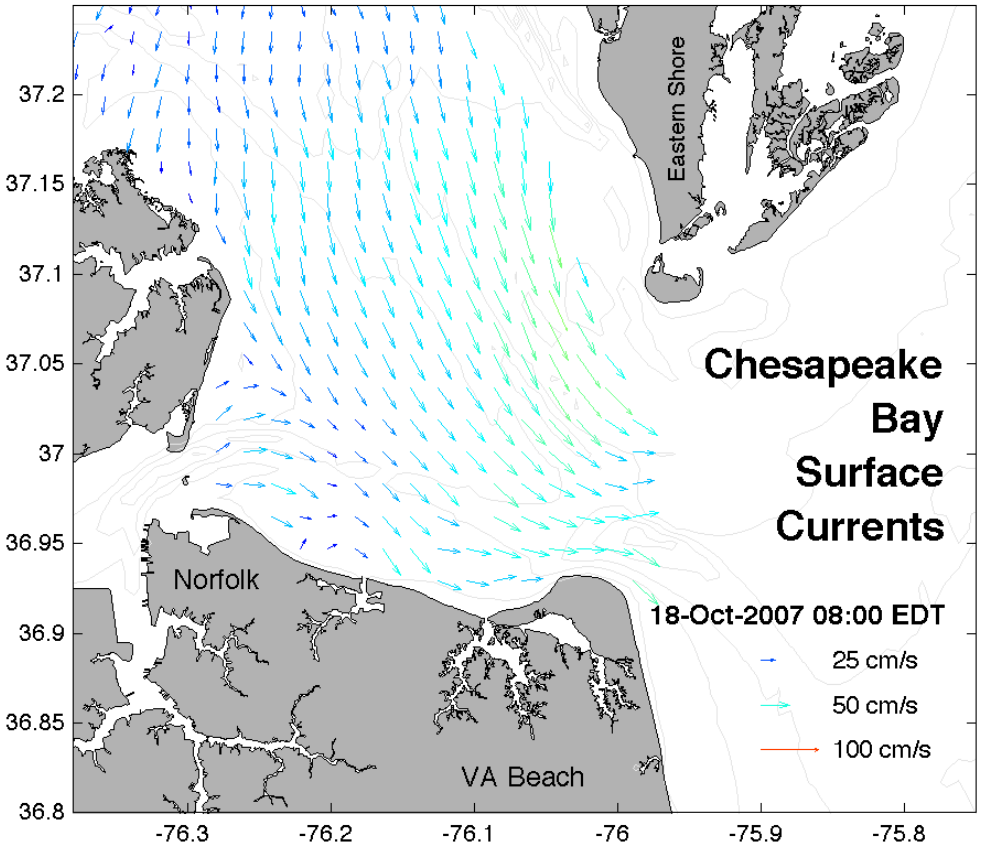
Surface Current Mapping in the Lower Chesapeake Bay

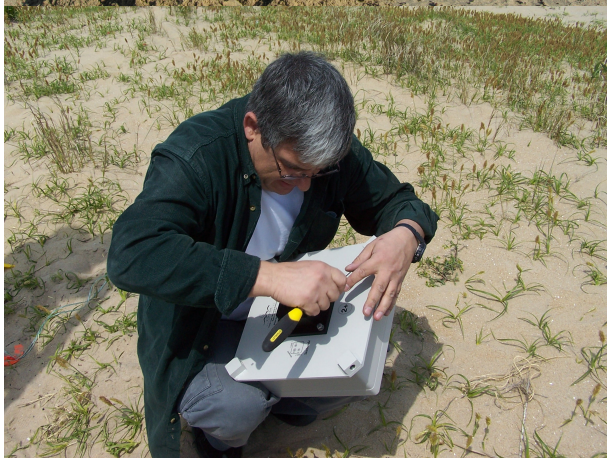


CENTER FOR COASTAL PHYSICAL OCEANOGRAPHY
OLD DOMINION UNIVERSITY

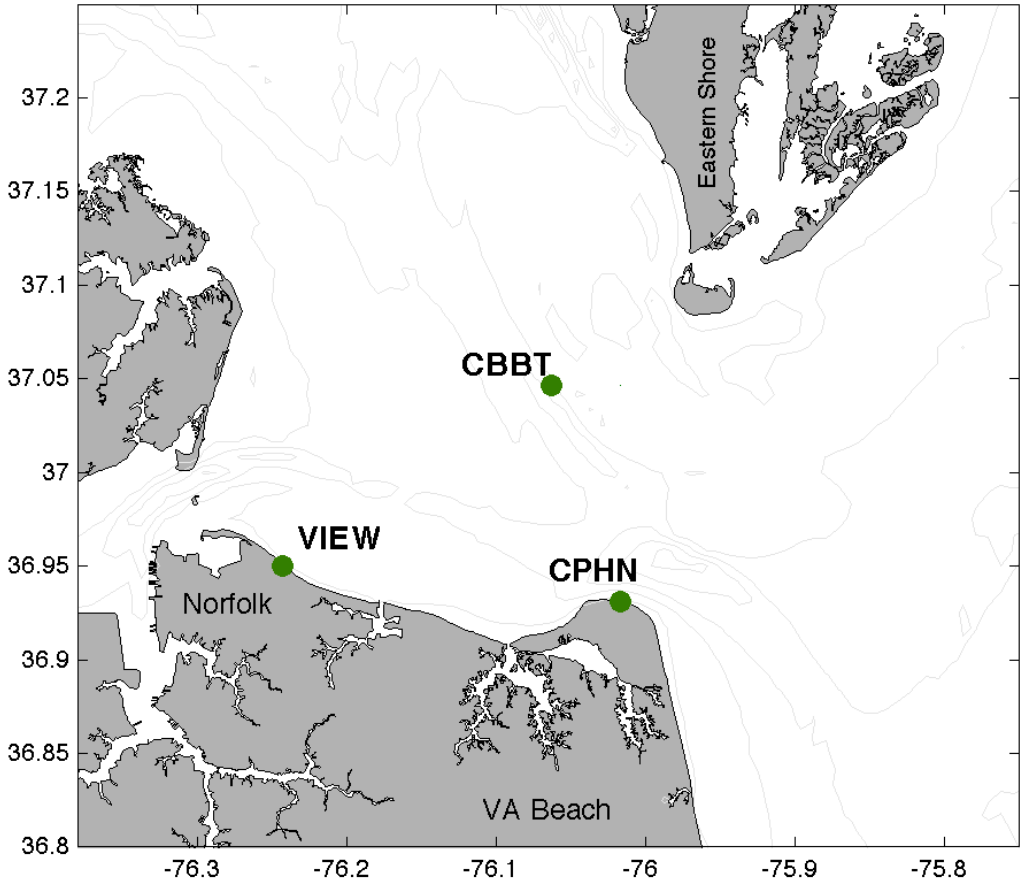
MACOORA
Mid-Atlantic Coastal Ocean Observing Regional Association

