Mid Atlantic Drifter Program:
Development of a Software Toolbox to Manage Drifter Data

Dr. Hugh Roarty and
Ms. Laura Nazzaro

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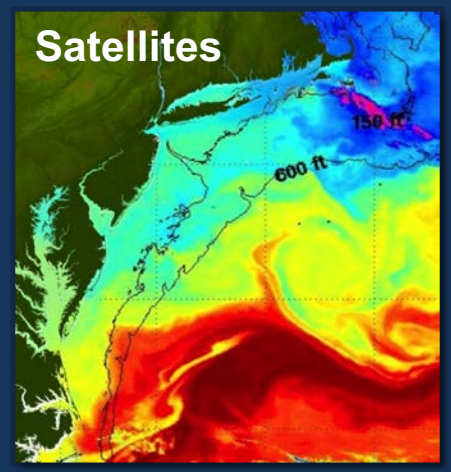
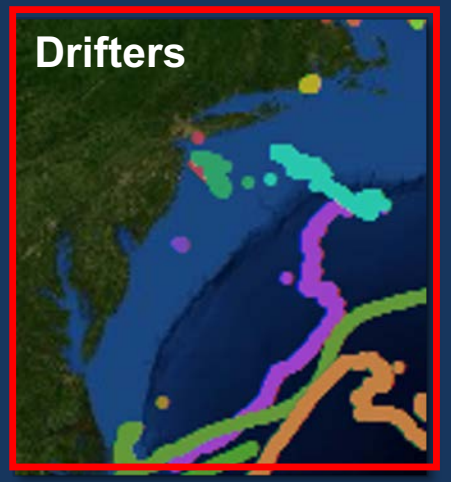
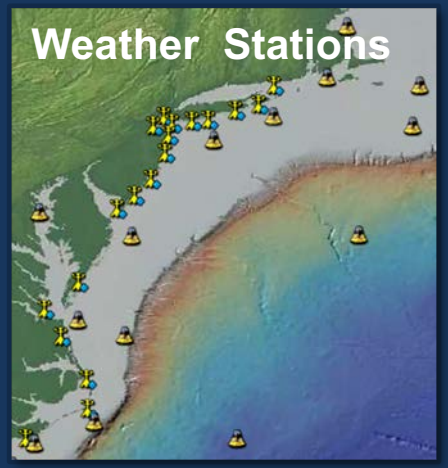
Ocean Information for a Changing World

IOOS
Integrated Ocean
Observing System

NOAA



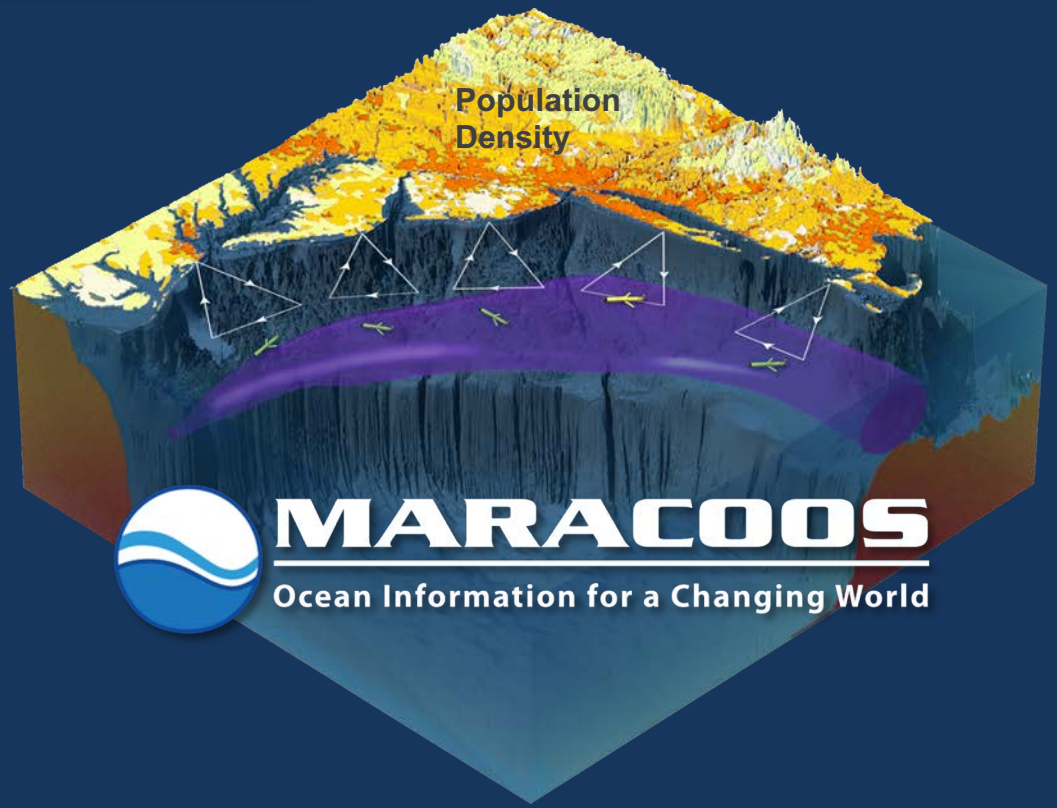




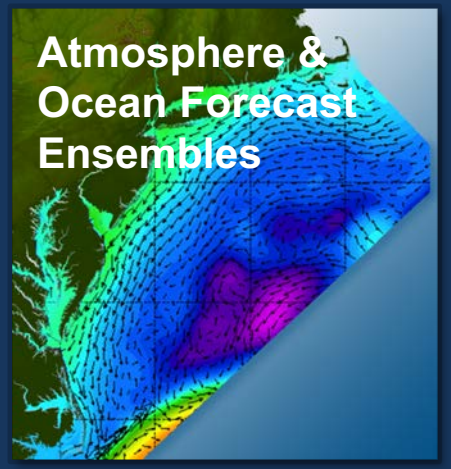
REGIONAL INFORMATION COORDINATION ENTITY
CERTIFIED
2016

IOOS
Integrated Ocean Observing System

AMBASSADOR™
WRN
WEATHER-READY NATION



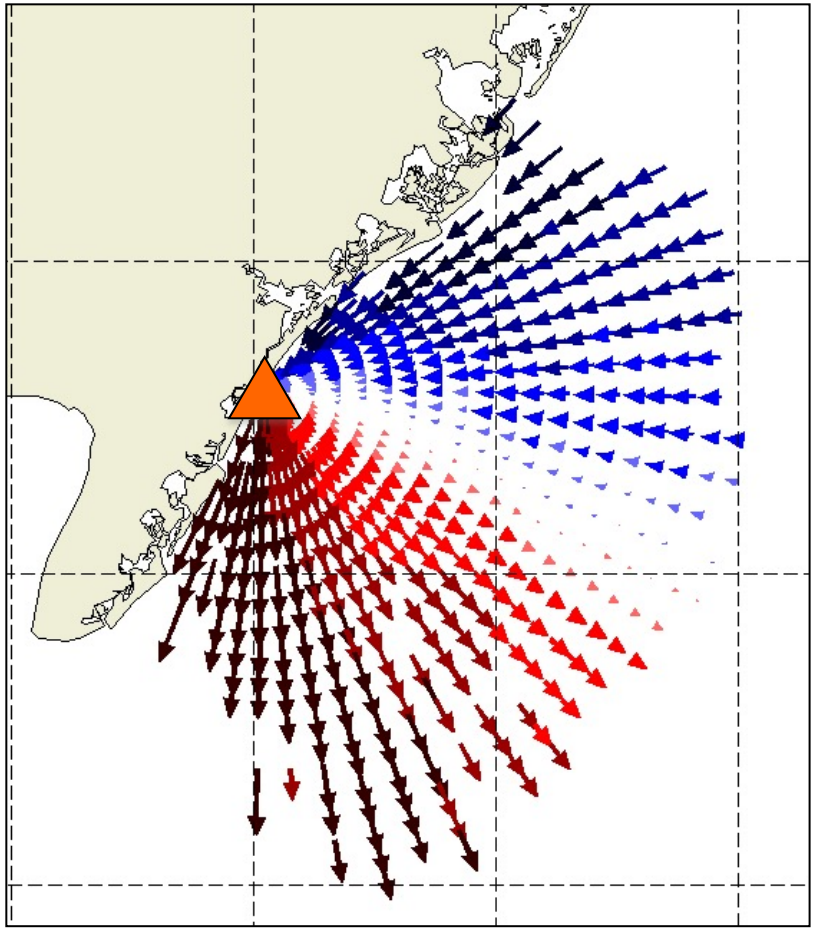
Powering Understanding and Prediction of the Mid-Atlantic Ocean and Coasts



