



# Extratropical Cyclones...

## Perspective from the Ocean Prediction Center

### Outline

1. OPC overview
2. Mentors
3. Production progression
  1. Light tables to integrated workstations
4. Marine weather and global shipping
5. Forecast and observational capabilities
  1. Sea Truth
6. Challenges

Joe Sienkiewicz, Chief, Ocean Applications Branch

# Ocean Prediction Center



**Core Mission: Protection of Life and Property at Sea**

**Fulfills U.S. responsibility to Safety of Life At Sea Convention (SOLAS) with  
NHC, WFO HFO, Alaska WFOs**

## Focus areas:

### 1. Marine Weather

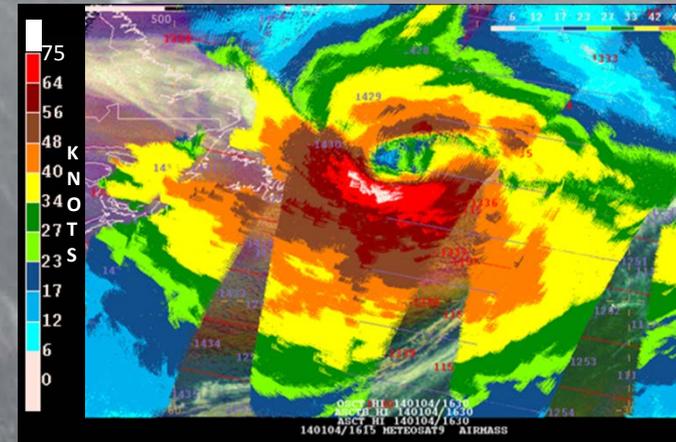
1. Warning Bulletins
2. Graphical and Gridded Products

### 2. Operational Oceanography

### 3. Coastal Guidance

1. Storm Surge
2. Marine Weather

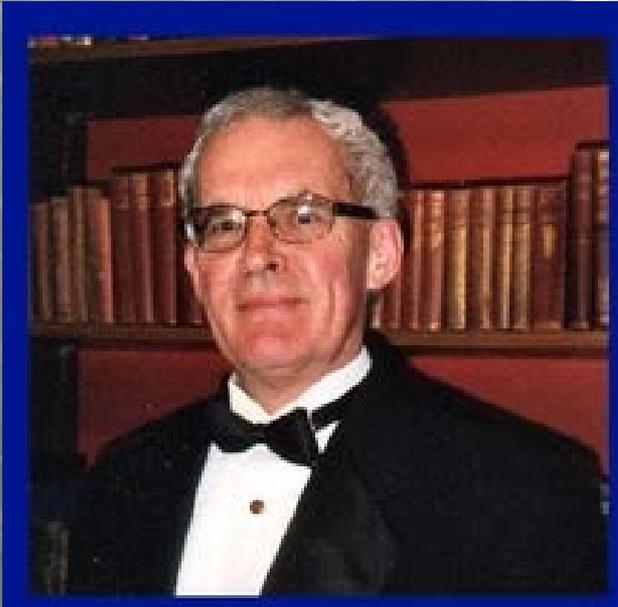
### 4. Enabling Ecological Prediction



An extreme ocean storm, 4 January 2014  
Hurricane Force winds (red 64-75 kt, white >75 kt) as retrieved from  
the European ASCAT-A and B scatterometers on the MetOp satellites.

**Joe Sienkiewicz**  
**Chief, Ocean Applications Branch**

# Mentors

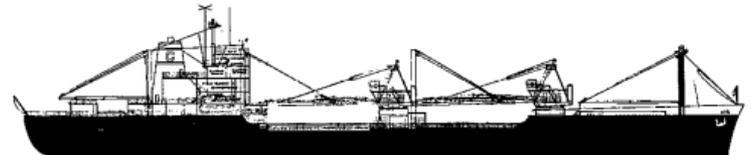


Prof. Peter V. Hobbs

## Robert W. Gove

DEPARTURE CAPE HENLOPEN, 24,0830 BUNKERS RECEIVED 4157 SAILING 6218 ETA PORT SAID 090600.

The last message heard from the *Poet* was at midnight when **Robert Gove**, the **third mate**, called his wife on ship-to-shore radio. The conversation was centered around being en route to Egypt, and mentioned nothing else but the basics of the trip.



The *Poet* in 1980. She was past her prime, but as cargo ships go she was in good shape. She carried no hazardous cargoes. Only grains.

