





Achieving a *Maritime Weather Ready Nation*: Challenges and Opportunities

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Maritime Extreme Weather 80+ hurricane force events/year

DISTRIBUTION OF HURRICANE FORCE WIND EVENTS, JUNE 2016 - MAY 2017





source: OPC Atlantic and Pacific surface analysis



TOP: heat map of total distribution of hurricane force low centers and hurricane force wind events (i.e., GreatSAND tip jets with no associated low center) for the winter season 2016/17.

RIGHT: bar chart comparison of hurricane force wind events between each ocean basin for the previous two winter seasons and multi-year average.

Basin	2016-2017	2015-2016	Multi-Year Average (2010-2014)
ATL	50	50	44.5
PAC	24	50	38.8

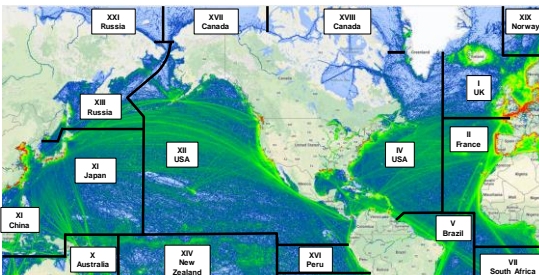
WWW.OPC.NEOP.NEHA.GOV
TWITTER.COM/NOAOPC
FACEBOOK.COM/NOAOPC






Maritime Extreme Weather Global forecasting challenge

US\$13 trillion in goods & 2 billion passengers per year travel at sea globally



Source of 2016 total ship tracks and background: marinetraffic.com

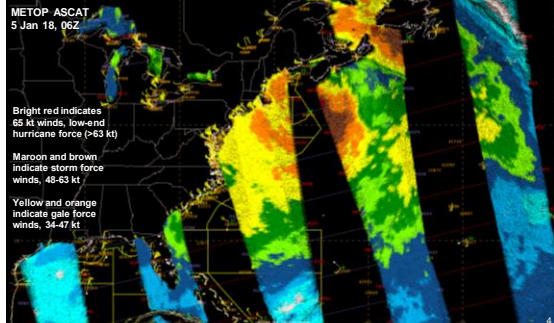
Maritime Weather Observations Sparse coverage over the oceans



METOP ASCAT
5 Jan 18, 06Z

Bright red indicates 65 kt winds, low-end hurricane force (>63 kt)

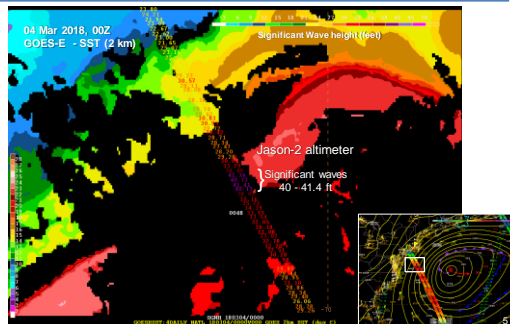
Maroon and brown indicate storm force winds, 48-63 kt

Yellow and orange indicate gale force winds, 34-47 kt



Forecasting Challenge Gulf Stream North Wall Effect





04 Mar 2018, 00Z
GOES-E - SST (2 km)

Significant Wave Height (feet)

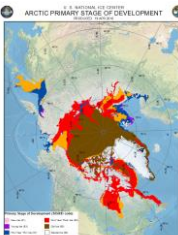
Jason-2 altimeter

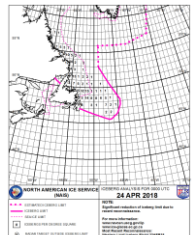
Significant waves 40 - 41.4 ft

Forecasting Challenge Arctic: Air-Ocean-Ice

U.S. NATIONAL CENTER FOR ENVIRONMENTAL PREDICTION
ARCTIC PRIMARY STAGE OF DEVELOPMENT





NORTH AMERICAN ICE SERVICE
24 APR 2018

Improve Arctic forecasts by integrating wind, wave, sea ice, and iceberg information

<http://www.natice.noaa.gov>



Impact-Based Decision Support Services IDSS – “March Madness” 2018



OTER EAST COAST SPECIAL WEATHER ADVISORY
03/03/2018 - 03/03/2018

Sector Hampton Roads Marine Safety Information Bulletin

Inclement Winter Weather Advisory

Sector Hampton Roads Port Entrance Closure and Restrictions

Due to the forecast of storm force winds and heavy seas at the entrance to Chesapeake Bay, the Captain of the Port (COTP) Hampton Roads will be imposing the following restrictions effective at 2 a.m. Friday, March 2, 2018; no vessels may enter or depart from the Chesapeake Bay, and no vessels over 2,000 gross tons may move within the port without obtaining permission from the COTP in his designated communication. These restrictions are anticipated to last until approximately 12 p.m. on Saturday, March 3, 2018, but are subject to adjustment based on conditions.

Shipping Density 03 Mar 18, 13:30Z

from MarineTraffic.com

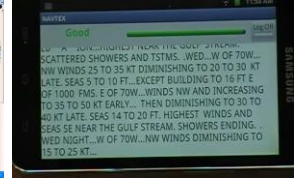


Forecast & Warning Delivery Reliance on radio broadcasts



HF Facsimile (WEFAX)

MF Text (NAVTEX)



YouTube video courtesy hamrad88
Published on 11 Dec 2015

YouTube video courtesy Black Cat Systems
Published on 22 Jul 2013



Maritime Weather Ready Nation: Summary



Lead the maritime weather enterprise into the 21st Century:

- R&D
 - Improve understanding of rapid extratropical cyclogenesis
 - Integrate ocean model output into forecast processes
- Observations:
 - Strengthen VOS through advocacy and automation
 - Maintain full spectrum of buoys (moored, drifting, ARGOS, etc)
 - Continue to exploit all available satellite data
- Forecasting and Impact-Based Decision Support Services:
 - Expand forecaster focus into medium range (days 4 and beyond)
 - Embrace marine forecast collaboration, nationally and globally
 - Incorporate tools for probabilistic hazards information
 - Continue to expand core Federal partnerships and maritime industry outreach
 - Partner with commercial weather providers to foster innovation
 - Lead change to modernize requirements for weather information exchange
 - Integrate weather, ocean, and sea ice forecasting