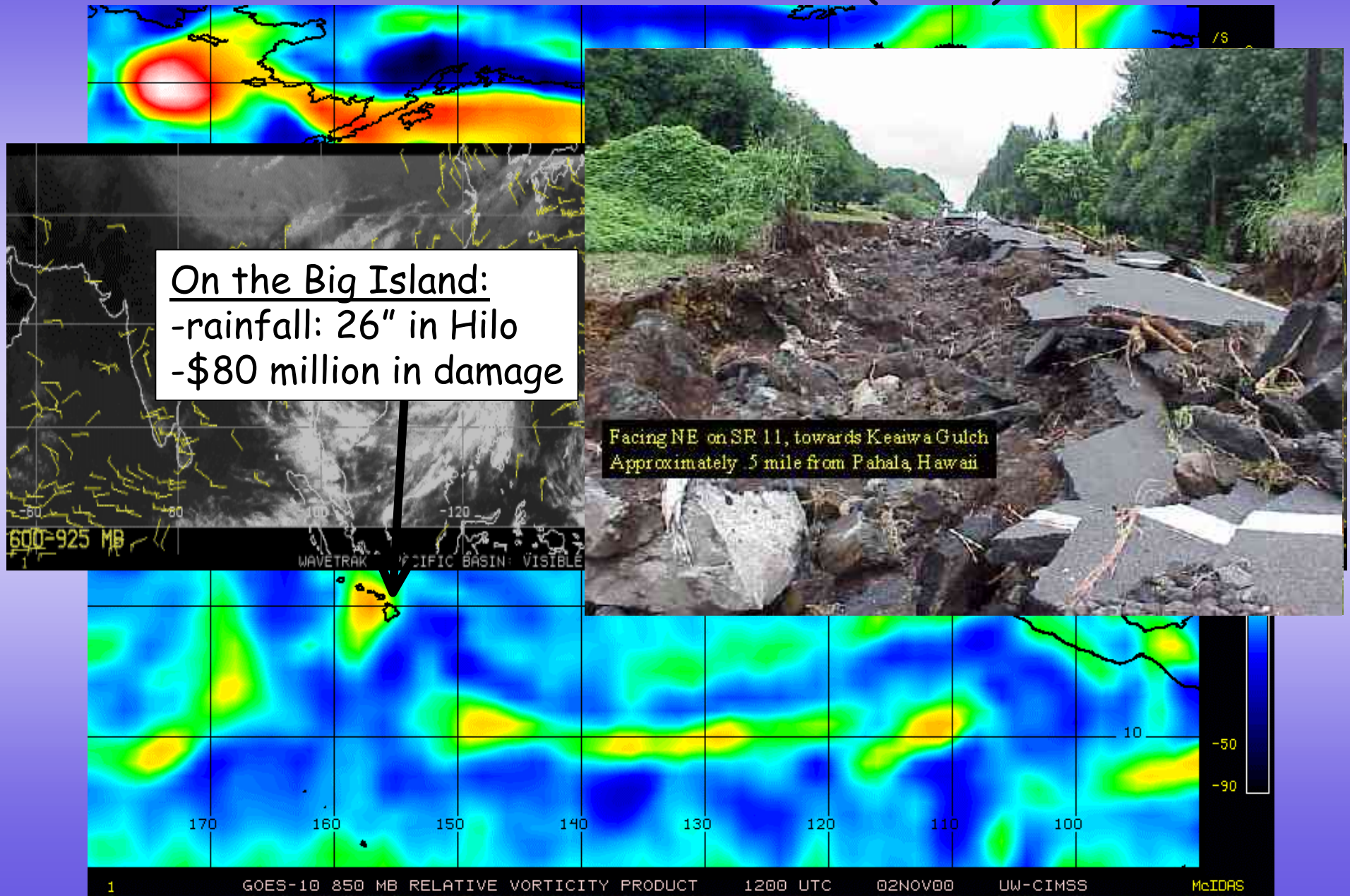
Experimental research product of:

