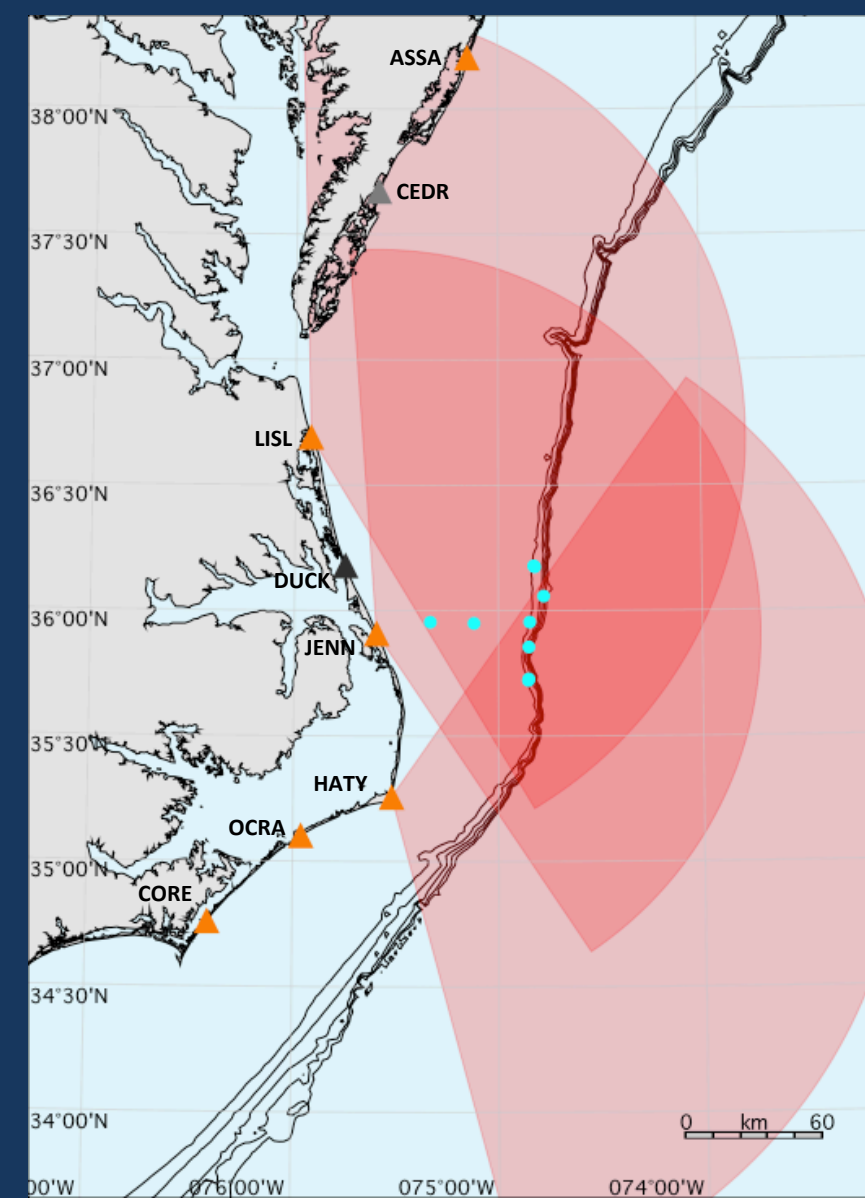




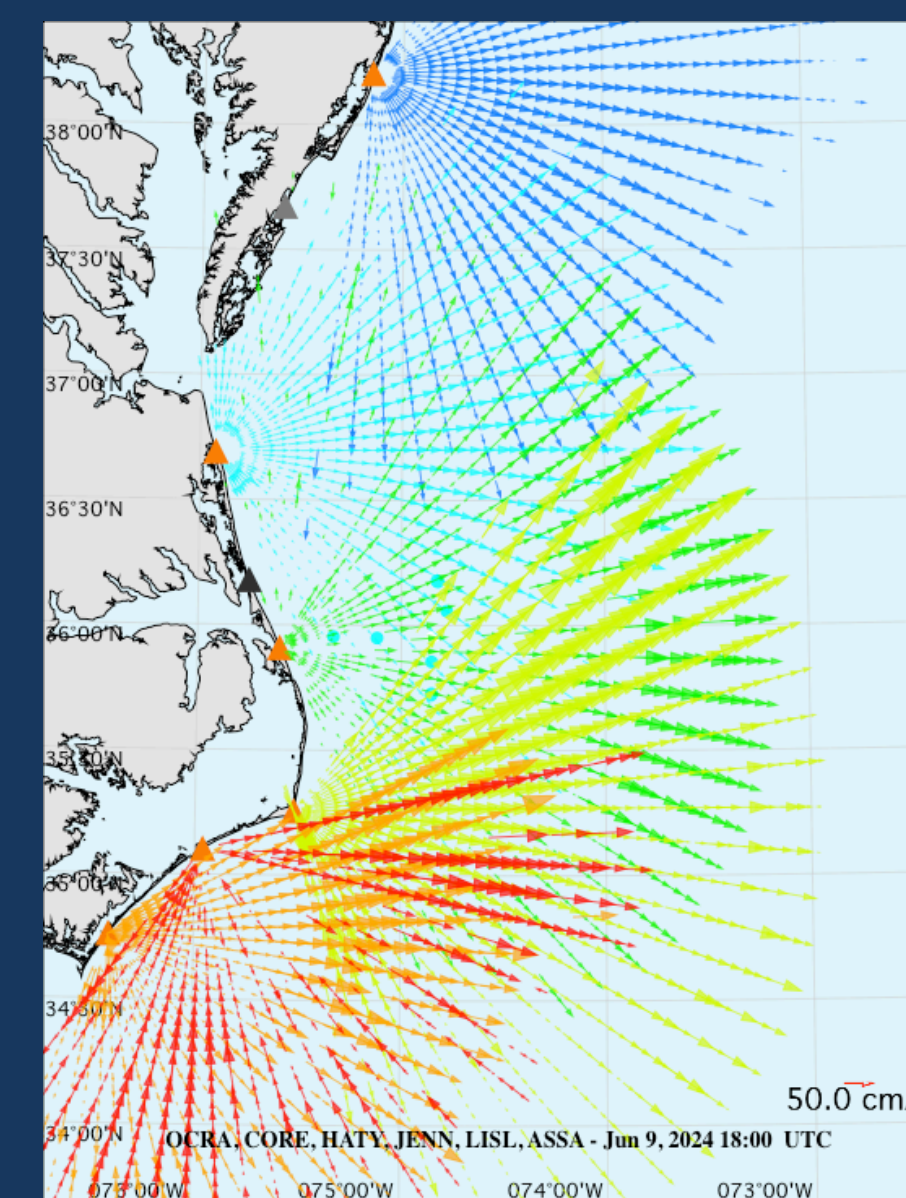
Surface Current Observations at the Southern Mid-Atlantic Bight Coastal Pioneer Array

Teresa Updyke (Old Dominion University), Patterson Taylor (ECU Coastal Studies Institute), Mike Muglia (ECU Coastal Studies Institute), Harvey Seim (University of North Carolina)
OOI Pioneer Array Workshop, Old Dominion University, September 2024

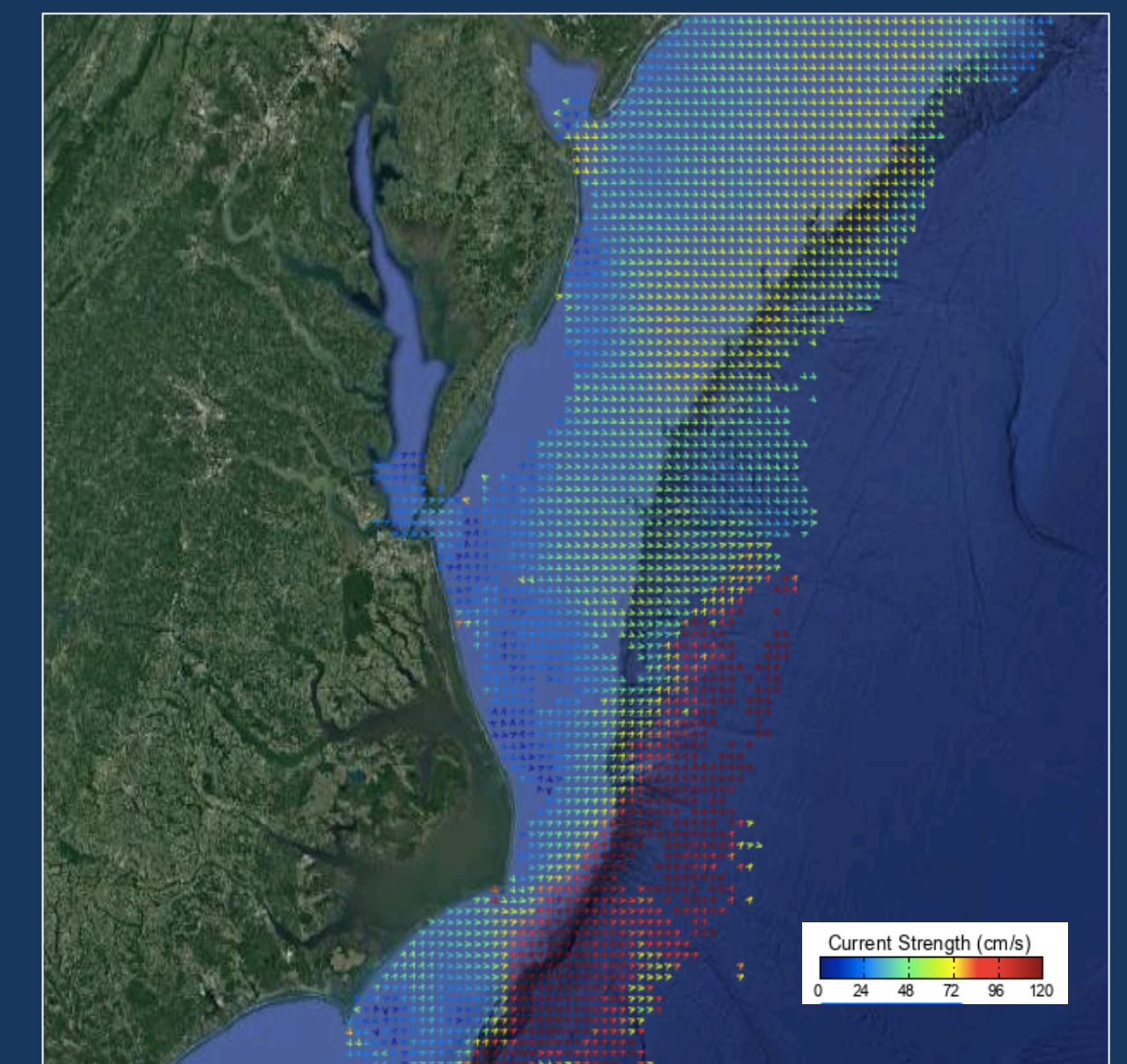
High frequency radar (HFR) stations along the North Carolina and Virginia coasts provide continuous observations of ocean surface currents in the area of the Southern Mid-Atlantic Bight Coastal Pioneer Array. Radial currents from individual stations are mapped onto a 6-kilometer spaced grid and the hourly maps are made available in near real-time for applications such as search and rescue operations, marine renewable energy development, spill response, ocean modeling and navigation. The measurements can be used to study the area's complex circulation and coastal transport processes in support of the four research themes identified for the Pioneer array. HFRs have monitored coastal currents offshore of the Outer Banks since 2003. The historical data set can provide context for new research and contributes a record of the movement of the position of the edge of the Gulf Stream off of Cape Hatteras.



