



Impact of the Loss of QuikSCAT on NOAA NWS Marine Warning and Forecast Operations

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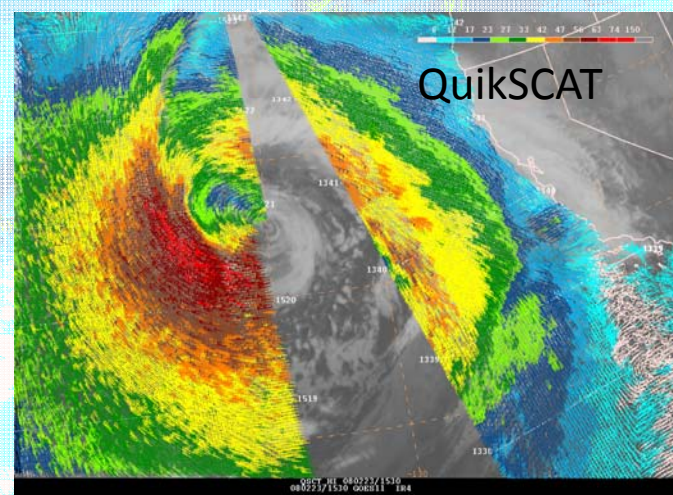
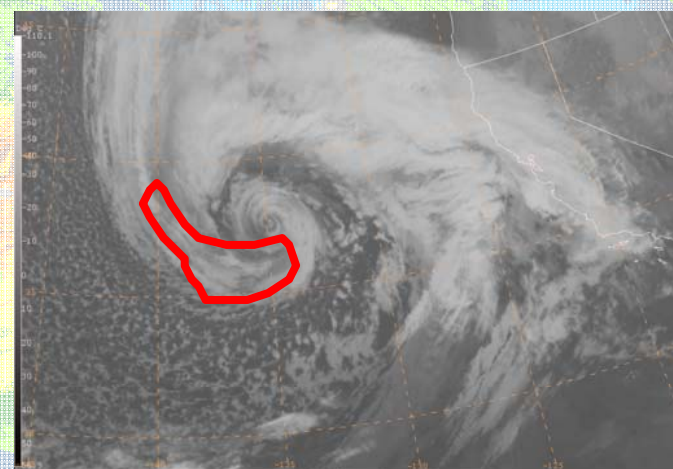
4 NESDIS StAR

5 UCAR

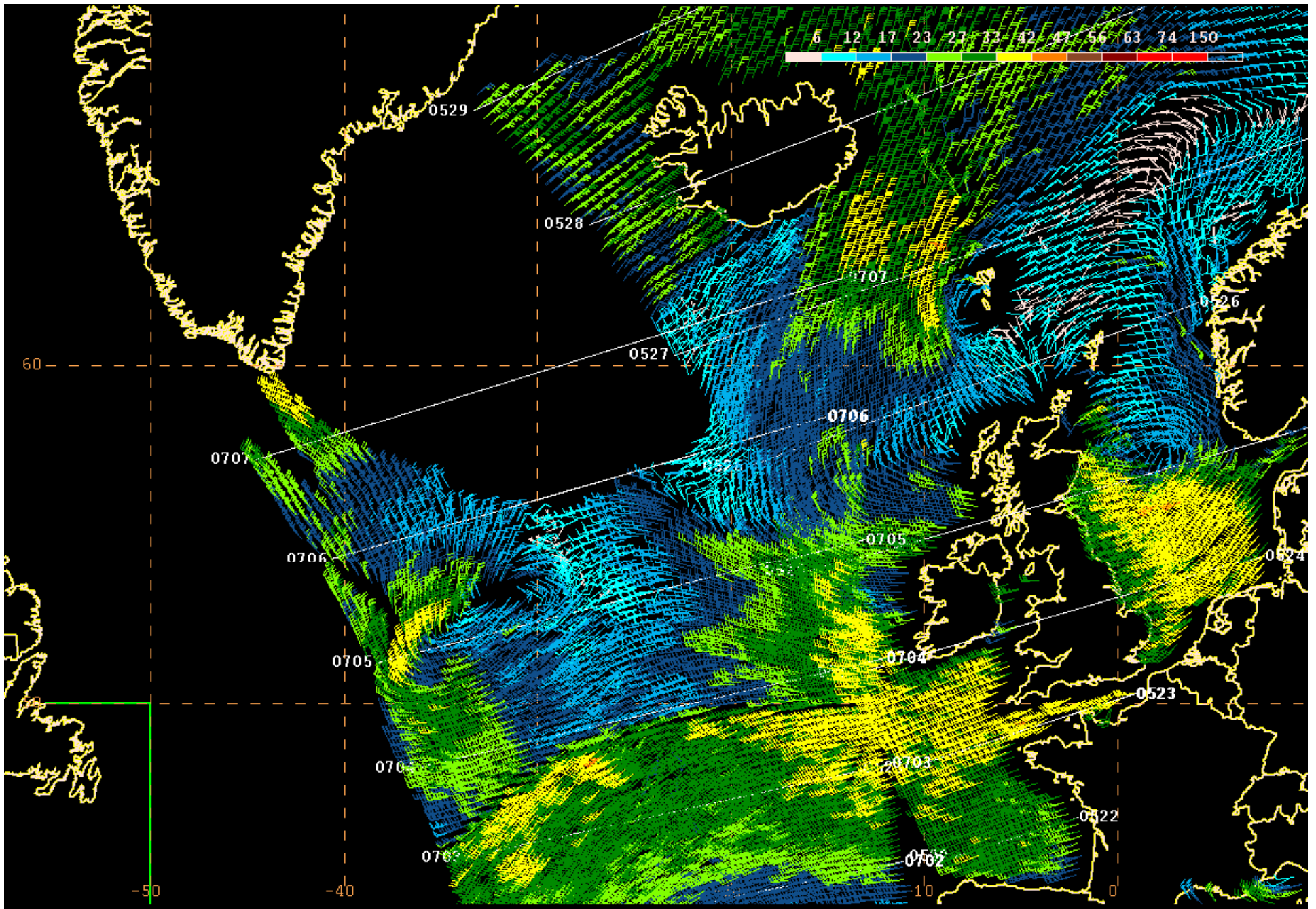
OVWST, Barcelona Spain



High resolution Ocean Surface Vector Winds (OSVW) fully integrated into operations