NOAA / AOML / Hurricane Research Division

Vorticity Analyses

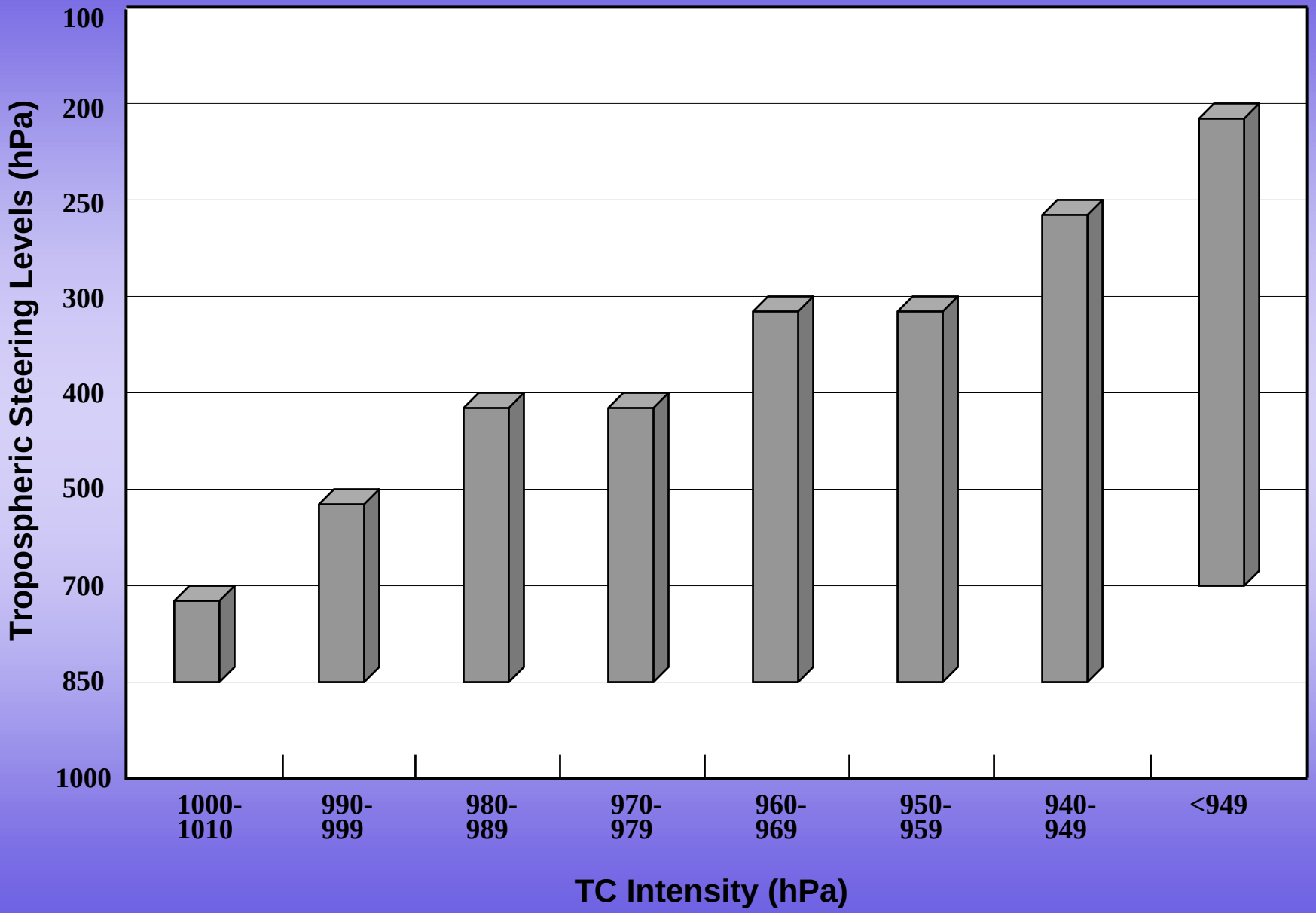
CIMSS Wavetrak and Vorticity Analyses

Hurricane Paul Remnants (2000)

