

Evaluation of Environmental Data for Search and Rescue II

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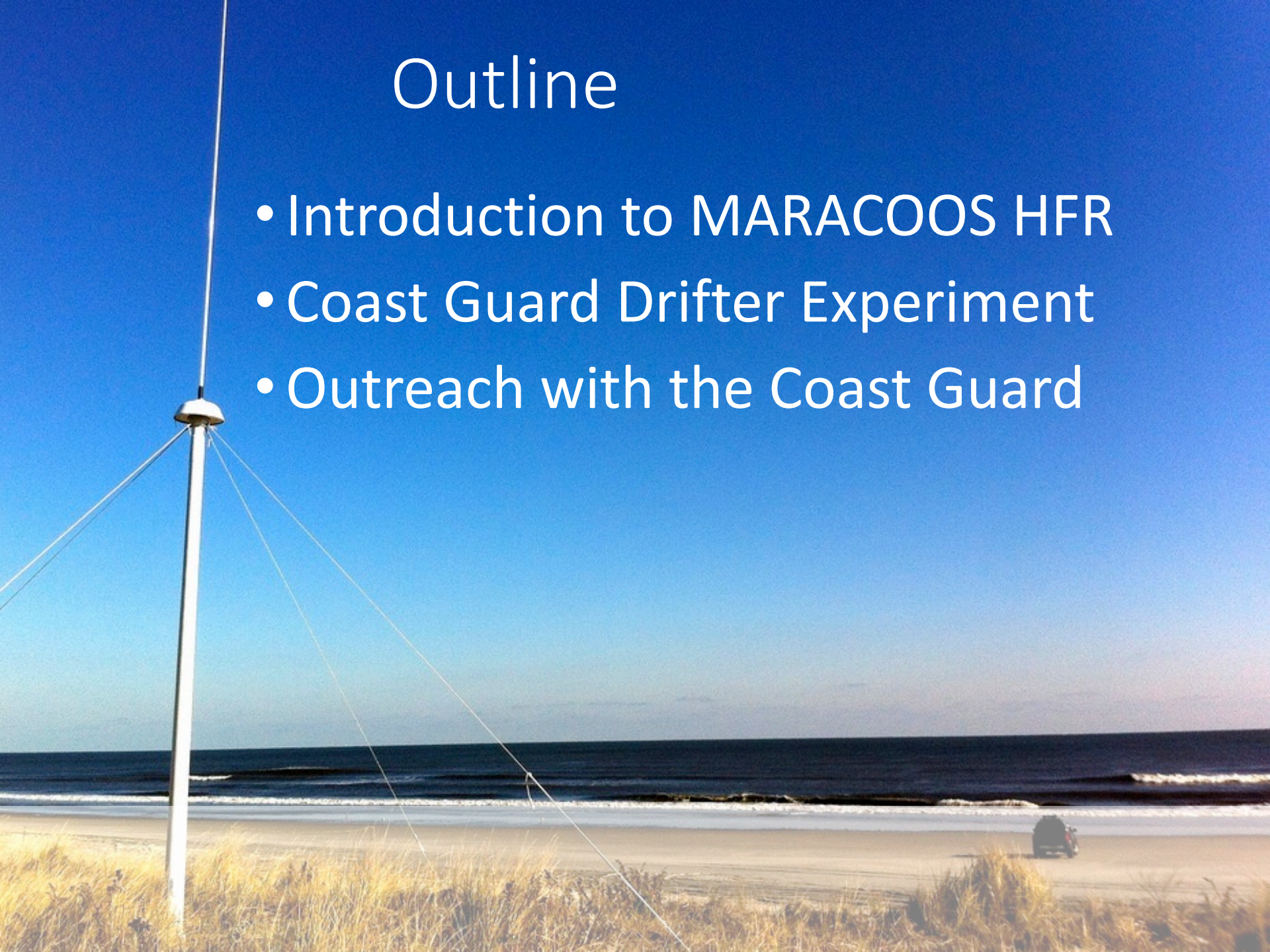


Coast Guard Sector Delaware Bay
June 15, 2022
New Brunswick, NJ



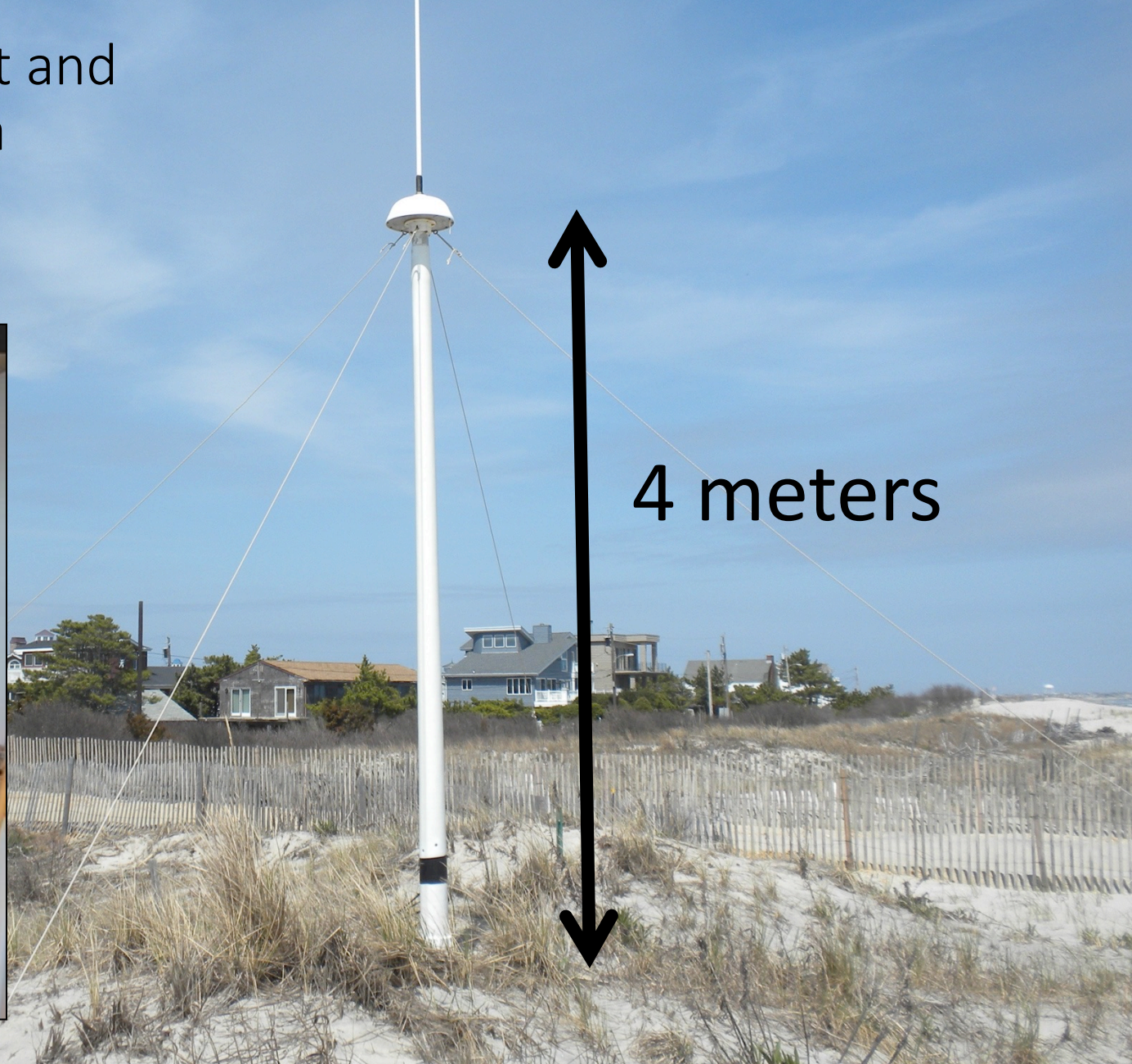
Outline

- Introduction to MARACOOS HFR
- Coast Guard Drifter Experiment
- Outreach with the Coast Guard