At present, three long range (5 MHz) SeaSonde® stations (LISL, JENN and HATY) monitor surface currents over the Pioneer array moorings (light blue circles). Radial coverage areas for these three stations are shaded.



Radial maps for Jun 9, 2024 18:00 UTC. These radial grids have range steps of 5.8 km and 5-degree directional bins.



Total current velocity field for June 9, 2024 18:00 UTC displayed on the National HF Radar Network website. Radial data have been combined using an unweighted least squares method.

Data Access

Real-time data are available at <https://cordc.ucsd.edu/projects/hfrnet/>. See the data tab for options to download radial and total current data.

MARACOOS regional 6 km maps can be found at <https://hfr.marine.rutgers.edu/erddap> and https://tds.marine.rutgers.edu/thredds/cool/codar/cat_totals.html

A reprocessing effort is underway for NC station data. For any reprocessed data sets, contact Teresa Updyke (tupdyke@odu.edu) and Harvey Seim (hseim@email.unc.edu).

HFR community software: <https://github.com/rowg>

HF Radar Station	Location	Data Collection Period	Regional Association	Owner	Primary Technical Contacts
ASSA	Assateague Island	2007 - present	MARACOOS	ODU	Teresa Updyke tupdyke@odu.edu
CEDR	Cedar Island, VA	2007 - Jan 2020	MARACOOS	ODU	
LISL	Little Island Park, VA Beach	2009 - present	MARACOOS	ODU	
DUCK	Duck, NC	2003 - Mar 2023	SECOORA	UNC	Patterson (Trip) Taylor taylorp@ecu.edu Mike Muglia mugliam@ecu.edu
JENN	Jennettes Pier	2023 - present	SECOORA	UNC	
HATY	Cape Hatteras	2004 - present	SECOORA	UNC	
OCRA	Ocracoke Island	2021 - present	SECOORA	UNC	Anthony Whipple whipple@email.unc.edu
CORE	Core Banks	2013 - present	SECOORA	UNC	

Publications

Muglia, Mike, et al. "An Observation-Based Study of Gulf Stream Meander Kinematics Offshore of Cape Hatteras." *Frontiers in Marine Science* 9 (2022): 867439.
Muglia, Mike, Harvey Seim, and Patterson Taylor. "Gulf stream position, width, and orientation estimated from HF radar radial velocity maps off Cape Hatteras, North Carolina." *Journal of Atmospheric and Oceanic Technology* 39.5 (2022): 689-705.
Muglia, Michael, Harvey Seim, and Patterson Taylor. "Gulf Stream marine hydrokinetic energy off Cape Hatteras, North Carolina." *Marine Technology Society Journal* 54.6 (2020): 24-36.

Acknowledgements

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