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

CIT
CENTER FOR INNOVATIVE TECHNOLOGY



- Introduction to HFRADAR Sites & Data
- Products & Applications
- Validation
- Sub-tidal Circulation in the Bay
- Research Questions

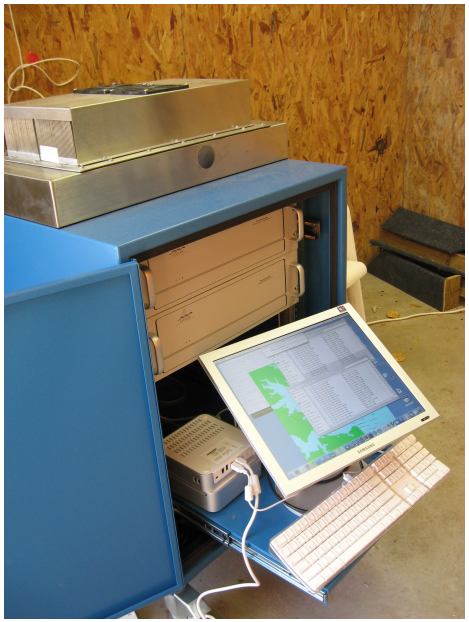


HF RADAR SITE LOCATIONS IN THE LOWER CHESAPEAKE

AT OUR FIELD SITES

25.4 MHz CODAR Standard Range antennas with co-located Tx/Rx

Cell phone modems connections



Data Products are Updated Hourly @

http://www.ccpo.odu.edu/currentmapping

About
- Latest News
- Contact us
- Project Overview
- Photos
- Documents

Data Products
- Latest Velocity Map
- Movie
- Alongshore Currents
- Subtidal Map
- Sample Trajectories
- Sample Time Series
- Download Data

Diagnostics
- CBBT site
- VIEW site
- CPHN site
- 50 Hr Total Coverage
- Radials
- 50 Hr Radial Coverage
- Baselines

External Links
- NOAA Winds & Tides
- Weather.com Marine Forecast
- Wunderground Forecast
- CODAR
- National Network
- MARCOOS
- ROWG
- Rutgers
- Southern California

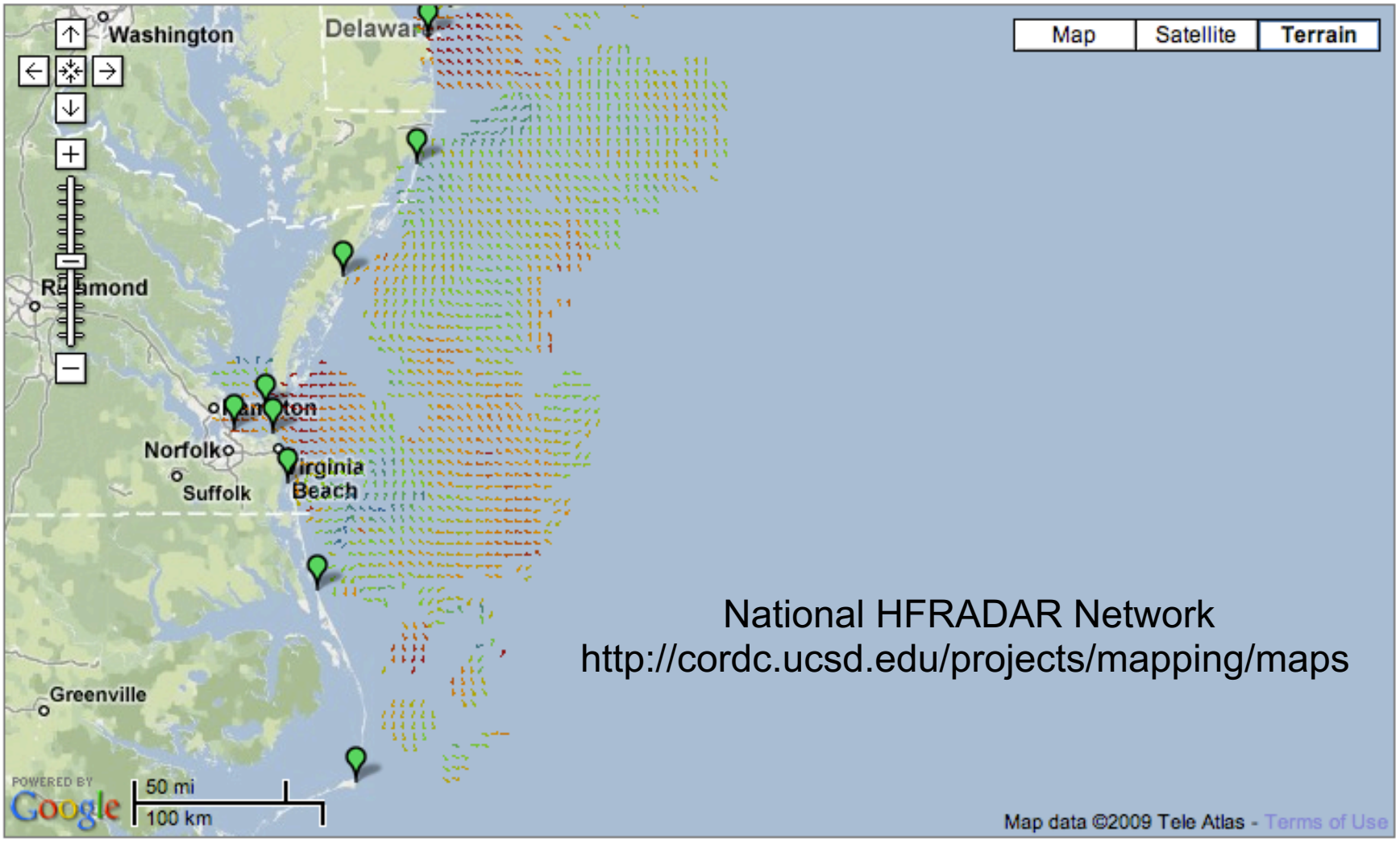
Quick Links to Most Recent Data

CBBT 1st Island 2nd Island 3rd Island 4th Island

A project of the Center for Coastal Physical Oceanography, Department of Ocean, Earth and Atmospheric Sciences, Old Dominion University.