# Progress



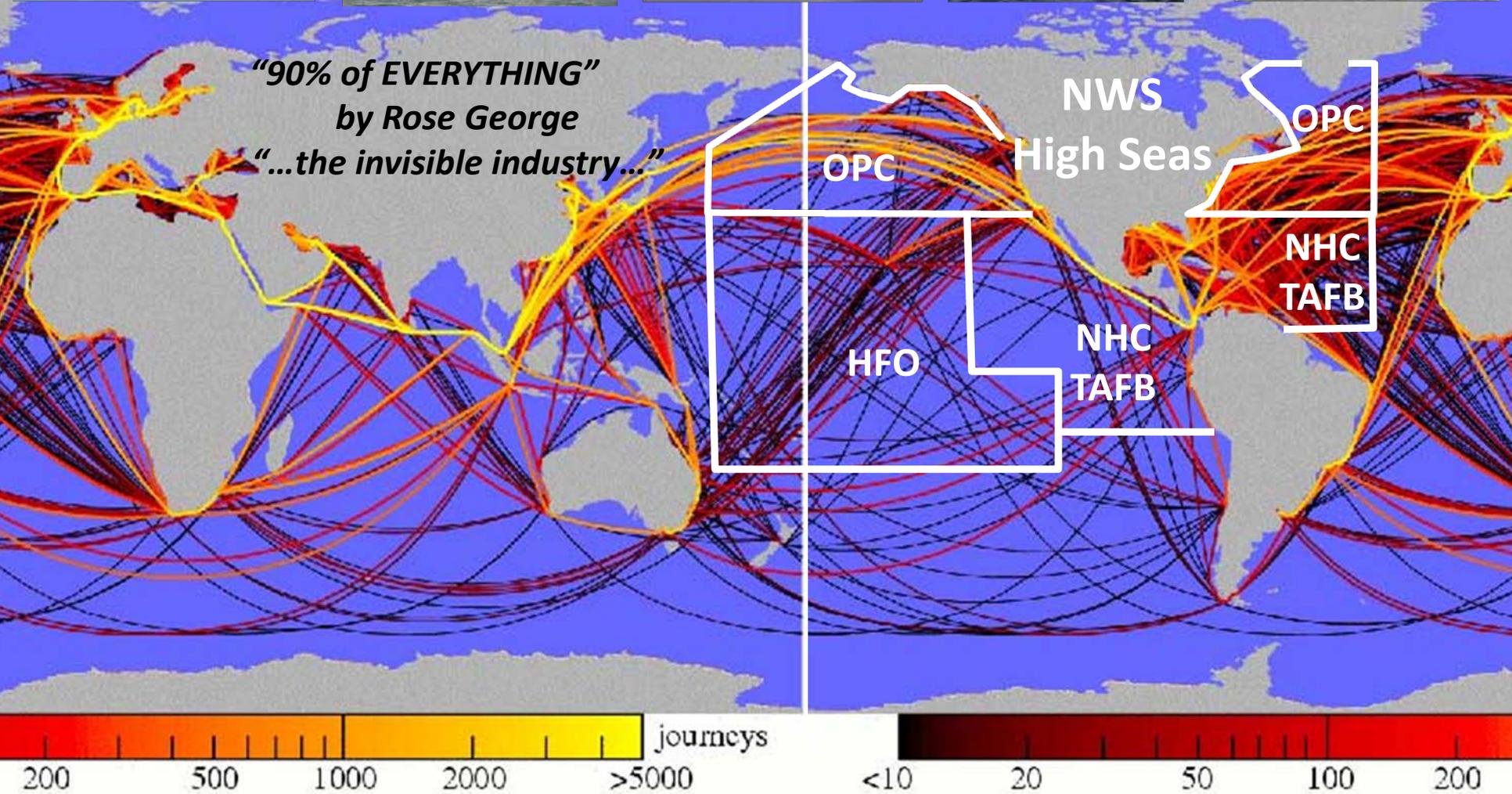
1996

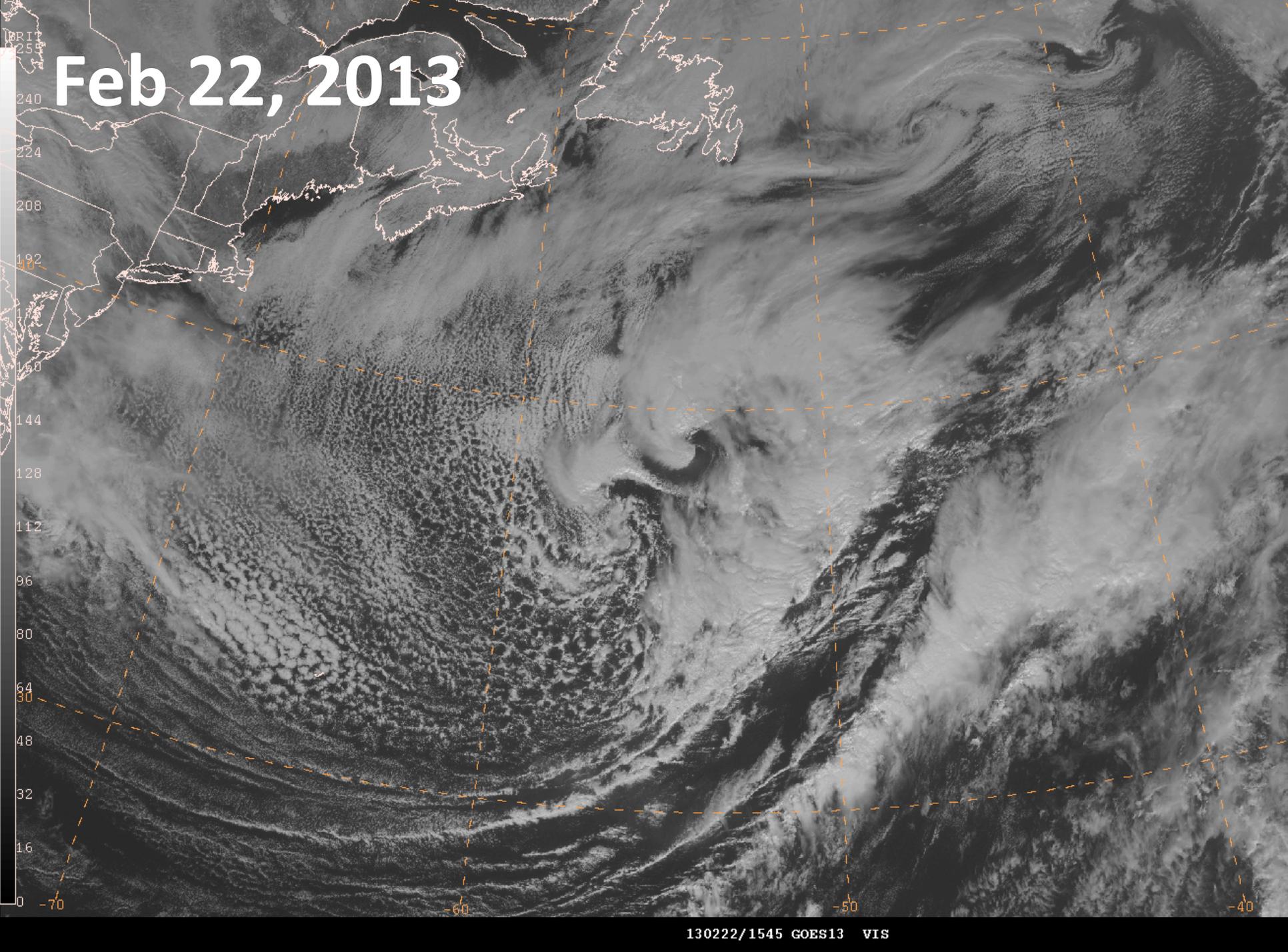