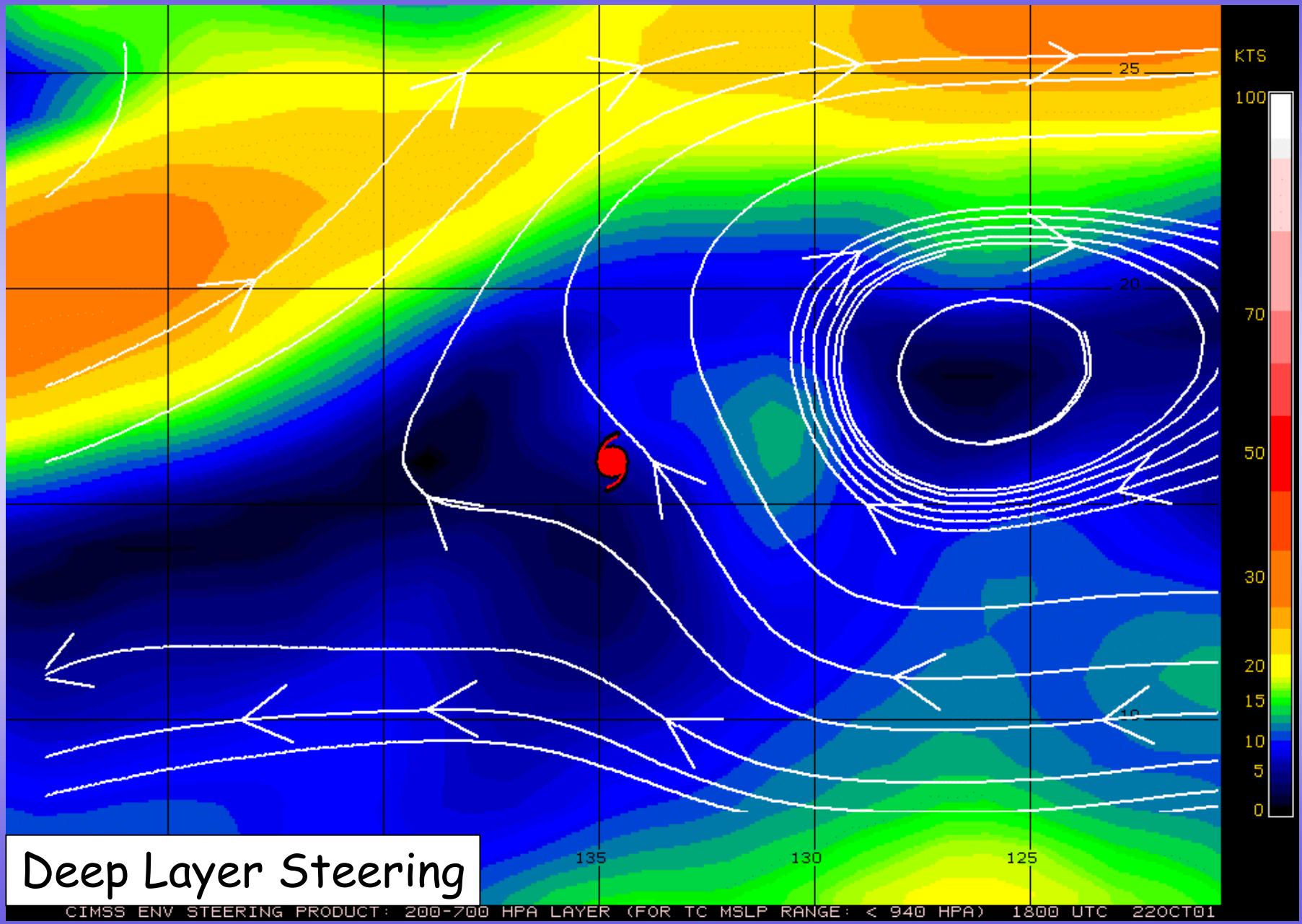


Environmental Steering Analyses

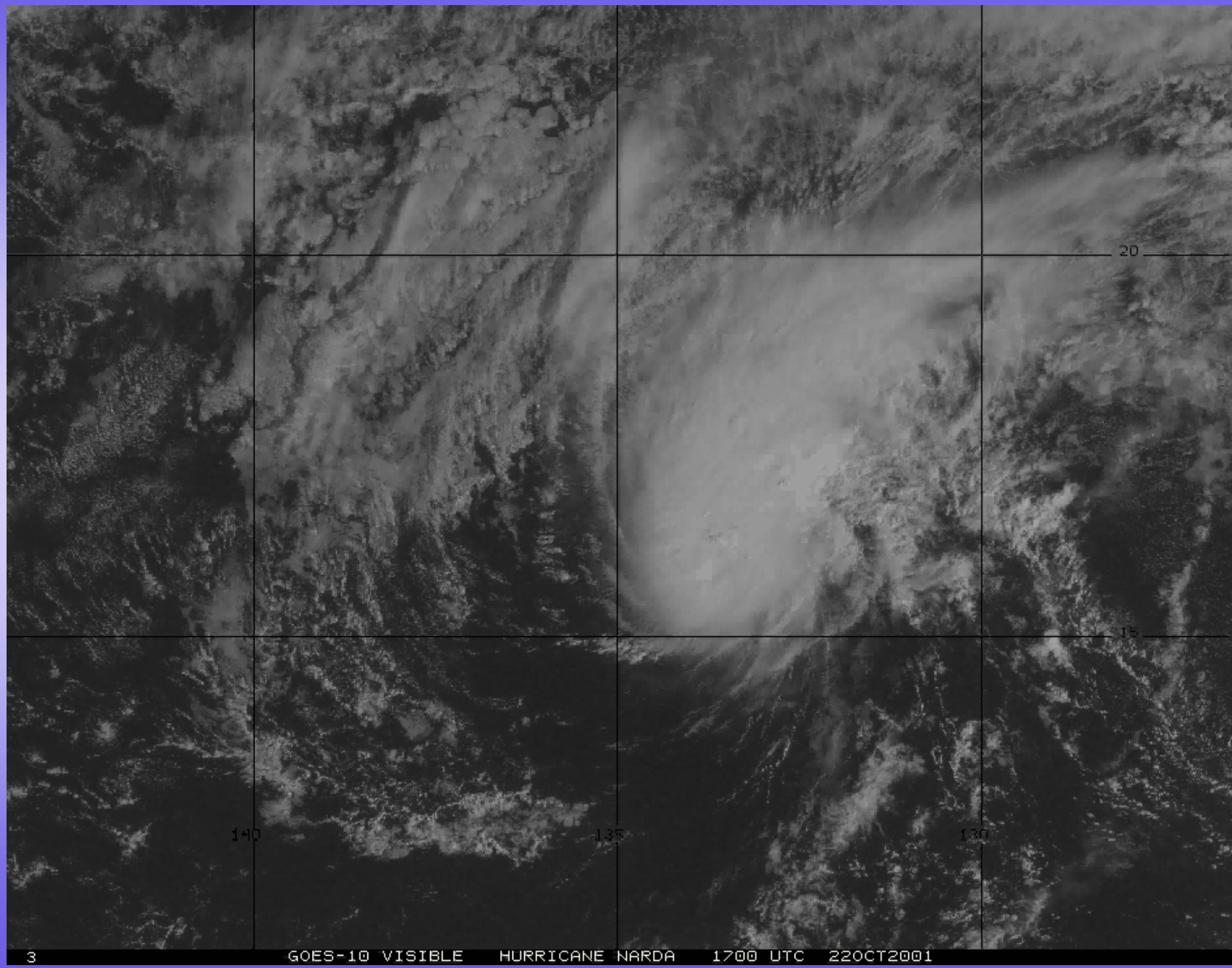
