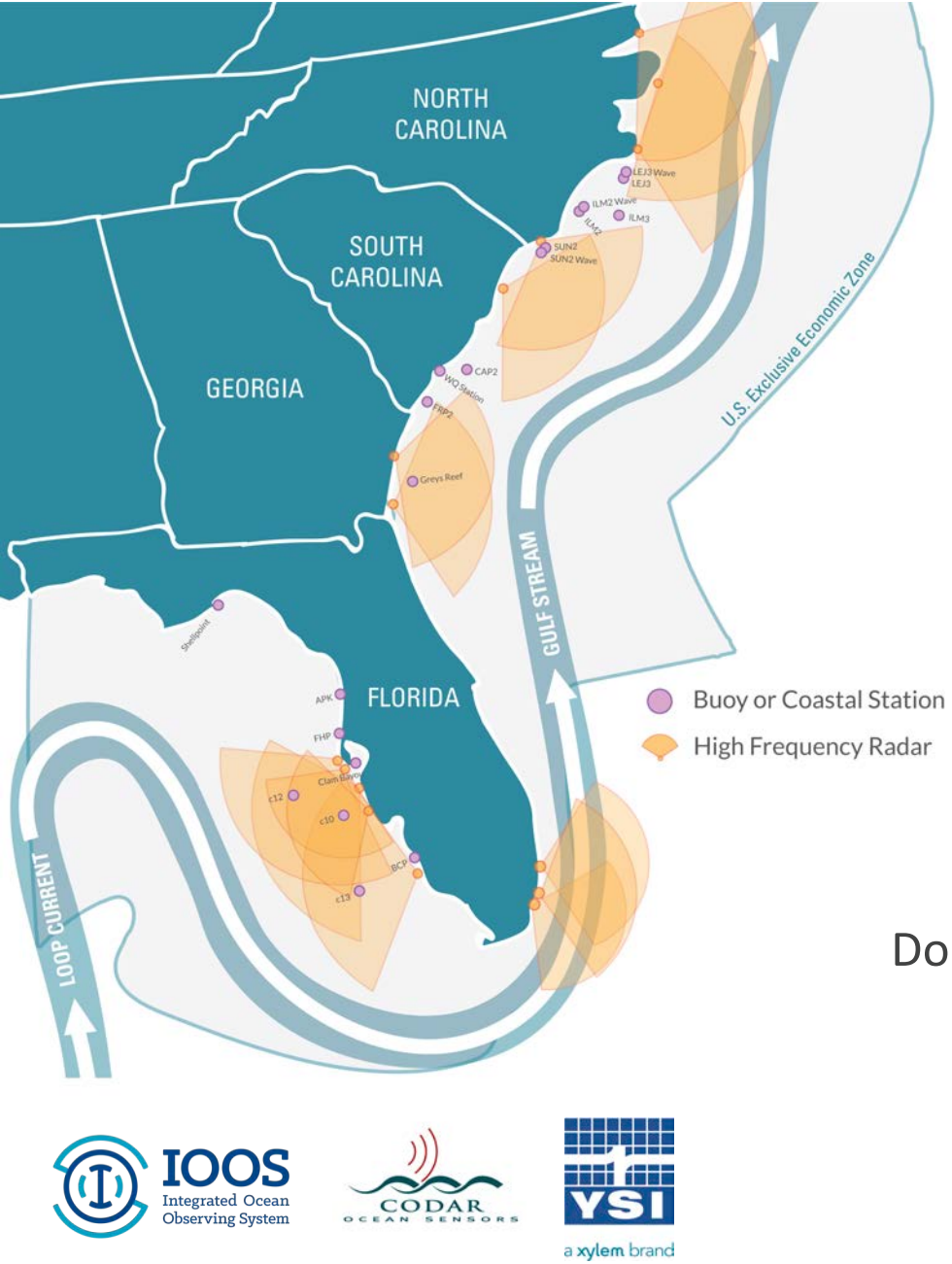


SECOORA
Southeast Coastal Ocean Observing Regional Association

# Shining a light (HF radar) on ocean currents in South Carolina

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*University of South Carolina*

IOOS Integrated Ocean Observing System
CODAR OCEAN SENSORS
YSI a xylem brand

# Objectives and Approach

## Objectives

- Provide realtime continuous HF radar surface current measurements over Long Bay, SC
- Train a new generation of undergraduate and graduate students in the use of HF radar measurements
- Create monthly and annual climatologies of surface currents in Long Bay, SC – climatologies are needed to assess climate change variability.
- *Develop new techniques for improving data quality and extracting wave measurements from beam forming HF radars*