2003



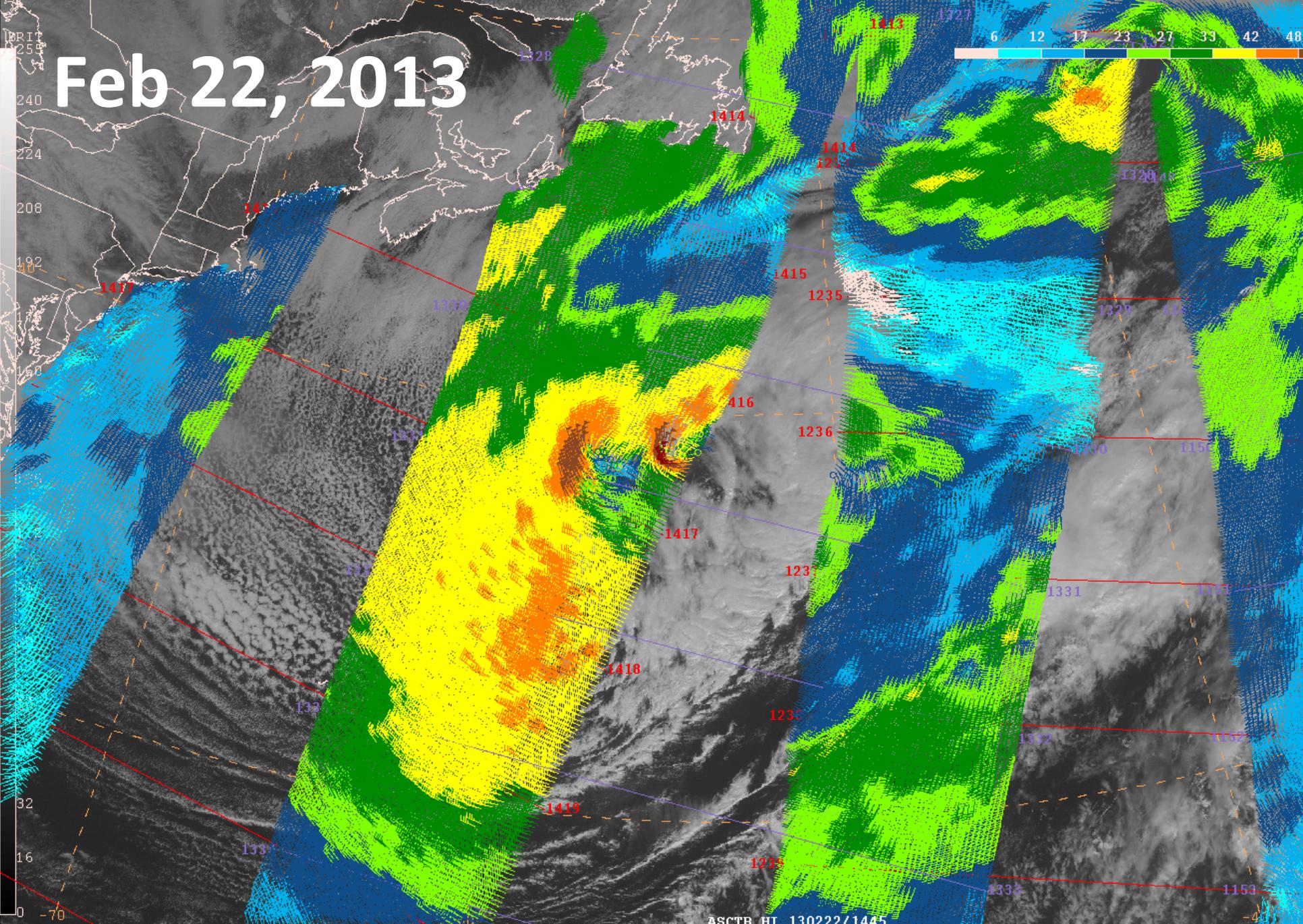
2014





Feb 22, 2013