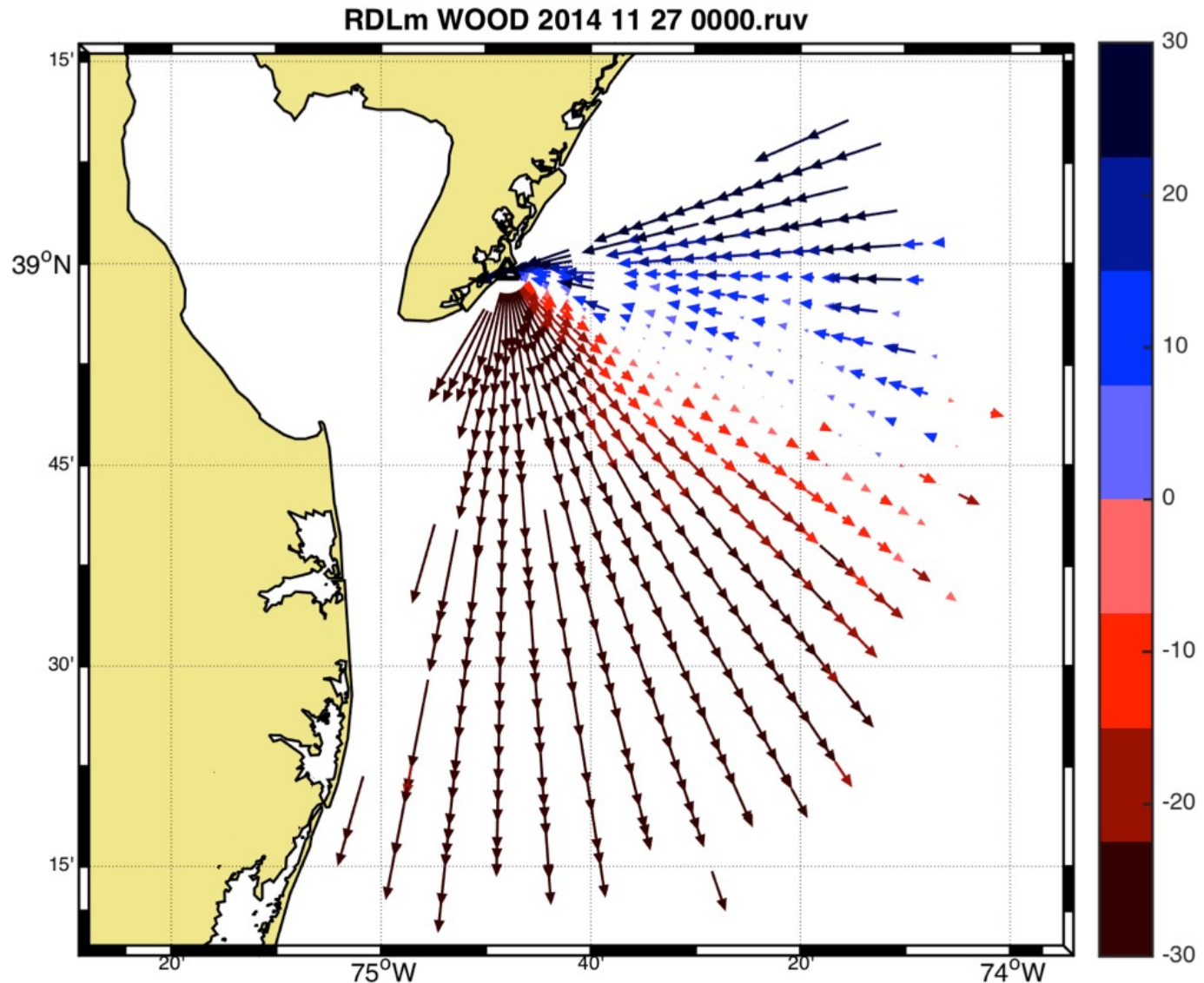


Introduction to High Frequency Radar

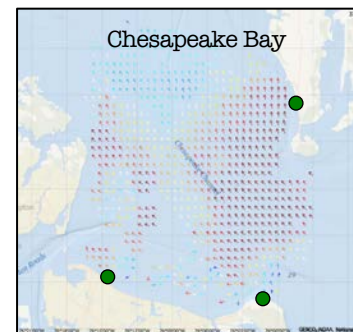
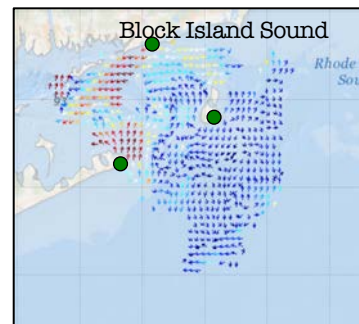
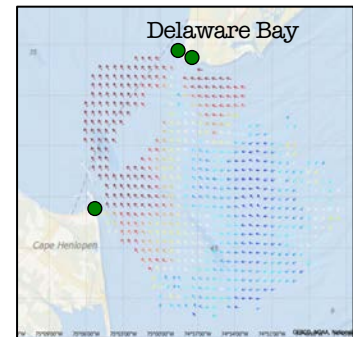
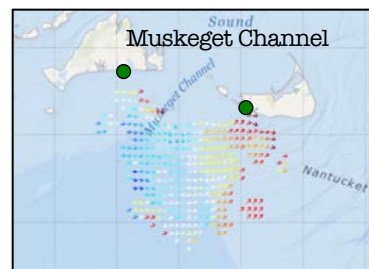
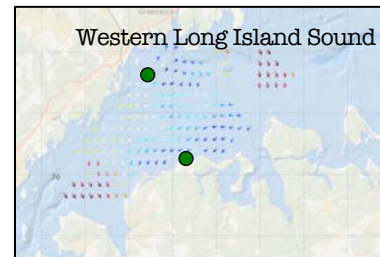
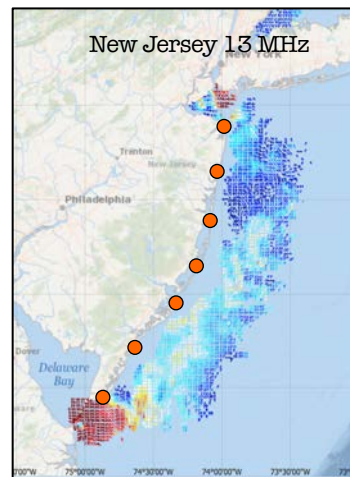
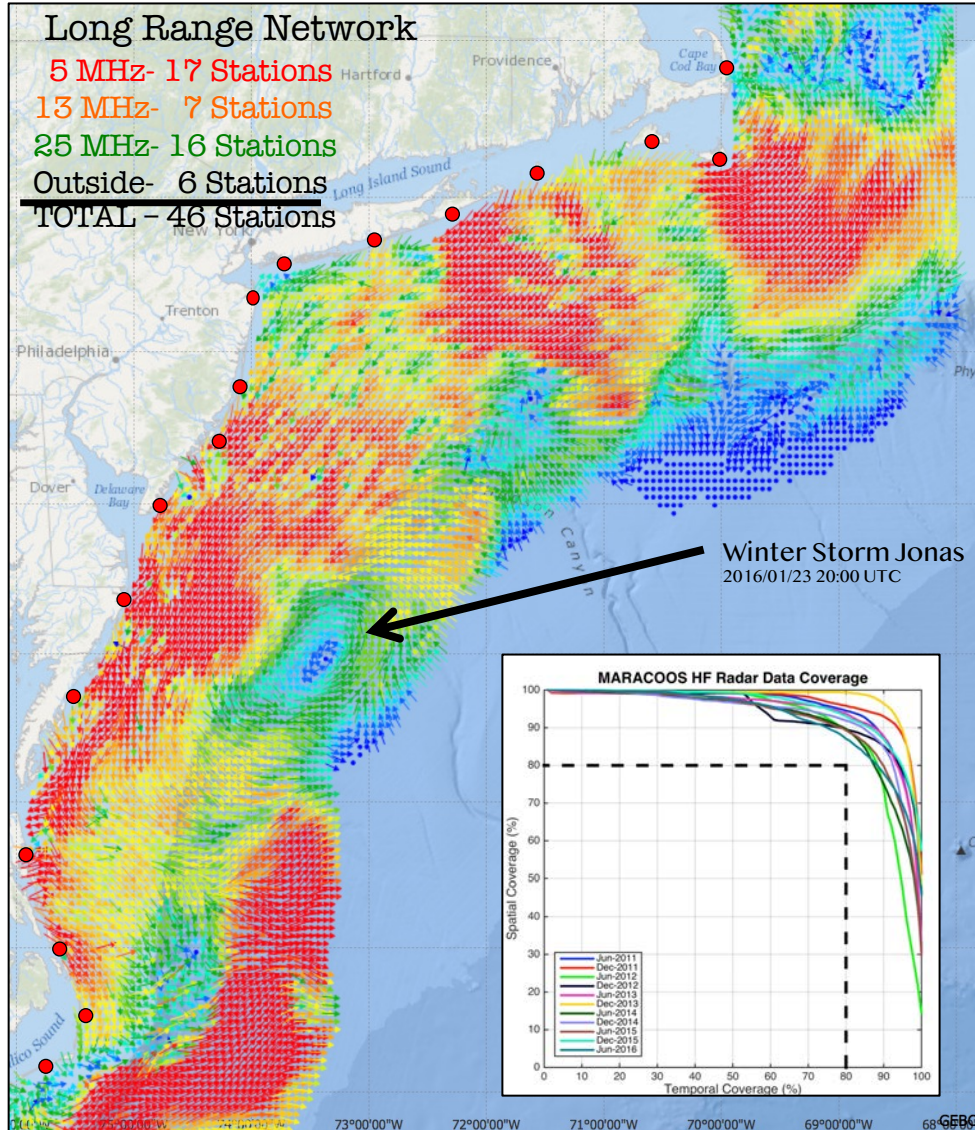
13 MHz Transmit and Receive Antenna



