



## SECOORA Projects Updates

- Moorings and HFR
- Gliders
- Modeling
- Applications
- Data Management and Communication

# SECOORA Regional Assets

- 2016-17 project goals: keep coastal stations, moorings, and HF Radars operational.
  - Overall our PIs have been successful
    - New HFR installation
    - Upgrades to stations
  - There have been a few challenges
    - Hurricane Matthew
    - Erosion problems at HFR sites
    - Ship strikes for offshore moorings

# Observing Success

- Big Carlos Pass, FL coastal site (USF: Luther)
- Rebuilt - replaced the MET mast on the drawbridge deck, replaced all sensors
- Enhancement - added a Vemco fish tag recorder and a passive acoustic sensor with Jim Locacsio (Mote Marine Lab).



Wiring sensors



Newly mounted well

# Observing Success

UNCW (Leonard & Dorton) moorings faired well during Matthew.

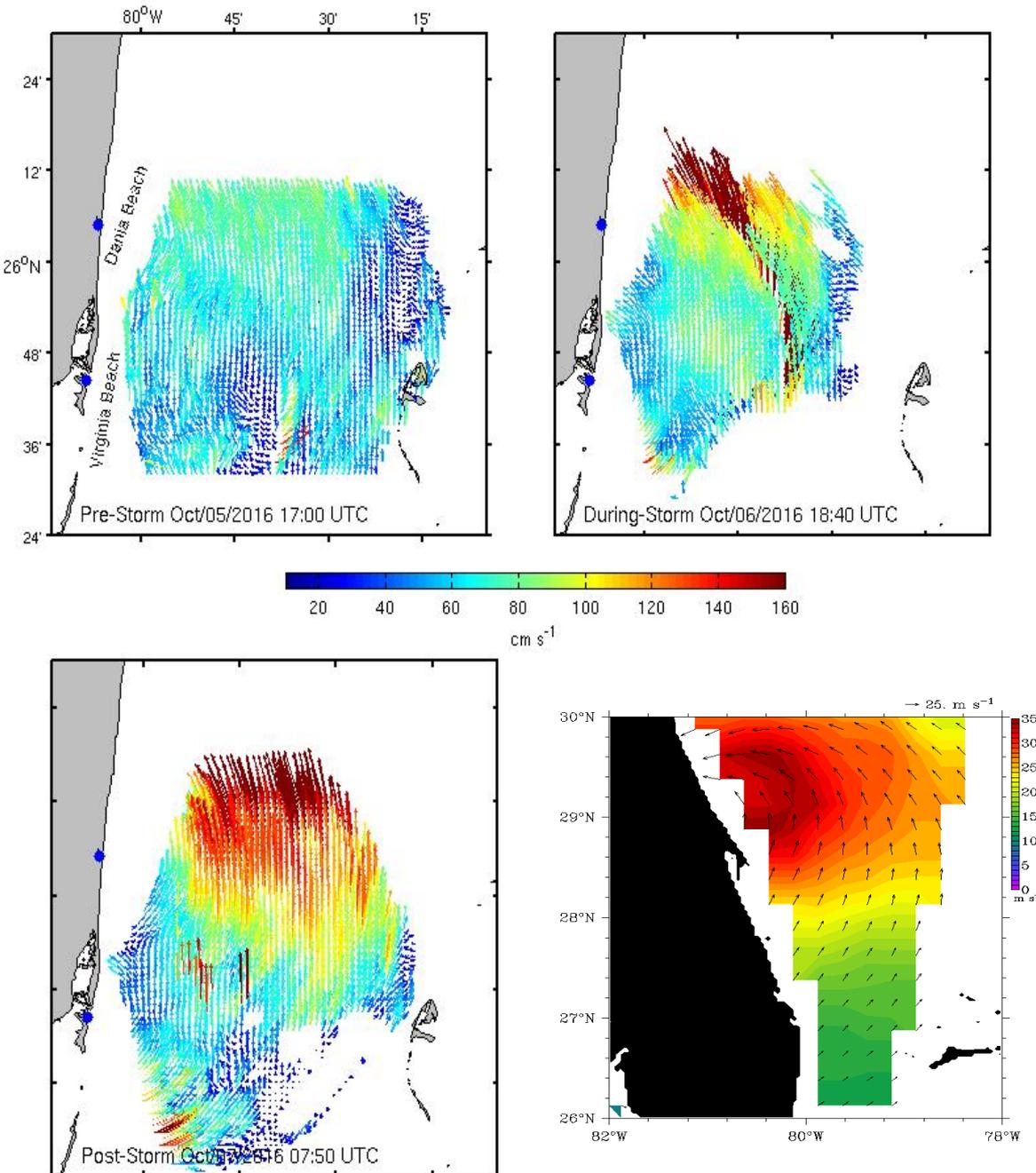
Outer Onslow Bay, NC: LEJ3 and LEJ3Wave data from Hurricane Matthew, October 5-10, 2016