Funding by the National Oceanic & Atmospheric Administration through the Center for Innovative Technology and MARCOOS (Mid-Atlantic Regional Coastal Ocean Observing System). Special thanks to the City of Norfolk and the Chesapeake Bay Bridge Tunnel Authority for providing sites for the antennas.

Interface to HFRADAR Derived Surface Currents



« -1 Day -1 Hour +1 Hour +1 Day »

Bookmark View

- [x] HF RADAR Sites
- [ ] Oil Platforms
- [x] Overlay Surface Currents
- [ ] Use 25hr Averages

6 km Resolution

2009-08-15 19:00:00 UTC SET

2009-08-15 19:00:00 UTC

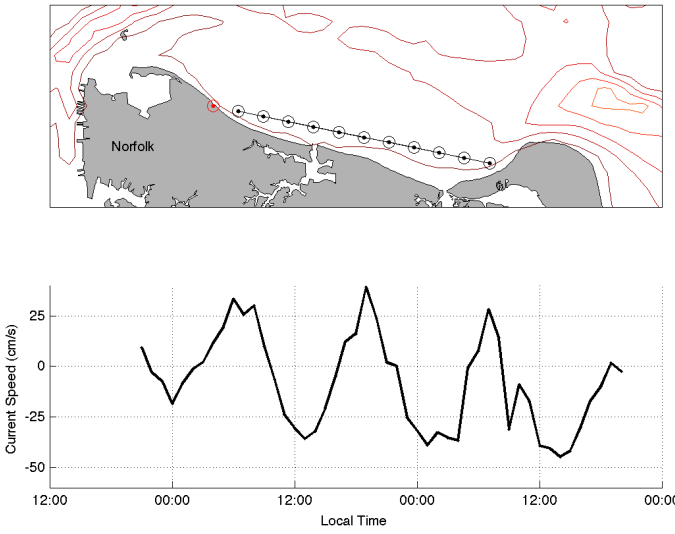
0 cm/s 12 25 37 50

0 Min cm/s 50 Max

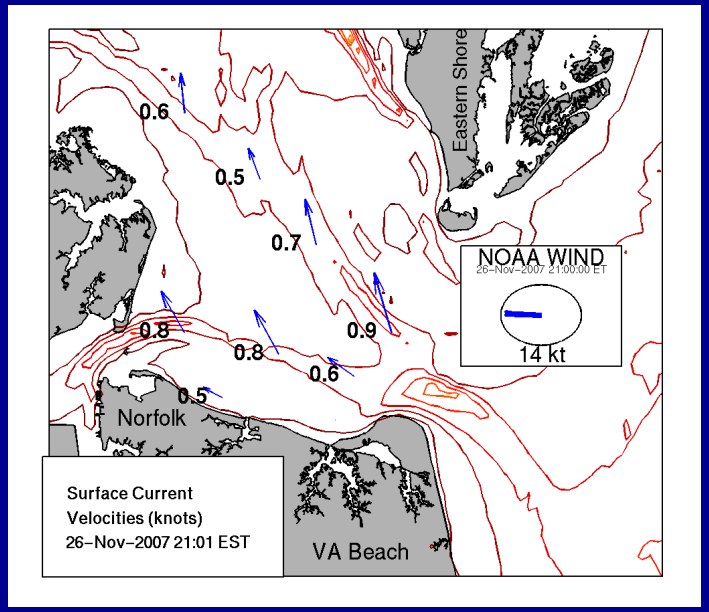
View Full Page

Updated: 2009-08-16 13:29:27 UTC
Participating Organizations: 30
Number of Physical Sites: 123
Total Records: 1487239