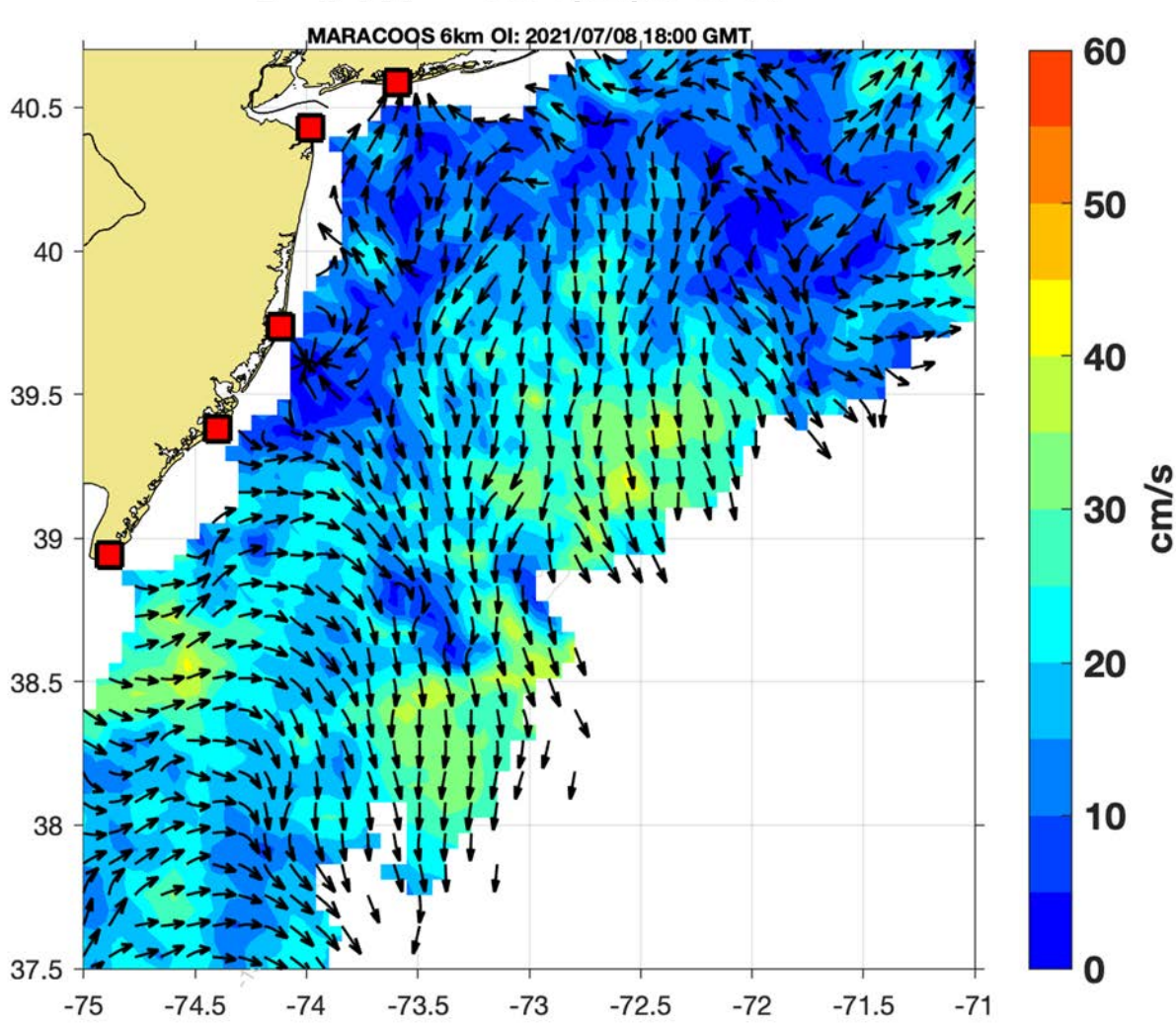
RUTGERS
School of Environmental and Biological Sciences