# Feb 22, 2013

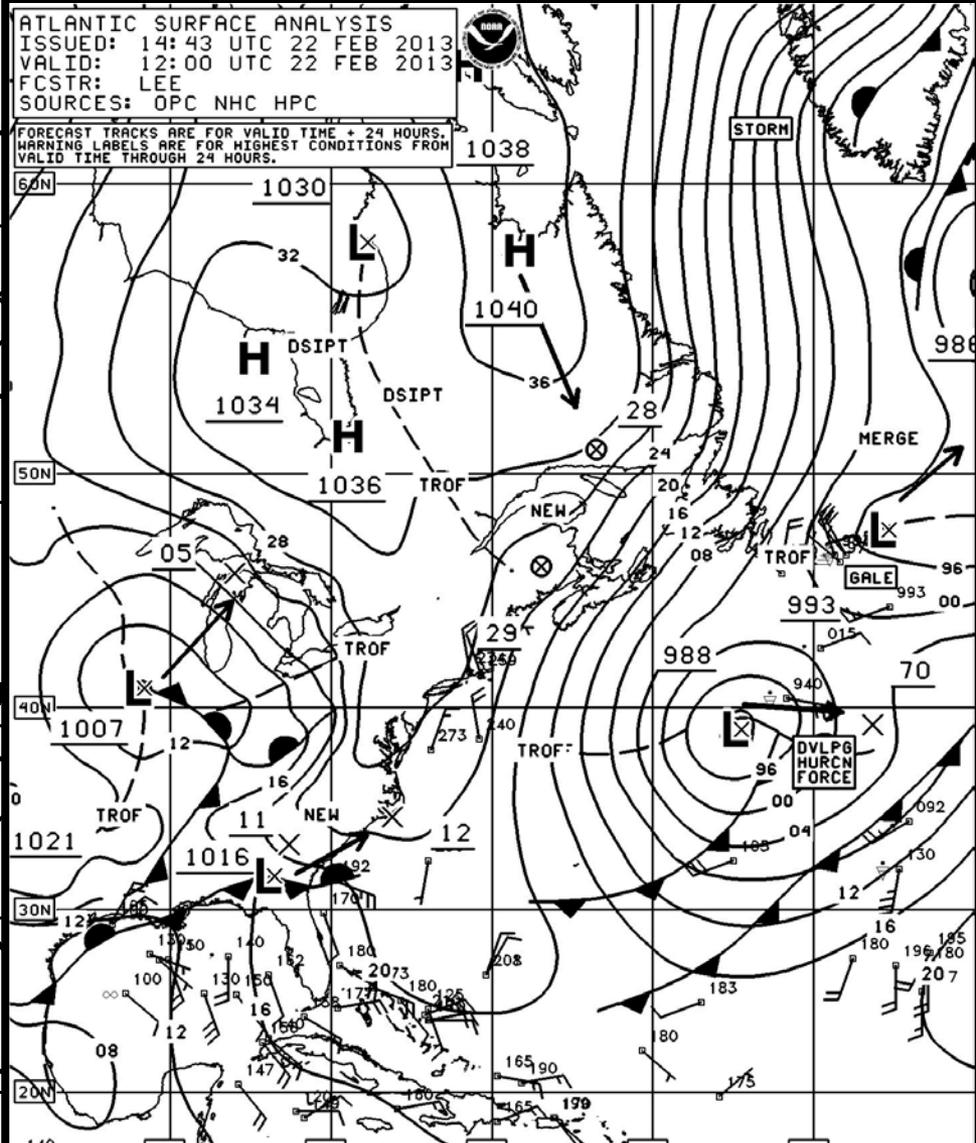
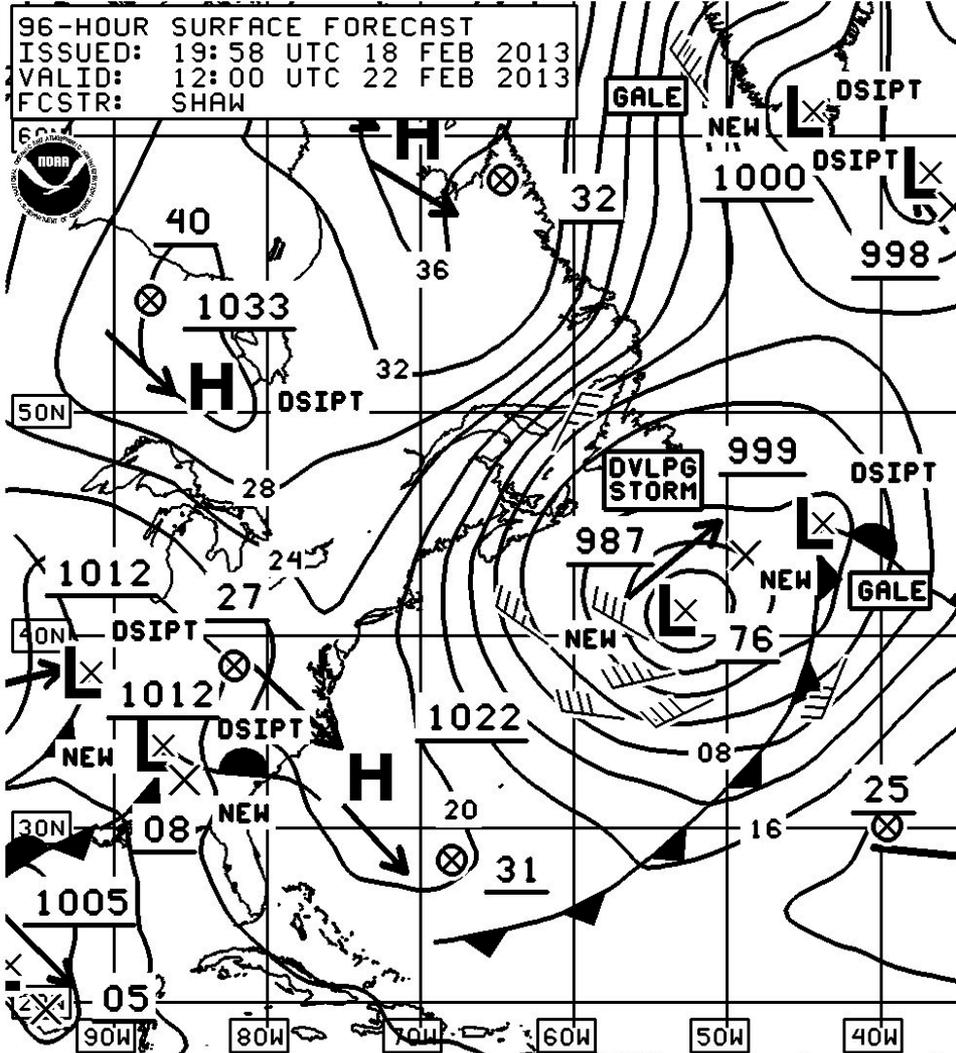