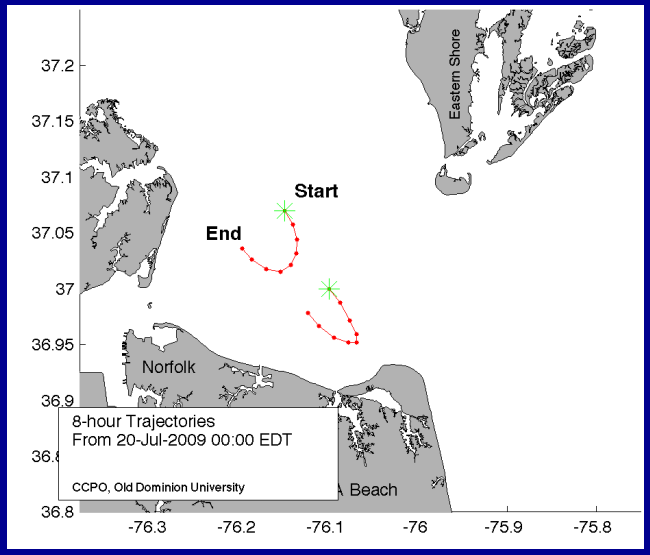
Alongshore Currents



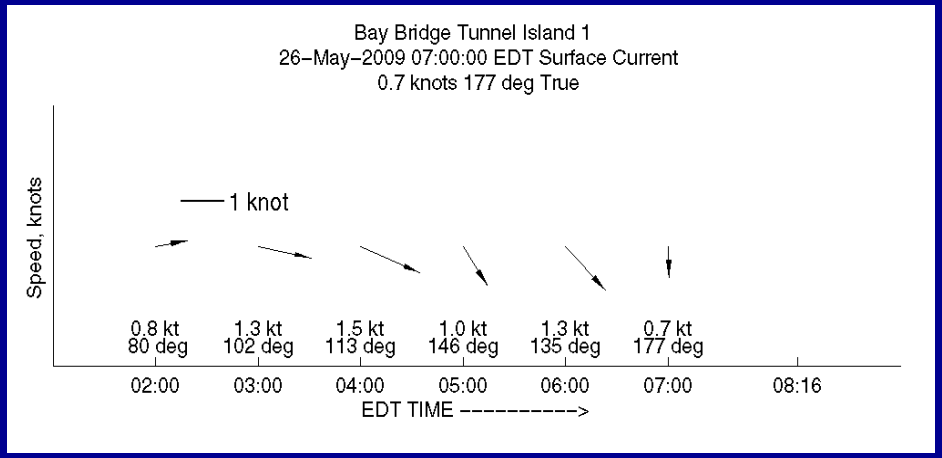
Shipping Channels



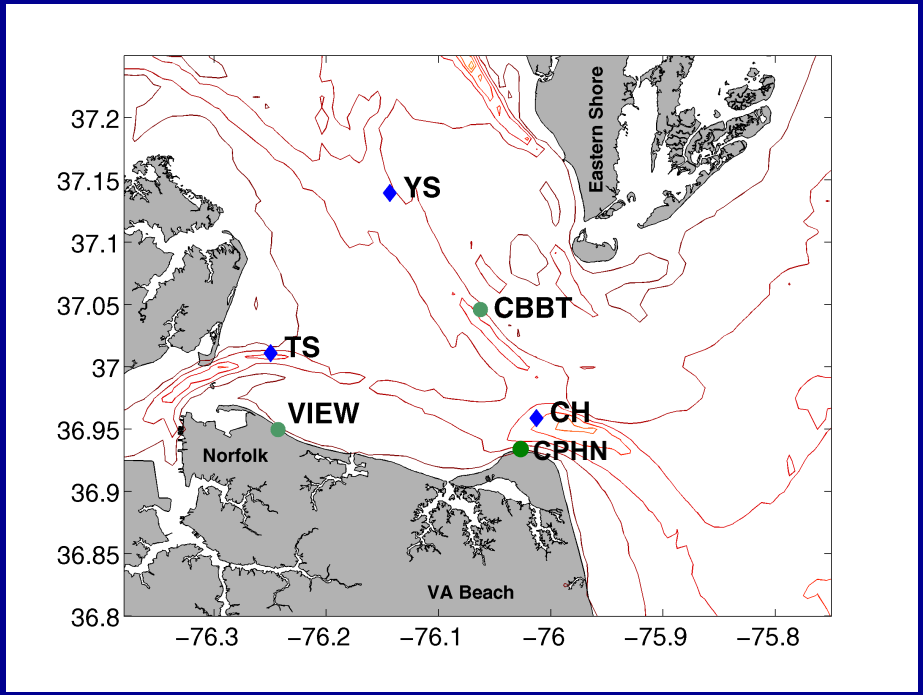
Trajectories



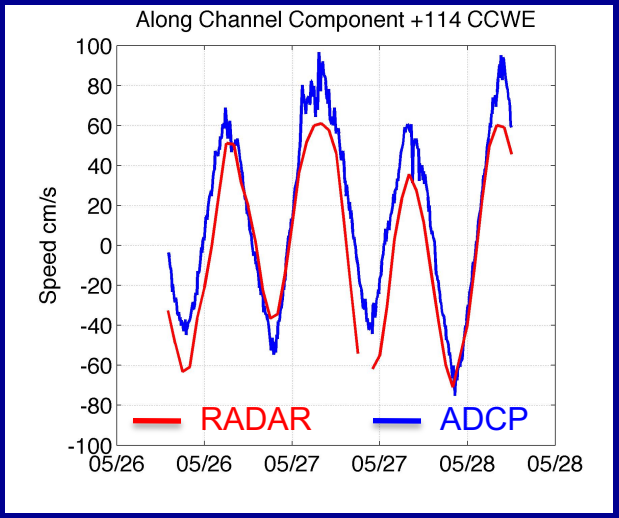
Times Series



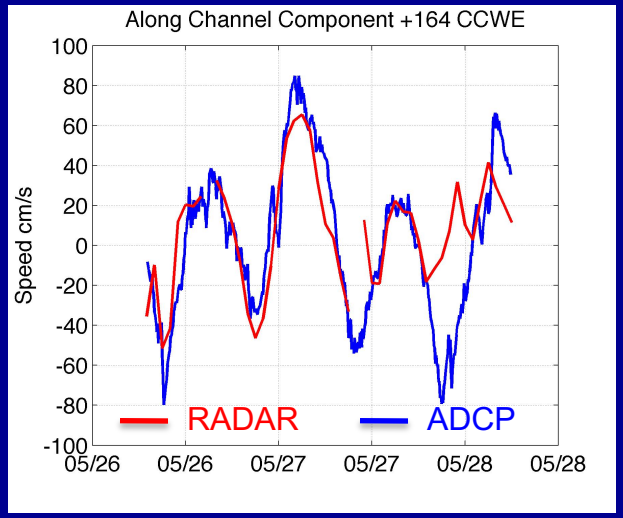
Comparisons with NOAA PORTS Doppler Current Profilers



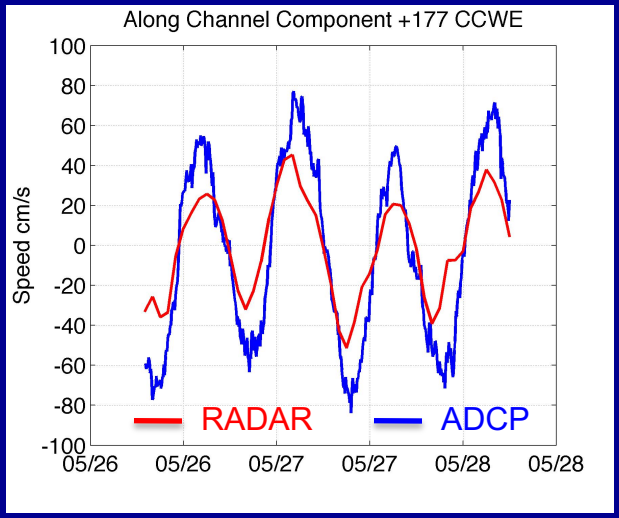
York Spit (YS)