# Observing Success HFR (UM: Shay) Response to Matthew:

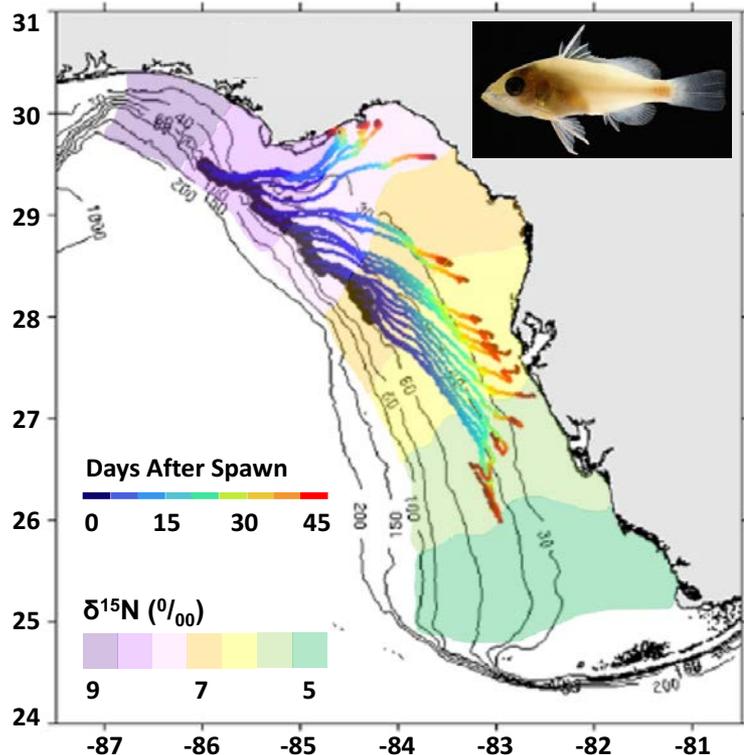
Pre-Matthew (upper left),  
Matthew (upper right), and  
Post-Matthew (lower left)  
surface currents from WERA.  
Notice the interference  
patterns in the storm panel.  
ASCAT image in the lower  
right panel (m/s).

Winds from Fowey Rocks  
during Oct/05 (Pre-storm;) NE  
direction 5 to 10 m/s, during  
Storm was crossing south  
Florida latitudes; N direction  
12 to 15 m/s; and,  
next 12 hours after; W-SW  
direction 14 to 20 m/s.