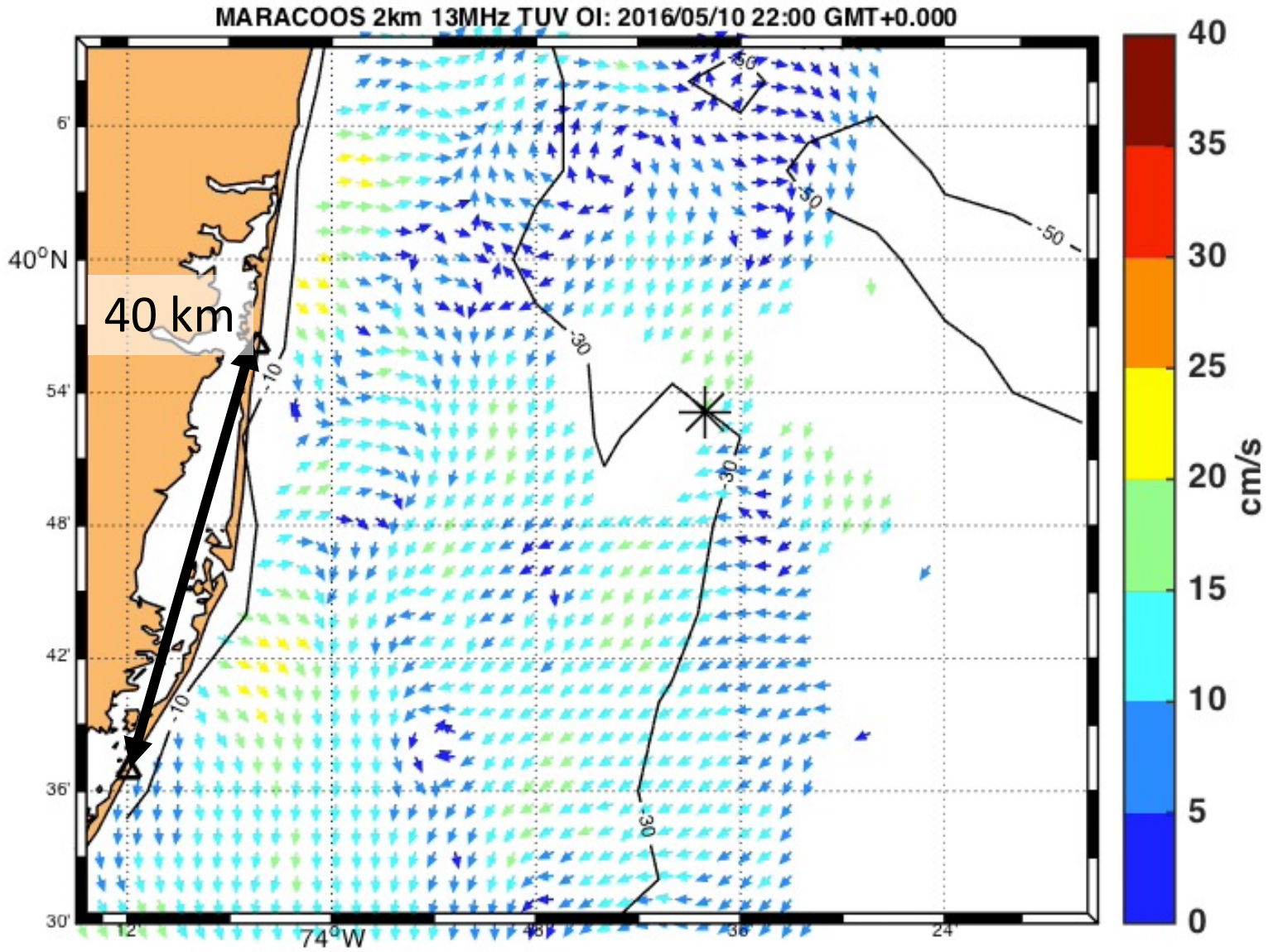
Center for Ocean Observing Leadership

Hourly radial surface current measurements

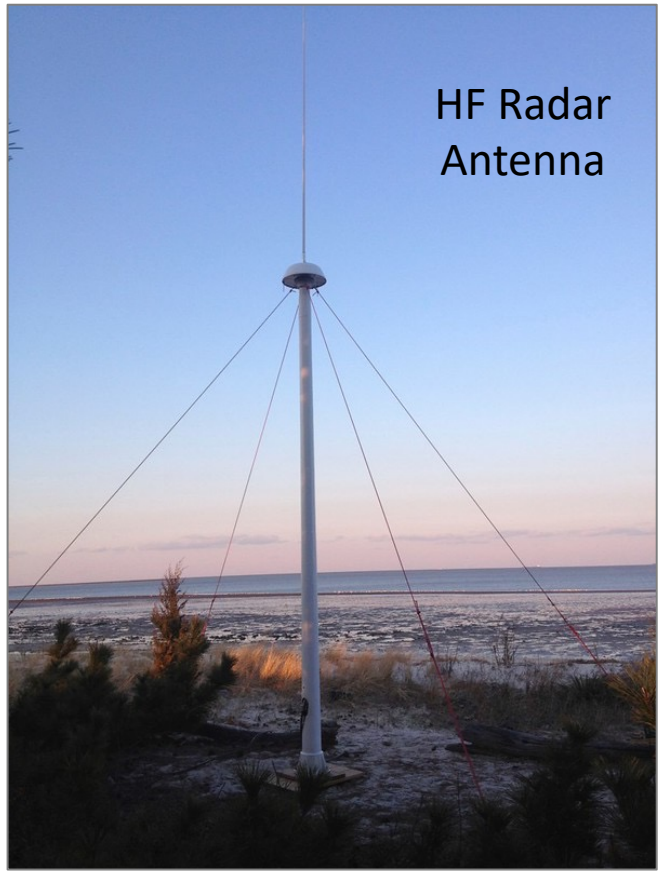


Hourly total current measurements

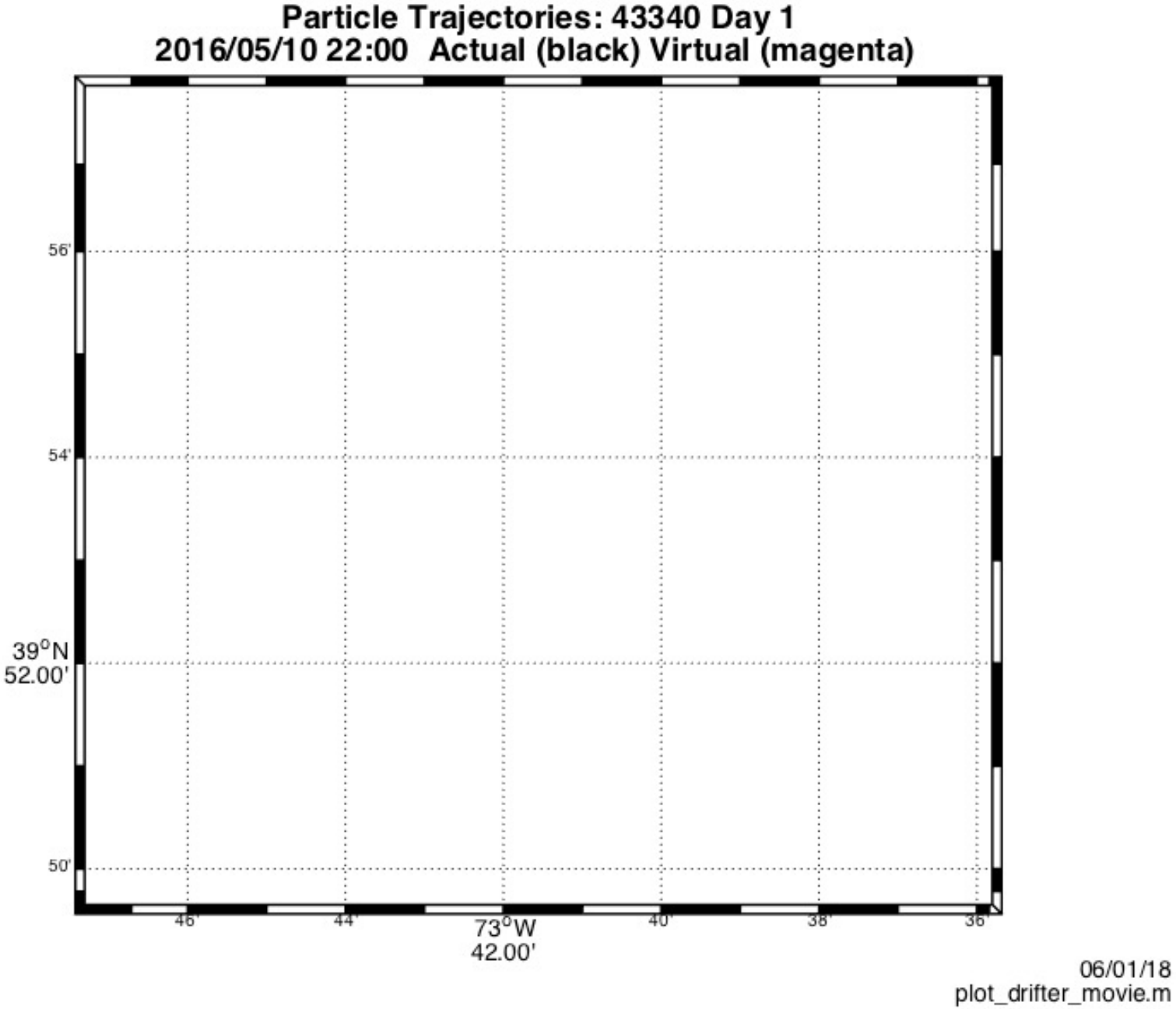




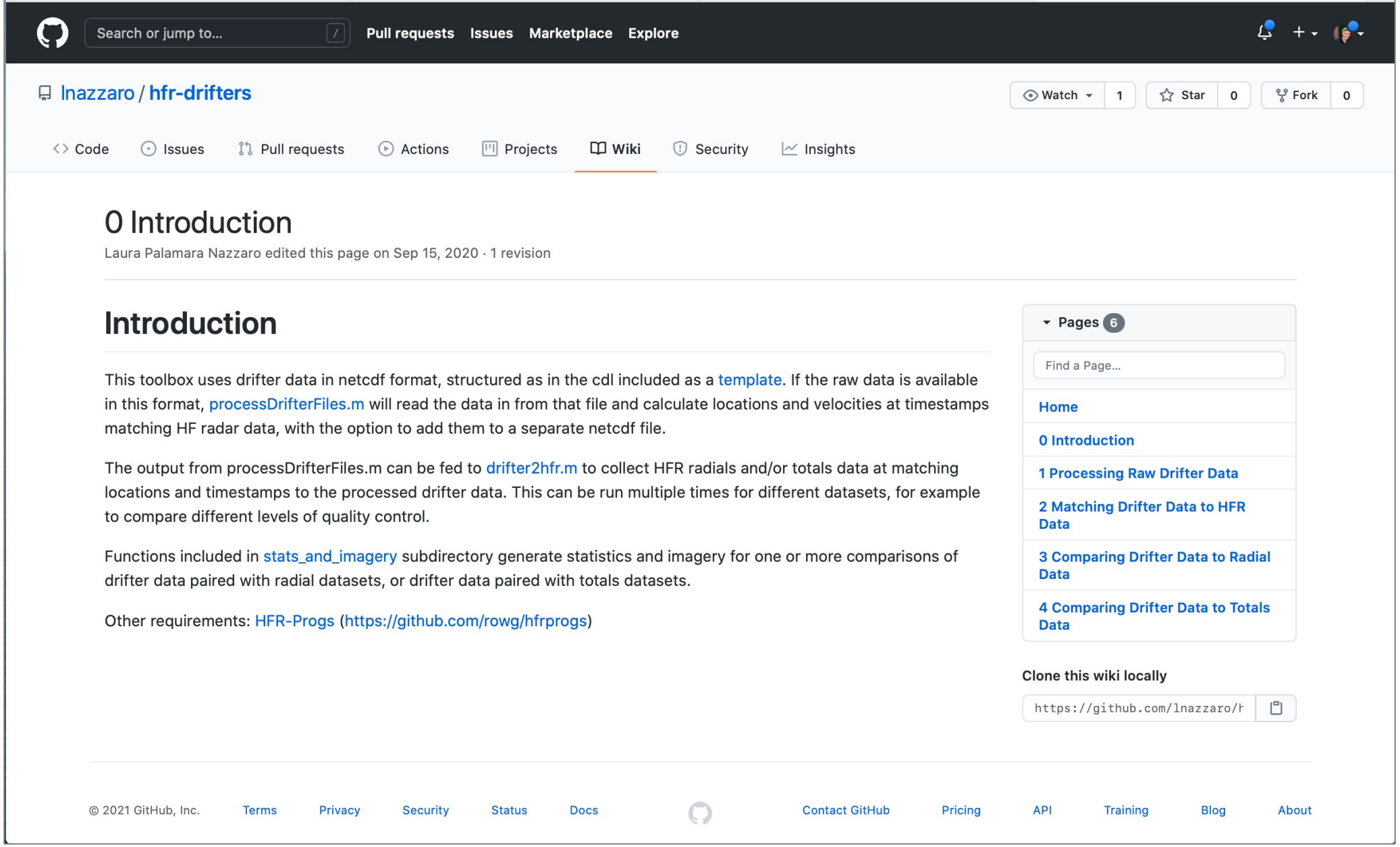