TC Intensity vs Environmental Steering



Hurricane Narda 22 Oct 2001 1800 UTC

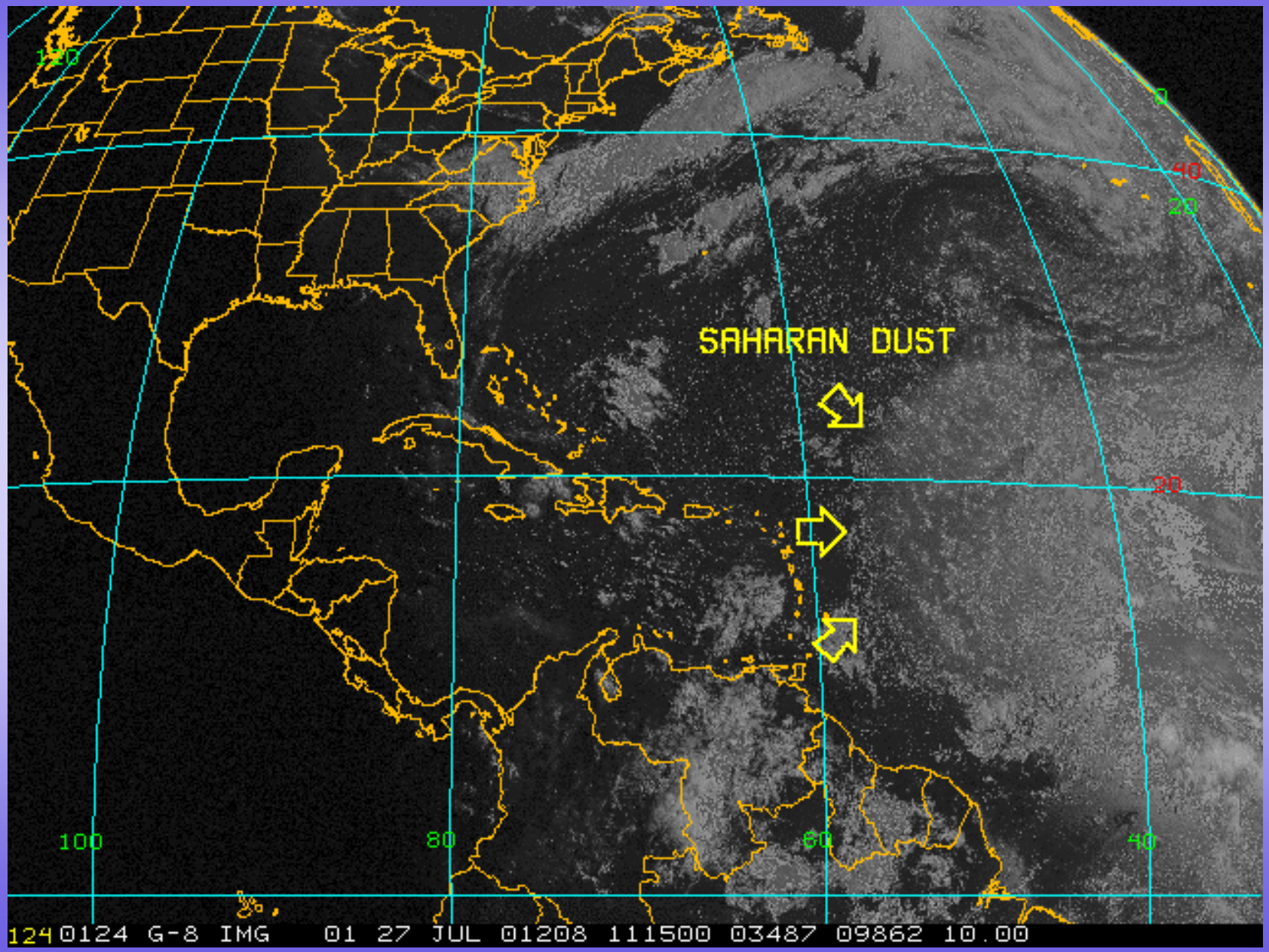


Hurricane Narda 22-23 October 2001