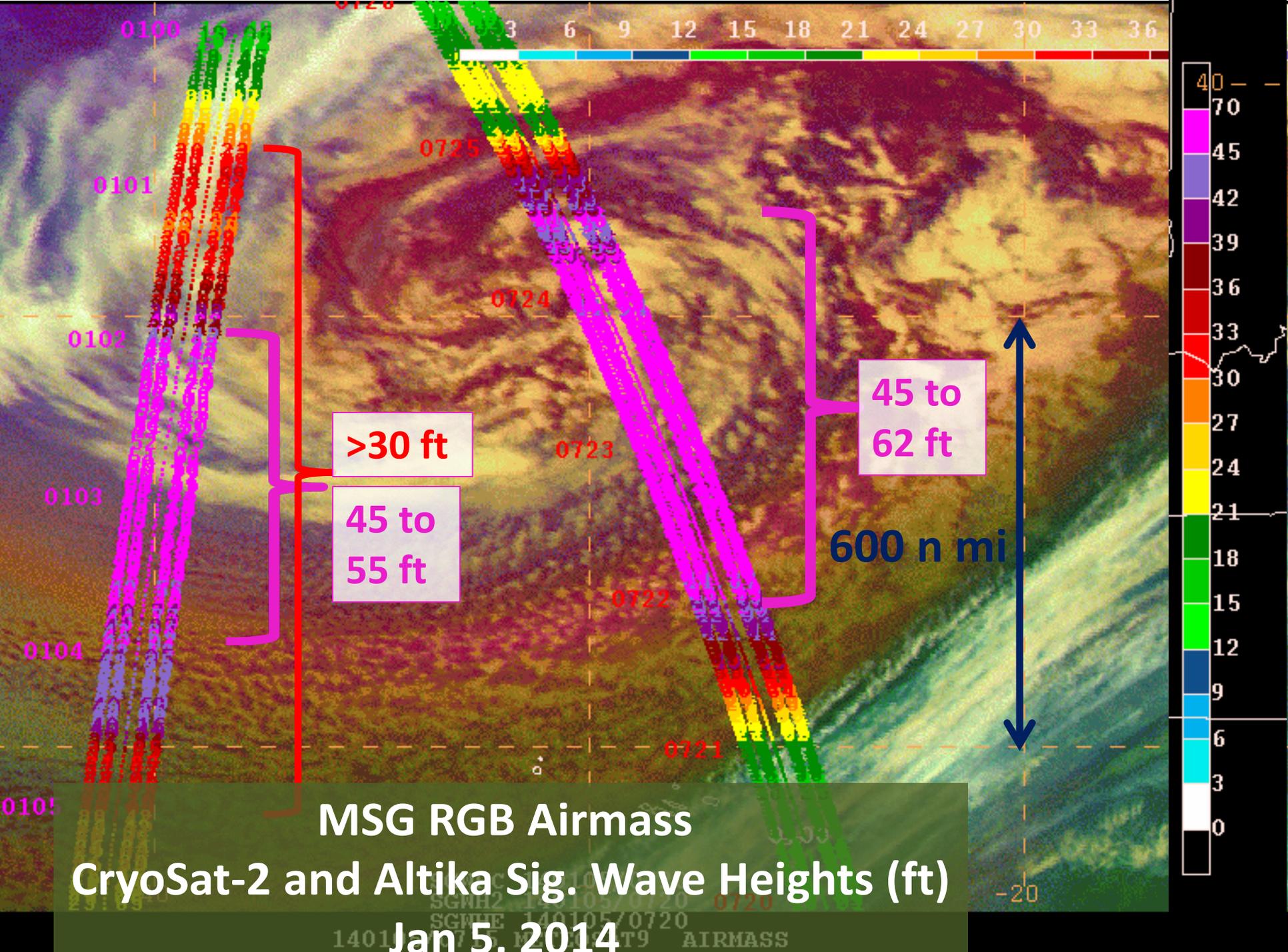
ASCTB\_HI 130222/1445  
ASCT HI 130222/1445  
130222/1445 GOES13 VIS

# Feb 22, 2013

## Analysis

### 96 hour Forecast

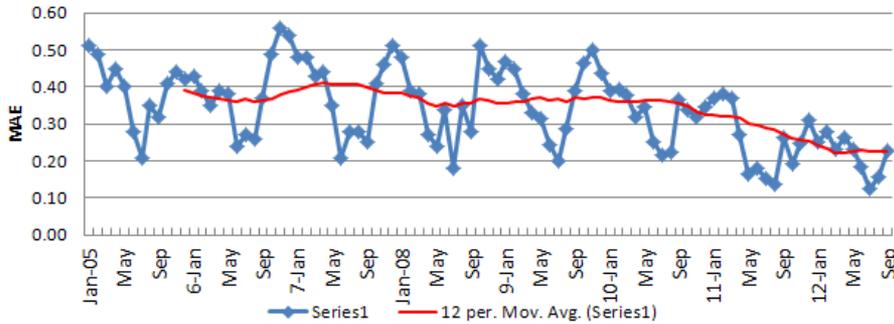




# Performance (Cyclones) 2005 - 2012

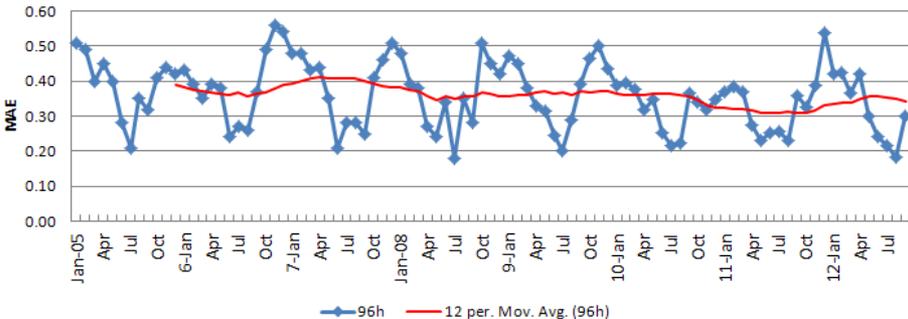
Warnings – Mean Average Error (Categorical)