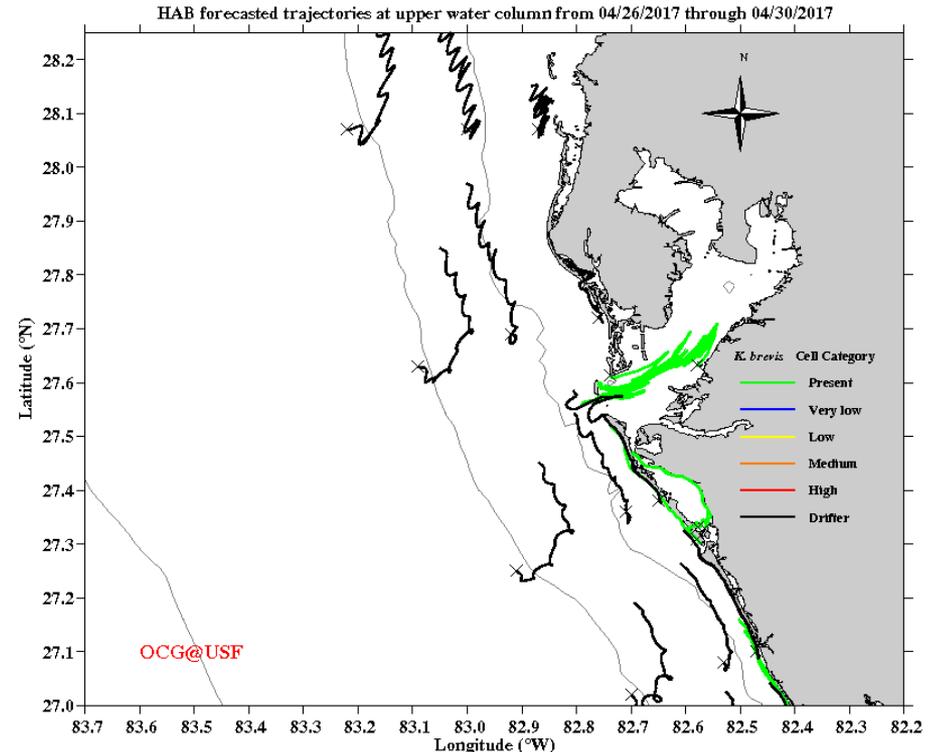
# Observing Success

Ecology is fully 3-D. USF (Weisberg) moorings give the vertical dimension of the flow field and water properties.



Solution to the gag grouper recruitment conundrum: Juveniles get from offshore spawning to nearshore settlement along the bottom.

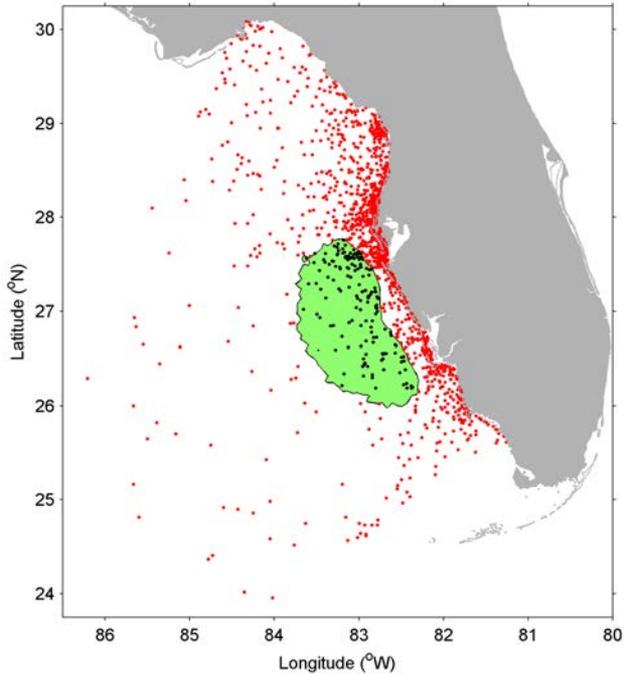
Seasonal prediction and short-term tracking of red tide. Moored observations used for model testing.



USF/FWC WFCOM *K. brevis* red tide tracking tool.

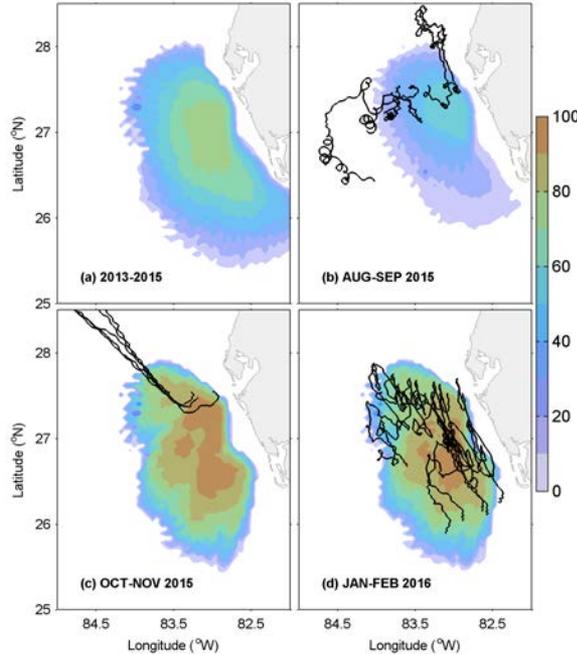
# Observing Success

HFR (USF: Weisberg) used in SAR. The WFS leads the USA in **SAR Cases**.



