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

Joe Sienkiewicz
Chief, Ocean Applications Branch
Mentors

Prof. Peter V. Hobbs

Robert W. Gove

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
“90% of EVERYTHING”
by Rose George
“...the invisible industry...”
MSG RGB Airmass
CryoSat-2 and Altika Sig. Wave Heights (ft)
Jan 5, 2014
Performance (Cyclones)  
2005 - 2012

Warnings – Mean Average Error (Categorical)  
Position Error (N MI)

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

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

• Hurricane Force Warning Initiated Dec 2000
• Detection increased with:
  - Forecaster familiarity
  - Data availability
  - Improved resolution
  - Improved algorithm

**WARNING CATEGORIES**

Pre-QSCAT
1. GALE 34-47 kt
2. STORM ≥48

QSCAT ERA
1. GALE 34-47 kt
2. STORM 48-63 kt
3. HURCN FORCE ≥ 64 kt

- 25 km QuikSCAT Available in N-AWIPS Oct 01
- 12.5 km QuikSCAT available May 04
- Improved wind algorithm and rain flag Oct 06

QuikSCAT Launch Jun 99

Hurricane Force Wind Warning Initiated Dec 00

Totals
A-289
P-269
558
COMPOSITES OF ~ 500 WIND FIELDS

Radials – 1000 km
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
NOAA Ship Gordon Gunter
SE of Nantucket
9 mb pres fall in 1 hr
Winds rapidly building to 60 kt with guists to 110 kt
Seas building to 30 ft with isolated 40 ft