* In Situ Drifters



Surface
Drifter

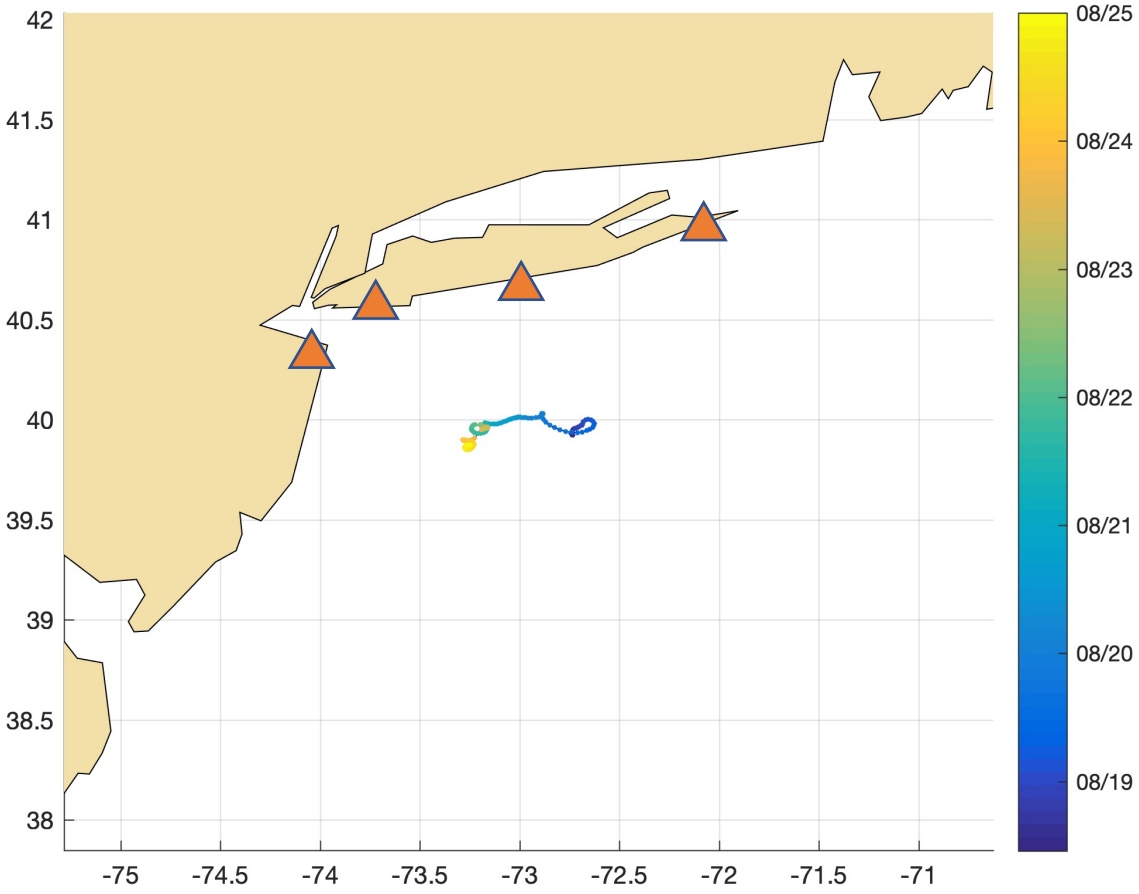


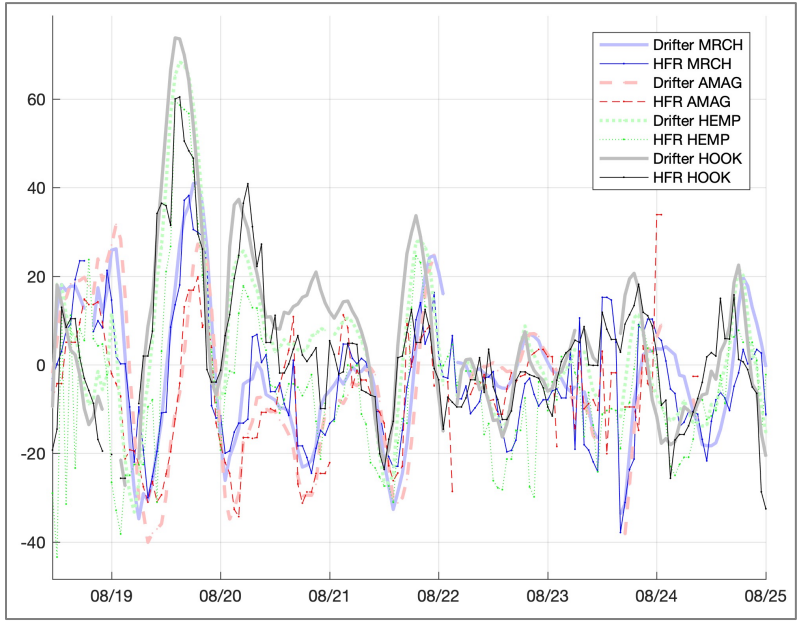
HF Radar vs Drifters

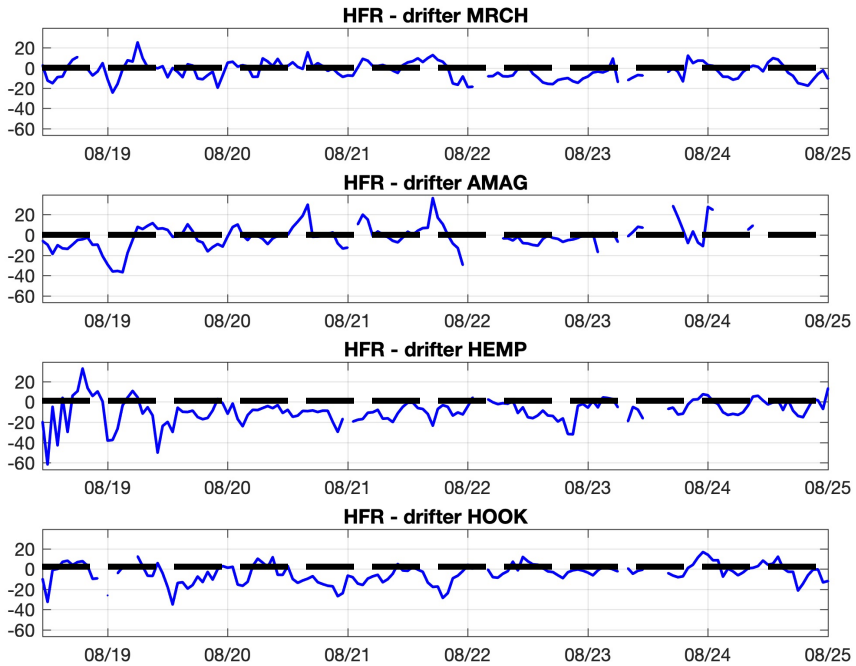


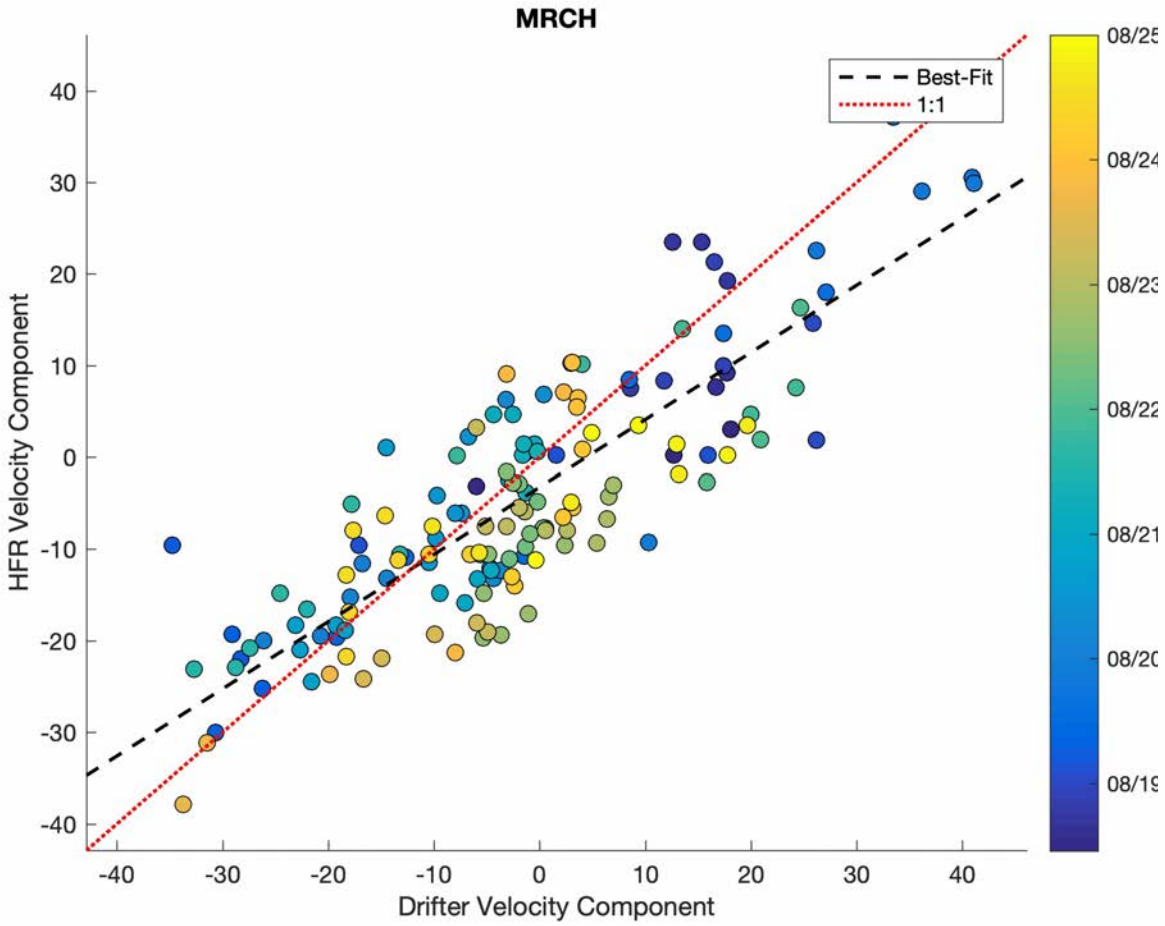
https://github.com/lnazzaro/hfr-drifters/wiki/0-Introduction