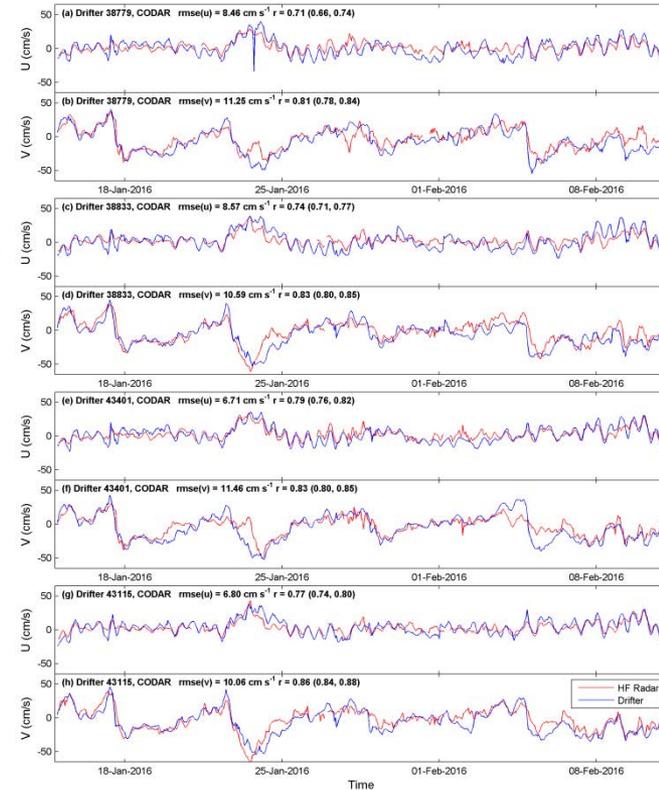
**Red dots** indicate WFS SAR cases. **Green region** indicates potential HFR coverage.

Drifter experiments show WFS coverage to be inadequate to support SAR.



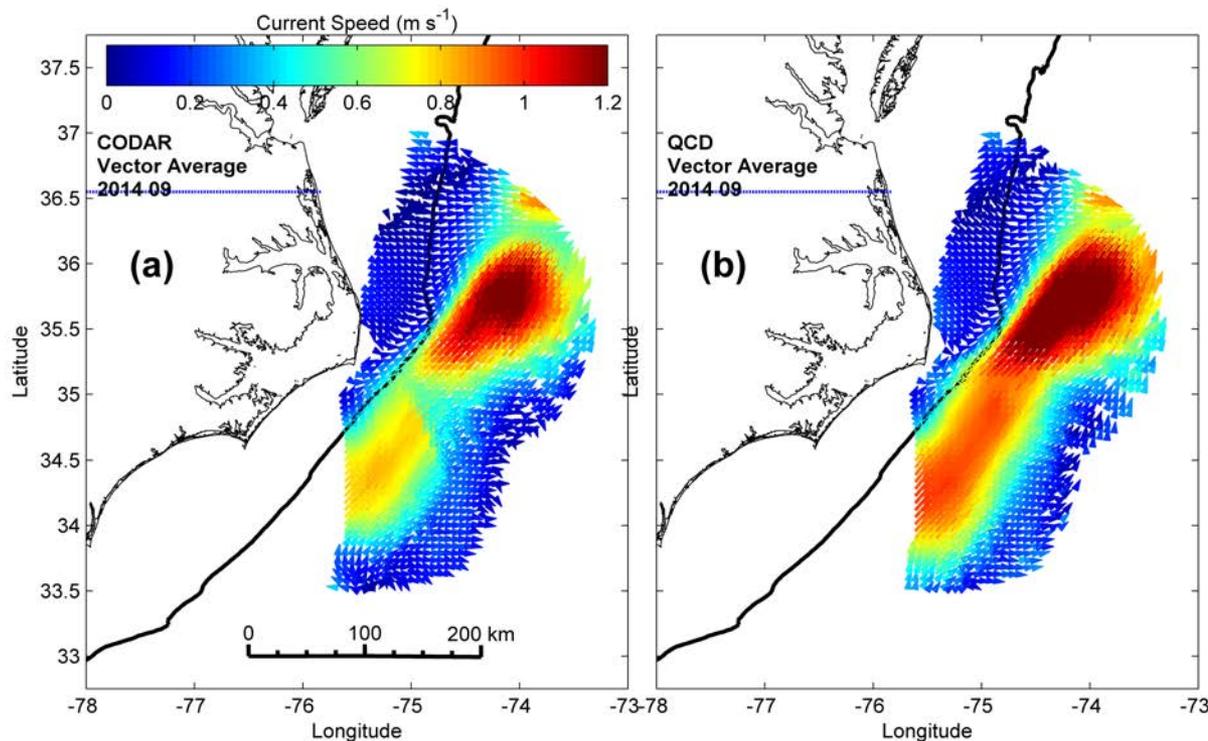
HFR coverage for each of 4 seasonal drifter deployments.