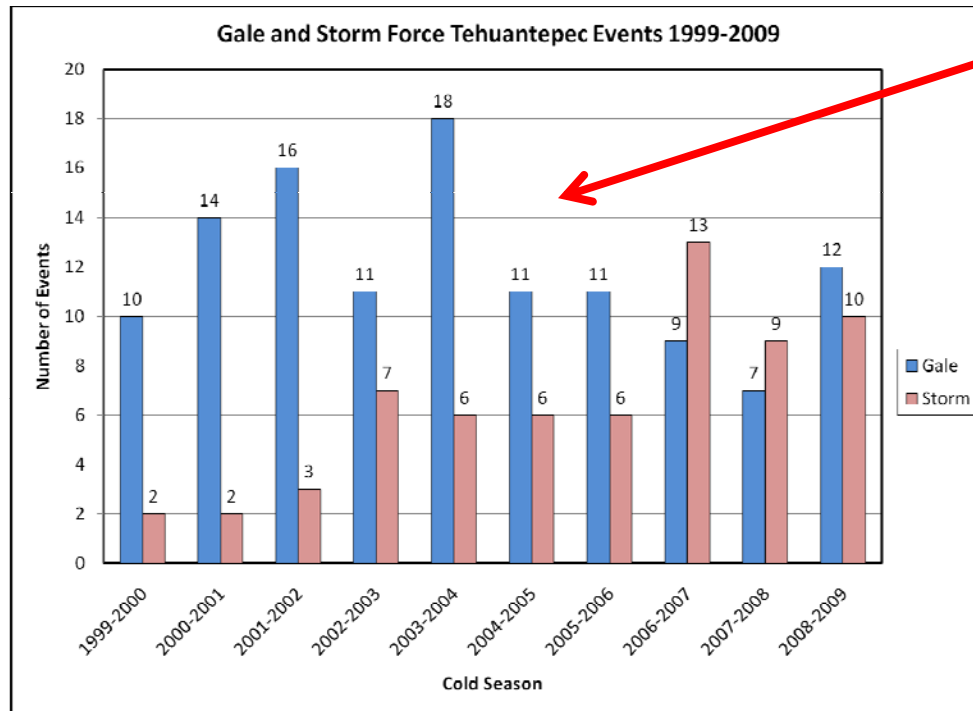
- Twice daily near complete wind field
- Increased situational awareness
- Improved detection and warning capability
- Enhanced understanding of winds over oceans
- Allowed focus on extreme cyclones (Hurricane Force)



QSCAT 091123/0920

Impact of QuikSCAT Loss

Tropical Analysis and Forecast Branch



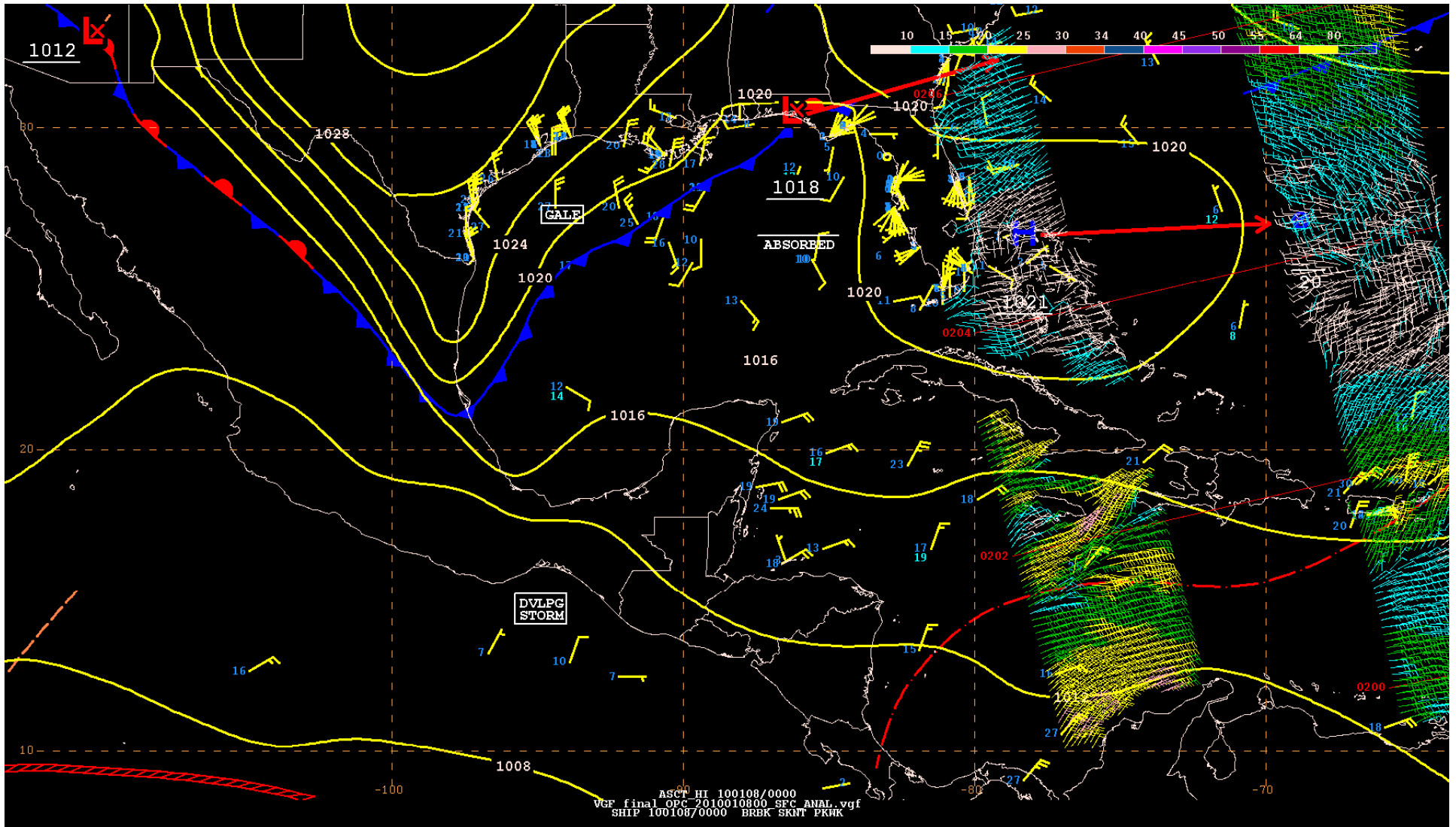
Brennan et al. (2010) *Wea. Forecasting*

- 10-year climatology of Gulf of Tehuantepec gap wind events based on QuikSCAT showed an average of 6 to 8 storm force events per cold season
- TAFB issued a total of 15 Gale and 5 Storm warnings for the area during the 2009-2010 cold season based on improving NWP model output, but could not get confirmation of the Storm warnings from ASCAT
- Typically 1 ASCAT pass per day hits this region, compared to 2 QuikSCAT passes on most days

- From Jan-Mar 2010, TAFB issued 20 Gale warnings in their Atlantic waters, 9 in the Gulf of Mexico, and 4 in the Caribbean

Case Example – 8-14 January 2010

Gulf of Mexico Gale/Tehuantepec Storm



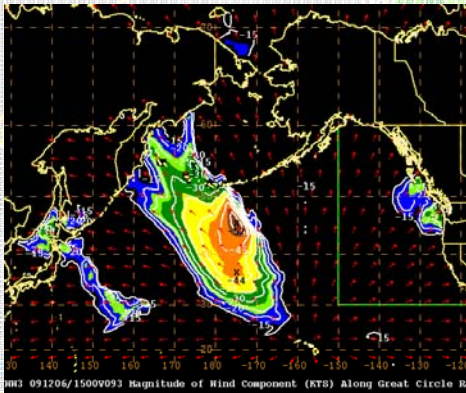
Surface analysis, ship/buoy obs and ASCAT every 6 h from 8-14 January