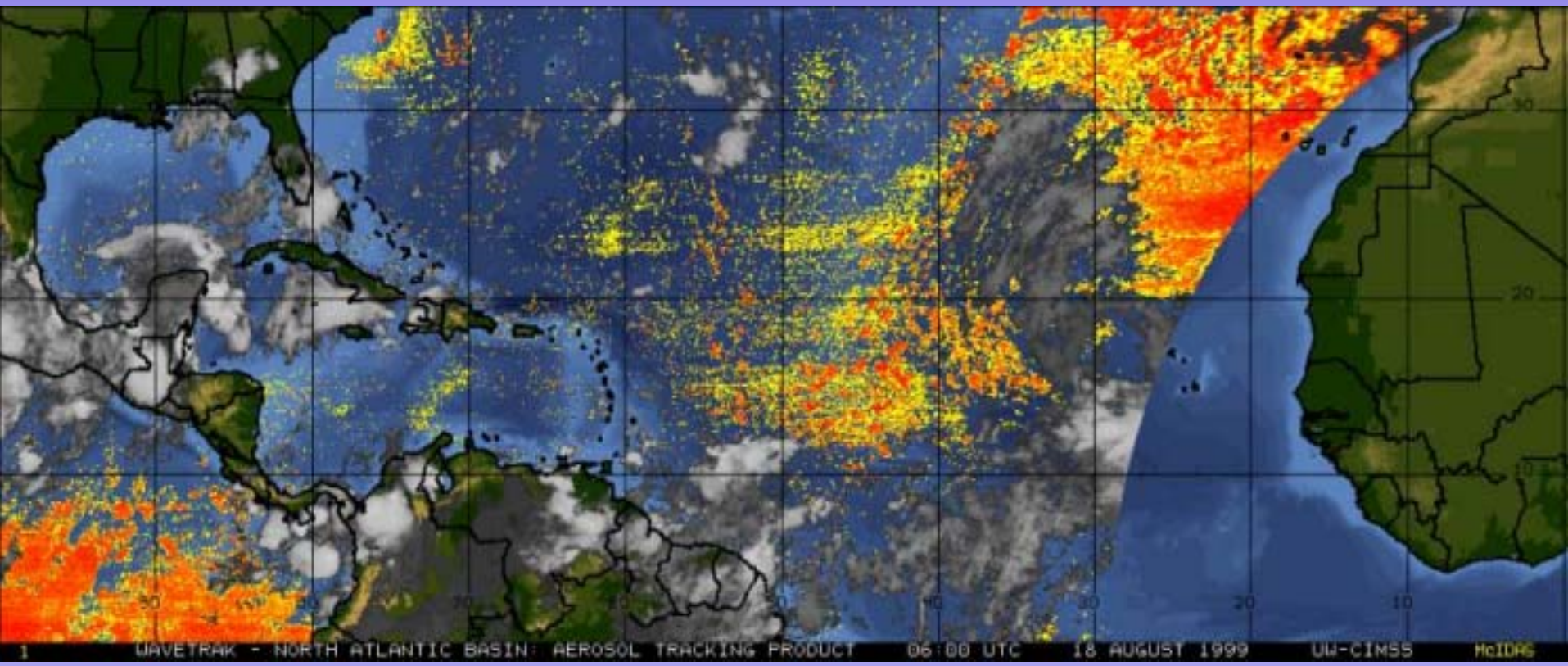
Saharan Air Layer Analyses

Tracking Saharan Dust Using GOES (2001)