Radial Current Measurements from a Single Station

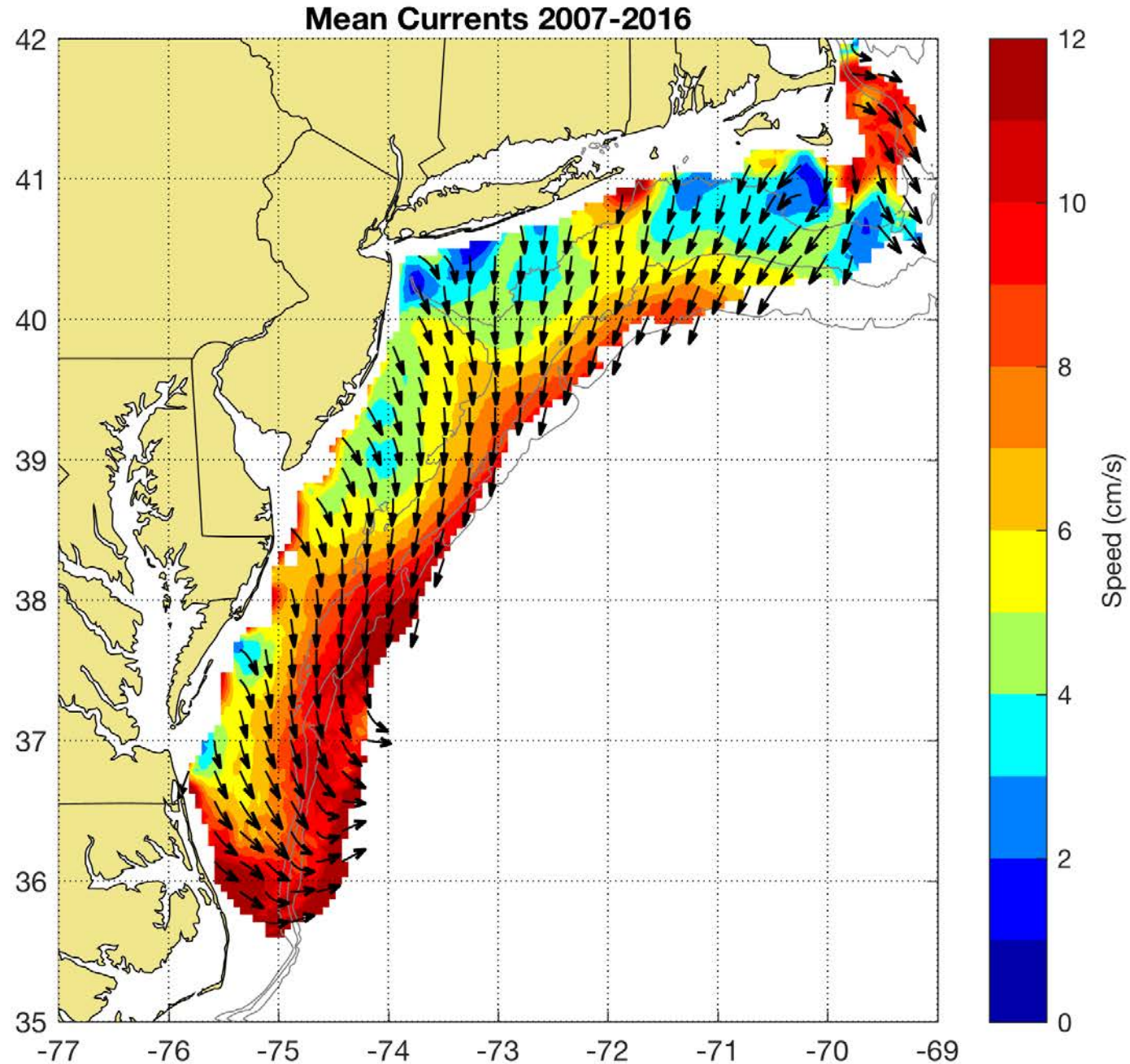


MARACOOS HF Radar Network

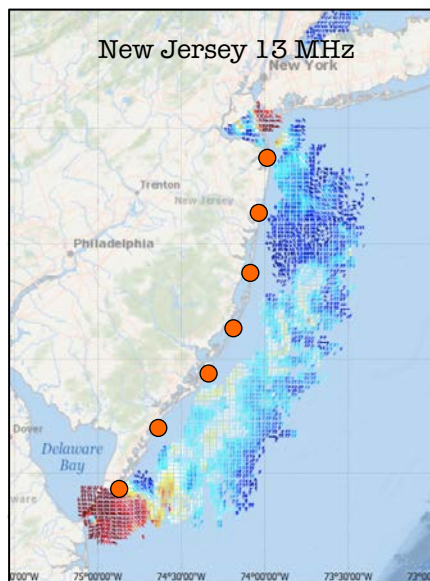


Decade of Surface Current Measurements

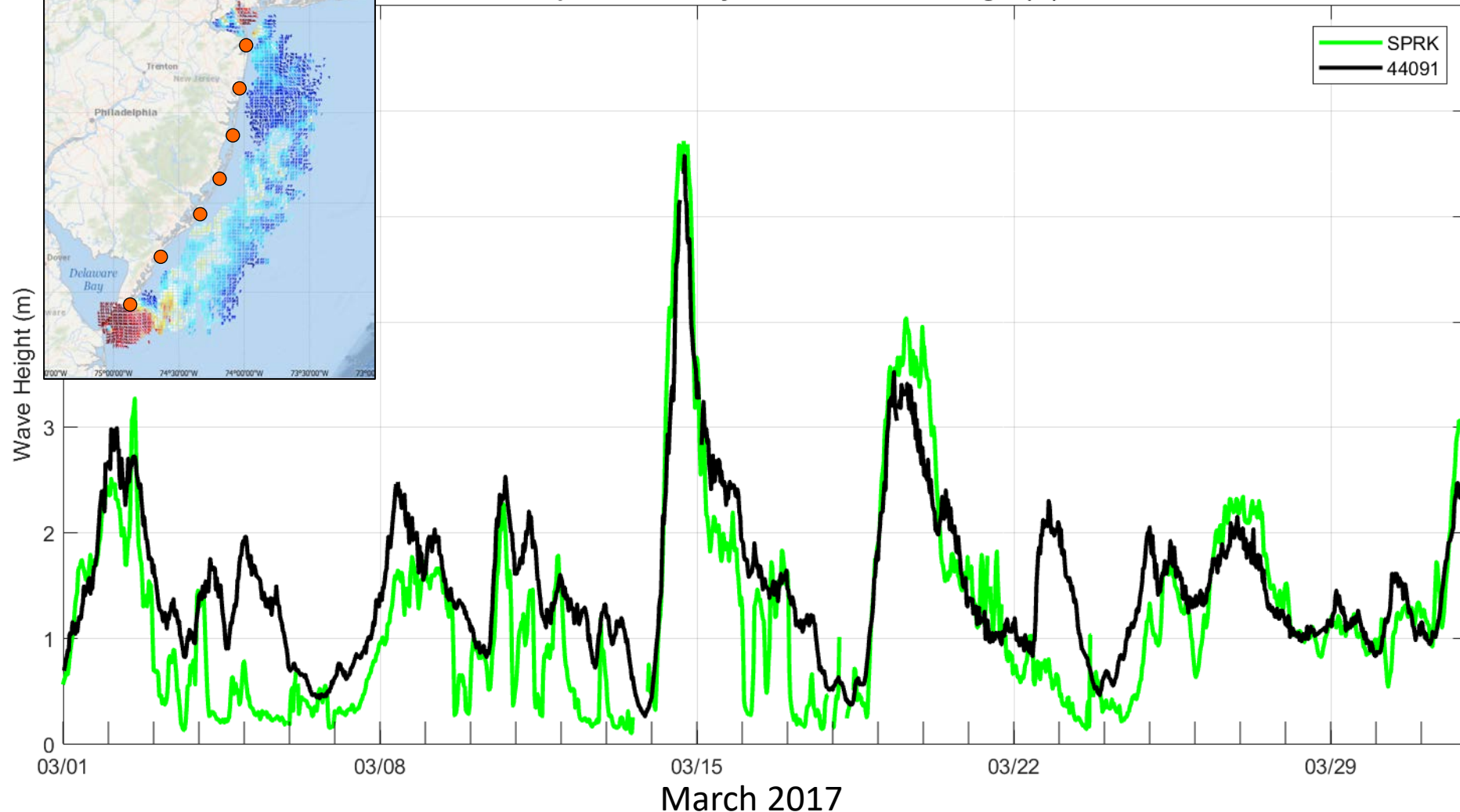
2007-2016



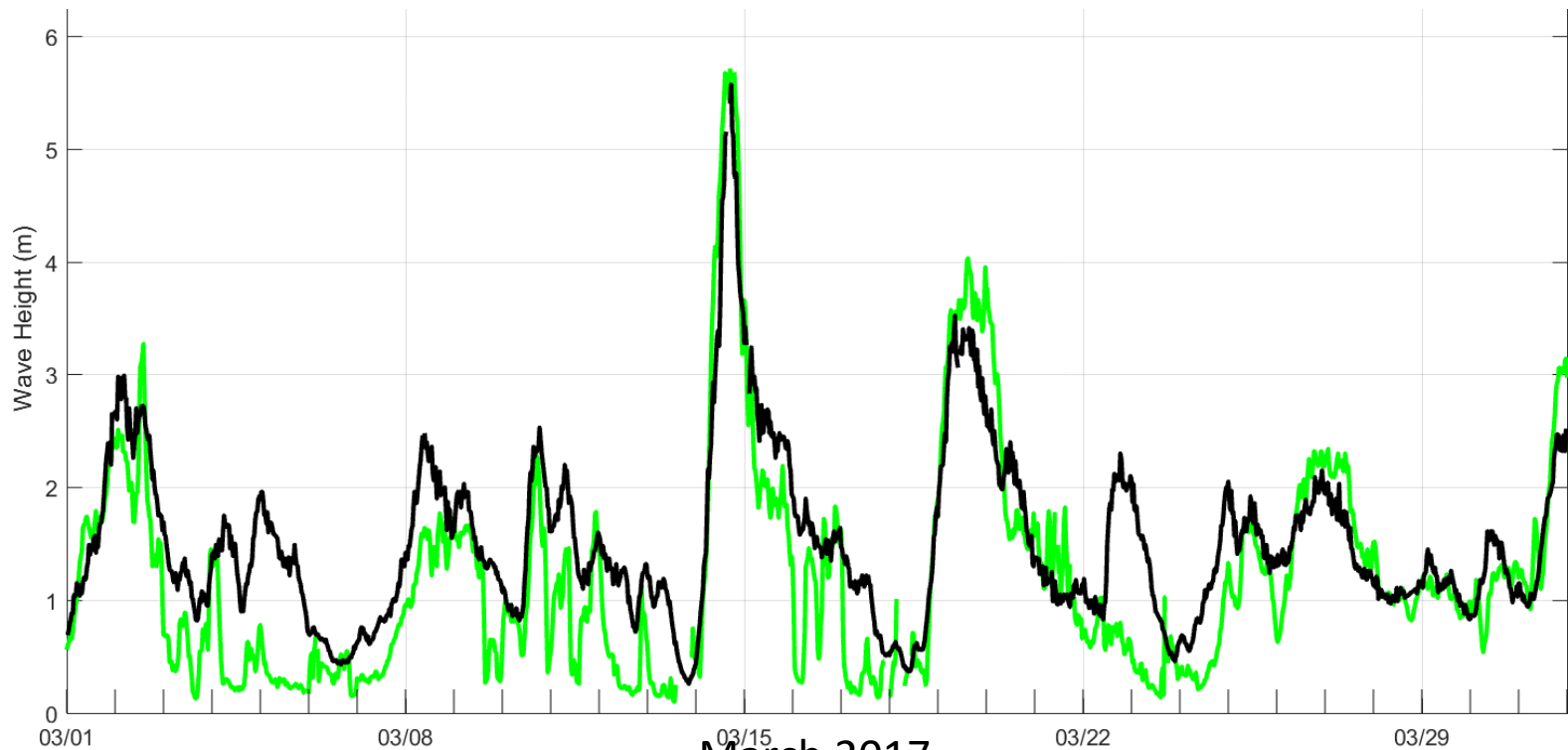
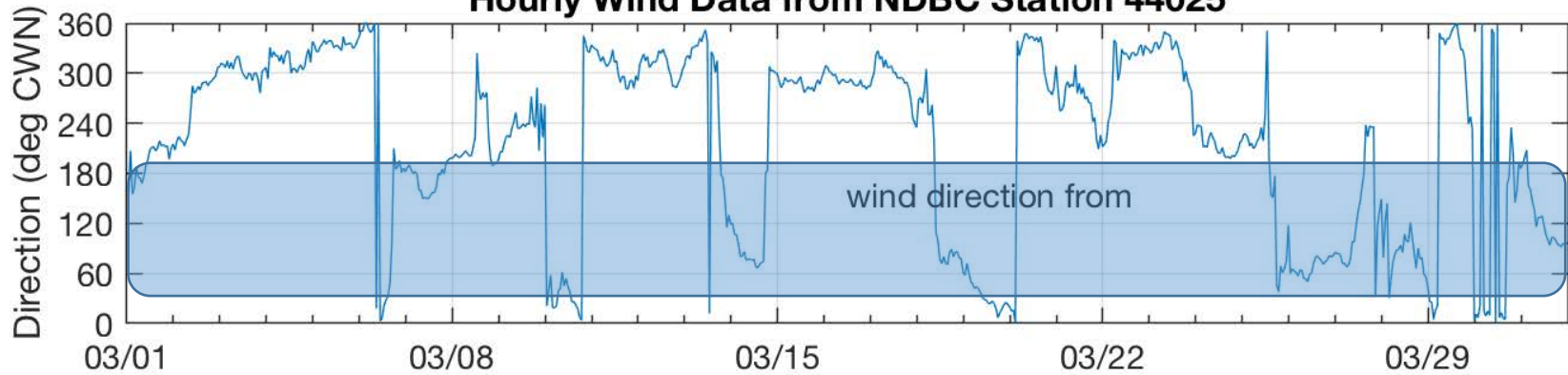
Wave Measurements from a Single Station



R8 Comparison of Buoy and CODAR Wave Height (m)



Hourly Wind Data from NDBC Station 44025



March 2017

Project Partners

Rutgers University

Dr. Hugh Roarty

HF Radar Network Coordinator

CODAR Ocean Sensors

Mr. Chad Whelan,

Chief Technology Officer

NWS WFO Mt. Holly

Mr. Alan Cope

Science and Operations Officer

Mr. Walt Drag,

Senior Meteorologist

IOOS

Dr. Jack Harlan,

HF Radar Project Manager

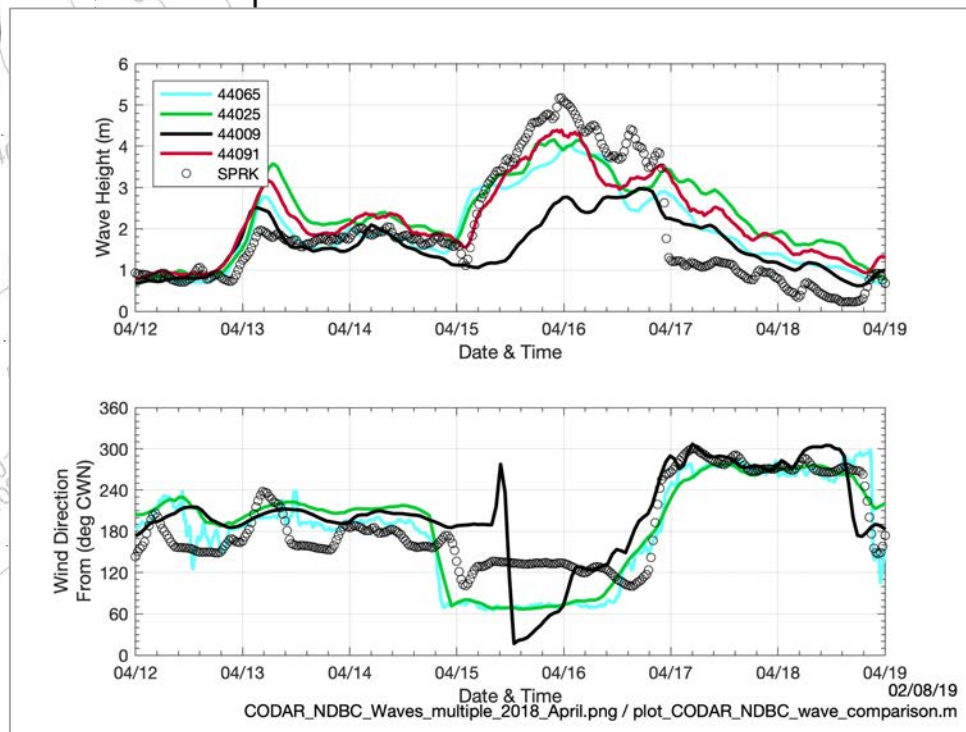
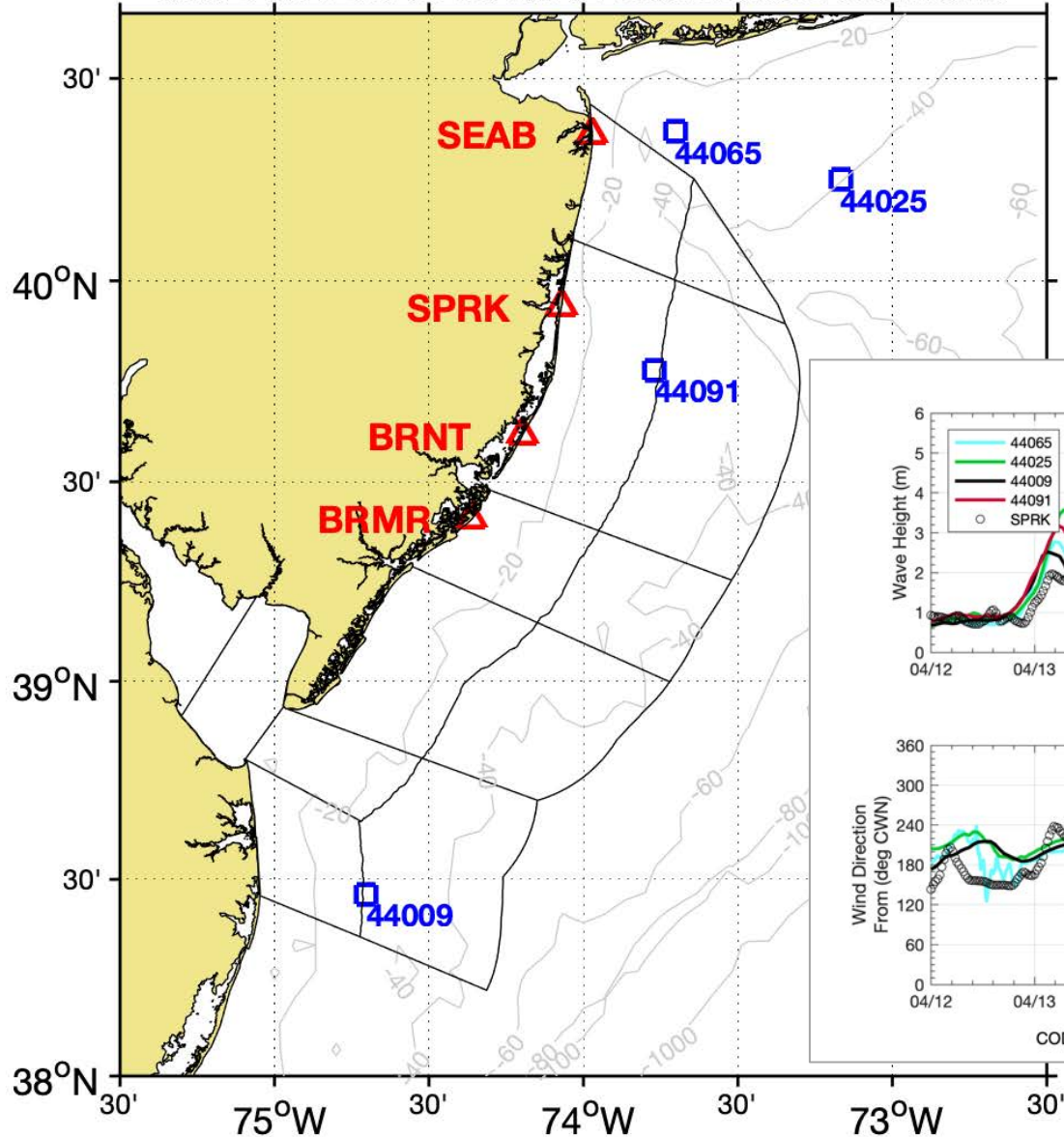
NWS Office of Science and Technology Integration

Mr. Dennis Atkinson

Meteorologist



MAB NDBC & 13 MHz SeaSonde Stations



Coast Guard Drifter Experiment

May 4, 2009: After a year of testing, NOAA Announces on U.S. Department of Commerce Website that MARACOOS CODAR is Operational in SAROPS

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DEPARTMENT OF COMMERCE

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Top News



U.S. Coast Guard Photo

NOAA, U.S. Coast Guard: New Ocean Current data to Improve Search and Rescue Activities

Washington (May 4)—A new set of ocean observing data that enhances the ability to track probable paths of victims and drifting survivor craft should improve search and rescue efforts along the U.S. coast. The data comes from the Integrated Ocean Observing System (IOOS®), part of a joint effort among NOAA, the Mid-Atlantic Coastal Ocean Observing Regional Association, the U.S. Coast Guard, and the Department of Homeland Security. The new data sets include surface current maps from high frequency radar systems. [\(More\)](#)



File Photo

Secretary Locke Sworn in at White House Ceremony by Vice President Biden

Washington (May 1)—U.S. Secretary of Commerce Gary Locke and U.S. Health and Human Services Secretary Kathleen Sebelius were sworn in by Vice President Joe Biden in ceremonies at the White House. President Barack Obama also attended the ceremonial swearing-in event in the East Room. "My Cabinet is now full of energetic innovators like Kathleen and Gary. . . I am thrilled to have them by my side as we continue the work of turning our economy around and laying a new foundation for growth that delivers on the change the American people asked for, and the promise of a new and better day ahead," President Obama said. Locke, a key member of the President's economic team, is the department's 36th Secretary, leading its 12 agencies and bureaus and more than 52,000 employees. [\(President's Remarks\)](#)



File Photo

Secretary Locke Discusses Trade Promotion Agreement with Colombian Minister for Trade

Washington (May 1)—U.S. Commerce Secretary Gary Locke hosted a meeting with Colombia's Minister for Trade, Industry and Tourism, Luis Guillermo Plata, at the Commerce Department today. This was the first meeting between Minister Plata and Secretary Locke. The Secretary and Minister Plata reaffirmed the commitment of both governments to move forward on progress towards the U.S.-Colombia Trade Promotion Agreement. The two leaders also underscored the importance of building stronger business ties through activities like joint cooperation in trade capacity-building for small- and medium-sized enterprises and good governance programs. [\(More\)](#)

Last Updated: May 4, 2009
Questions regarding this section may be directed to the [Department of Commerce Webmaster](#)

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Present Activity:

Bring all sustained regional-scale HFR networks up to operational status in USCG SAROPS

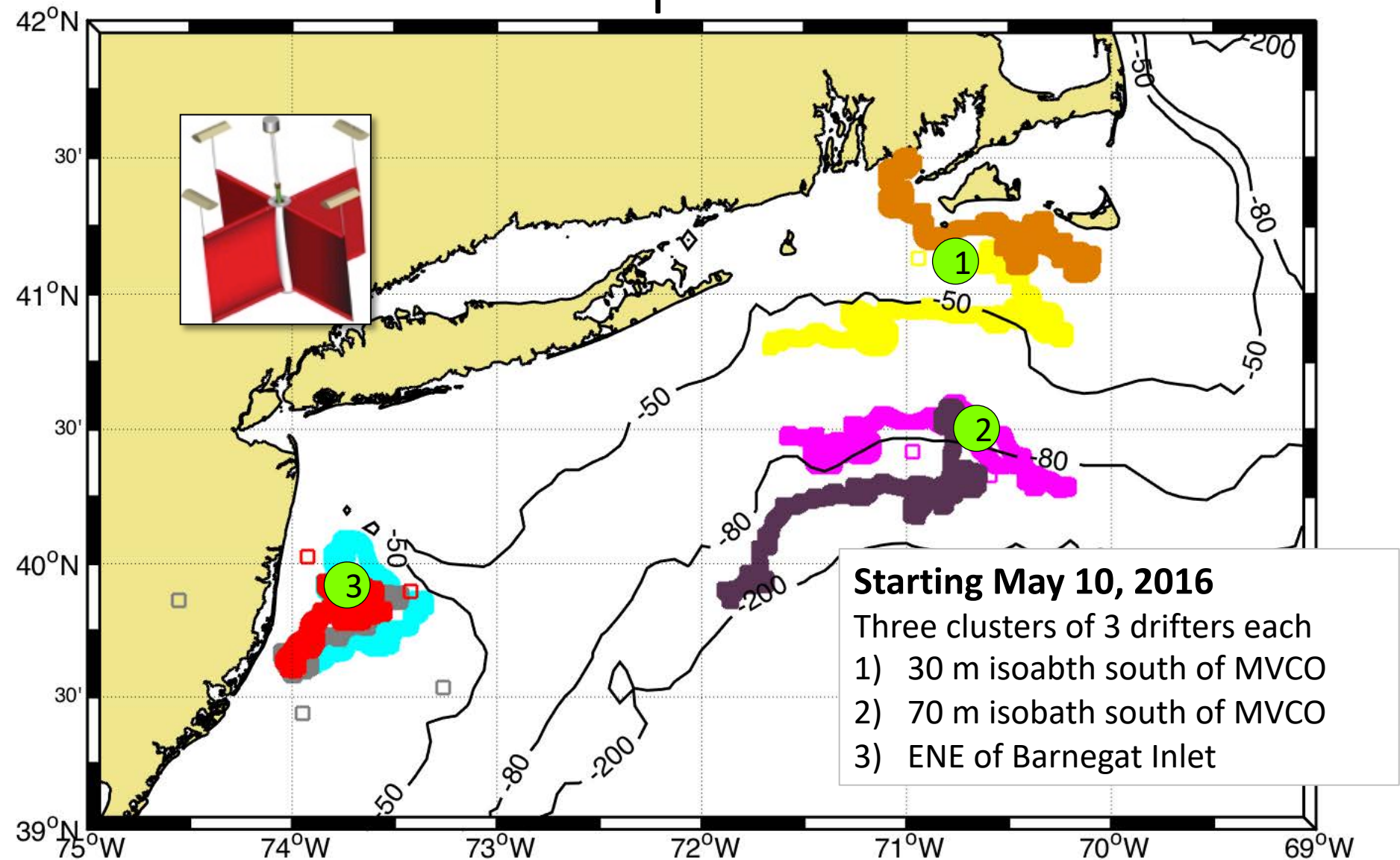
3 West Coast Regions for California & Oregon are ready.

