Advancing Coastal Intelligence in the US Caribbean: Surface Currents

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Performance Period: June 1, 2018 – December 1, 2018

LONG-TERM GOALS

Rutgers University Center for Ocean Observing Leadership (RUCOOL) is a global leader in High-Frequency radar (HFR) network implementation and management. Through this proposal, RUCOOL looks to assist CariCOOS in the expansion and operation of their HFR network. The US Coast Guard has identified the ocean surface current data from the five existing HFR stations as an important resource for their search and rescue activities. The real-time surface current information improves the decision-making capabilities during critical lifesaving search and rescue missions.

The HFR network is part of the observational sensor subsystem for CariCOOS. The other subsystem for CariCOOS is a modeling and forecast component. The subsystem is comprised of wave, storm surge, wind and ocean circulation models. The ocean circulation model is based upon the Regional Ocean Modeling System (ROMS). The goal of this proposal is to compare the surface current measurements of the HF radar network with the output of the circulation model and test the capability of the other models to assimilate the measured ocean surface current data.

MILESTONES / OBJECTIVES

No.	Deliverable	Delivery Date	Status
1	Deliver paper on Sargassum tracking method at OCEANS 2018 meeting in Charleston, SC	October 25, 2018	Complete
2	Make the Sargassum tracker real time	December 20, 2018	Revised to January 15, 2018
3	Hold midterm project meeting in Puerto Rico	November 15, 2018	Revised to February 15, 20187
4	Work with CARICOOS partners to test delivery of Sargassum warning	March 15, 2019	On Schedule
5	Attend CARICOOS General Assembly	April 2019	On Schedule

WORK COMPLETED

1. The funds in the no cost extension for Year 2 were spent out and we will be invoicing you soon.
2. The paperwork for Year 3 has been submitted by Rutgers and we are awaiting funding for year 3.
3. A webpage that summarizes the project is located here. Below is a summary of the radar operations for the progress period.
4. The HF radar data is comprised of radial and total vector data. The network is almost recovered from Hurricane Maria. The radial data availability over the progress period is provided in Figure 1. The one troubling aspect of this plot is the radial vector count for the CDDO station. There is a daily drop in coverage due to an outside interference problem. The problem has been identified as a nearby light. Colin Evans is working with the property owner to remedy the situation. The totals vector maps are typically created on a 2 km and 6 km grid. The monthly average vector plots from the 6 km grid are shown in Figure 2 and the data coverage plots are shown in Figure 3.
5. PowerPoint presentations were created providing background information on the Sargassum Seaweed problem in the Caribbean.
6. The methodology for tracking the Sargassum seaweed was presented at the OCEANS'18 conference in Charleston, SC. The paper and presentation are attached. Now that the methodology is complete we will make it operational in January 2019. A website that describes the methodology has been created here.
7. Plots of average radial and radial coverage plots have been compiled from June 2018 to December 2018. These are shown in Figure 4