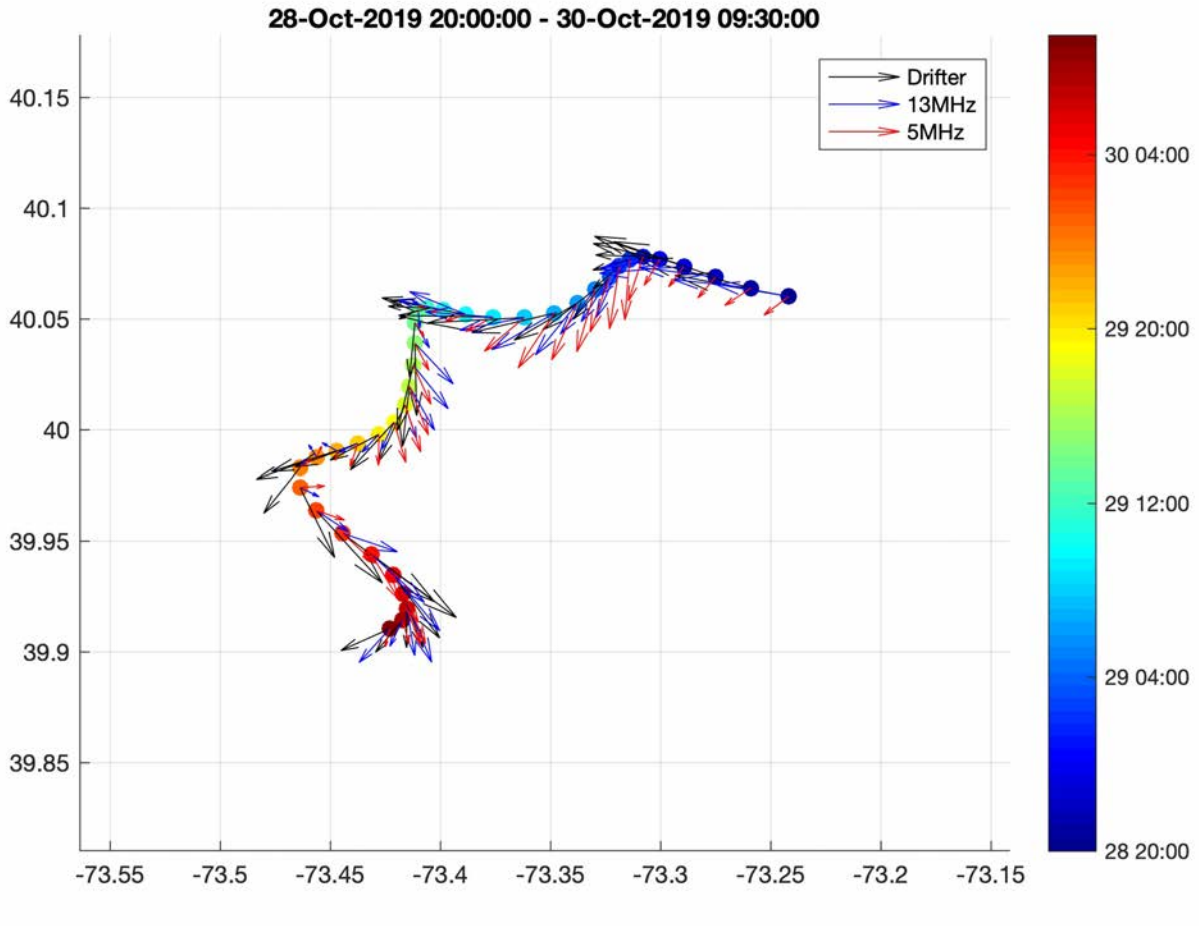
Radial Drifter Comparisons





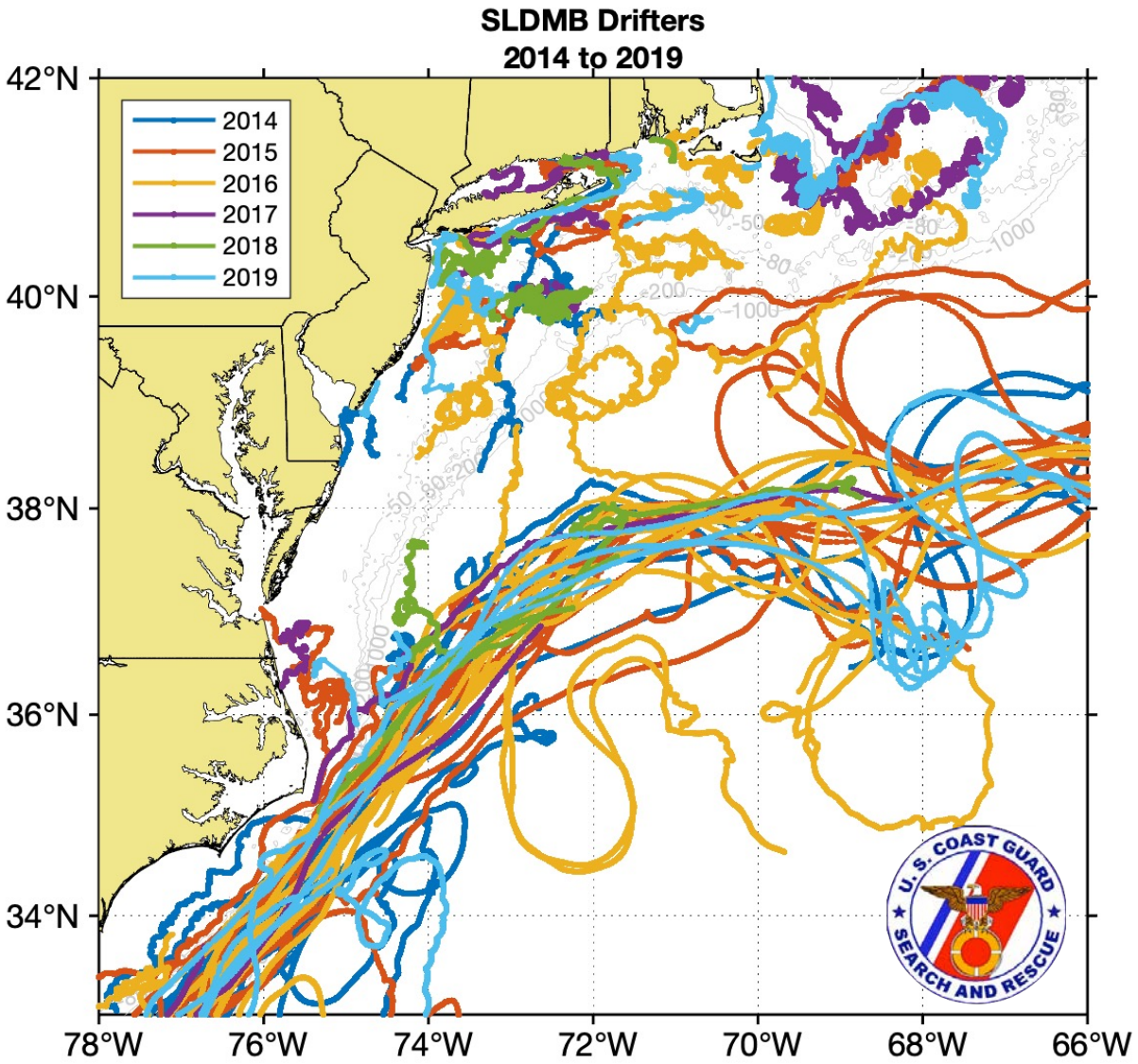


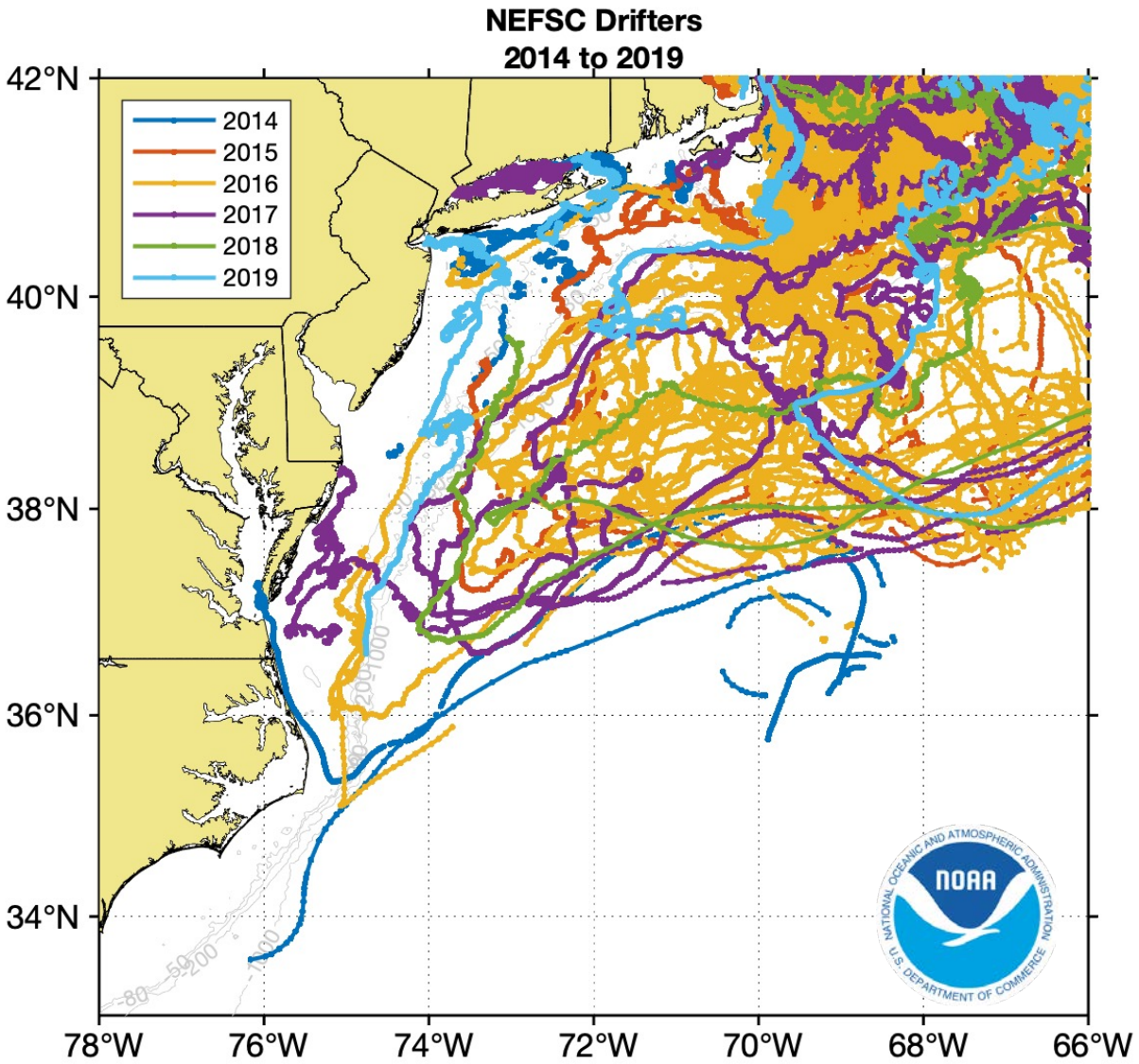

MRCH
Best-Fit
1:1
HFR Velocity Component
Drifter Velocity Component
40
30
20
10
0
-10
-20
-30
-40
-40
-30
-20
-10
0
10
20
30
40