Coast Guard Surface Current Data Requests 2011-2014

Rank	Product	Orders	Percent	Orders/Week
1	North Atlantic HYCOM (NCEP)	22,661	26%	190
2	Aggregated ADCIRC Global HYCOM (NCEP)	13,494	16%	113
3	Global HYCOM (NCEP)	8,978	10%	75
4	San Fran Bay tides (ASA)	8,367	10%	70
5	Chesapeake Bay (NOS)	7,538	9%	63
6	Global NCOM (Navy)	6,762	8%	57
7	Aggregated ADCIRC NCOM	5,506	6%	46
8	HF Radar Data and Predictions	4,501	5%	38
9	Global HYCOM (Navy)	2,720	3%	23
10	Tampa Bay (NOS)	1,699	2%	14
11	NY HOPS (Stevens Institute)	1,135	1%	10
12	Delaware Bay (NOS)	1,111	1%	9
13	Mariano - Ship Drift	557	1%	5
14	Aggregated NCOM Tidal	527	1%	4
15	FVCOM Mass Bay (UMass)	498	1%	4
Total		86,054	100%	723

Email from Eoin Howlett May 7, 2014

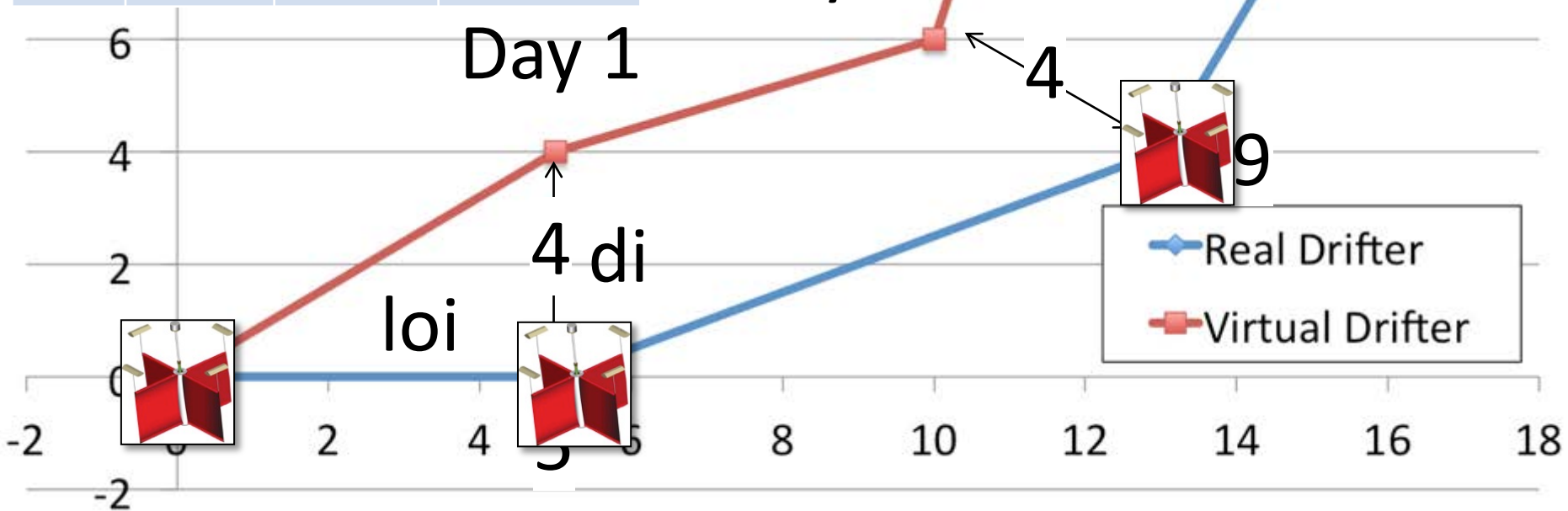
USCG Drifter Experiment



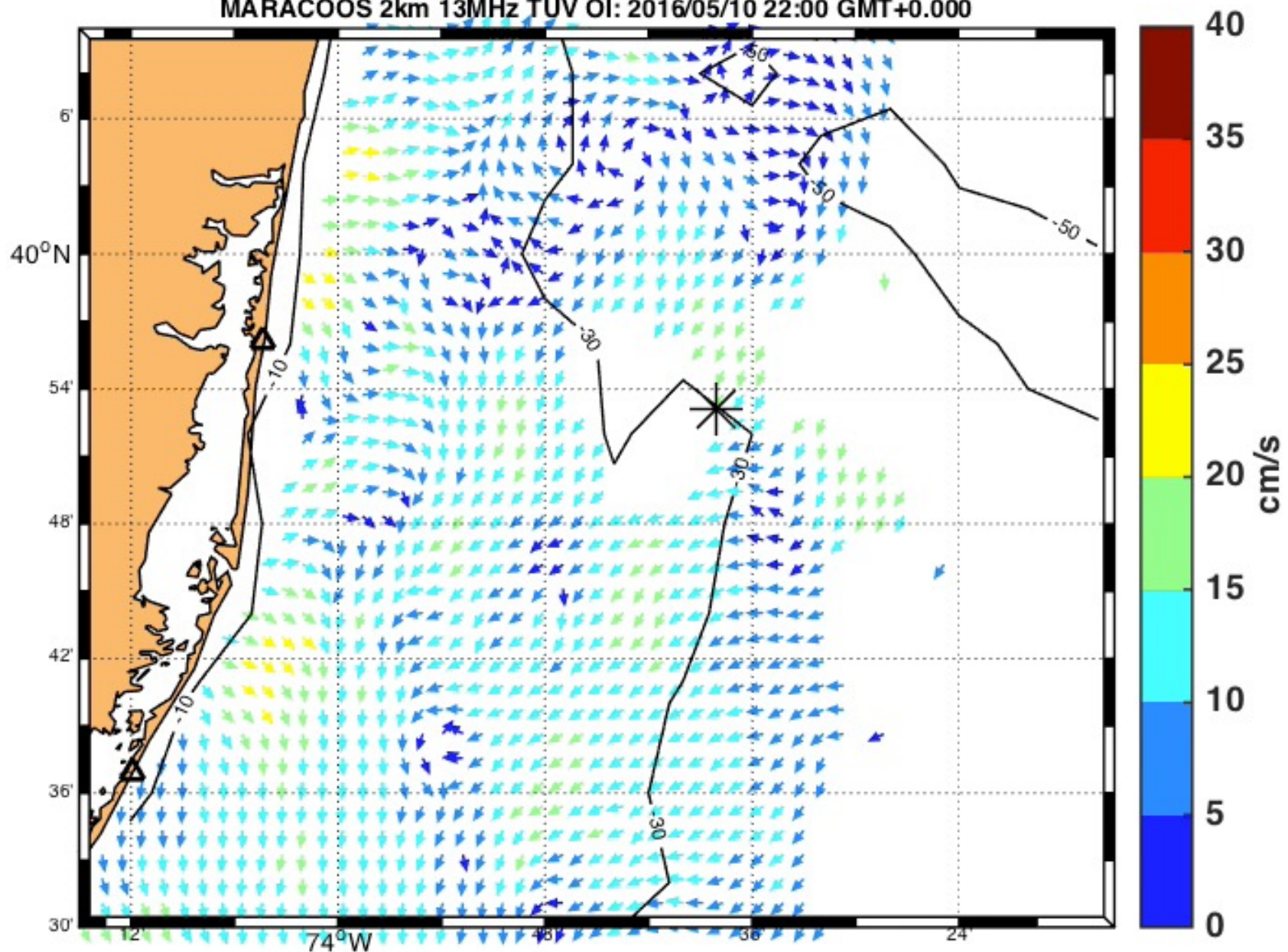
$$\text{Skill} = 1 - \frac{\sum d_i}{\sum l_{oi}}$$

Liu & Weisberg 2011

Day	$\sum d_i$	$\sum l_{oi}$	skill
1	4	5	0.2
2	8	14	0.4
3	13	24	0.5



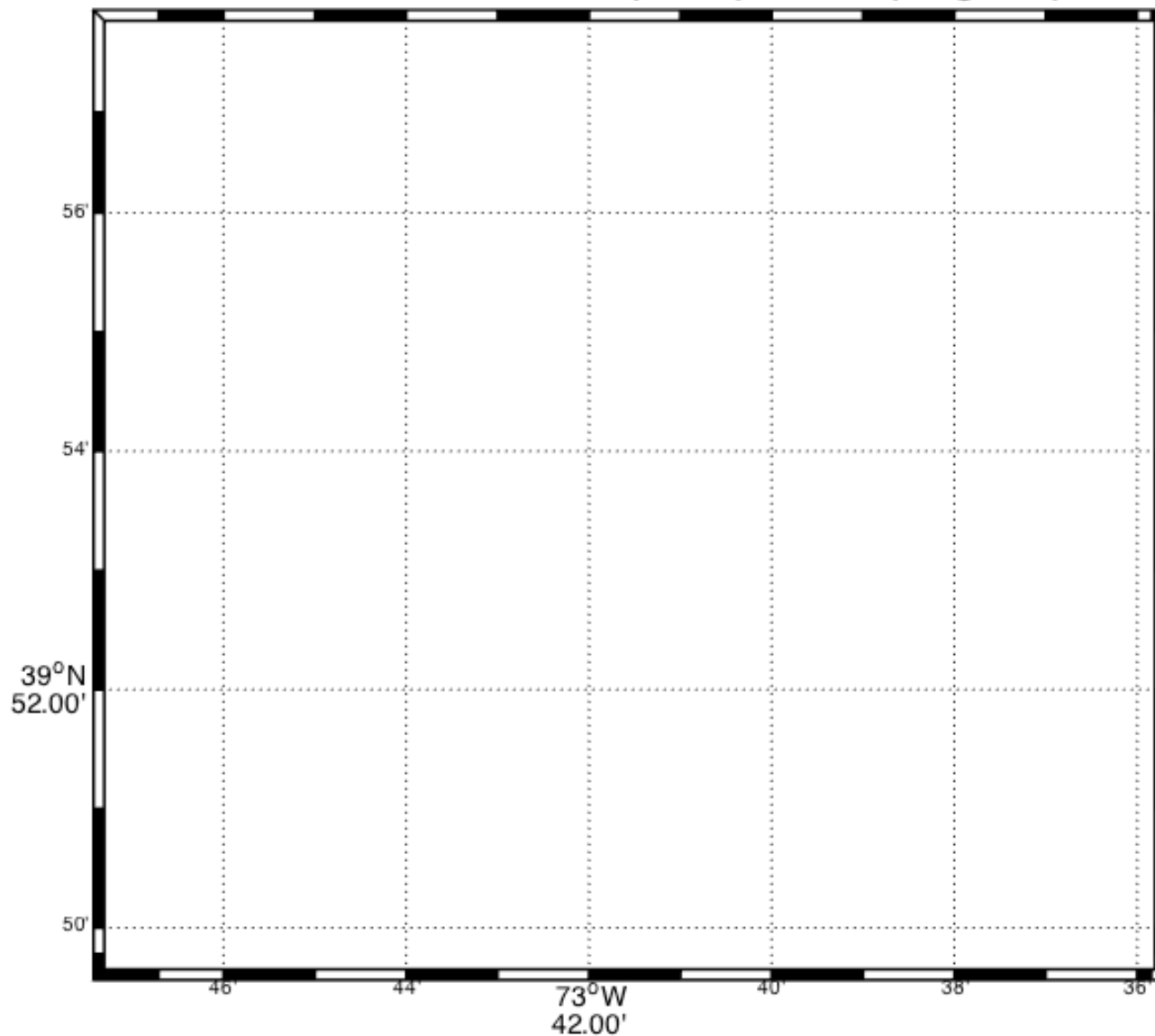
MARACOOS 2km 13MHz TUV OI: 2016/05/10 22:00 GMT+0.000