Case Example – 8-14 January 2010

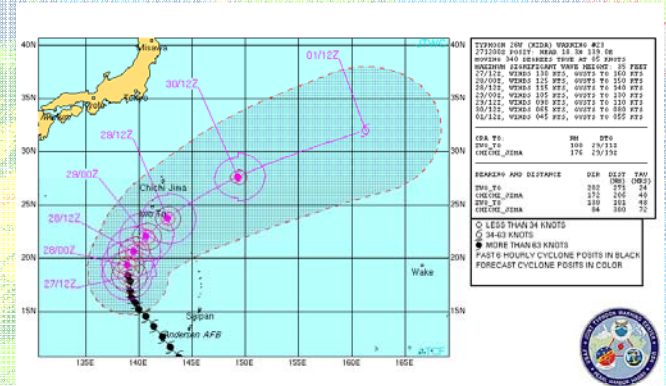
Gulf Gale/Tehuantepec Storm

- Only 5 ASCAT “hits” on the Gulf of Tehuantepec in a 7-day period
 - Strongest ASCAT winds 40-45 kt on 10 Jan
 - No ASCAT data in region from 03 UTC 9 Jan through 15 UTC 10 Jan and from 15 UTC 10 Jan to 04 UTC 12 Jan
 - 3 storm-force ship observations
 - Only a couple ASCAT gale-force retrievals in far SW Gulf of Mexico
- Summary of lost capability due to loss of QuikSCAT
 - Ability to capture storm-force winds
 - Full outline of area impacted by gale-force winds in strongest events
 - Ability to compare the model wind field with observations over a large spatial area
 - Decreased forecaster confidence for severity, coverage, and timing of most extreme events

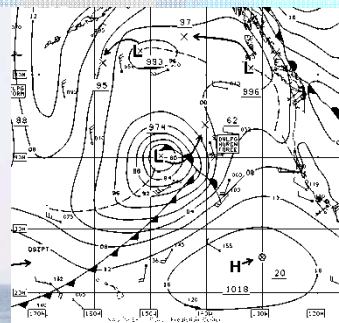
Specific events



Dec 9, 2009 – Hawaii big wave event



- Tropical Storm Nida “...other than satellite data and without QuikSCAT data the ability to measure winds for these islands has been severely hampered making it difficult to verify any tropical system.”