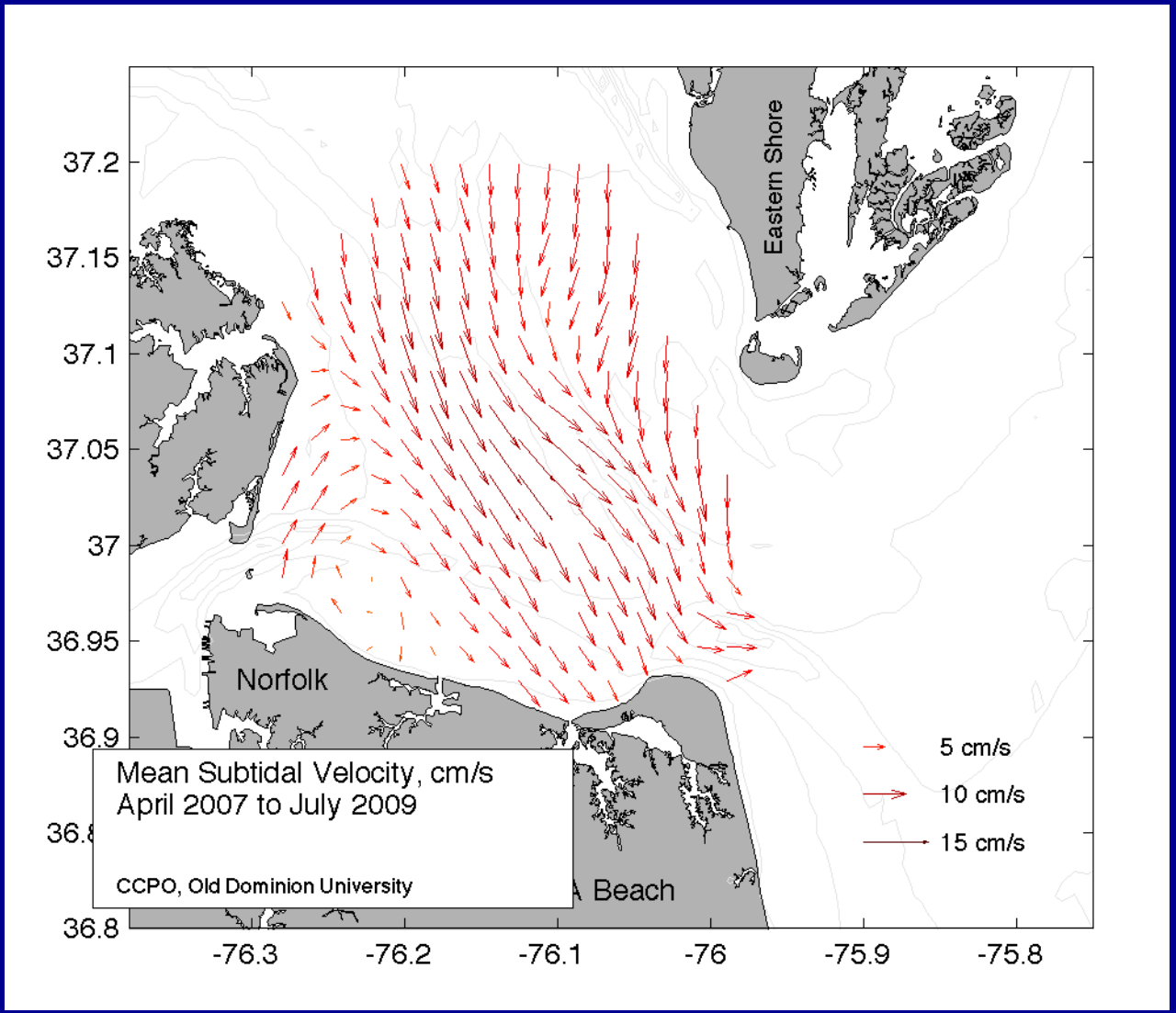
Cape Henry (CH)



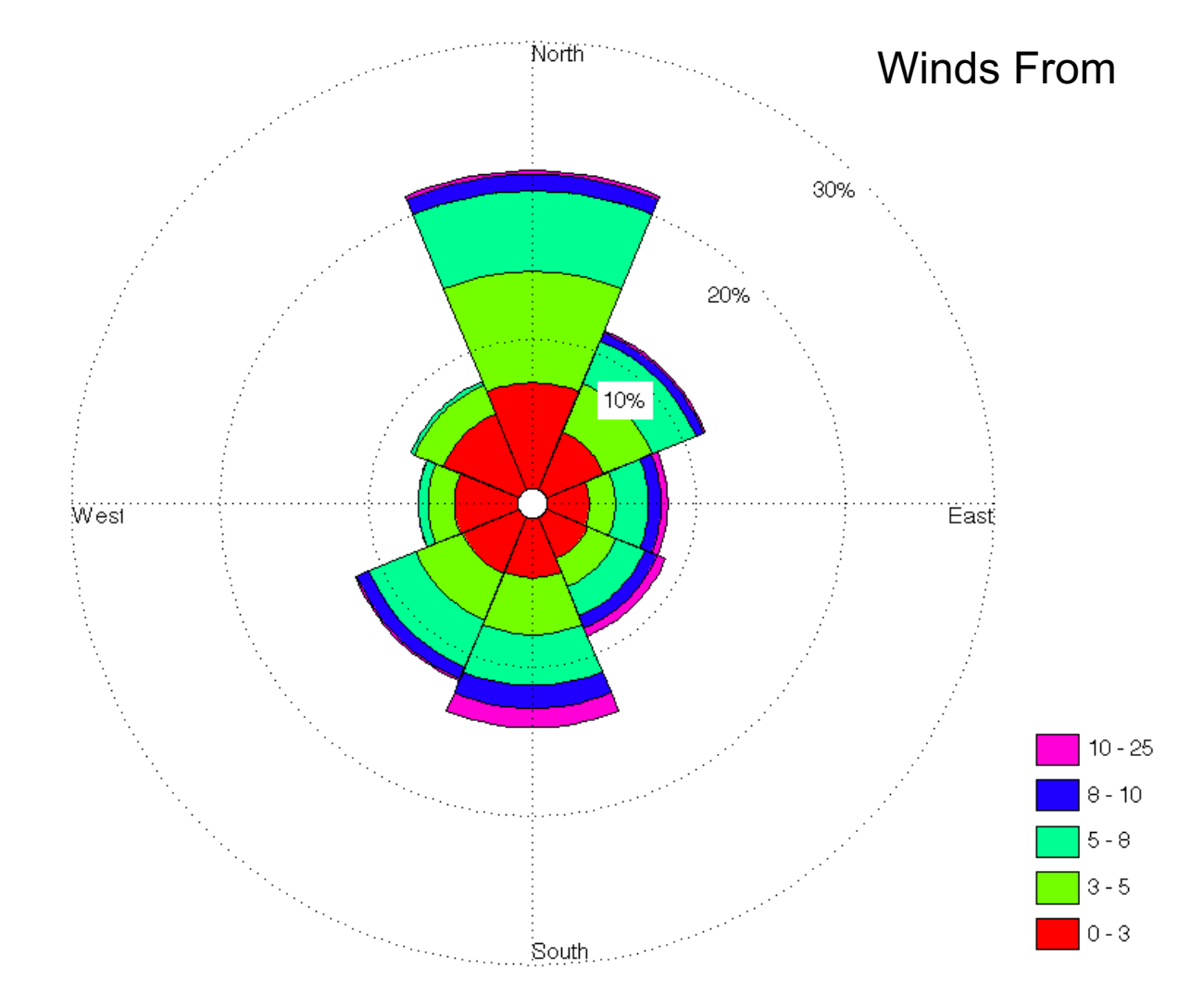
Thimble Shoals (TS)