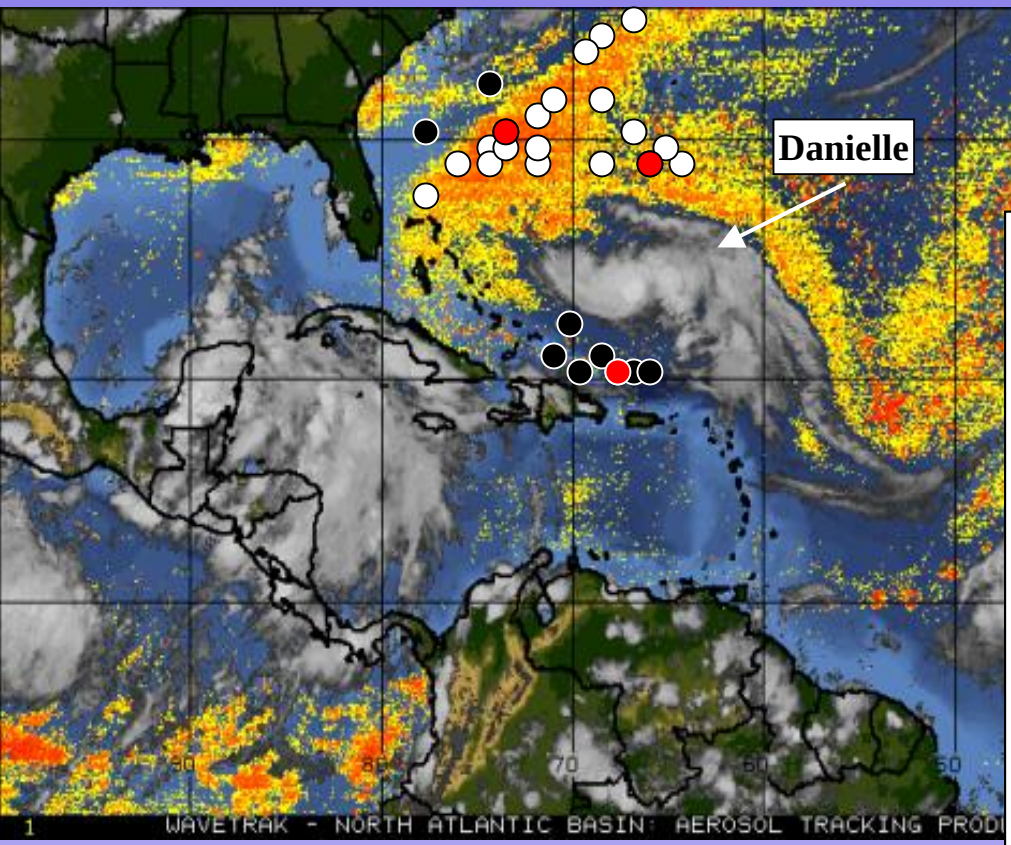
Hurricanes Dennis/Cindy/Emily 1999

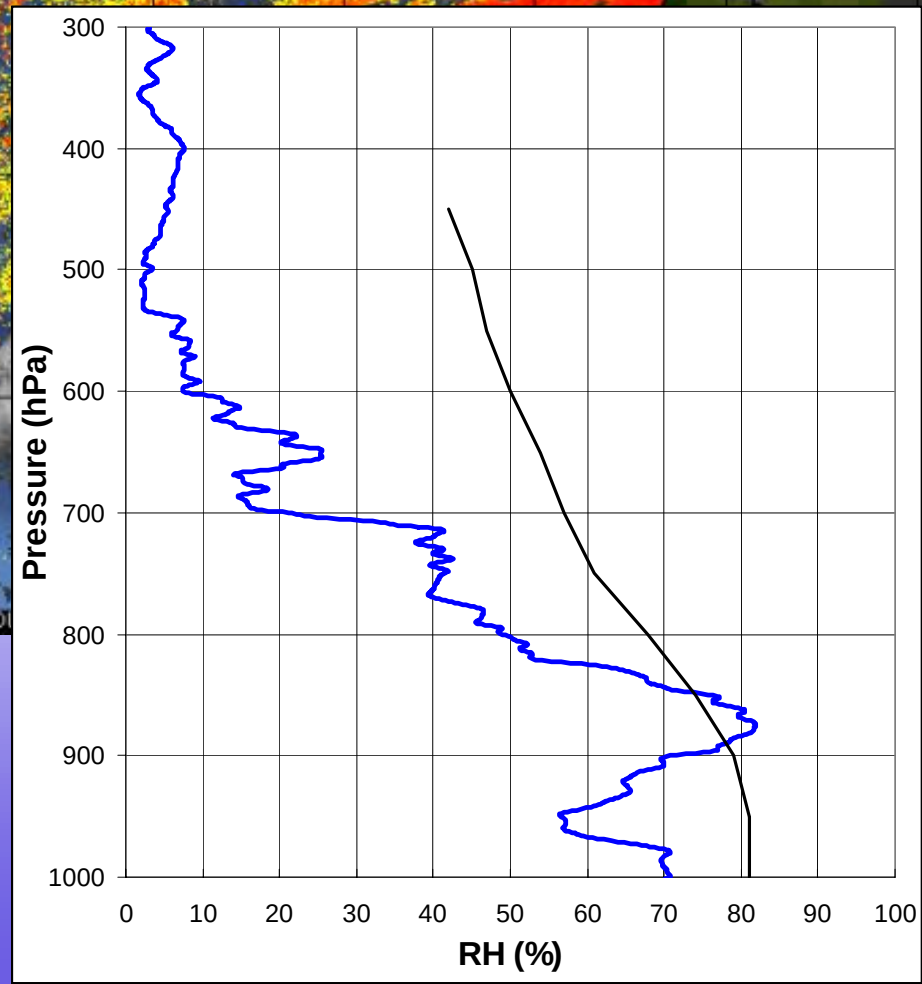
GOES Split-Window Imagery



Hurricane Danielle 29 August 1998 00 UTC

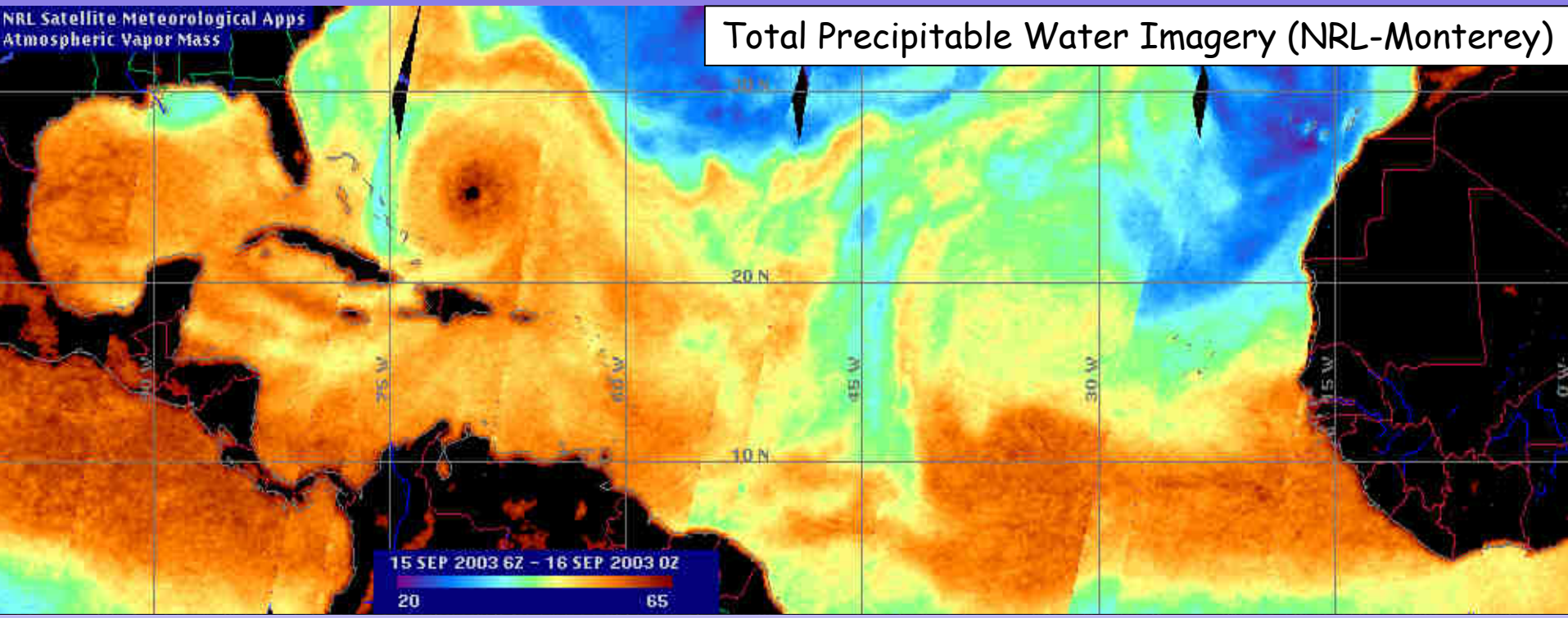
GPS sondes launched from the NOAA G-IV





2005 Saharan Air Layer Experiment (SALEX)