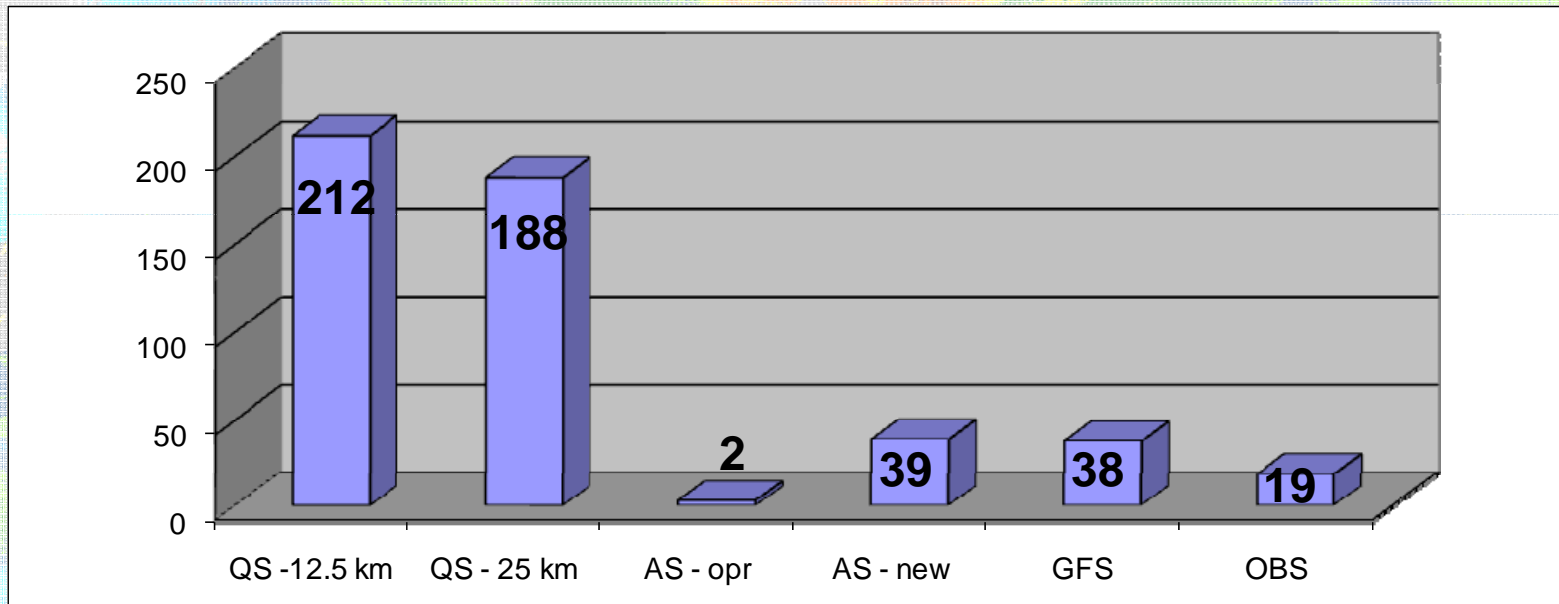


Jan, 2020 – C/V Horizon Hunter damaged en route to Guam ...diverted to Hawaii

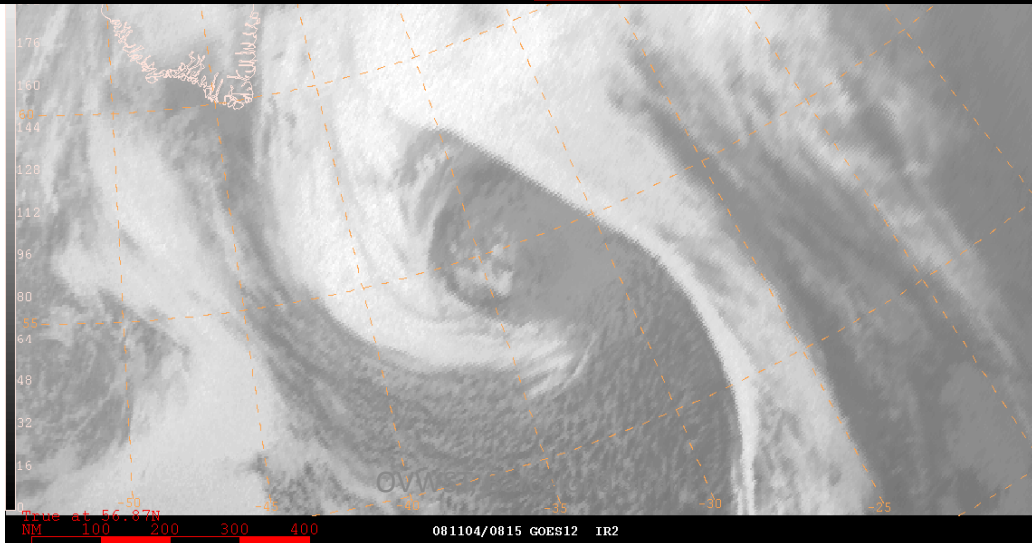
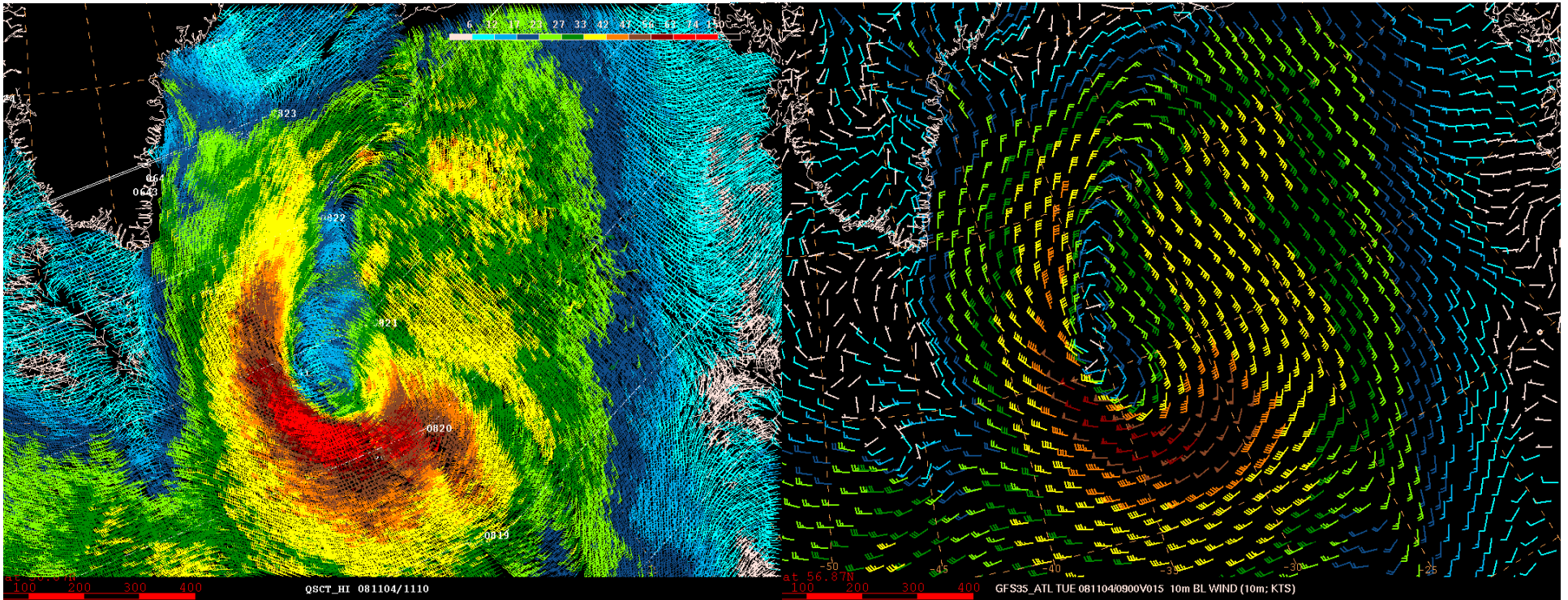
May 19, 2010