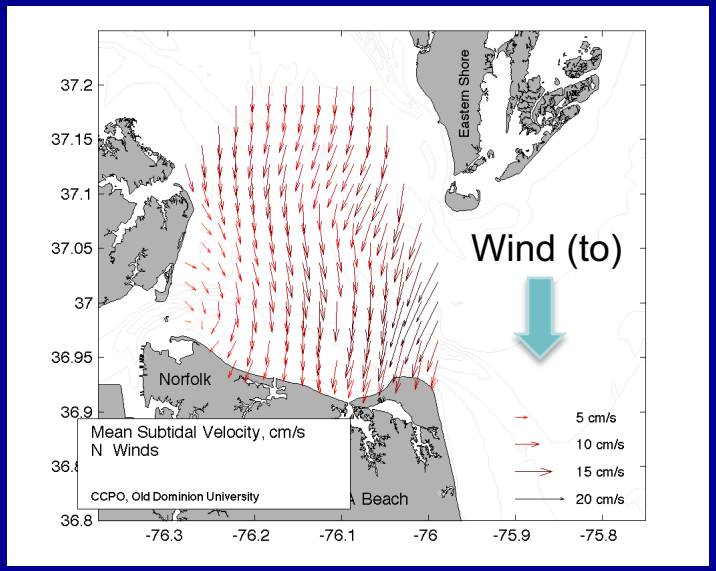
Mean Surface Circulation

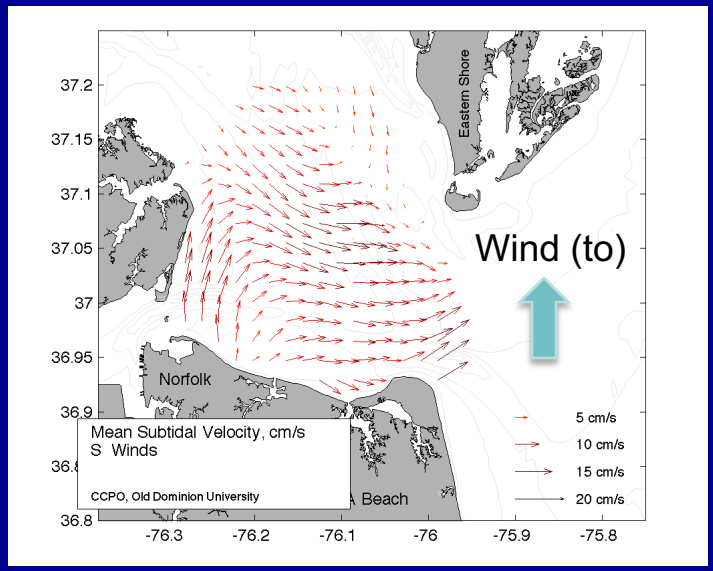


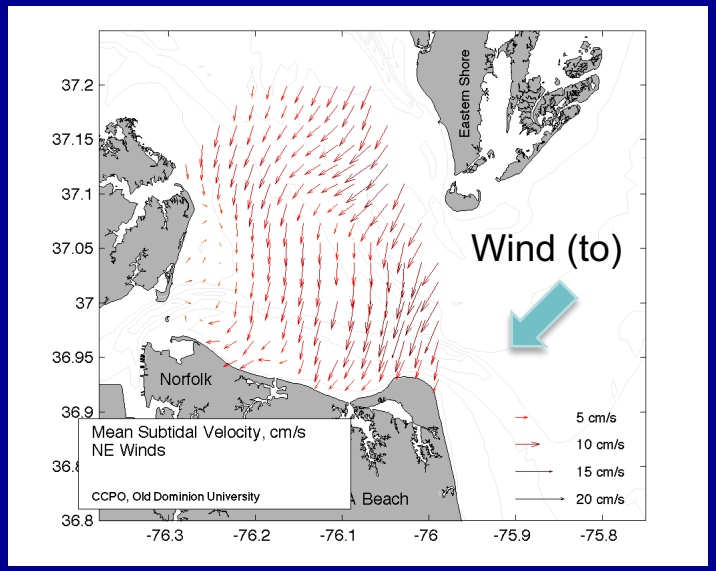
Bridge Tunnel Winds

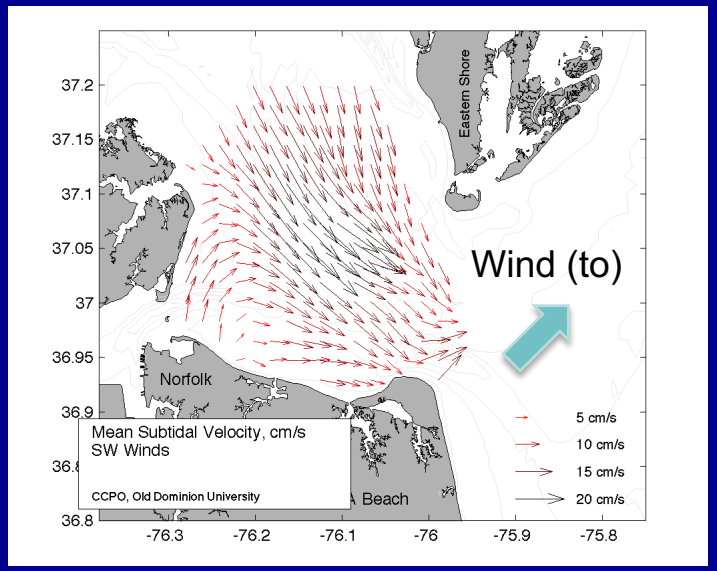


Wind Responses

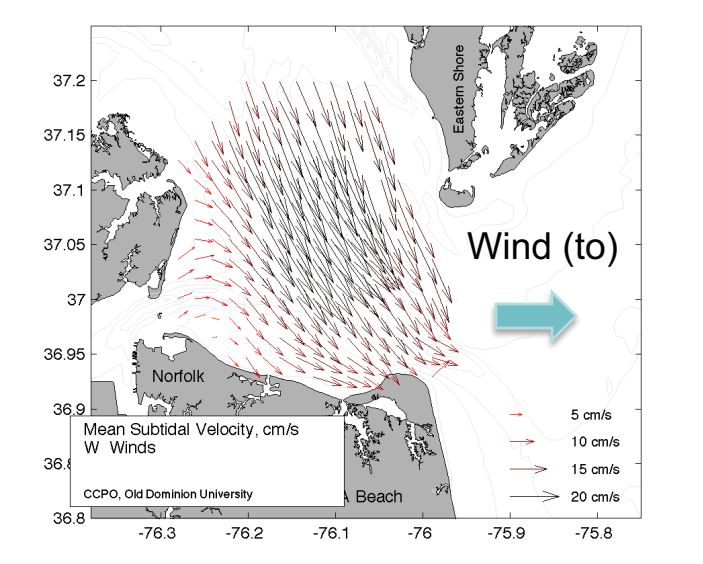


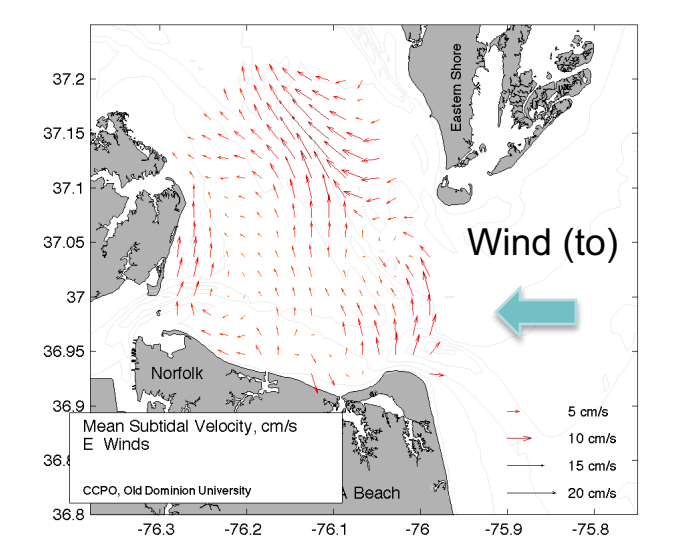


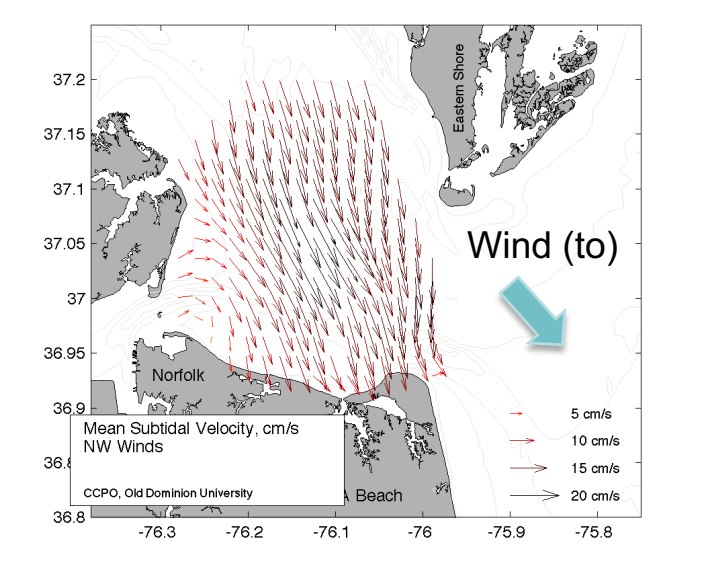


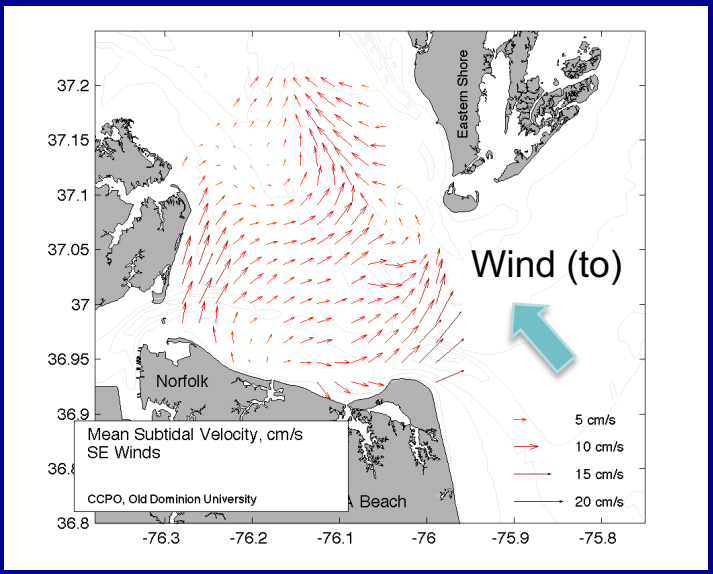


Wind Responses









Research Questions