08/25
08/24
08/23
08/22
08/21
08/20
08/19

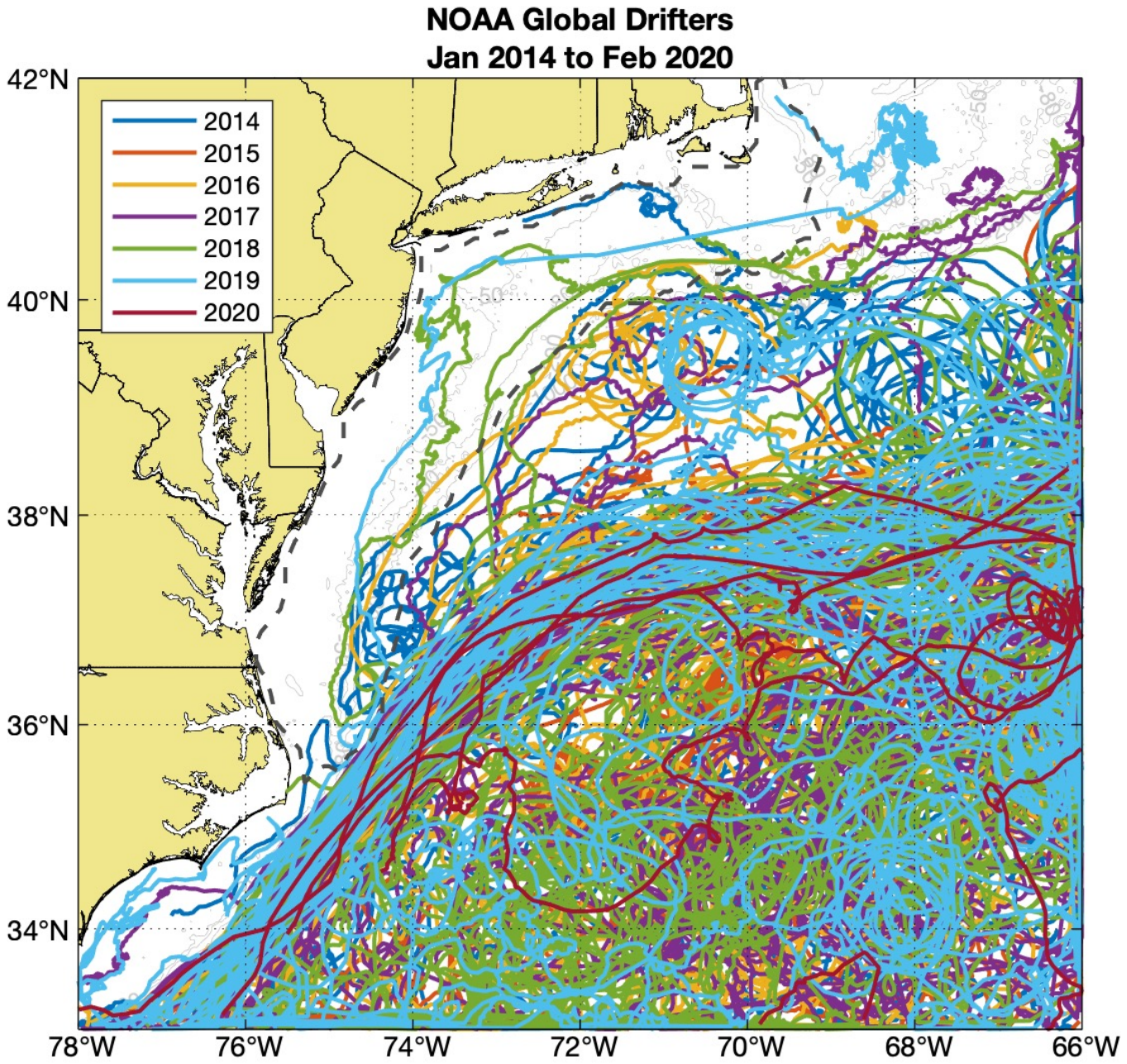

28-Oct-2019 20:00:00 - 30-Oct-2019 09:30:00
Drifter
13MHz
5MHz
40.15
40.1
40.05
40
39.95
39.9
39.85
-73.55
-73.5
-73.45
-73.4
-73.35
-73.3
-73.25
-73.2
-73.15
30 04:00
29 20:00
29 12:00
29 04:00
28 20:00