MAJOR OUTCOMES

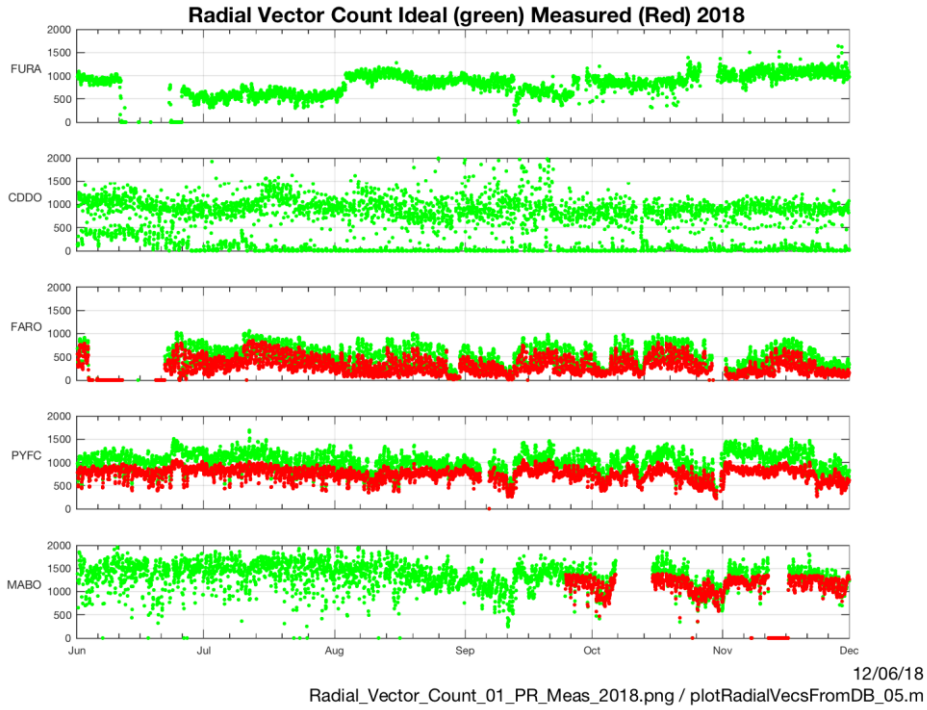

Figure 1: Ideal (green) and measured (red) radial data availability of the 5 HF radar stations in Puerto Rico on the Rutgers servers for June 1, 2018 to December 1, 2018.