- What is the combined effect of wind and river discharge on sub-tidal surface circulation?
- What are the effects of severe storms on surface circulation patterns?
- What percentage of the total current velocity is due to the individual tide, wind and river discharge components?

Final Comments

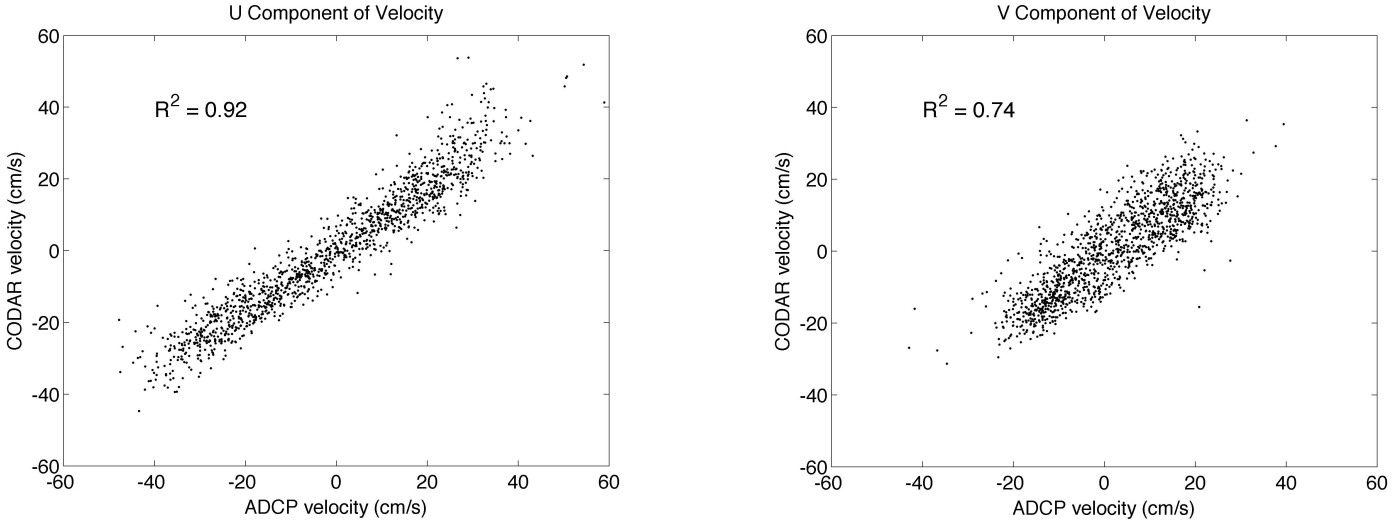
- HF RADAR surface current data in the lower Chesapeake Bay dating back to April 2007 are of good quality and provide excellent temporal and spatial coverage in the region.