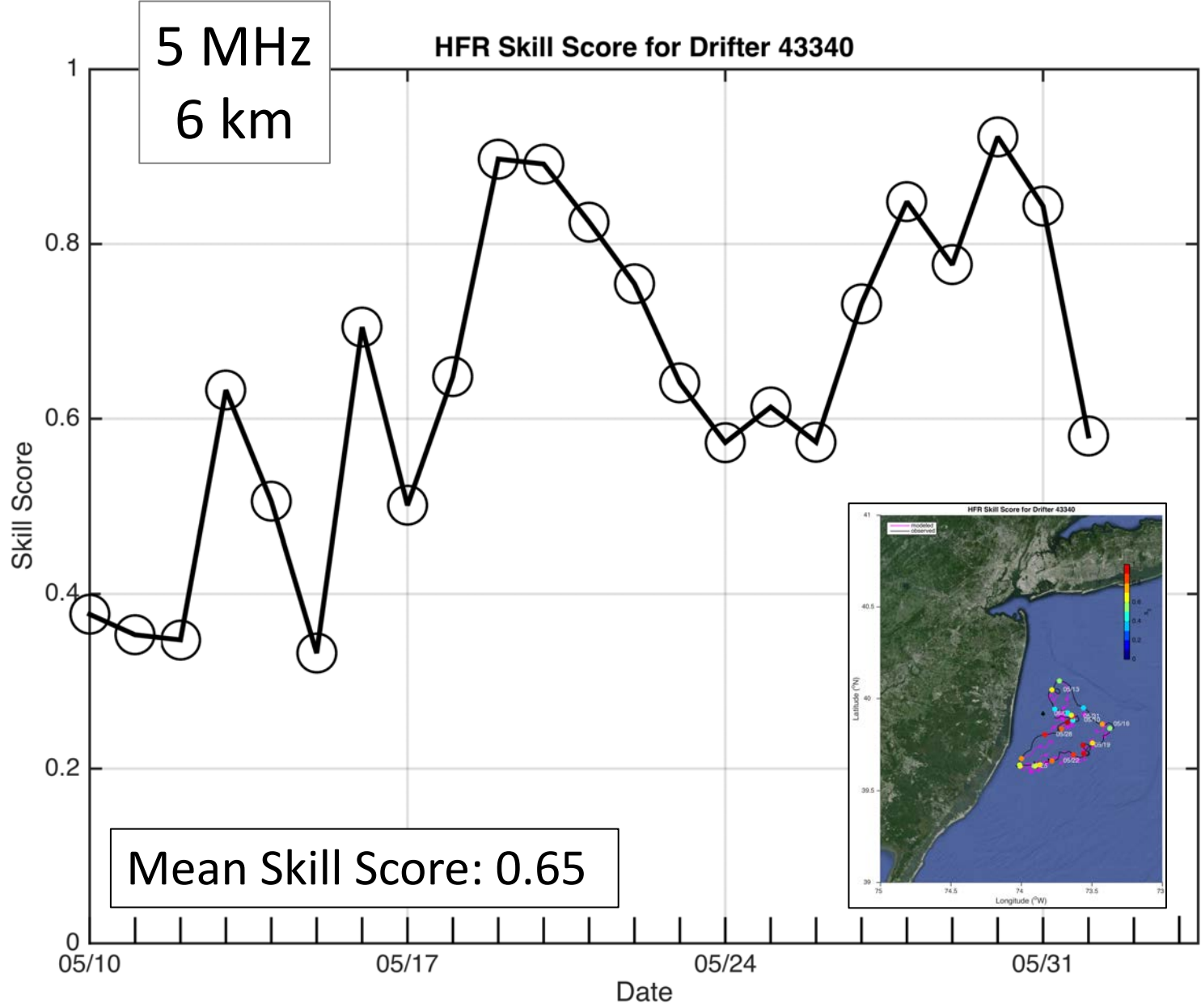
02/06/18

/Users/hroarty/Documents/MATLAB/HJR_Scripts/total_plots/hourly_vector_plot_wrapper_13.m

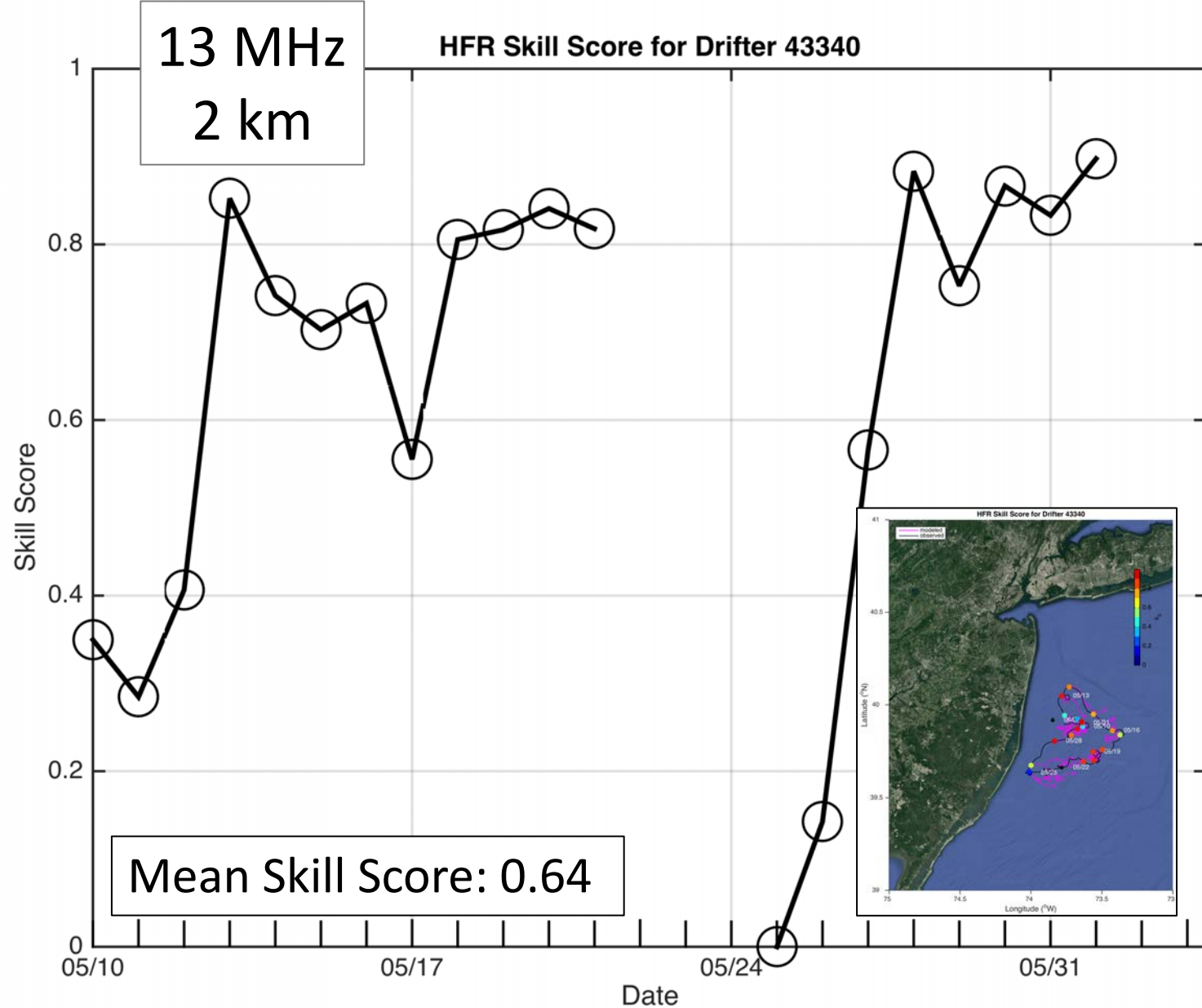
Particle Trajectories: 43340 Day 1
2016/05/10 22:00 Actual (black) Virtual (magenta)

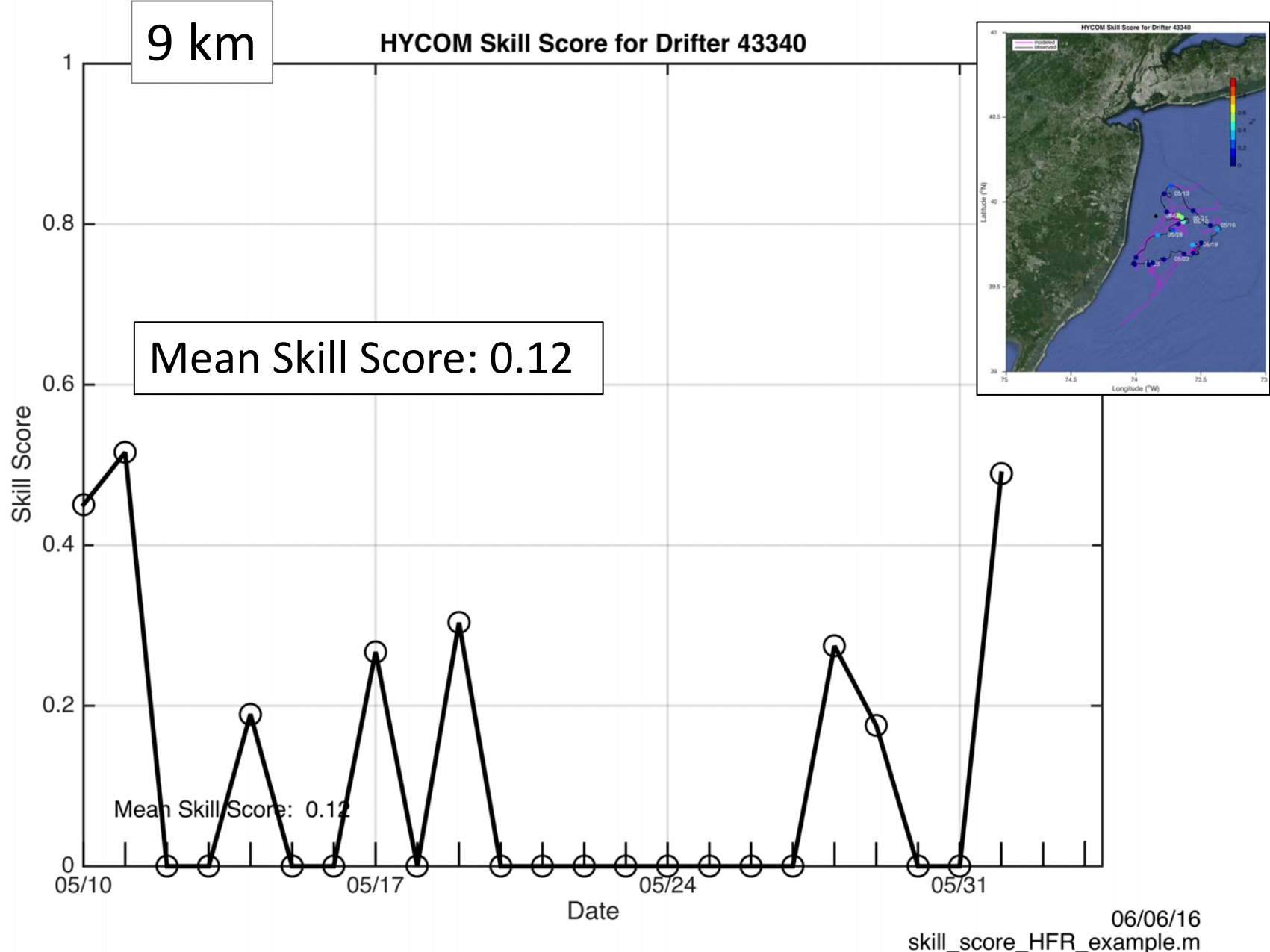


06/01/18
plot_drifter_movie.m

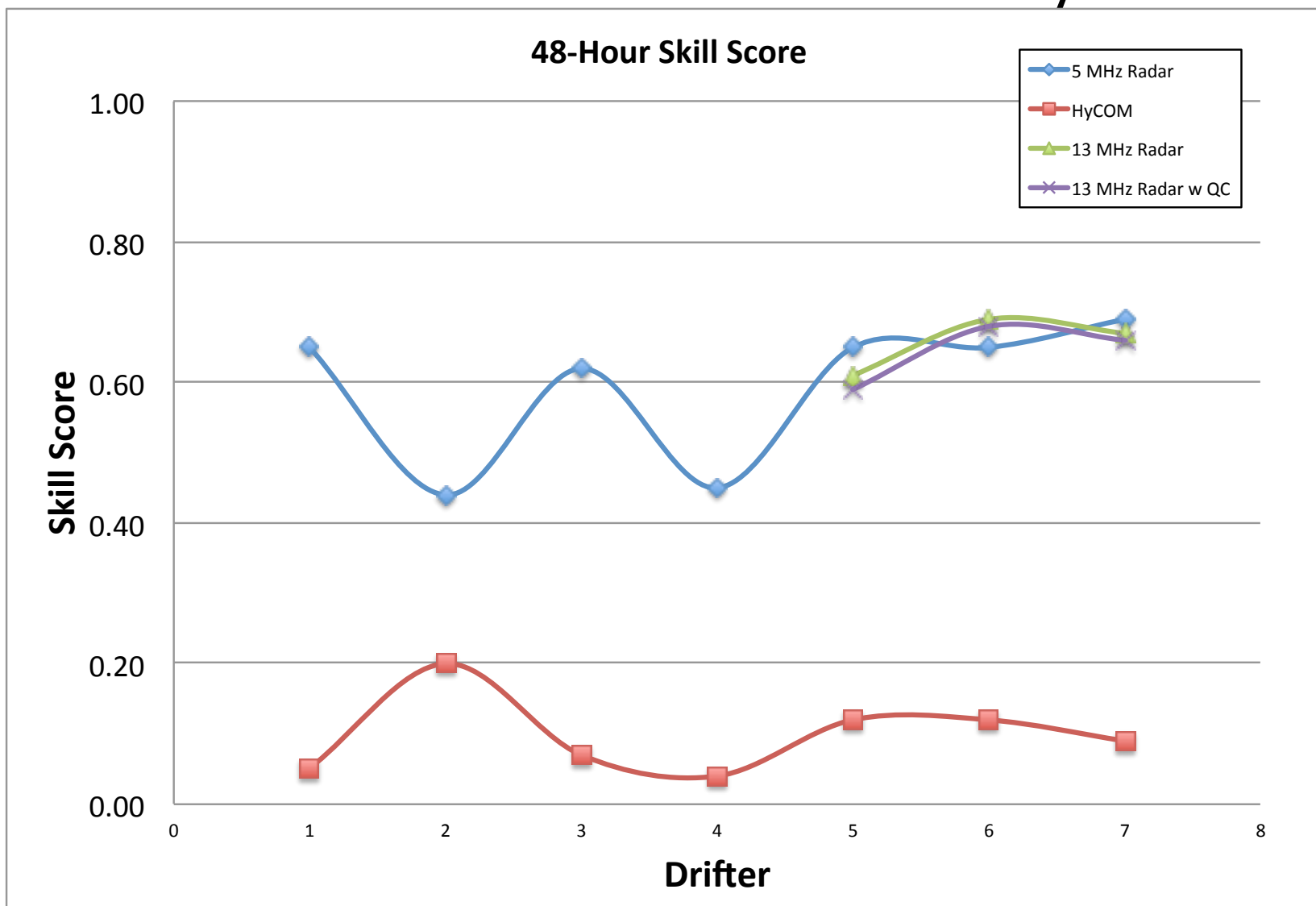


06/06/16
skill_score_HFR_example.m





Drifter Skill Score Summary



Coast Guard Outreach

Outreach to the Coast Guard



National Search and Rescue School
Mr. Earl Matthews
Yorktown, VA
January 19, 2017