47 NOAA G-IV Research Hours

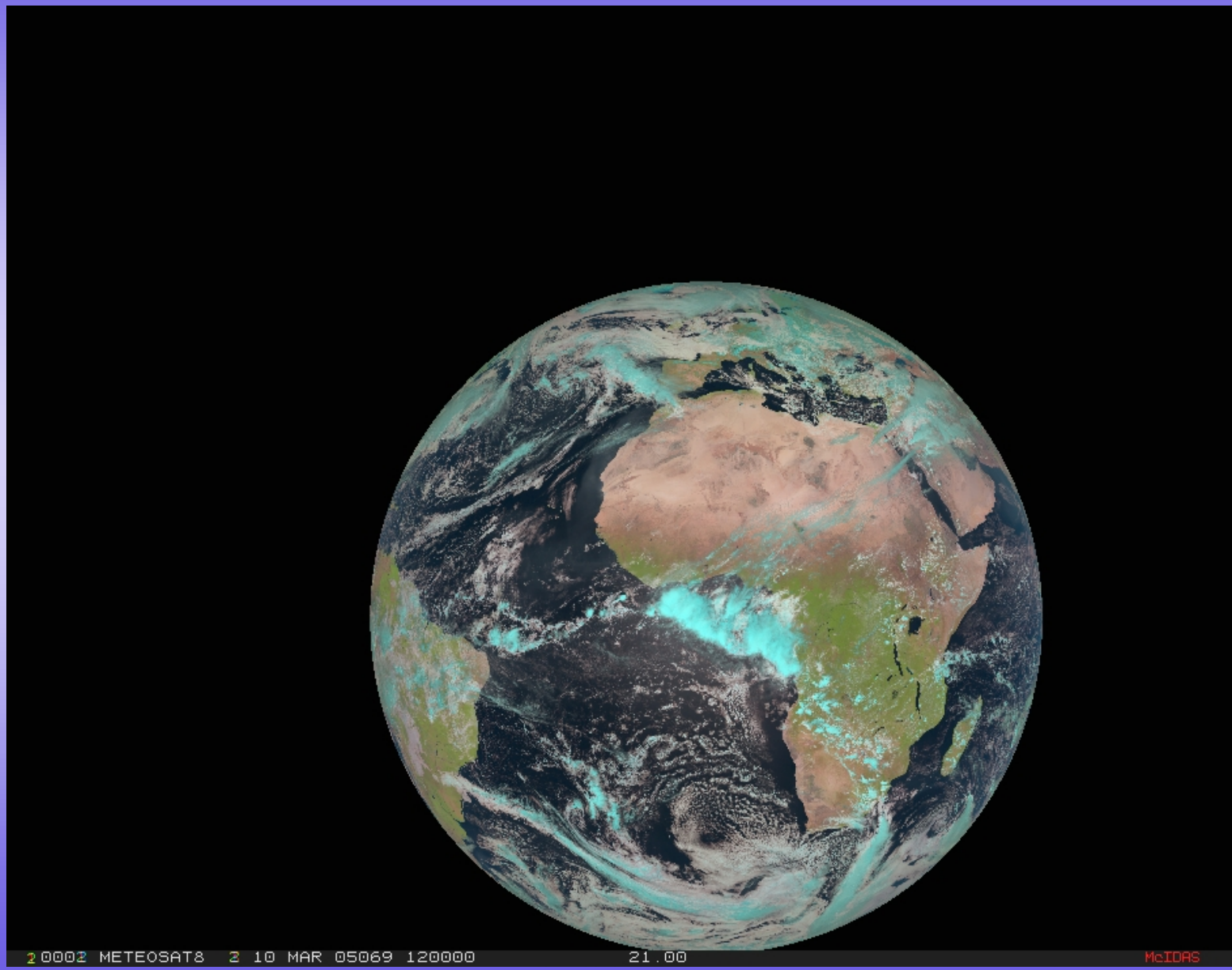


Total Precipitable Water Imagery (NRL-Monterey)

Investigate the mechanisms by which the Saharan Air Layer's low humidity, strong mid-level winds, and suspended mineral dust affect tropical cyclone intensity change in the North Atlantic.