Drifter experiments show the efficacy of HFR for SAR when coverage exists.



**Drifter/HF-radar** velocity component comparisons.

# Observing Success



## HFR (UNC-CH Seim)

- Implementation of QC standards
- a) before b) after
- Note increase in speed of Gulf Stream and elimination of velocity jump in QC'ed field

## Implementation of Quality Control standards (Seim)

- Haines, S., H. Seim and M. Muglia, 2017. Implementing Quality Control of High-Frequency Radar Estimates and Application to Gulf Stream Surface Currents, *J. Atmos. Ocean Tech.*, *in press*.

# Observing Success

- PEACH – NSF funded
- New HFR installation (SkIO) and moorings (UNC, CSI, WHOI)
- Installed 4 new 13.5MHz radars on Outer Banks, NC (NSF funding)
  - Hatteras and Ocracoke Islands
- 2 UNC-CH buoys redeployed; 14 subsurface moorings
- Gilders
- HFR data and moorings will help determine dynamics of the water exchange between the continental shelf and the Gulf Stream
- <http://www.coastalreview.org/2017/05/team-tracks-ocean-energy-land-sea/>

# Observing Success

- USC (Voulgaris) in collaboration with UNCW (Leonard) embarked on an in-situ evaluation of the HF radar velocities using ADCP data from an instrument deployed for 6 months within HFR footprint in upper Long Bay (NC/SC border).
  - ADCP was out during Hurricane Matthew
- Preliminary analysis - the differences between the ADCP and HF radar measured velocities are highly correlated with the wind velocity vector, supporting the fact that the HF radar measures closer to the sea surface where the wind effect is the maximum and where in-situ sensors fail to measure.