Coast Guard Sector NY
Mr. Rodger Krass
Staten Island, NY
March 21, 2017

Outreach to the Coast Guard



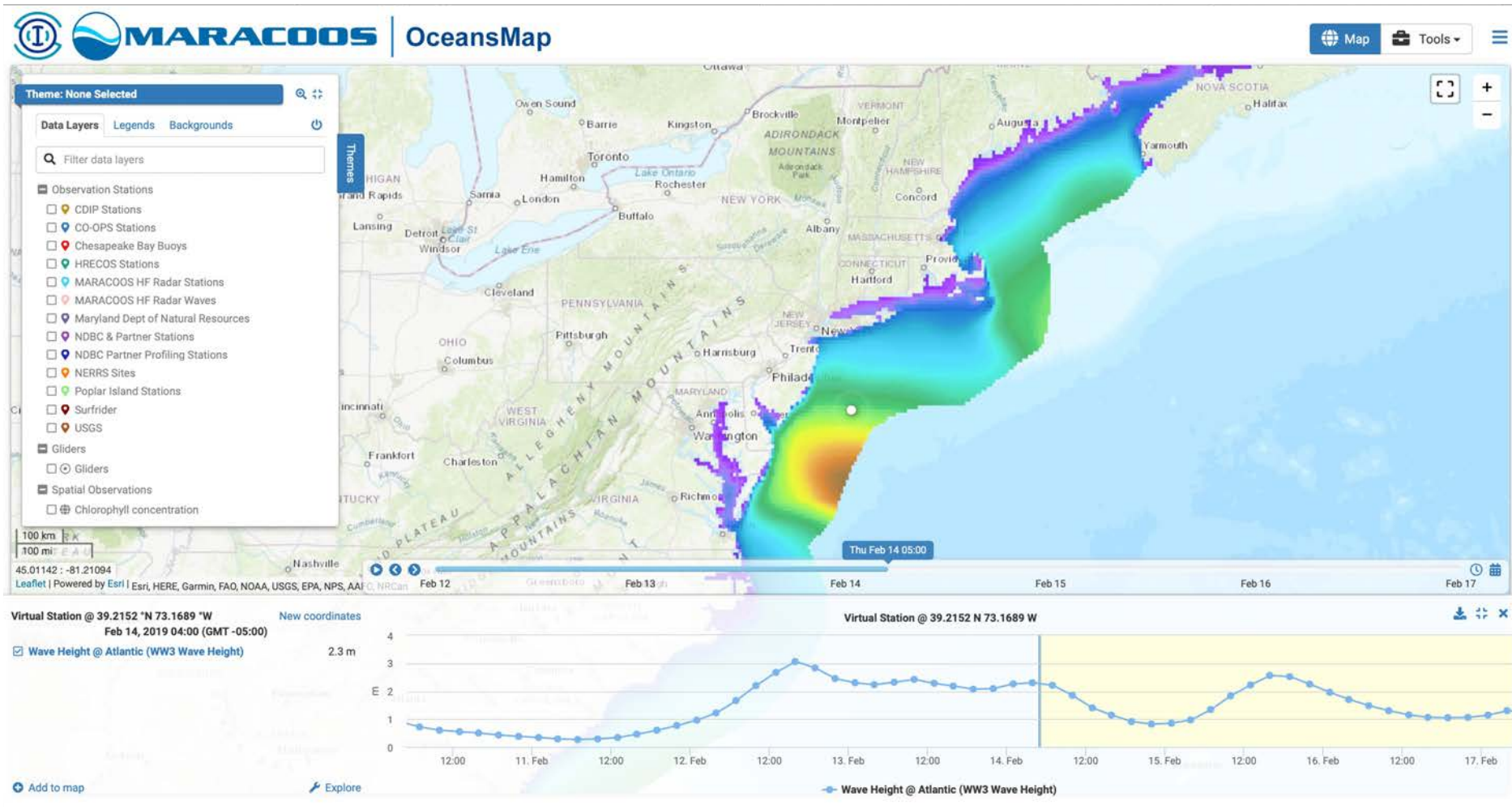
Coast Guard Sector Delaware Bay

LT. Chris Shivock

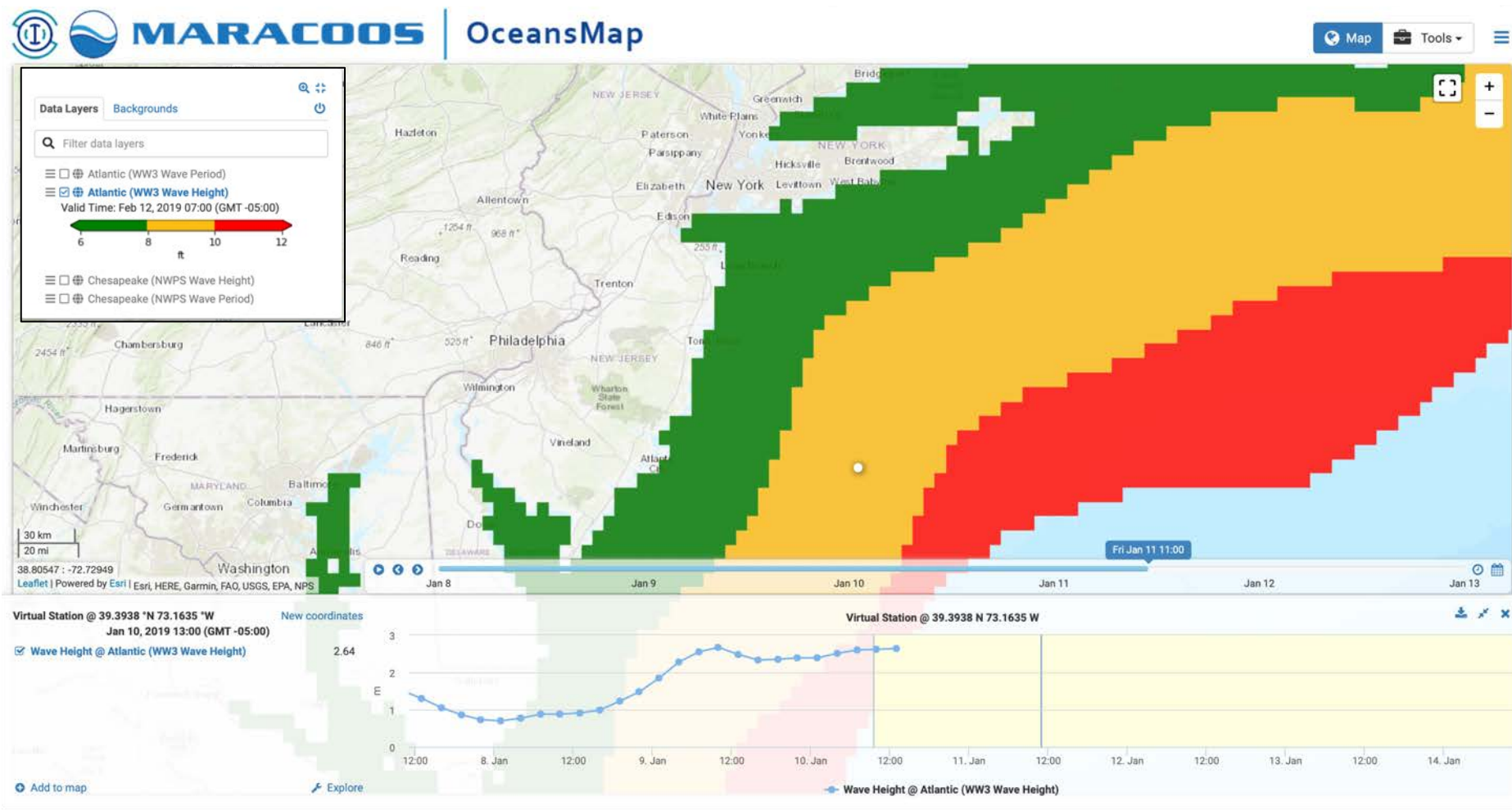
Yorktown, VA

May 16, 2018

Coast Guard Wave Product



Coast Guard Wave Product



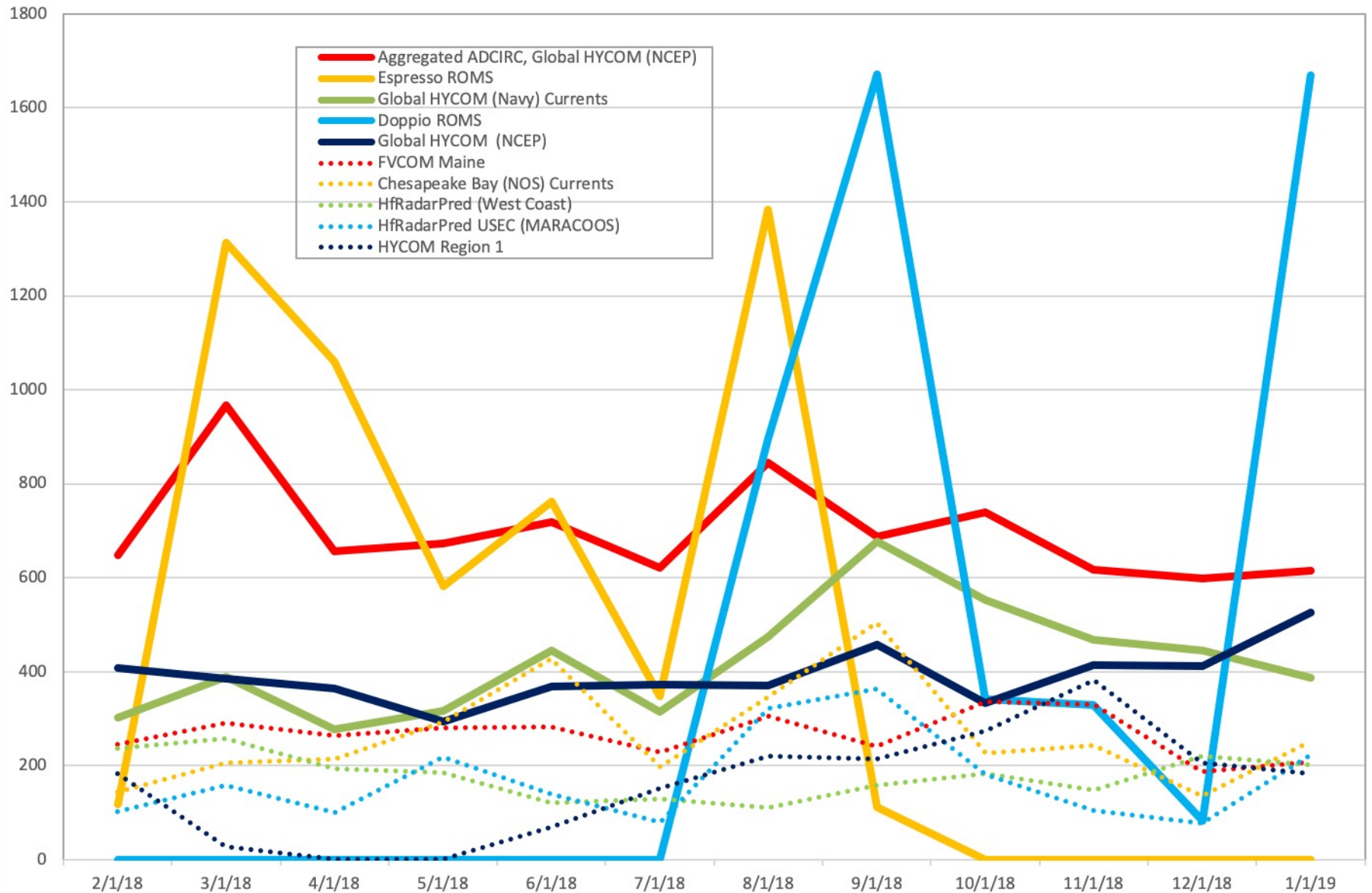
Coast Guard Surface Current Data Requests

Requests January 1 to December 31, 2017

Rank	USCG Product Key	Number of Orders	Percent	Orders/Week
1	Espresso_Rutgers_C	11,441	24%	220
2	AGG_ADCIRC_GHycom_C	6,860	14%	132
3	HFR Data & STPS_C	4,451	9%	86
4	Global_HYCOM_NCEP_C	3,927	8%	76
5	Global_HYCOM_Navy_C	3,754	8%	72
6	Maine_FVCOM_UMass_C	3,516	7%	68
7	NoAtl_HYCOM_NCEP_C	2,975	6%	57
8	ChesBay_NOS_C	2,804	6%	54
9	NW_Atl_NCSU_C	2,086	4%	40
10	Hawaii_UHI_C	1,380	3%	27
11	CA_3KM_UCLA_C	1,166	2%	22
12	ColumbiaR_NOS_C	1,026	2%	20
13	MassBay_FVCOM_UMass_C	886	2%	17
14	No_GoMex_FVCOM_NOS_C	886	2%	17
15	L_Erie_FVCOM_NOS_C	767	2%	15
		47,925	100%	922