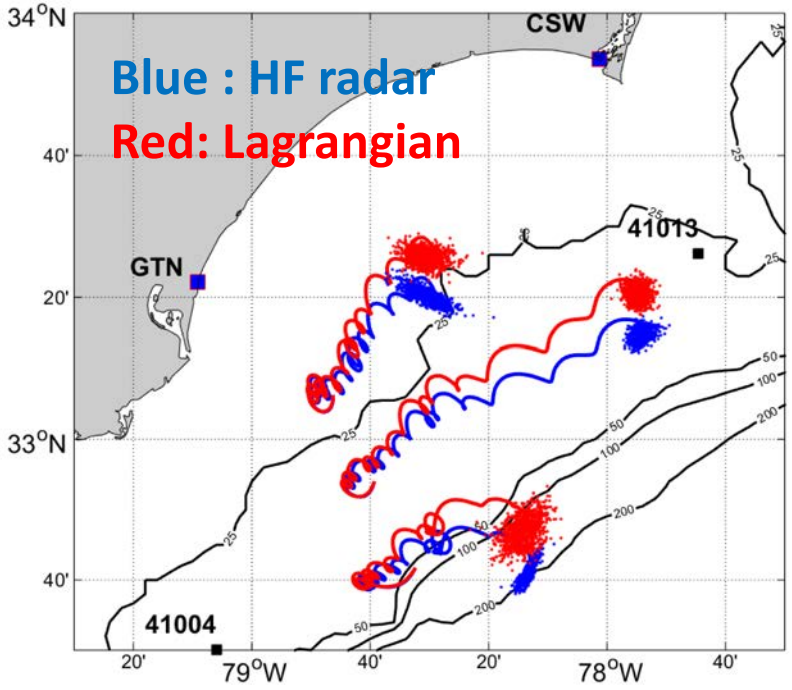
# Accomplishments

- Continuous HF coverage through Hurricane Irma (and others)

- Method development for radial current estimation that combines traditional WERA beamforming with CODAR's implementation of the MUSIC algorithm (presented at Ocean Sciences 2018; Cahl et al., in prep 2018).

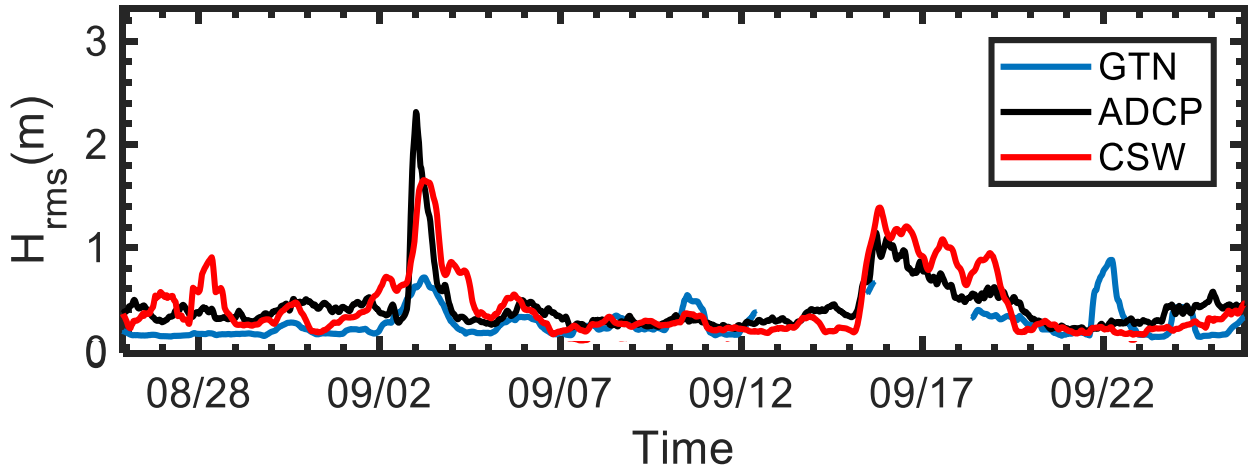
# Accomplishments

- Converting Semi-Lagrangian HF radar velocities to fully Lagrangian using partitioned wave data from the WW3 model (Kumar et al., 2017)