48 H Warning Chart



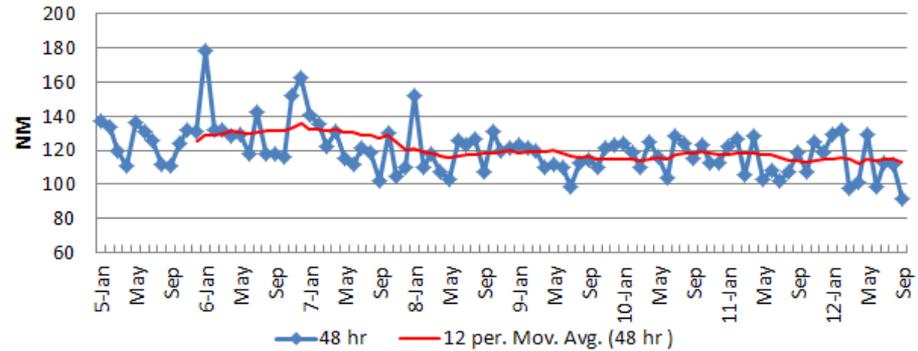
48 h – trend is improving  
96 h – slight improving trend

96H Warning Chart



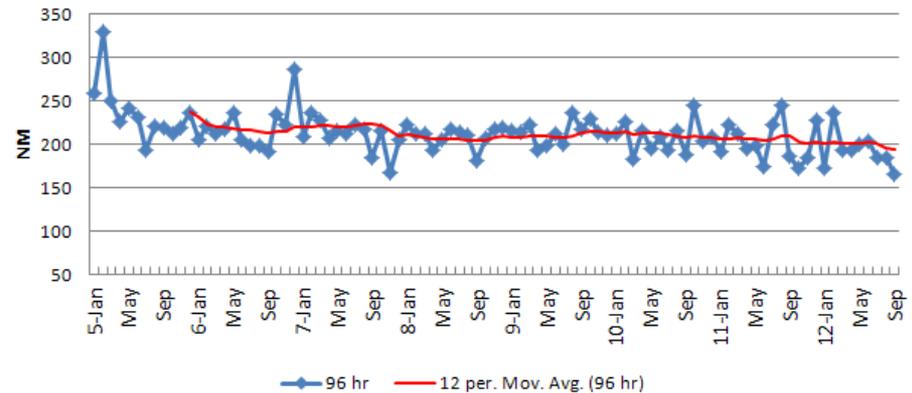
Position Error (N MI)

48 hr Position Error



48 h – 112 n mi (~ 28 n mi / 12 h)  
96 h – 215 n mi (~ 27 n mi / 12 h)

96 HR Position Error



# 35 years of Improvements

- **Observations**

- Satellite ocean vector winds (scatterometers)
  - Focus on the extreme event
- Satellite wave heights (altimeters)

- **NWP**

- Greatly improved predictive capabilities
  - No longer if - but when and how bad!!
  - Assimilation, resolution, physics
- Focus on **ocean waves**
- Availability of ensemble forecast systems