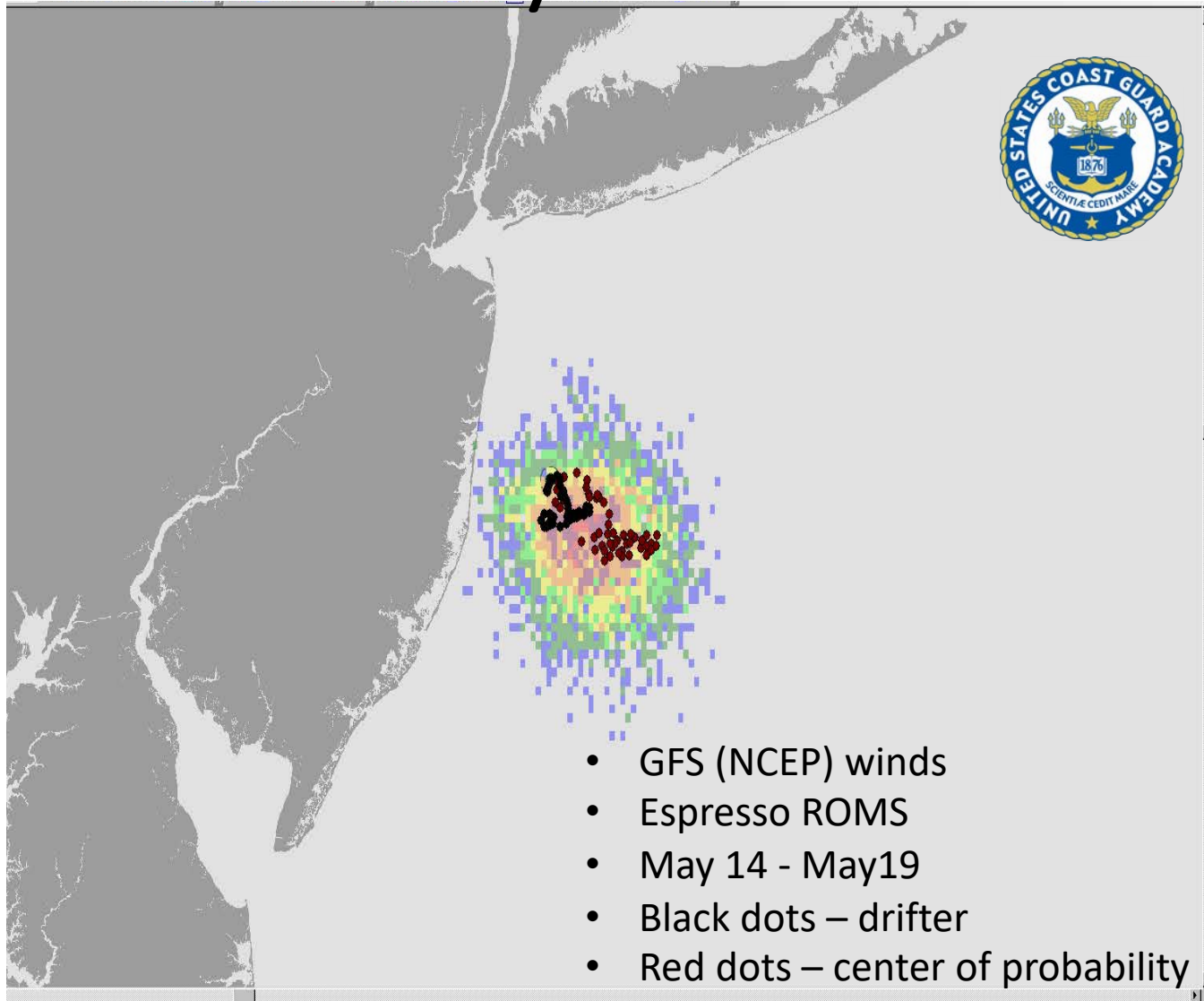
Email from Eoin Howlett March 20, 2018

United States Coast Guard Top Ten Monthly EDS Current Data Requests

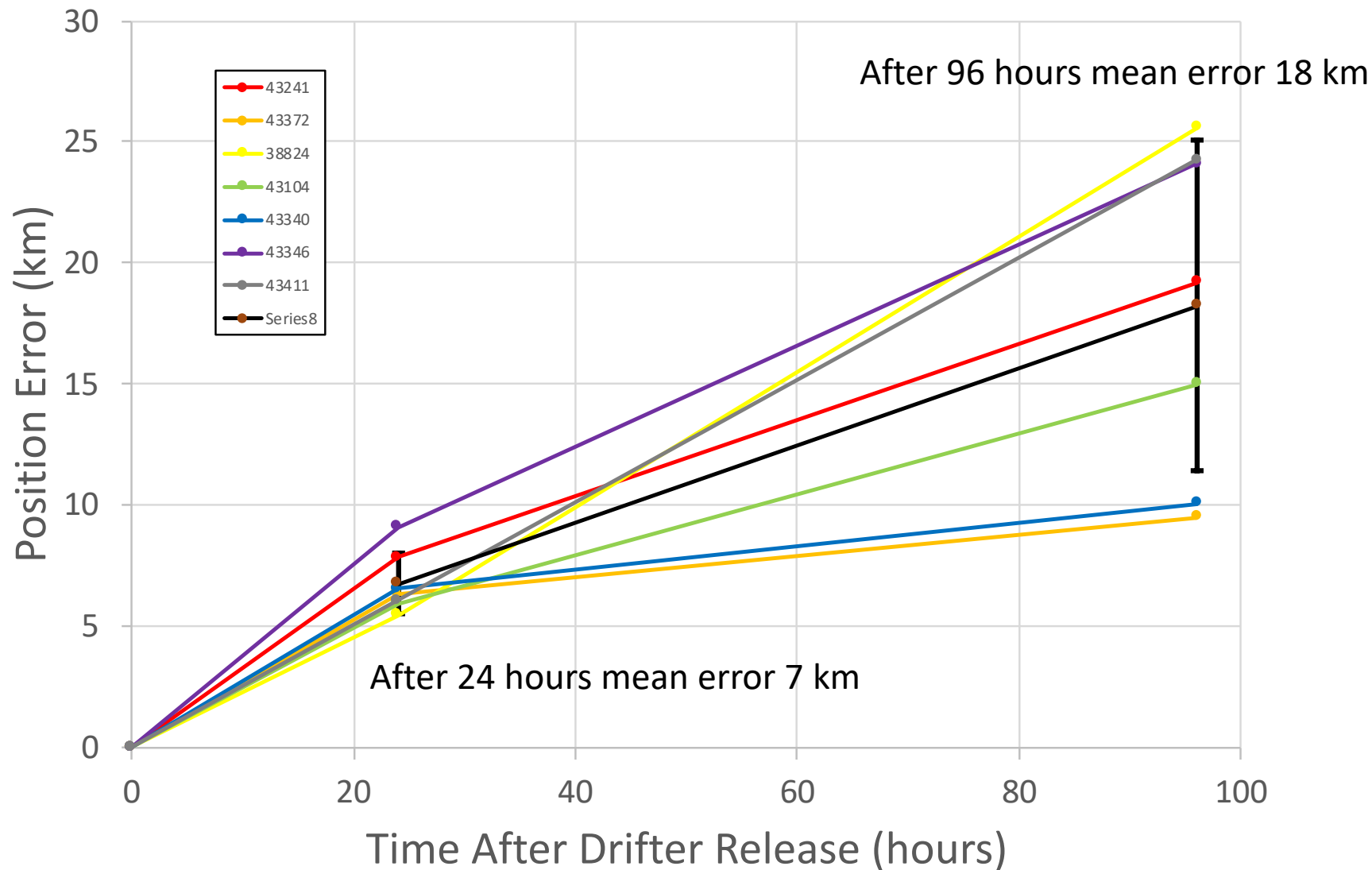




Results for Buoy 43411 in SAROPS

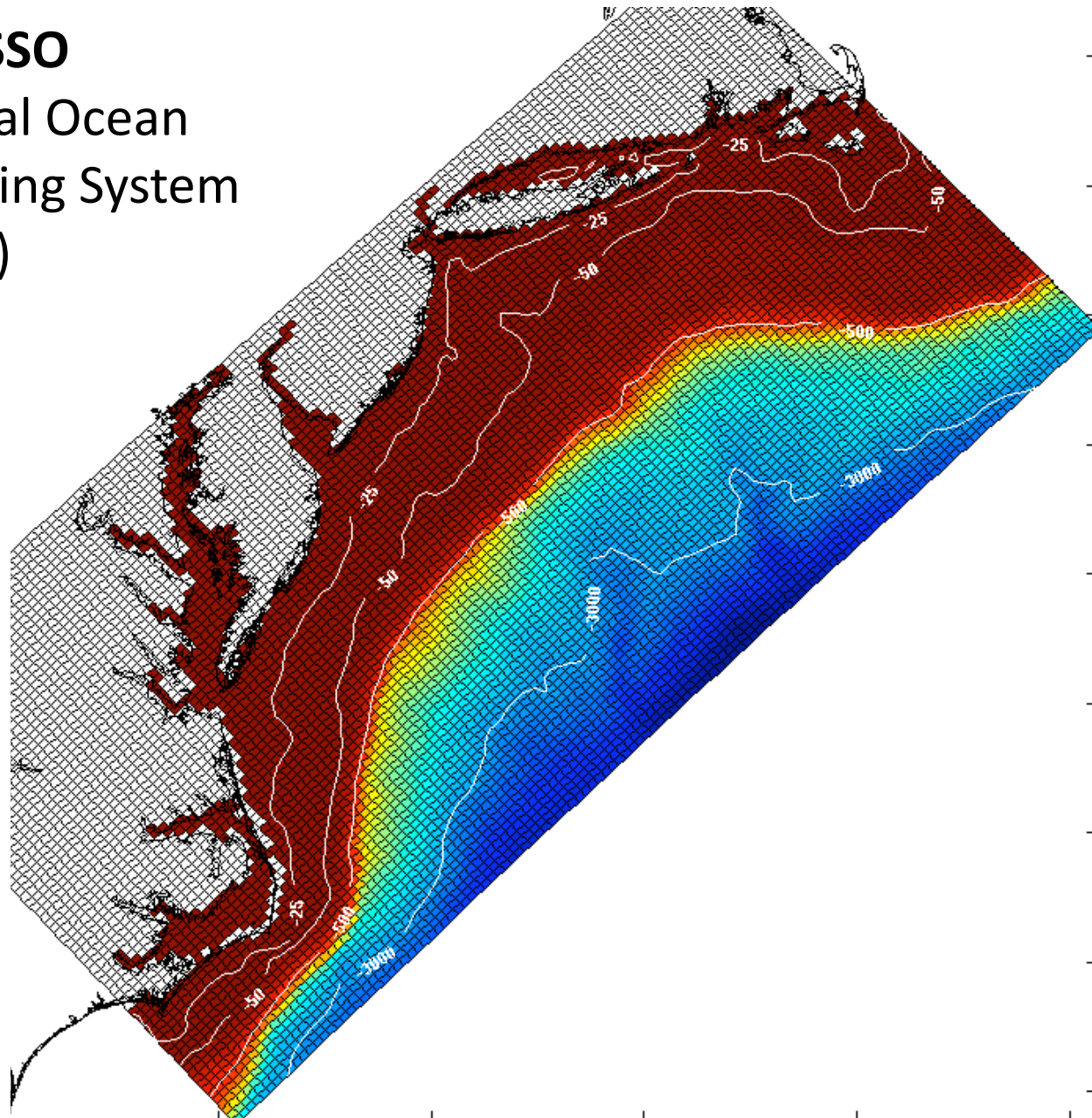


Ocean Model ESPRESSO Position Error

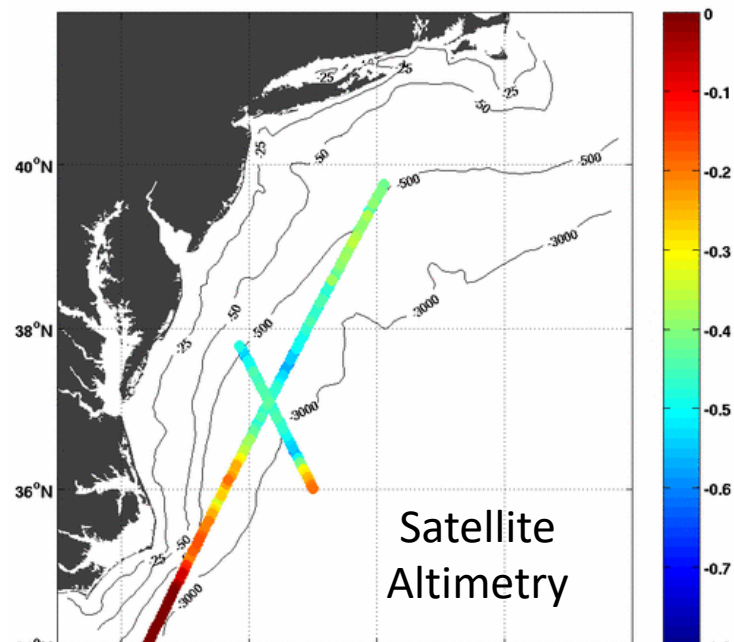
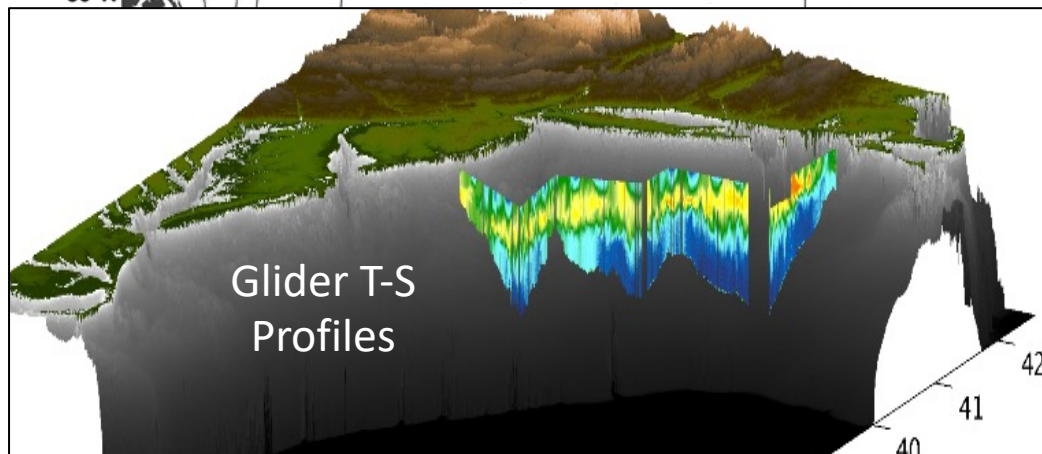
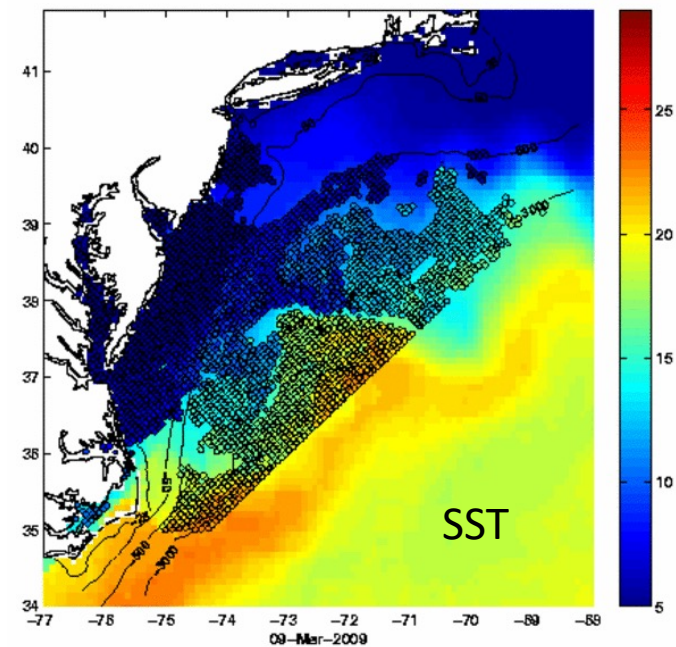
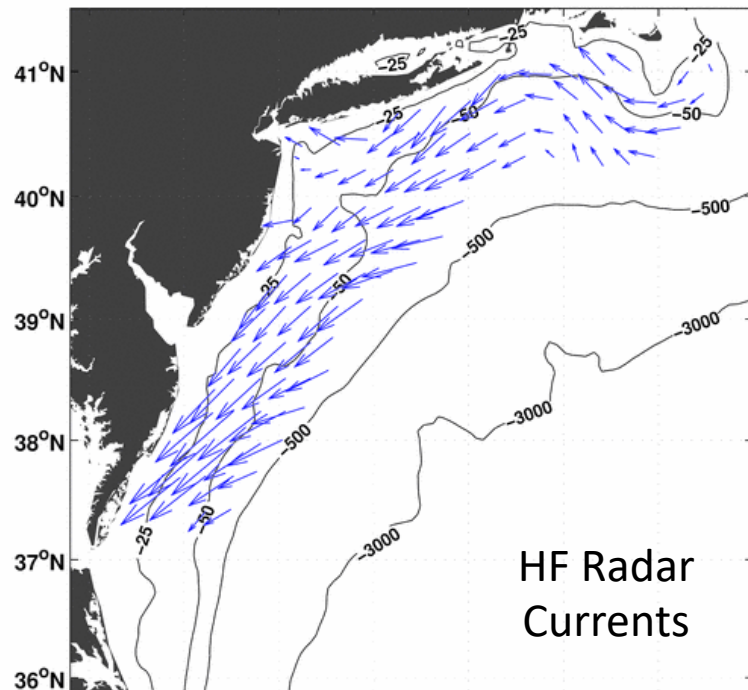