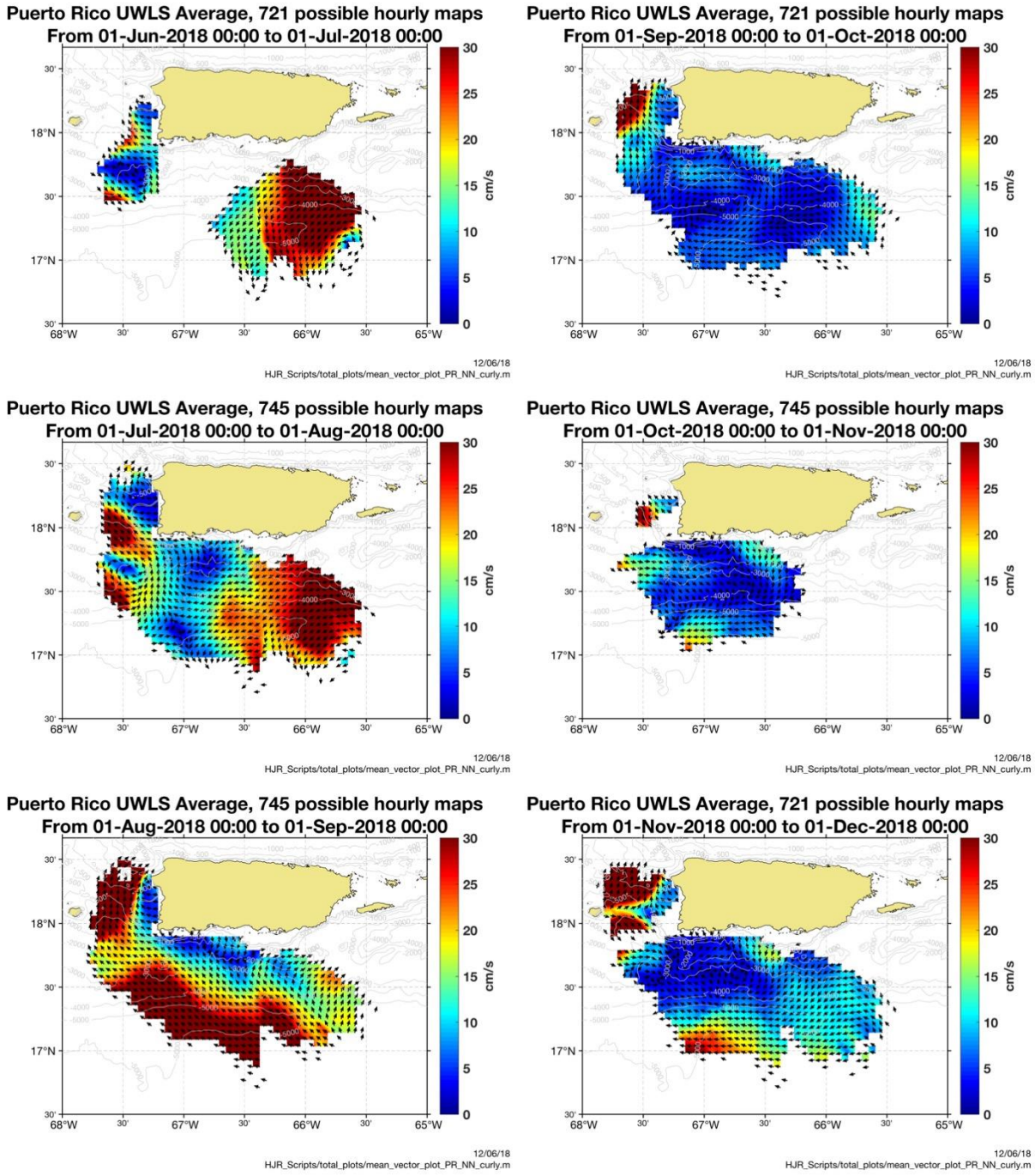

Figure 2: Monthly mean surface current measurements on the 6 km grid from June 2018 (top left) *to December 2018* (bottom right)*. The color bar indicates speed from 0-30 cm/s and the arrow on the map indicates direction the current is towards.* Each map requires 50% temporal coverage in order to plot a vector