# Observing Challenges



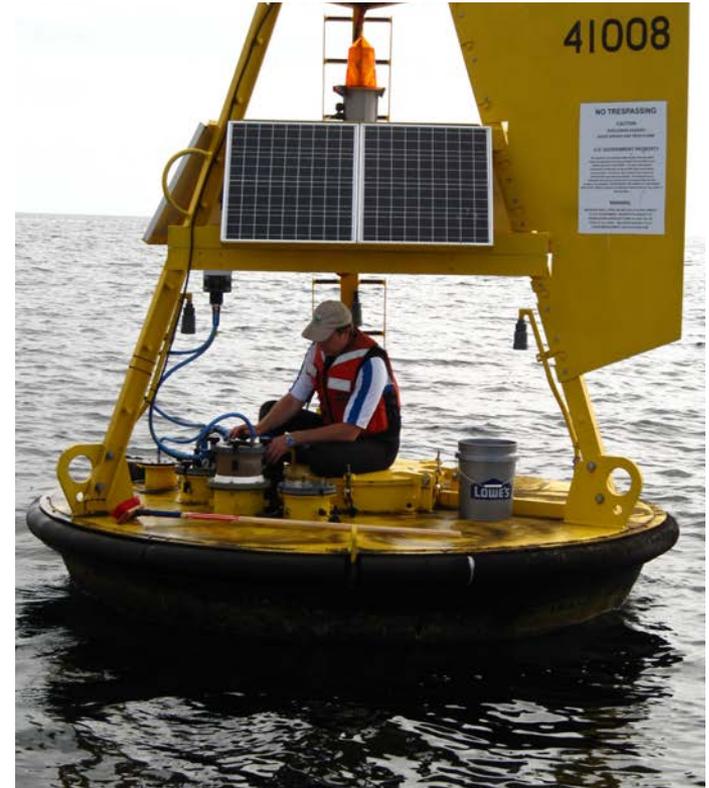
UNCW: Ship Strikes

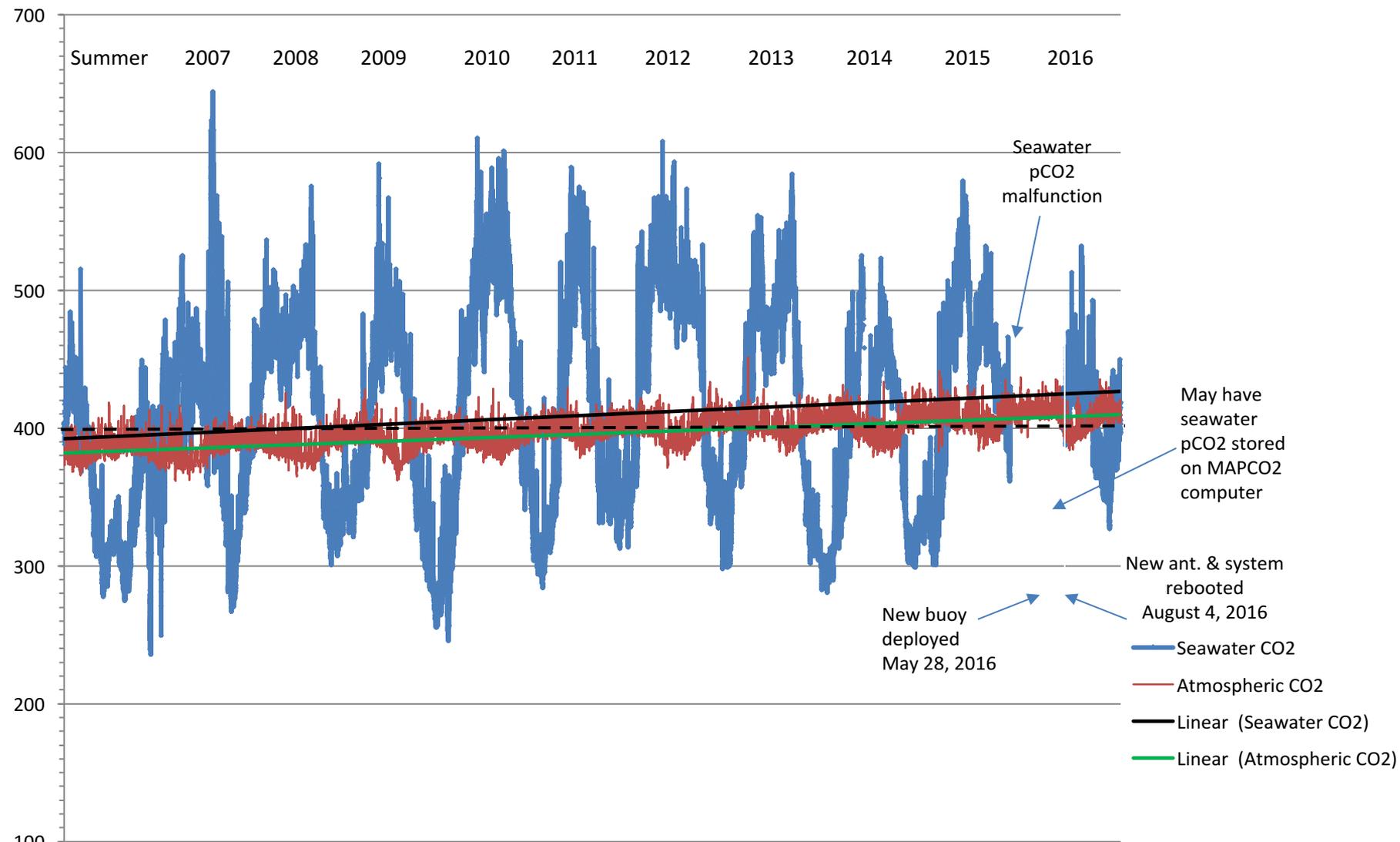


# Observing Challenges

## Gray's Reef (Noakes)

- January – Seawater pCO<sub>2</sub> malfunction
- May – Buoy 41008 replaced. All new MAPCO<sub>2</sub> instrumentation. System not transmitting.
- August – Replaced battery pack on MAPCO<sub>2</sub> and installed new GPS/iridium antenna. Reboot system.





# Observing Challenges

- Spring – Summer: the Georgetown HFR installation (USC: Voulgaris) is in a marine turtle nesting area
- Permanent installation of the antennas is not allowed
- As coastal erosion continues the antenna arrays are found closer to the beach, the area of turtle nesting.
- USC working with SCDNR in taking measures to avoid interference with the turtle nesting. Although manageable at present, it creates additional costs in modifications and in personnel expenditures.

# Observing Challenges

HFR Installation Recovery from Matthew (SkIO: Savidge)

- operation resumed shortly after power was restored at Jekyll Island, GA with reduced number of antennas
- Refurbishment/replacement of damaged poles/coils/cable connectors is ongoing

# Observing Challenges



Tx site disarray (photo: Dana Savidge)

# Observing Challenges



Buried and crushed antennas (photos: Dana Savidge)