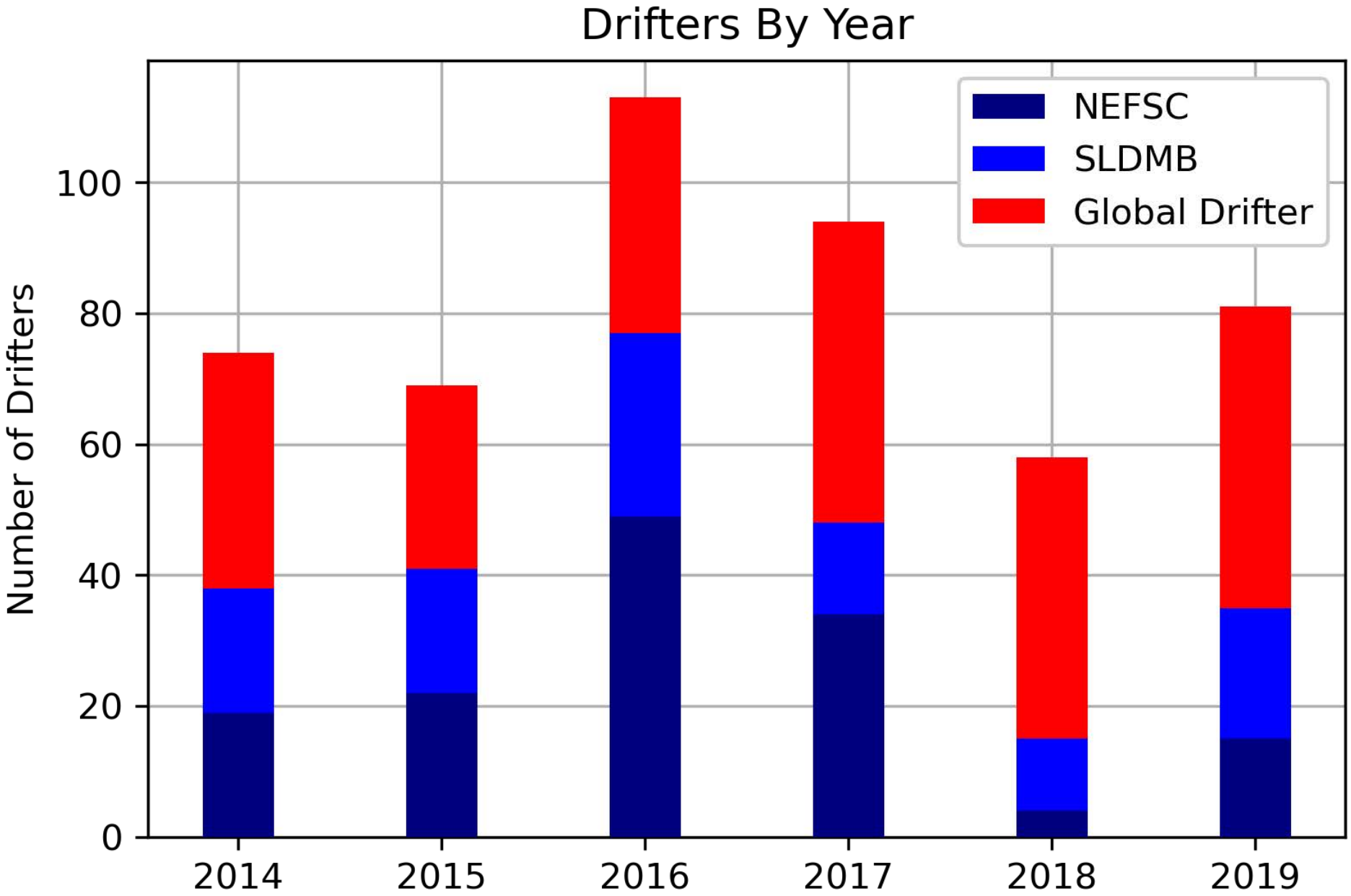
Drifter Data Sets

Regional Drifter Data Sets



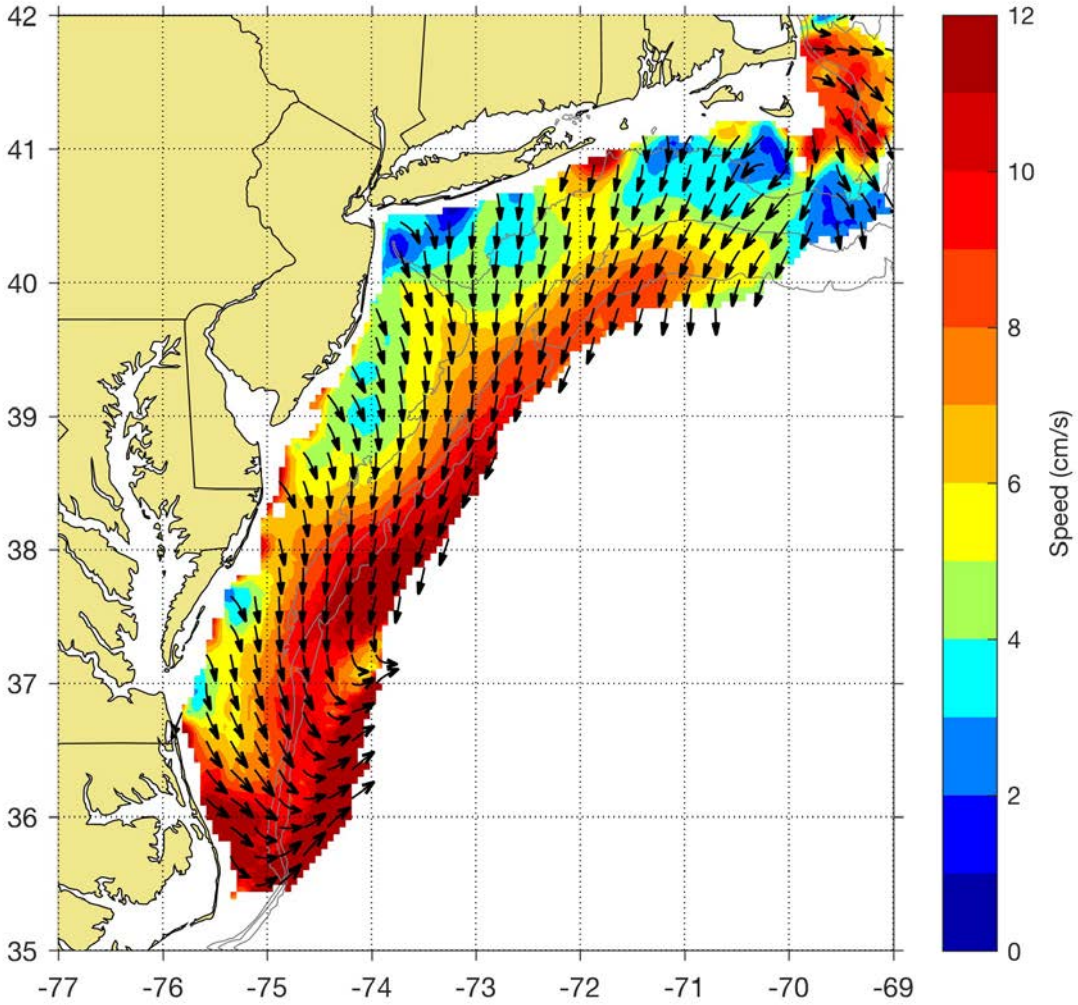



NOAA Global Drifters
Jan 2014 to Feb 2020
2014
2015
2016
2017
2018
2019
2020
42°N
40°N
38°N
36°N
34°N
78°W
76°W
74°W
72°W
70°W
68°W
66°W


Drifters By Year
NEFSC
SLDMB
Global Drifter
Number of Drifters
0
20
40
60
80
100
2014
2015
2016
2017
2018
2019