- Using these observations, basic questions about the local surface circulation can be answered, which will help to improve current forecasting capabilities for the benefit of the scientific and public service communities.

Acknowledgements

- Larry Atkinson and Jose Blanco
- CIT, MACOORA, NOAA
- CODAR support
- Advice and assistance from numerous other HF RADAR operators

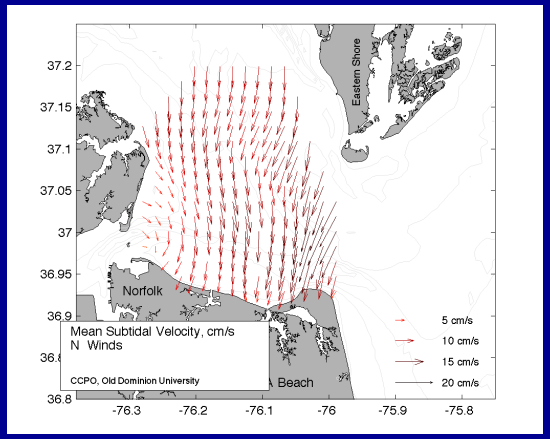
Comparisons with AWAC Current Profile Data

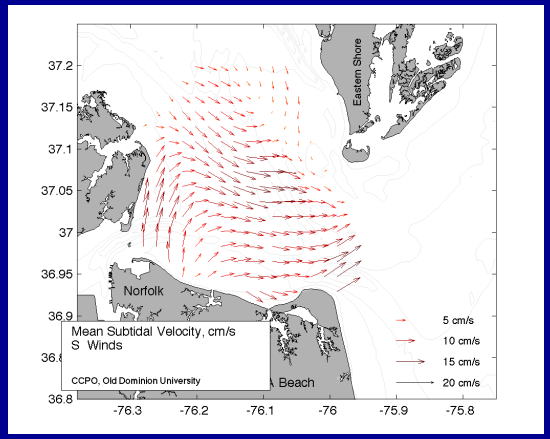


Scatter plots of ADCP data versus CODAR data for U and V velocity components during AWAC deployment 7 (Nov 13 2007 19:00 - Mar 7 2008 12:00 UTC).

Deployment	**5**	**7**	**8**	**9**
Start Date	3/9/07	11/13/07	3/12/08	7/8/08
End Date	7/6/07	3/7/08	7/7/08	11/7/08
Npoints	1606	1345	659	2727
Mean (U)	-4.64	-1.04	-5.84	-5.01
Mean (V)	-0.29	1.21	-0.7	3.65
RMS (U)	10.57	6.19	13.09	11.74
RMS (V)	9.3	6.93	10.74	11.35

Mean and root-mean-square statistics for the difference in velocity between the Doppler profiler and CODAR in U and V components for four deployment periods.


Eastern Shore
Norfolk
Beach
Mean Subtidal Velocity, cm/s
N Winds
CCPO, Old Dominion University
5 cm/s
10 cm/s
15 cm/s
20 cm/s
37.2
37.15
37.1
37.05
37
36.95
36.9
36.8
-76.3
-76.2
-76.1
-76
-75.9
-75.8


Eastern Shore
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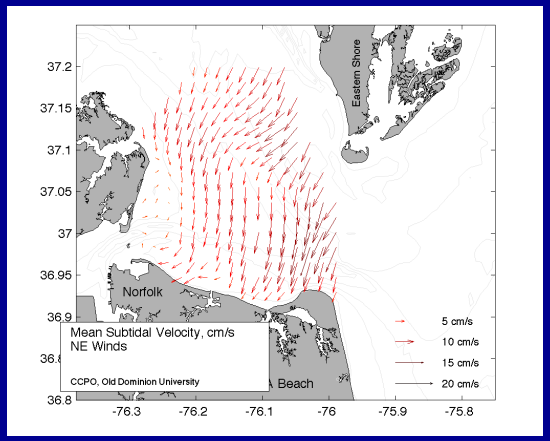
Eastern Shore
Norfolk
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Mean Subtidal Velocity, cm/s
NE Winds
CCPO, Old Dominion University
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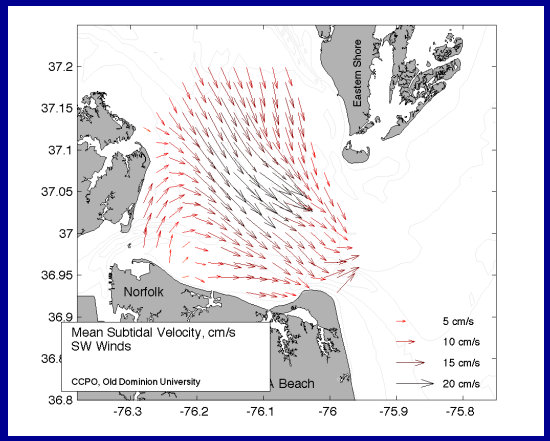
Eastern Shore
Norfolk
Beach
Mean Subtidal Velocity, cm/s
SW Winds
CCPO, Old Dominion University
5 cm/s
10 cm/s
15 cm/s
20 cm/s
37.2
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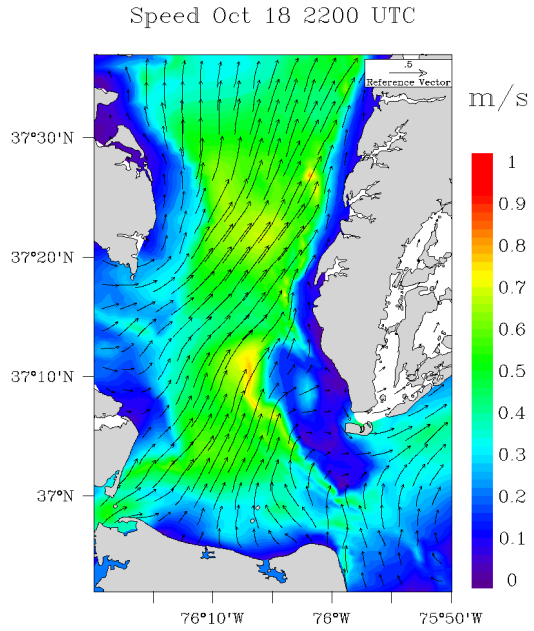

ChesROMS model output

Data Products Updated Hourly

http://www.ccpo.odu.edu/currentmapping

[Latest Velocity Map]

[24 Hour Movie]

[Sub-tidal Flow]

[Time Series]

[Alongshore Currents]

[Sample Trajectories]