OVWST, Barcelona Spain

Hurricane Force Observations (Oct'07 ~ May'08)

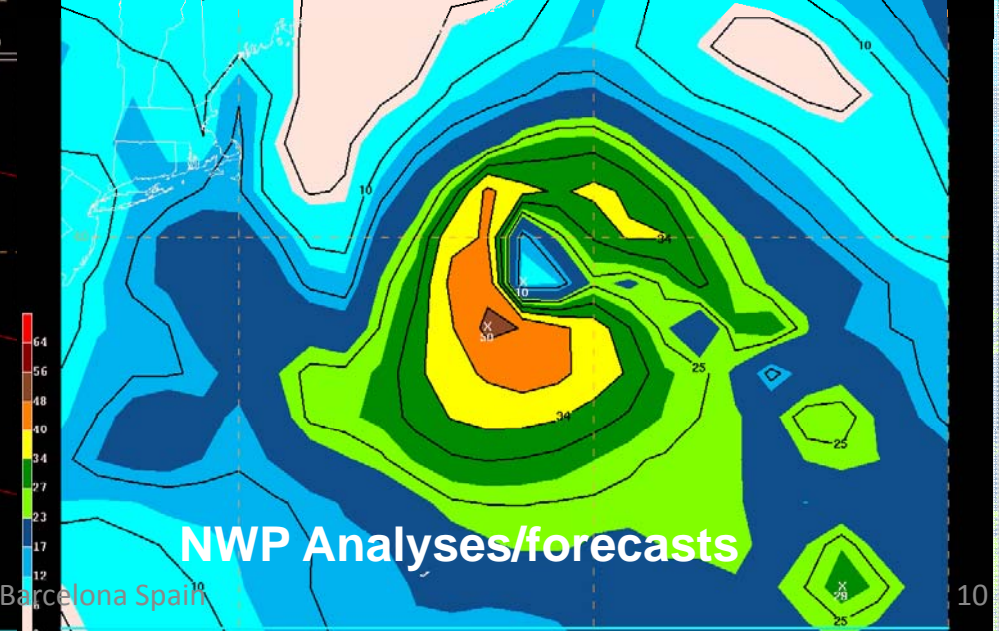
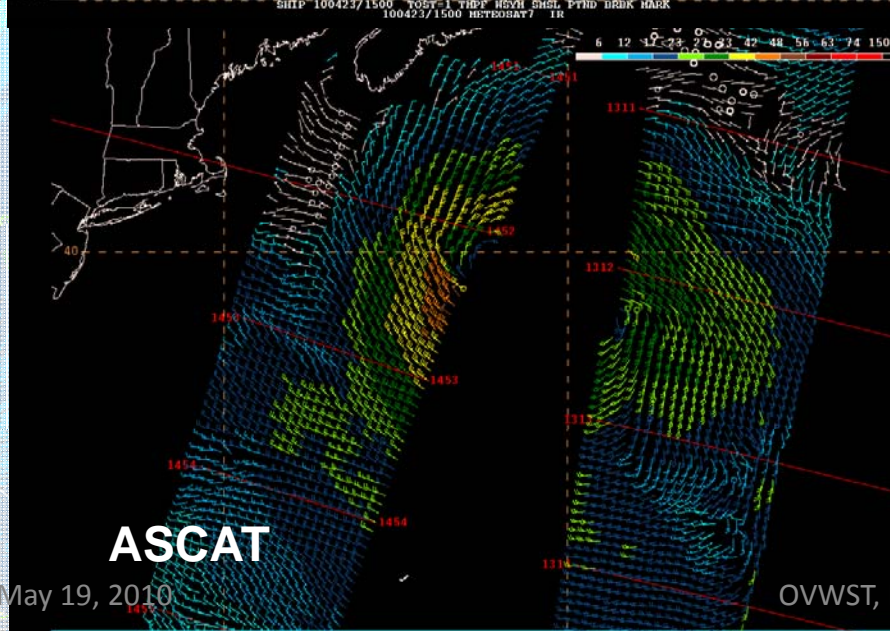
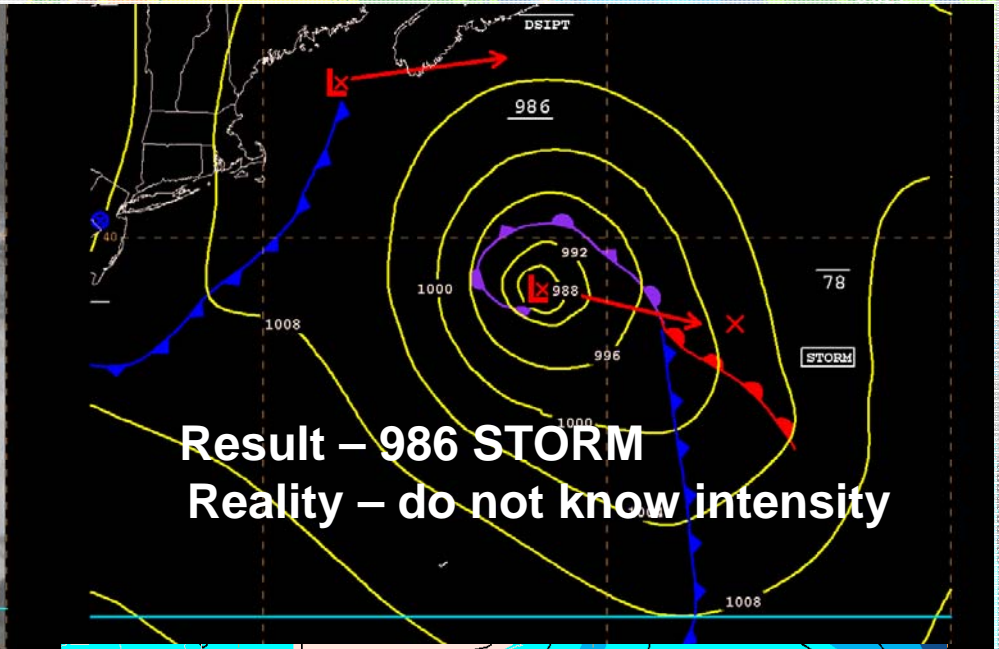
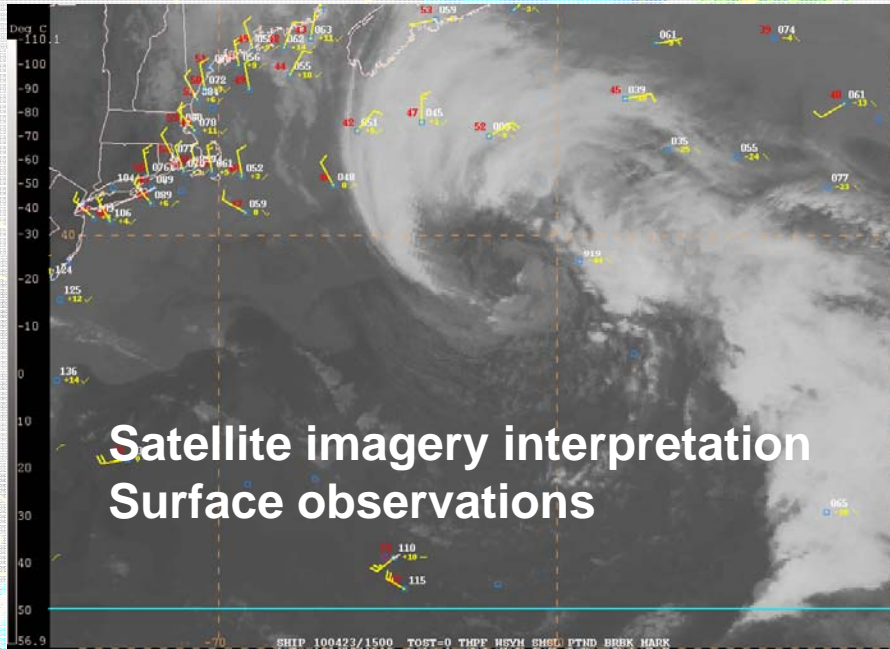