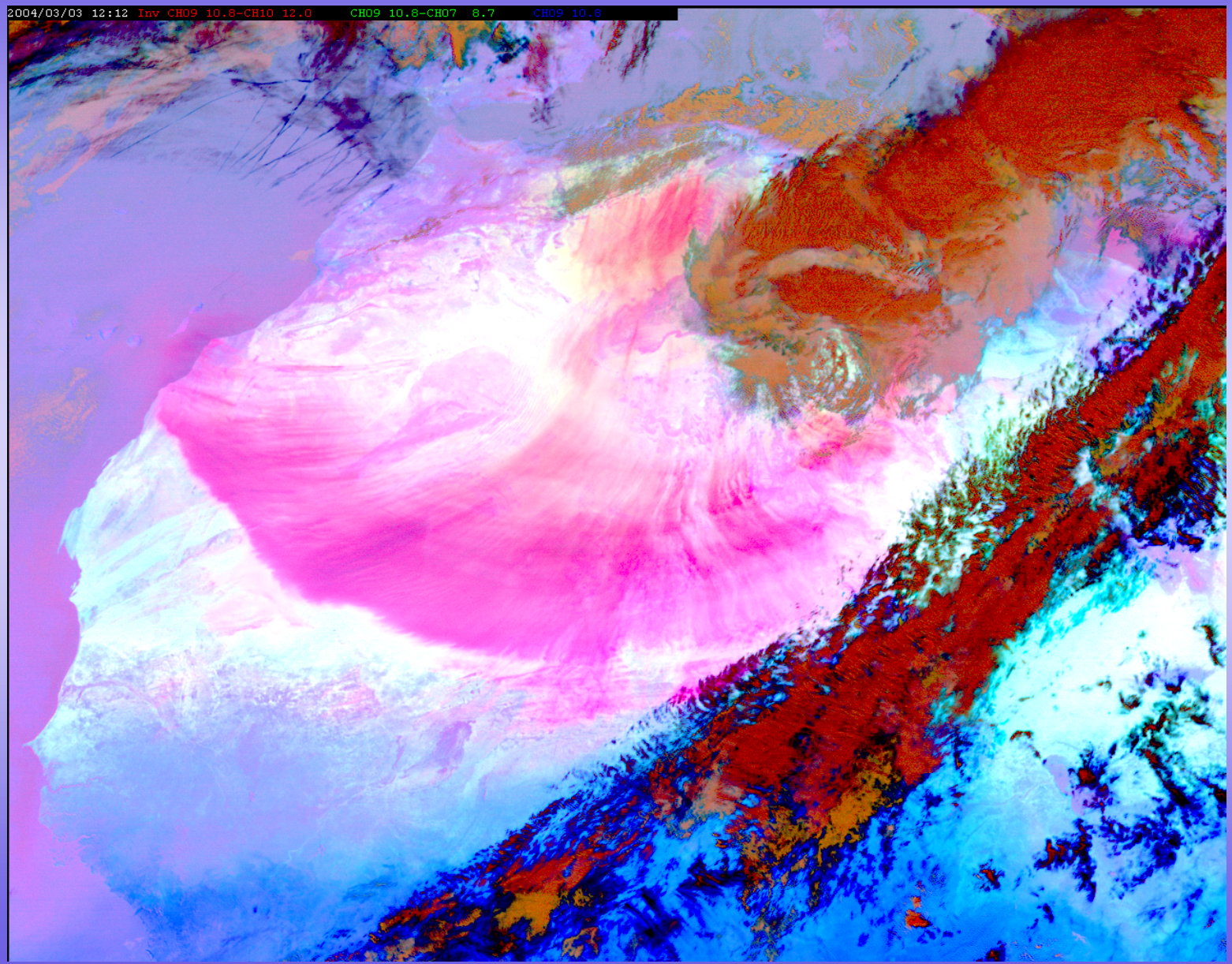
Meteosat-8 "True Color" Imagery

(1.6/0.8/0.6 μm)



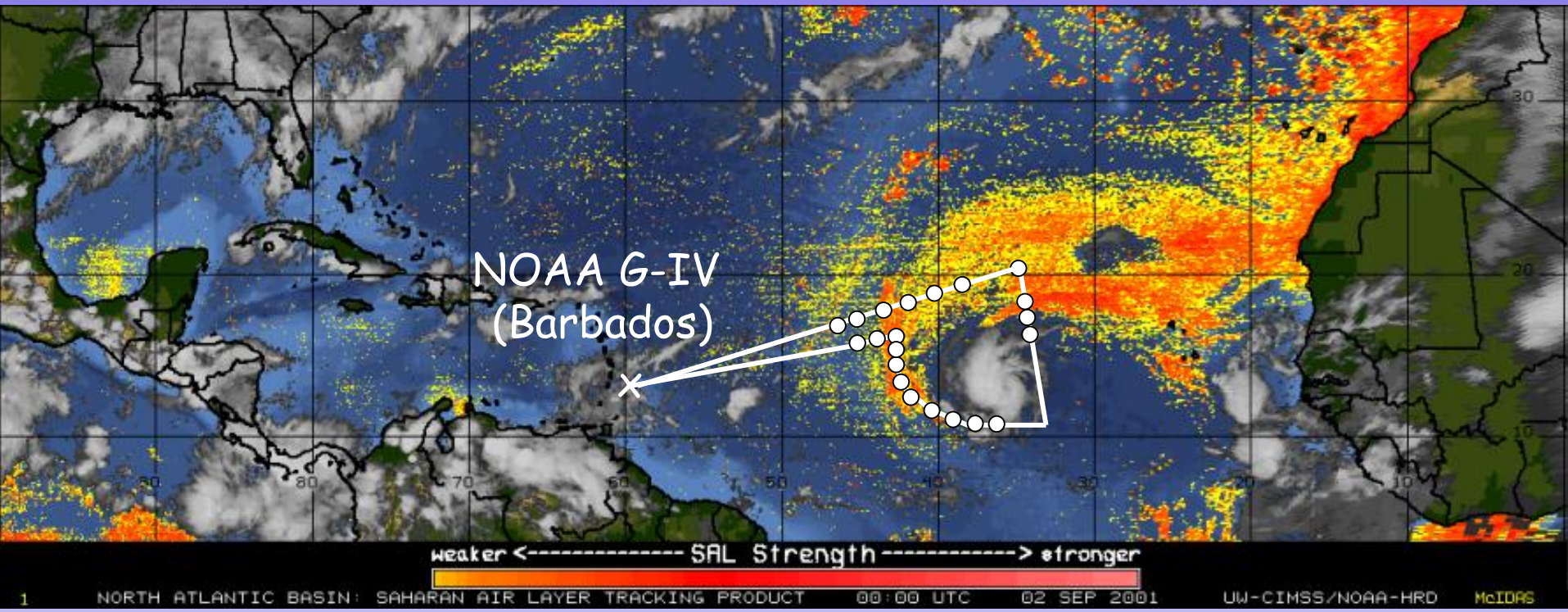
Meteosat-8 RGB Imagery (EUMETSAT)

(12.0-10.8/10.8-8.7/10.8 μm)



2005 Saharan Air Layer Experiment (SALEX)

47 NOAA G-IV Research Hours



CIMMS

Cooperative Institute for Mesoscale Meteorological Studies
University of Oklahoma
Established 1978

"Satellites are the primary observing tools in the tropics. I greatly appreciate the good work going on at CIMSS, particularly, the work of Chris Velden who has worked closely with the NHC since the mid 1980s. The Nation's Hurricane Warning Program is a true team effort. The folks at CIMSS are indeed part of that team."

Max Mayfield
Director of the National Hurricane Center

ODT…… ✓ x11

Deep Layer Mean Steering…… ✓ x1

SAL…… ✓ x1

CIMMS…… ✓ x9