# HF Cyclones Observed During 2000-2009 Winter Seasons



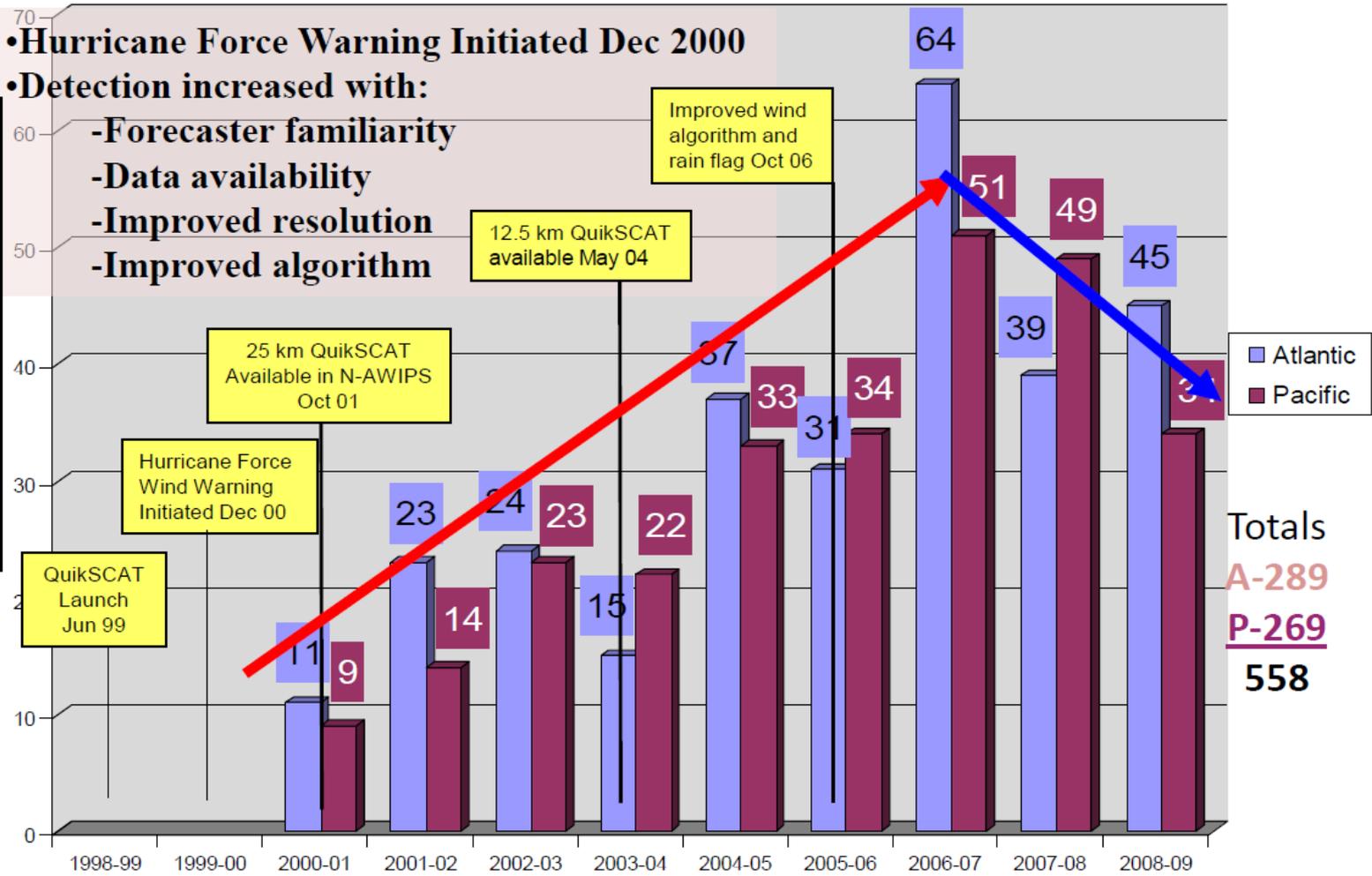
**WARNING CATEGORIES**

Pre-QSCAT

- GALE 34-47 kt
- STORM  $\geq 48$

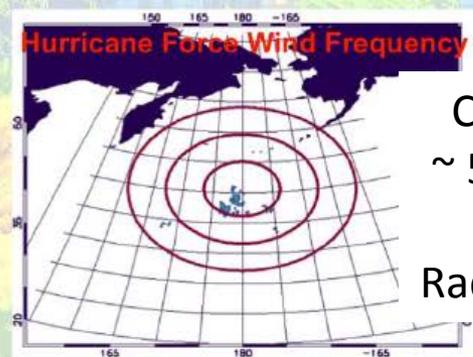
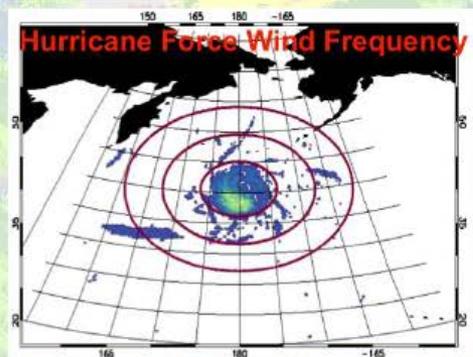
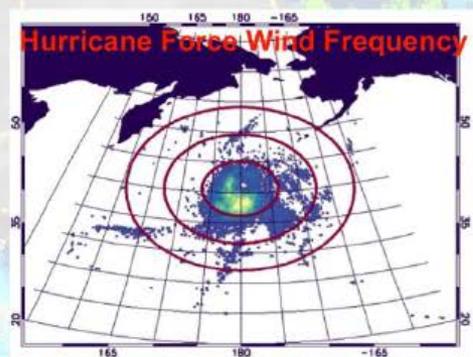
QSCAT ERA

- GALE 34-47 kt
- STORM 48 - 63 kt
- HURCN FORCE**  
 $\geq 64$  kt

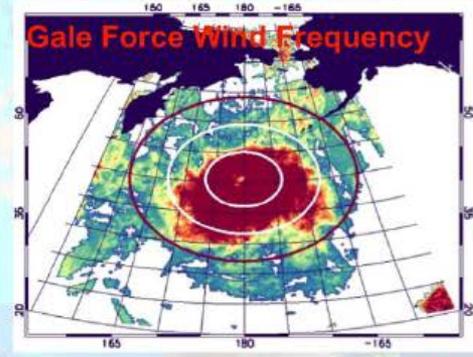
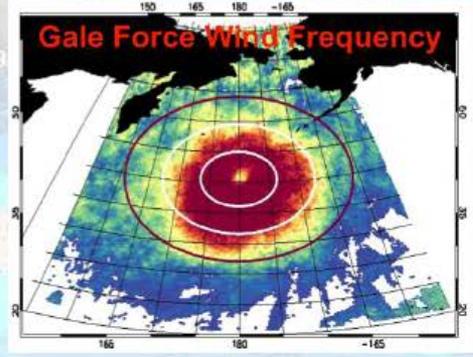
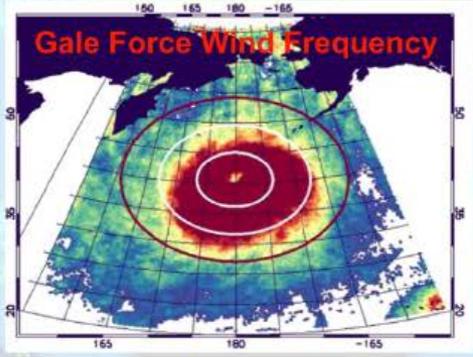
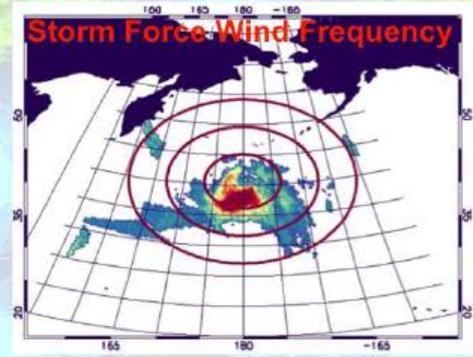
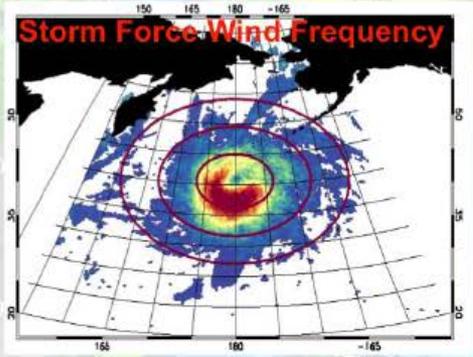
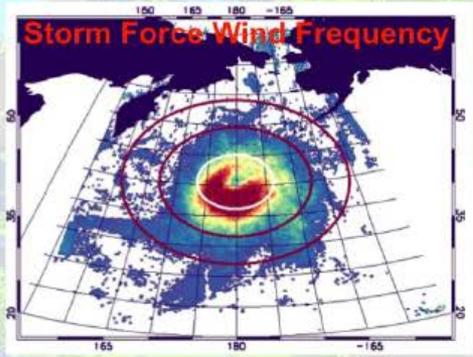