QuikSCAT vs. NCEP Global Forecast System



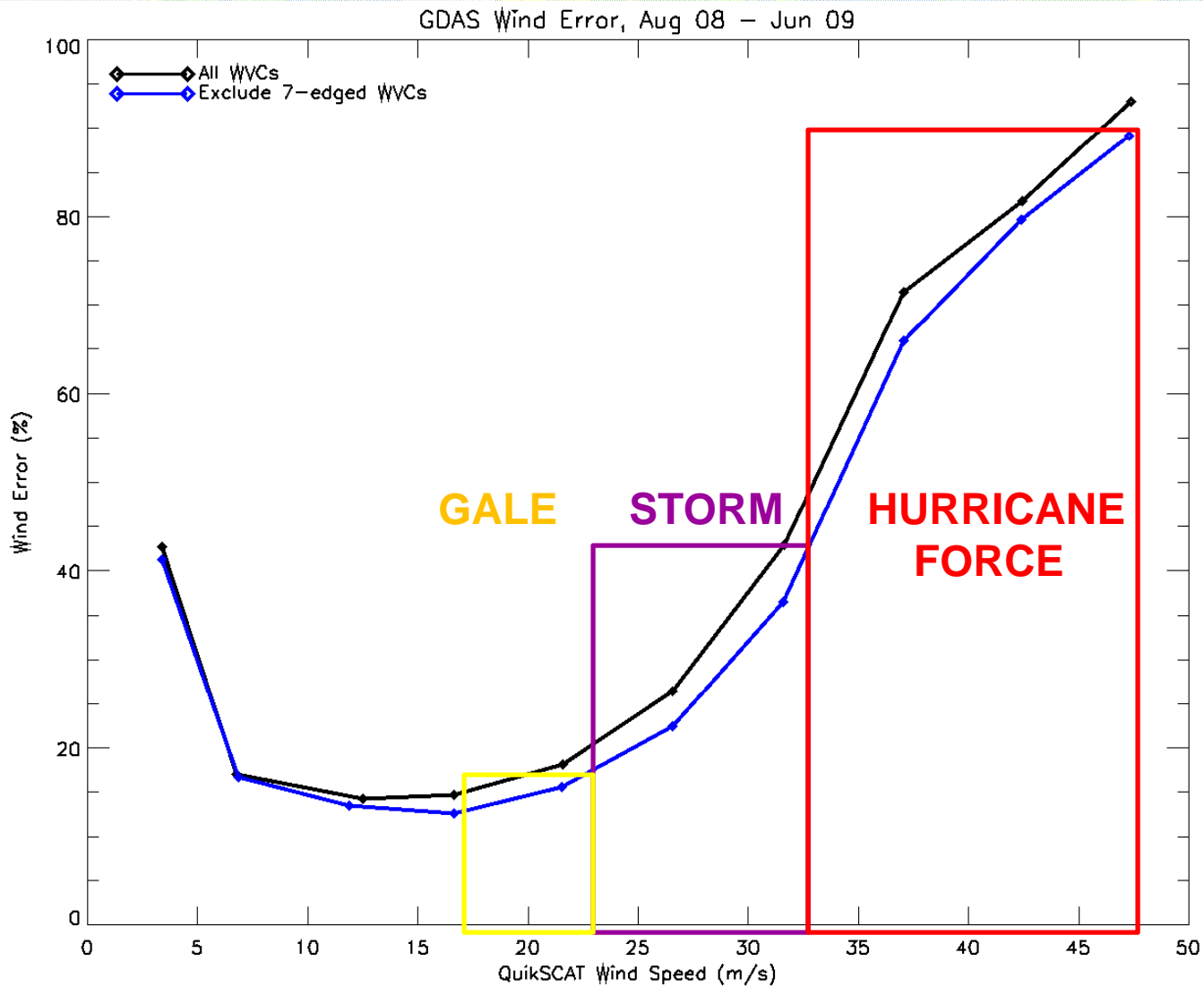
May 19, 2010

April 23, 2010 Forecaster tools – the Quandary



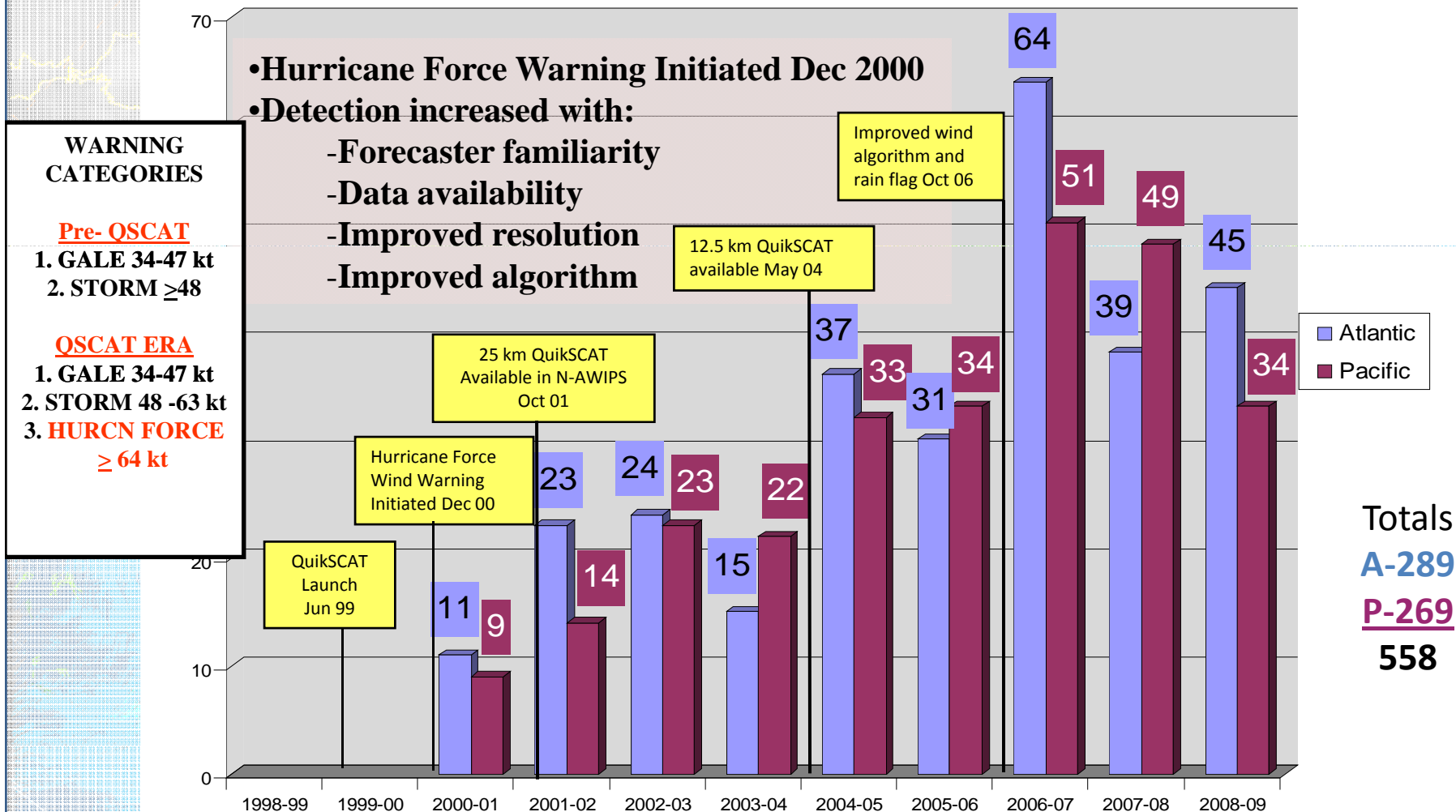
% Wind Error – QSCAT 25 km NRT vs. GDAS

Aug 08 – Jun 09

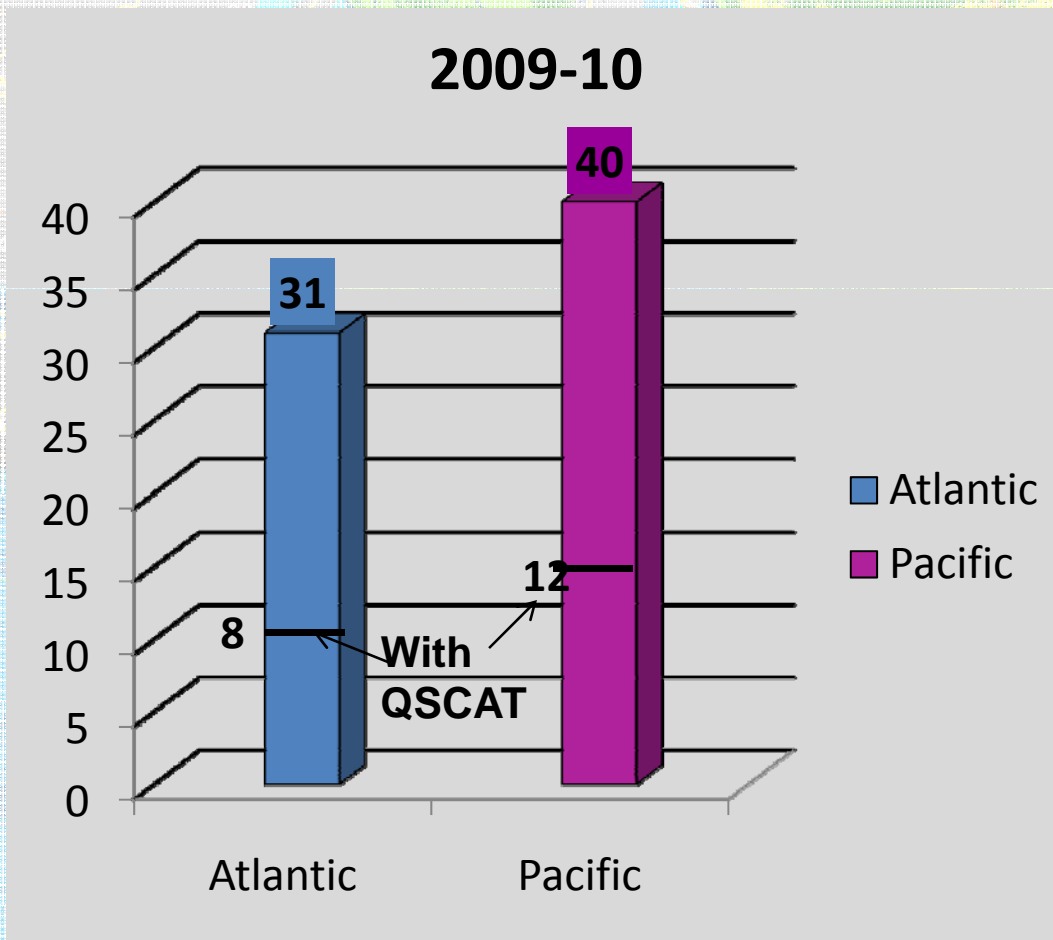




Hurricane Force Extra-tropical Cyclones – Detection and Warning Trend using QuikSCAT 2000-2009