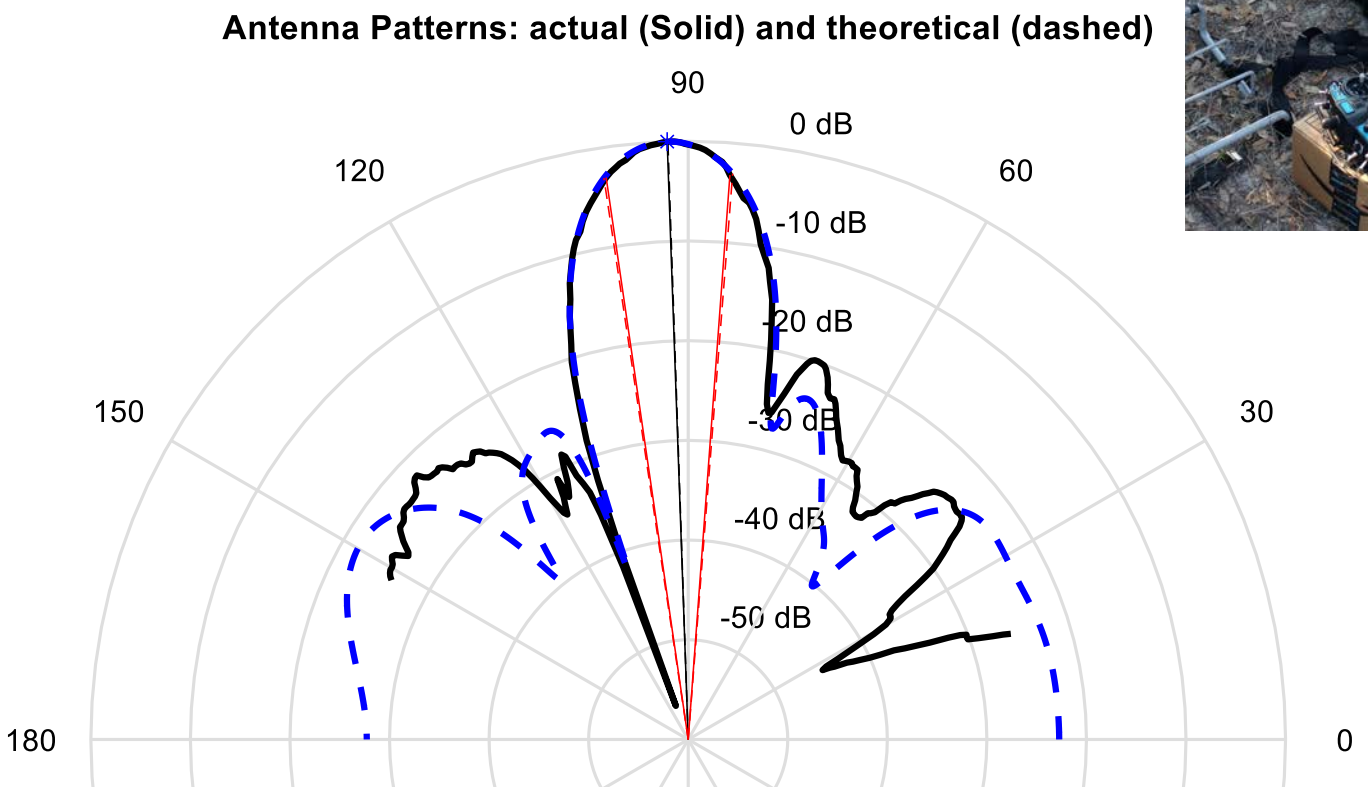
# Accomplishments

- Ocean wave measurements from HF radars. Evaluation of the empirical method.
- Study completed using existing VHF radar (48MHz)
- Underway using the SECOORA systems in Long Bay, SC (8.3MHz)



# Accomplishments

- Antenna pattern measurements using a UAV (drone)
- little difference along boresight
- larger differences at higher angles.



# Impact

- Graduate student research using the HF radar system has been presented at several scientific conferences and is in preparation for submission to scientific journals.

- Cahl, D.L. and Voulgaris, G. 2017. “It’s not just noise: Stokes’ drift and bias in beam forming HF Radar surface current measurements.” In: Radiowave Oceanography Workshop, Luneburg, Germany. September 2017.
- Alattabi, Z, Voulgaris, G., and Cahl, D., 2018. Ocean wave spectra estimates from high frequency beam forming radars in the South Atlantic Bight (CD14B-0029). Presented at 2018 Ocean Sciences Meeting, Portland, OR, 12-16 Feb.
- Cahl, D., Voulgaris, G., and Wu, X., 2018. It’s not just noise: Stokes’ drift and bias in beam forming HF Radar surface current measurements(CD21A-08). Presented at 2018 Ocean Sciences Meeting, Portland, OR, 12-16 Feb.
- Cahl, D., Voulgaris, G., and Wu, X., 2018. "It’s not just noise: Stokes’ drift and bias in beam forming HF Radar surface current measurements". Presented at SEOE grad day competitions, February 2018, University of South Carolina, Columbia, SC.
- Cahl, D., Voulgaris, G., and Huffman, B., 2018. "Modern Measurement Methods in Oceanography: From HF Radars to Drones". Presented at SEOE seminar, March 2018, Unviersity of South Carolina, Columbia, SC.
- Alattabi, Z, Voulgaris, G, and Cahl, D, 2018. “Ocean wave spectra estimates from high frequency beam forming radars in the South Atlantic Bight” Presented at University of South Carolina Discovery Day, April 2018, Columbia, SC