ESPRESSO

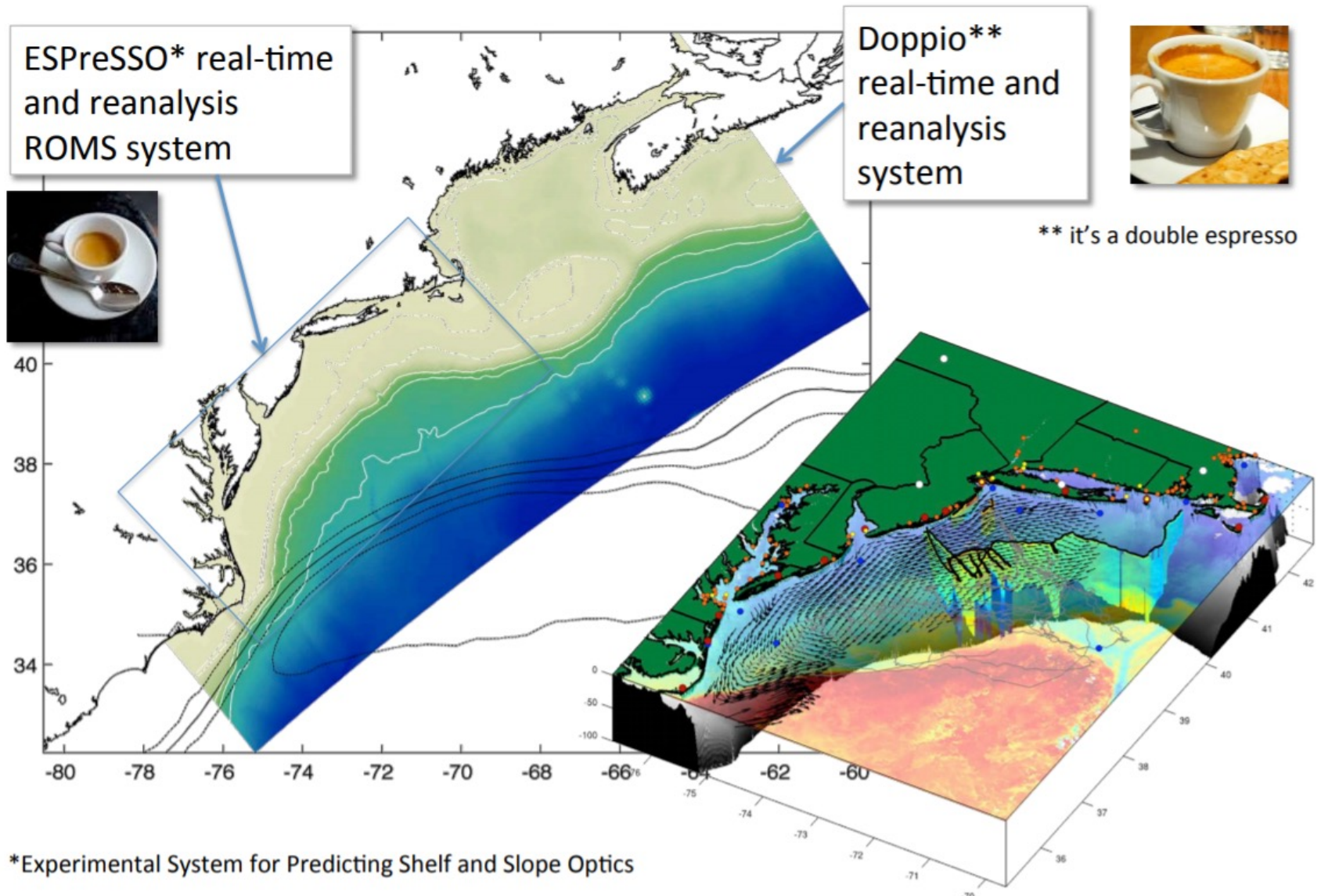
Regional Ocean
Modelling System
(ROMS)



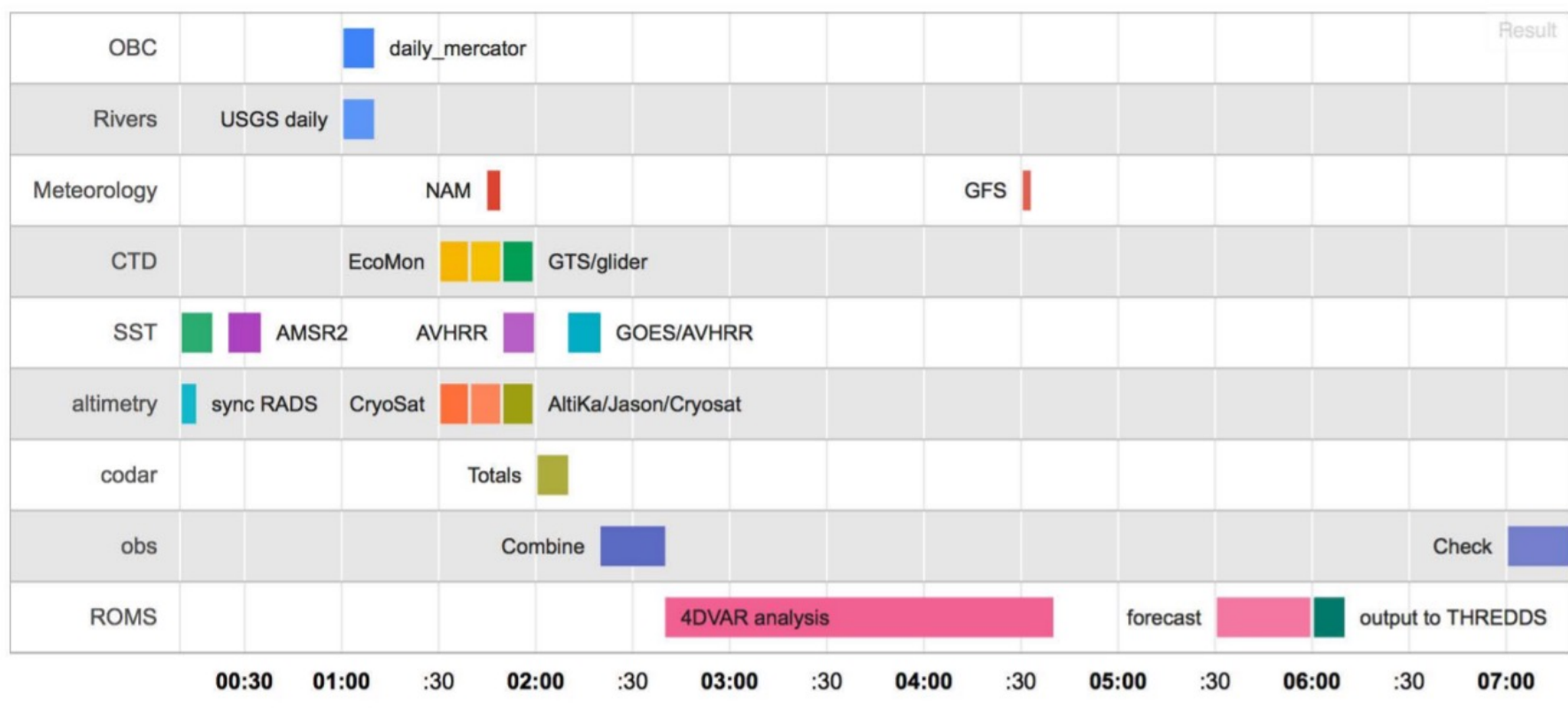
ESPRESSO IS DATA ASSIMILATIVE



Prediction - Innovation - Espresso becomes Doppio



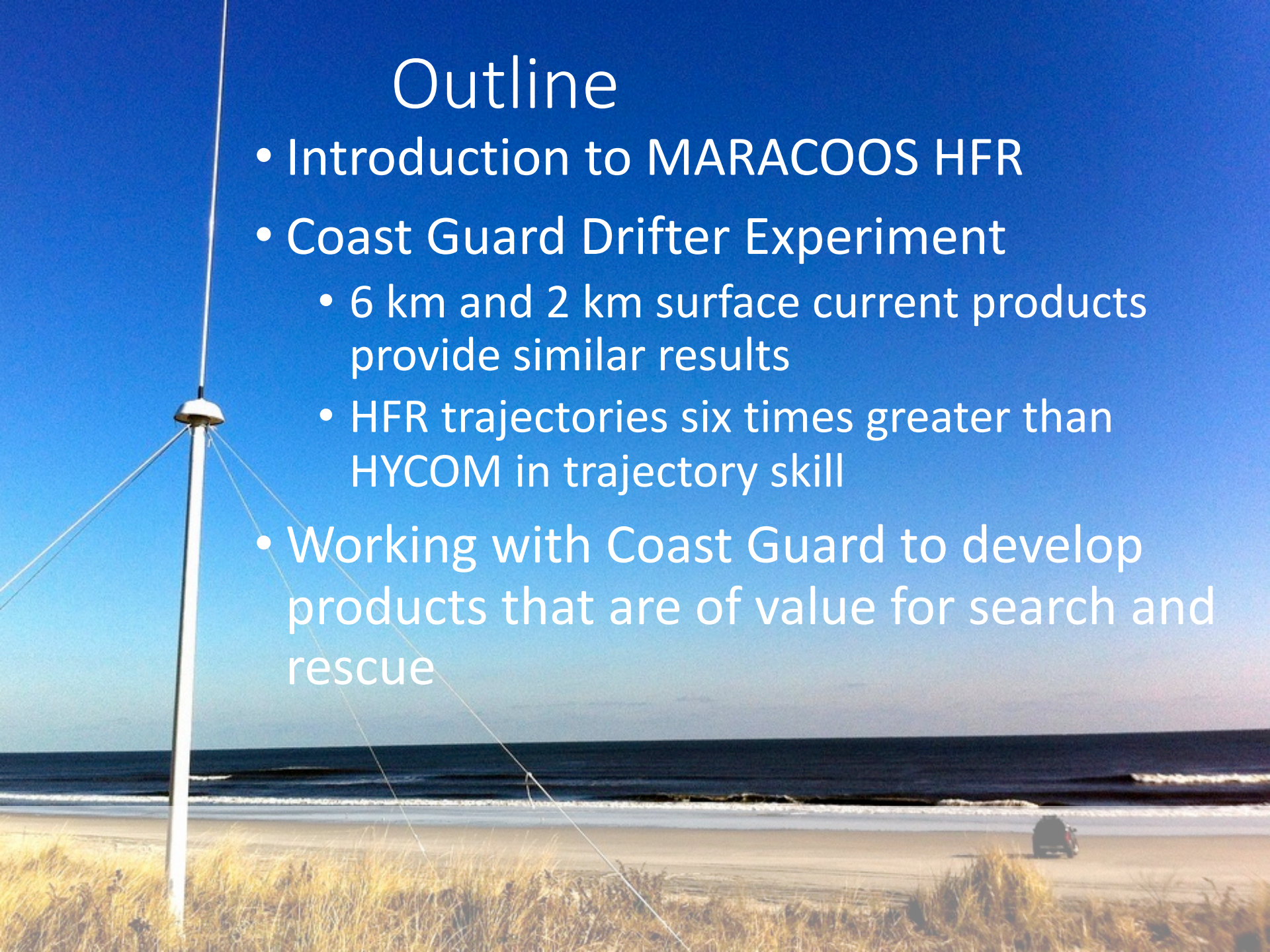
Doppio Data Assimilation



MARACCOOS_Operations_Overview_2018-11-21_Ver06.ppt

Outline

- Introduction to MARACOOS HFR
- Coast Guard Drifter Experiment
 - 6 km and 2 km surface current products provide similar results
 - HFR trajectories six times greater than HYCOM in trajectory skill
- Working with Coast Guard to develop products that are of value for search and rescue



Evaluation of Environmental Data for Search and Rescue II

THANK YOU