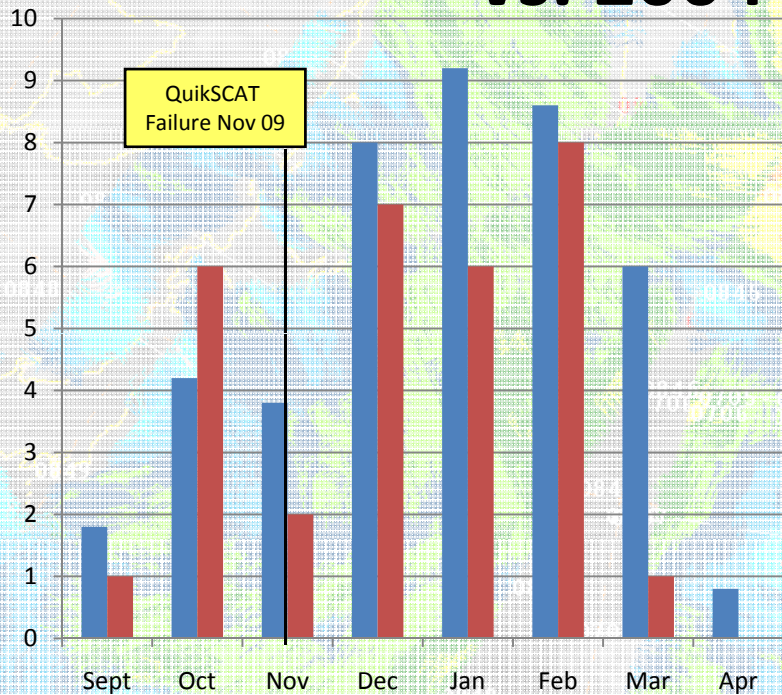


Forecaster estimated Hurricane Force cyclones Sep 09-Apr 2010



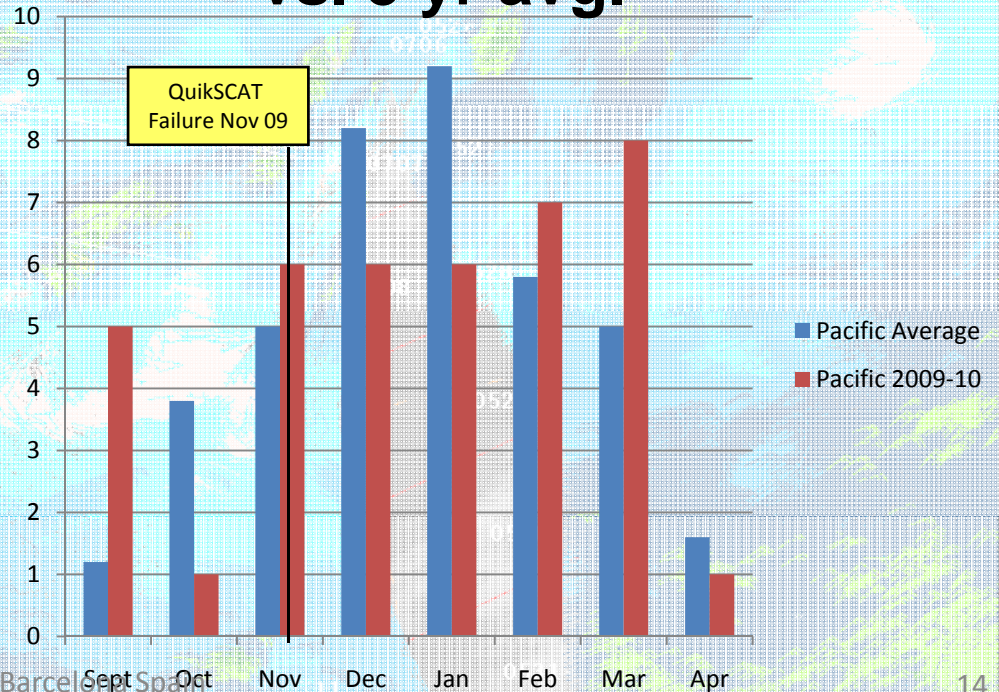
- Atl – below previous 5 yr average (43)
DJFMA – (32.6) 22
- Pac – at avg. (40.2)
DJFMA – (29.8) 28
- *highly subjective post QuikSCAT

Forecaster estimated Hurricane Force cyclones Monthly Distribution 2009-2010 vs. 2004-2009 average



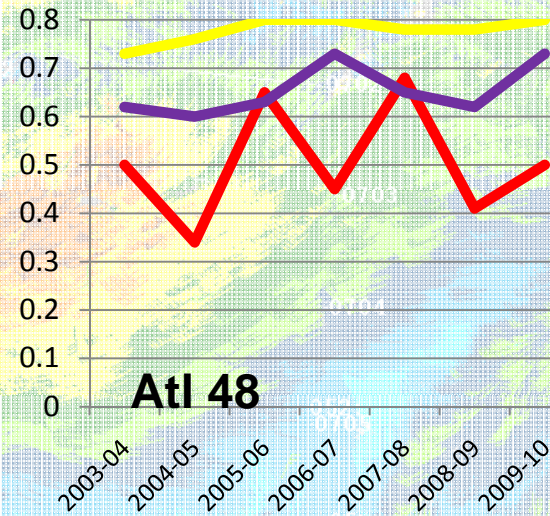
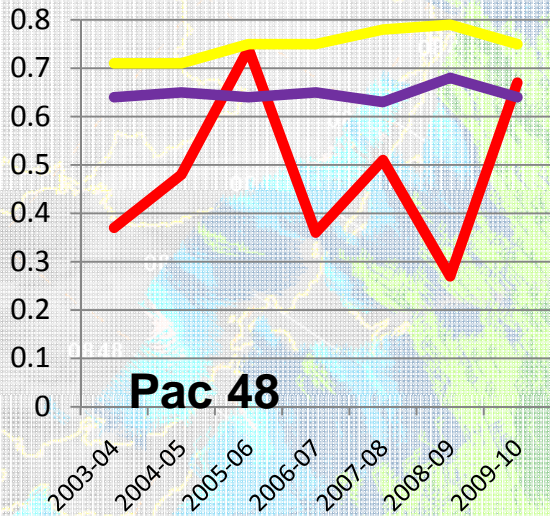
**Atlantic
33% reduction
vs. 5 yr avg.**

**Pacific
6% reduction
vs. 5 yr avg.**

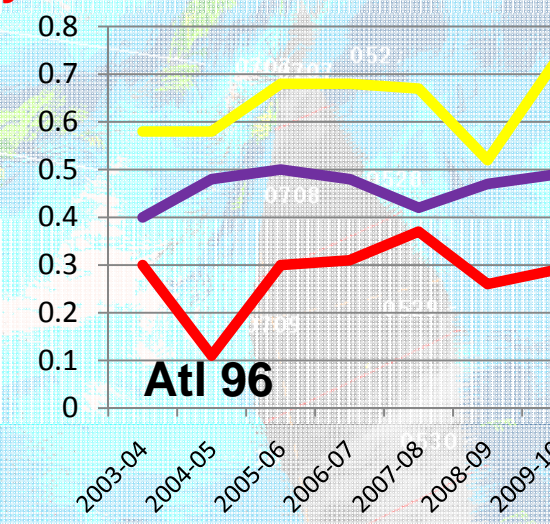
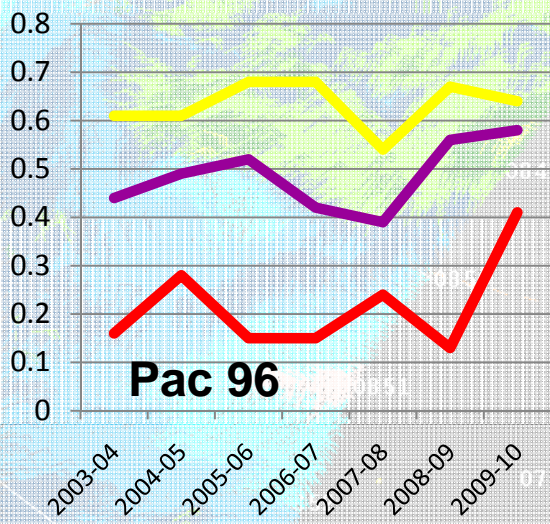


