



Supporting the Blue Economy - SECOORA 2018 Annual Meeting

SECOORA Principal Investigator Abstracts

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HF Radar Operation and Maintenance in Long Bay, SC

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University of South Carolina has been responsible for the operation and maintenance of the US IOOS/SECOORA identified priority WERA system radar sites located at Georgetown, SC (GTN) and Fort Caswell, NC (CSW).

The two sites have been operational for the current funding period providing surface current data for over 95% of the time. Surface currents are measured every 30 min and the data are available to the national HF radar network within 45 min of data collections. Hurricane Irma made landfall on September 11, 2017 and, although there was no damage that resulted in downtime, a few emergency cable repairs were necessary at the GTN site. Storm surge and overwash placed the cables underwater for a significant period of time but repairs were conducted in a timely manner. Data delivery continuous to be exceeding 94% of the time for both stations and we continue to update our climatology data on a monthly basis.

In addition, in collaboration with the University of North Carolina at Wilmington, we have embarked on an in-situ evaluation of the HF radar aiming at (i) evaluating the accuracy of the velocities and (ii) examining the ability of the systems to provide spectral information regarding ocean waves. For this purpose, an ADCP has been deployed in the footprint of the HF radar systems. Analysis suggests that the differences between the ADCP and HF radar measured velocities are mainly due to Stokes' drift not accounted by the HF radars and not due to vertical current shear (Cahl et al., 2018). A method was developed that allows the correction of HF radar derived radial velocities to truly Lagrangian using waves from wave models or measurements (Kumar et al., 2017).

Additionally, recent work by the USC group has shown that combining traditional WERA beamforming analysis with the MUSIC algorithm, used by beamforming systems, can be used to identify inaccuracies in radial velocity measurements (Cahl et al., in prep 2018).

The challenges of the project are related to coastal erosion around the HF radar deployment stations, leading to multiple instances of HF radar antenna relocation. In addition, during Spring – Summer the Georgetown station is in a marine turtle nesting area. Permanent installation of the antennas is not allowed as we are unable to alter the



natural environment. Thus, as coastal erosion continues the antenna arrays are found closer to the beach, the area of turtle nesting. We are in continuous communication with the SC Department of Natural Resources in taking measures to avoid interference with the turtle nesting. This is achieved through continuous monitoring and changes of the installation. Although manageable at present, it creates additional costs in modifications and in personnel expenditures. In the long term, if there is not a reversal of the erosional patterns, relocation or decommission of the station might be inevitable.