# QuikSCAT, WindSat and ASCAT HF Observations within North Pacific ETCs



Composites of  
~ 500 wind fields  
Radials – 1000 km



QuikSCAT

WindSat (RSS)

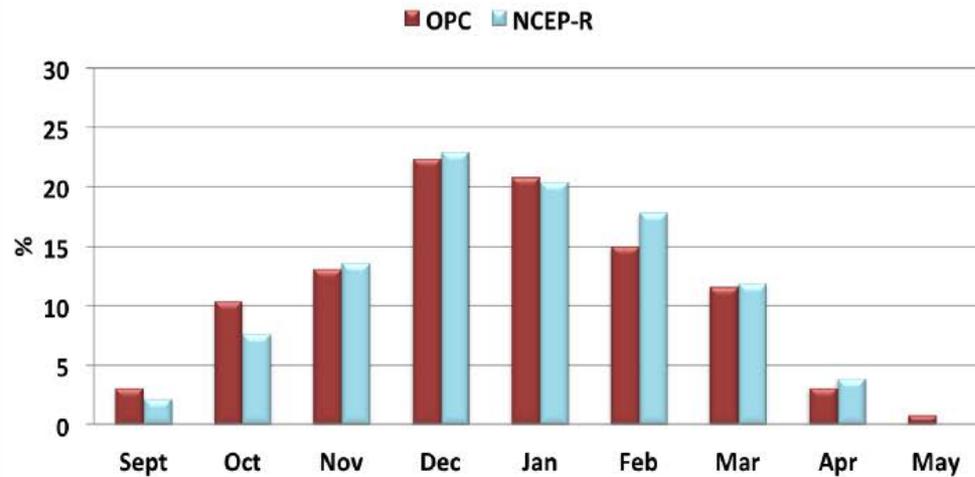
ASCAT-(cmod5h)



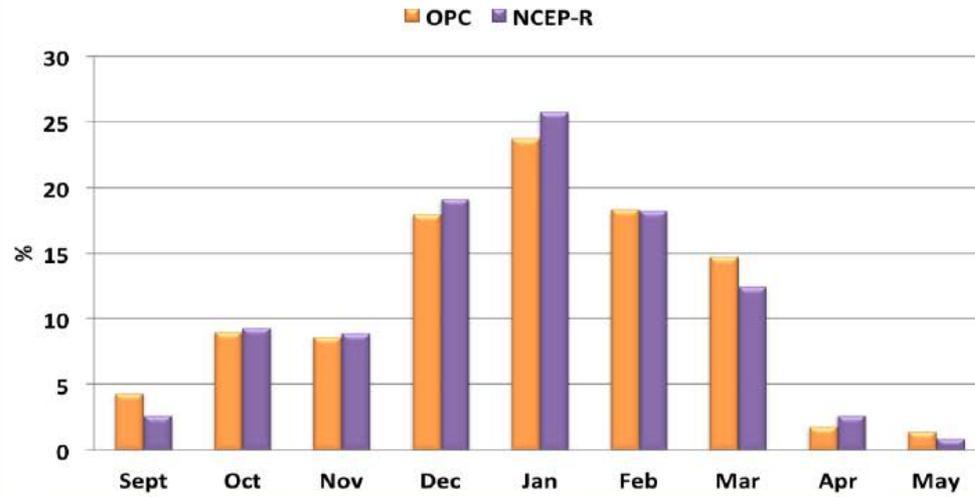
# Monthly Distribution 2001-2009



### Monthly Distribution - N Pacific 2001-2009



### Monthly Distribution - N Atlantic - 2001-2009



- NCEP-R monthly distribution of ETC's that reached HF status follows OPC detected trends in both N Pacific and N Atlantic ocean
- Peak months are Dec and Jan in N Pacific and Jan in N Atlantic
- NCEP-R shows more cyclones earlier in season in N Atlantic and later in season in N Pacific

# Challenges

- Marine weather not an area of emphasis
- Maintaining and improving observations
  - Non-standard satellite instruments
- Information  Products and Services
- Training - Keeping knowledge relevant
  - Knowledge reflected into products and services
- Consistency across areas of responsibility
- Extension to probabilistic suite
- Extension of forecast horizon



**Surprise!!**



NOAA Ship Gordon Gunter  
SE of Nantucket

9 mb pres fall in 1 hr

Winds rapidly building to 60 kt with gusts to 110 kt

Seas building to 30 ft with isolated 40 ft