Forecaster verification 48,96 Pacific, Atlantic

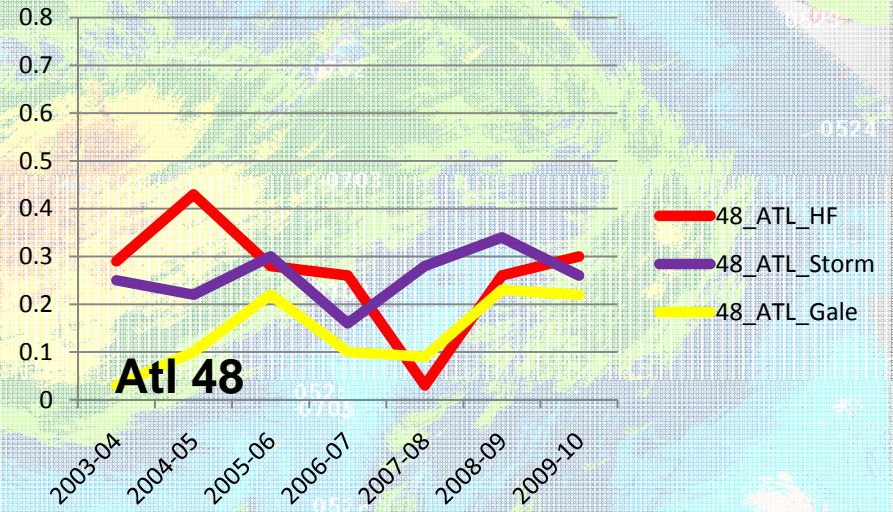
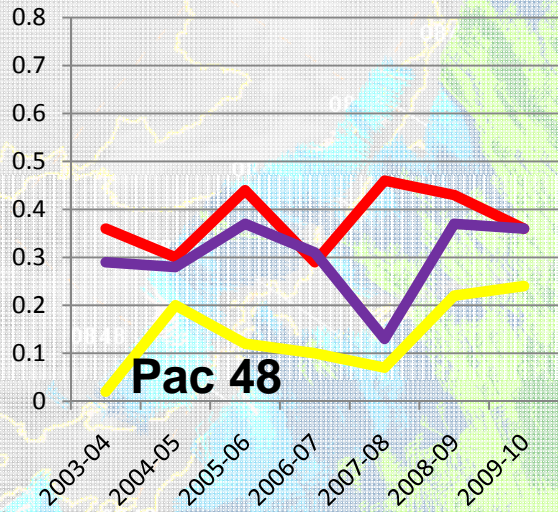
Probability of Detection (POD)



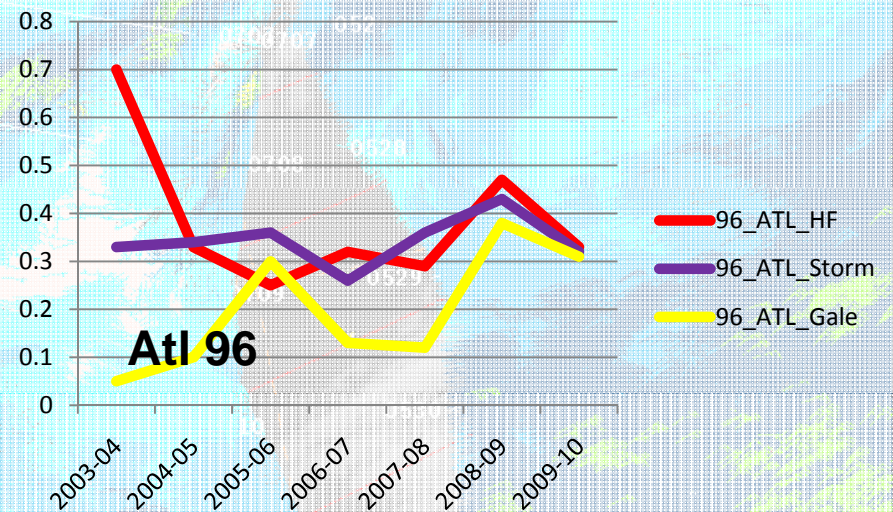
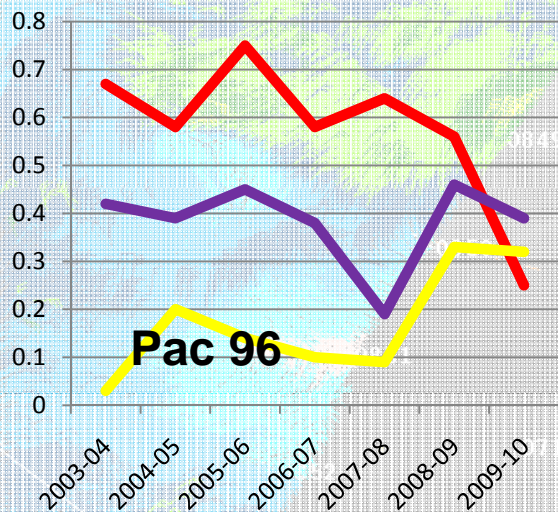
03-09 ONDJFM
*** 09-10 (DJFM) Only**



Forecaster verification 48,96 Pacific, Atlantic False Alarm Rate(FAR)



03-09 ONDJFM
* **09-10 (DJFMA) Only**



Summary

- Have lost OVW consistency for defining warnings
 - relying heavily on imagery, NWP and ASCAT
 - less “**observed**” HF cyclones (Atlantic)
 - nearly **all not** verified by “observations”
 - cyclone verification suggests forecasters growing reliance on NWP to estimate warning categories (HF cyclones)
 - Need to compare NWP analyses to forecaster estimated warnings
 - NWP (GDAS) - low bias for warning categories (compared to QSCAT)
 - less storm force in Gulf of Tehuantepec
 - less able to define warning areas
 - need to examine other orographic jets (Greenland Tip Jet)
 - W Pacific cyclones – reduced detection capability
 - Atlantic hurricanes – impact still to be determined

Impact of QuikSCAT Loss

Tropical Cyclones

- NHC has not had any TCs develop in its AOR since the failure of QuikSCAT
- Likely impacts going forward into 2010 season:
 - Loss of useful data for the analyzing the location, intensity, and structure of TCs, particularly those that are not sampled by aircraft reconnaissance
 - Even ASCAT “hits” often fail to sample the entire TC circulation
 - Reduced capability to identify winds above tropical storm force due to resolution and retrieval algorithm issues
 - Degraded analysis of 34-kt wind radii in major hurricanes not sampled by aircraft reconnaissance
 - Fewer passes over formative systems
 - QuikSCAT was occasionally helpful in making the decision to initiate advisories

Great Circle Ray Tracing

North coast – New Guinea Dec. 2008