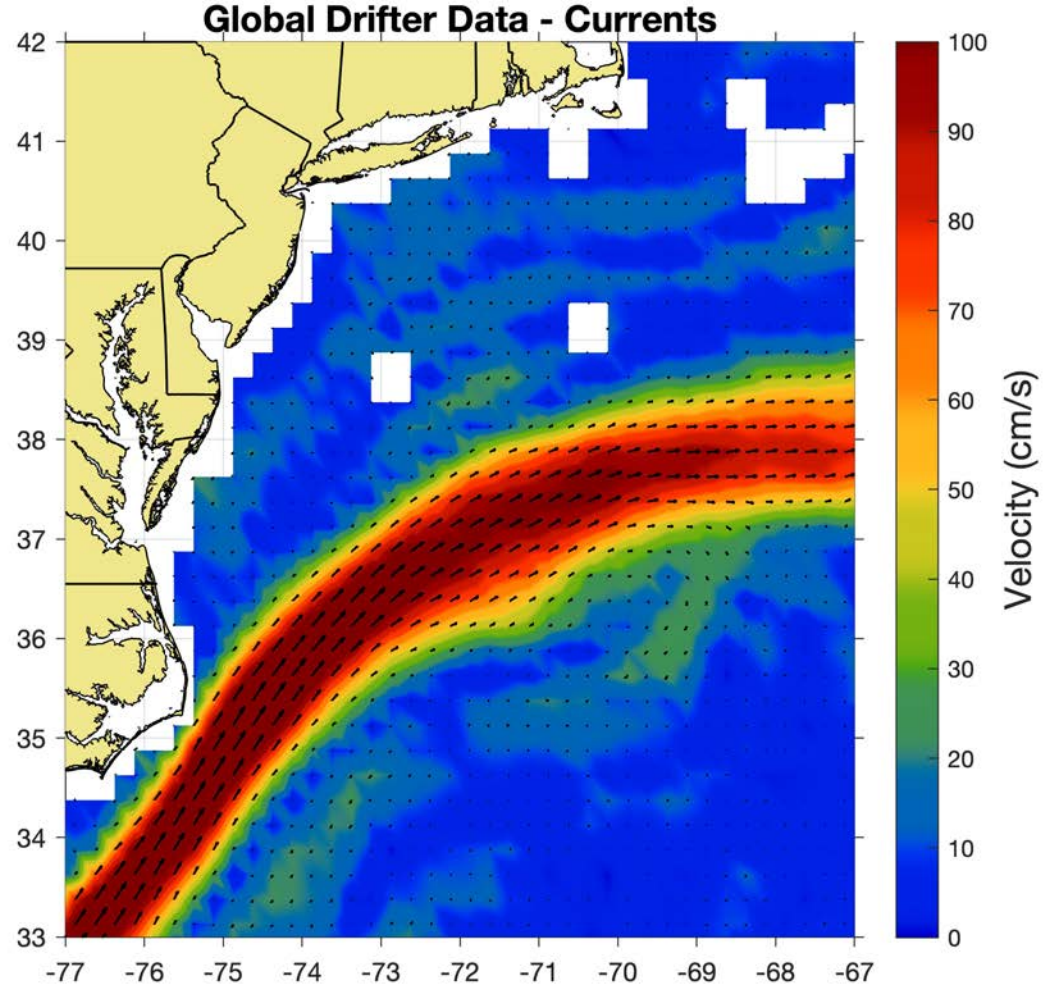
Mid Atlantic
Surface Current Climatology

MARACOOS HFR Surface Current 2007-2016



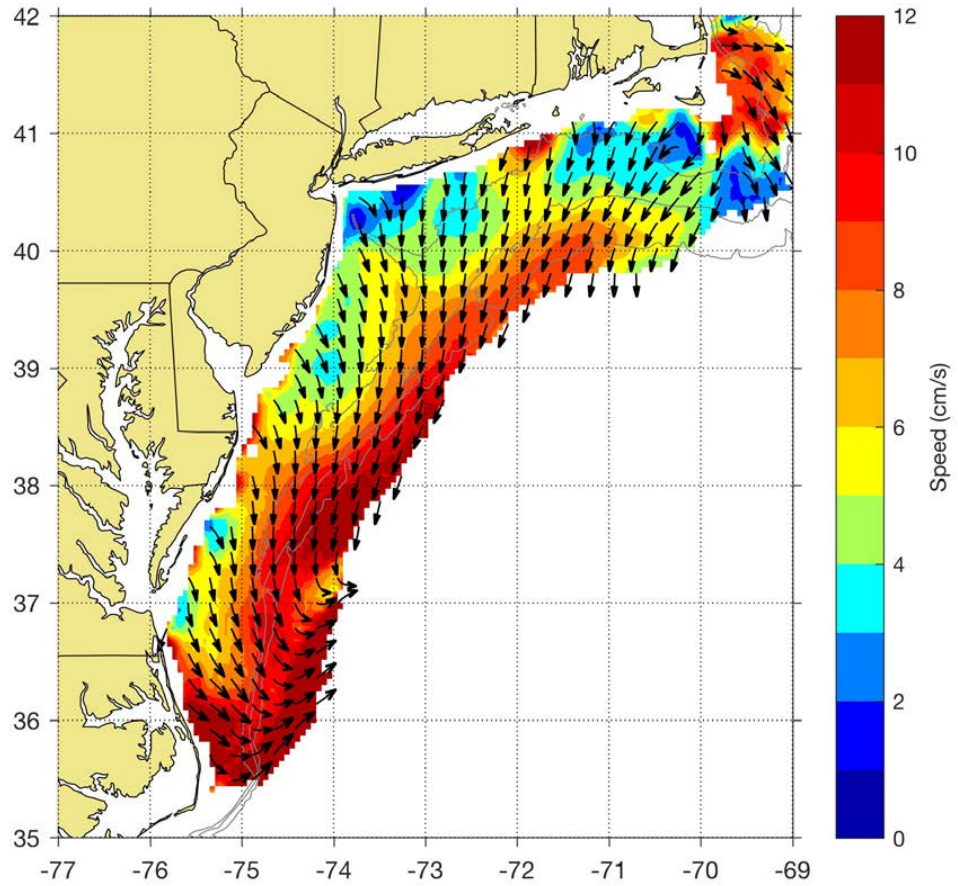
Roarty, H.et al. "Annual and seasonal surface circulation over the Mid-Atlantic Bight Continental Shelf derived from a decade of High Frequency Radar observations." *Journal of Geophysical Research: Oceans* 125, no. 11 (2020): e2020JC016368.

Northwest Atlantic Surface Currents 1979-2015



Laurindo, L., A. Mariano, and R. Lumpkin, 2017: An improved near-surface velocity climatology for the global ocean from drifter observations *Deep-Sea Res. I*,**124**, pp.73-92, doi:10.1016/j.dsr.2017.04.009 .

MARACOOS HFR Surface Current
2007-2016



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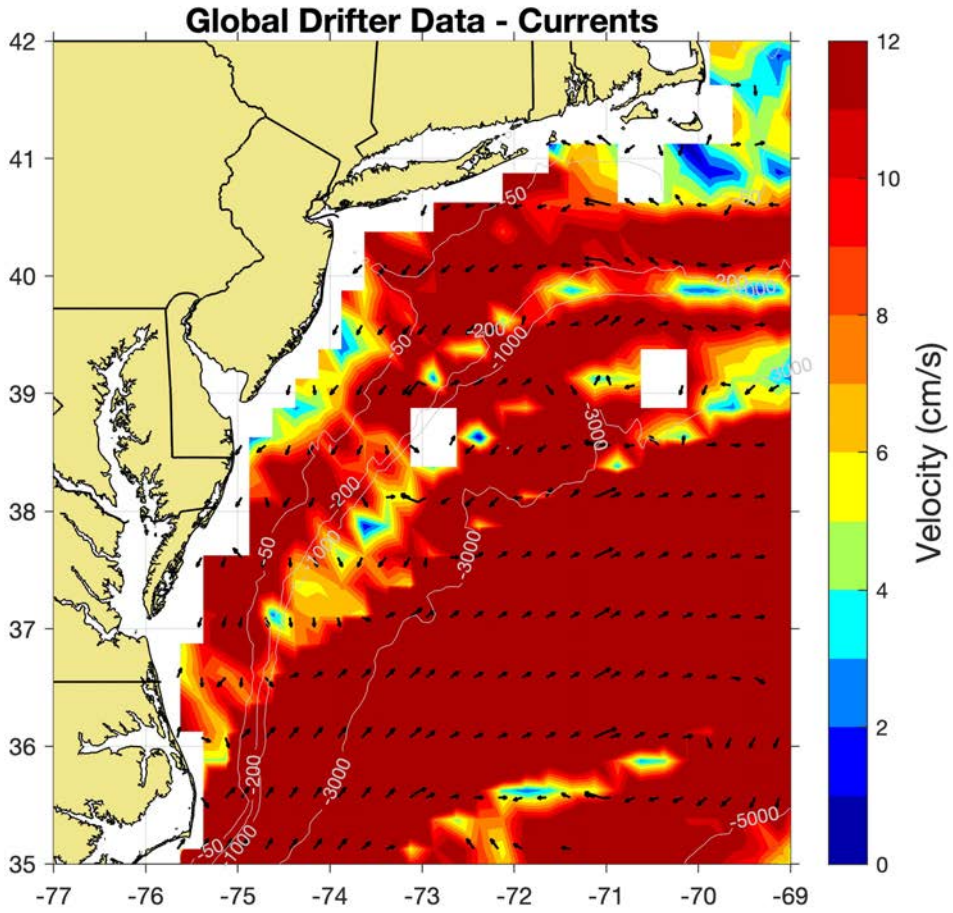
MARACOOS HFR Surface Current
1979-2015



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Conclusions

- A software toolbox has been developed to quality control and store drifter data in a NetCDF file for easy retrieval and sharing.
- Regional drifter data sources from the US Coast Guard and NOAA fisheries can double the amount of drifter data compared to the NOAA Global Drifter Program.
- These regional drifter data sets can also help fill in measurements near the coast which make them excellent validation sources for HFR.
- The downscaling of the drifter derived climatology of Global near surface currents highlighted some issues, which hopefully can be improved by utilizing regional drifter data sets.

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Thank You

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