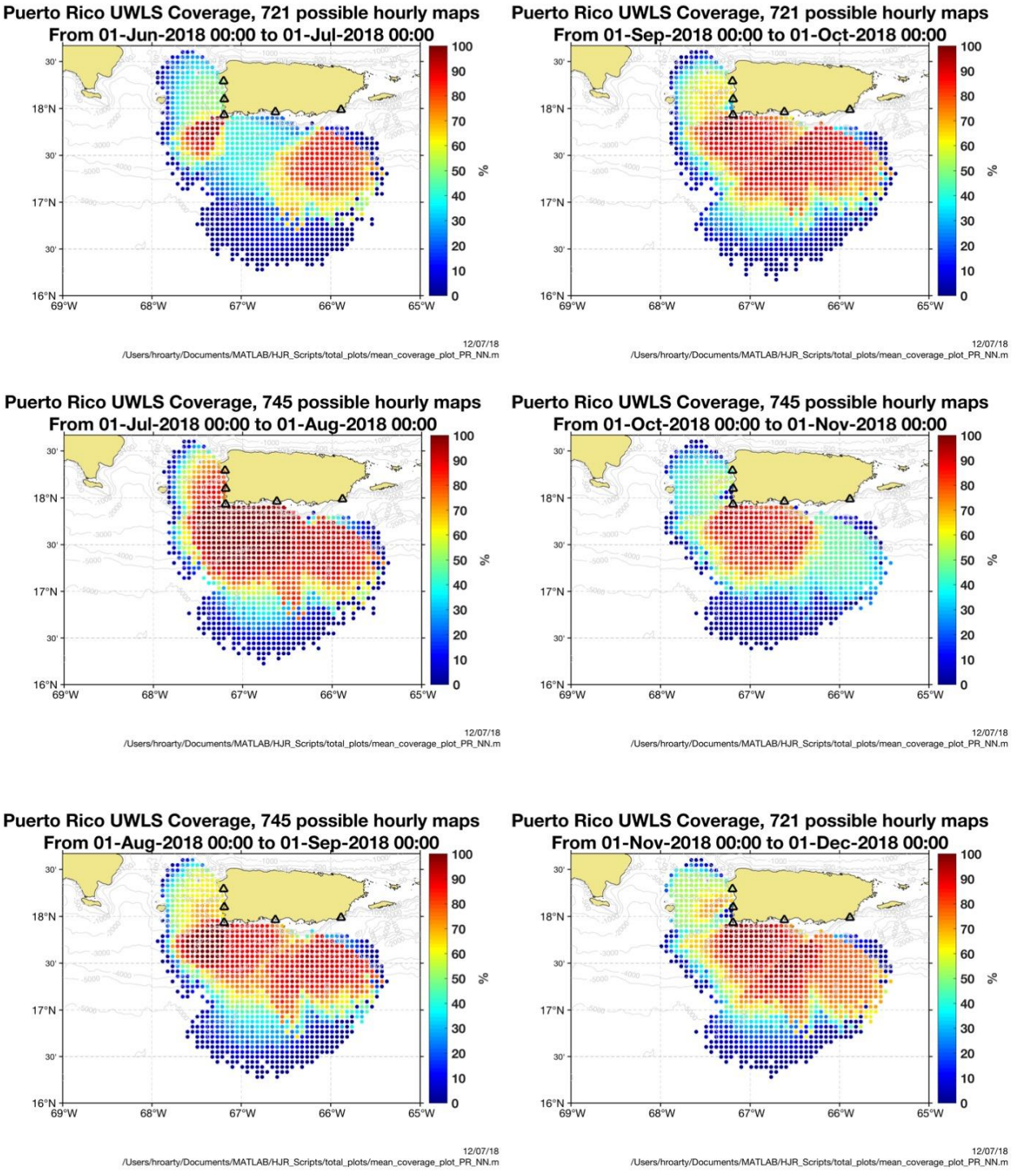

Figure 3: Monthly data coverage maps on the 6 km grid from June 2018 (top left) *to December 2018* (bottom right). *The color bar indicates percent data coverage from 0% (blue) to 100% (red).*

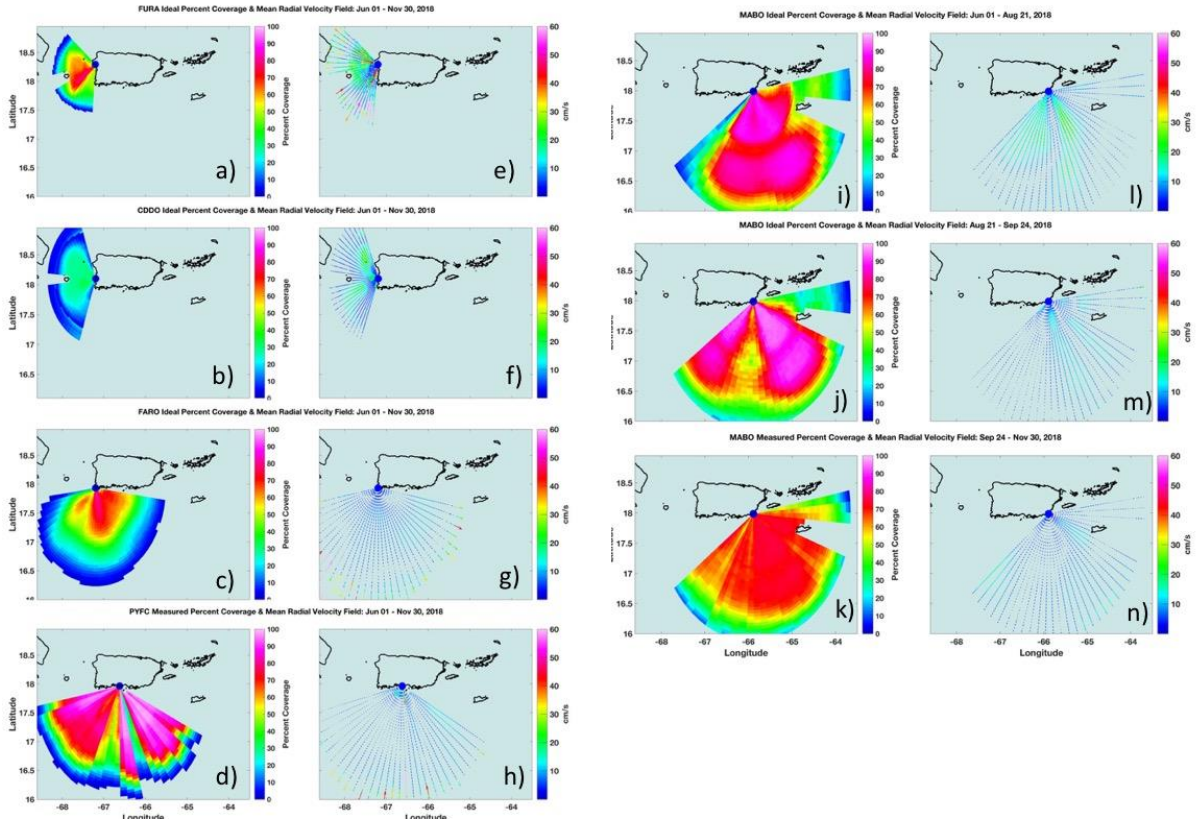

Figure 4: Radial coverage maps for a) FURA b)CDDO c)FARO d) PYFC and i-k) MABO and average radial maps for e) FURA f) CDDO g) FARO h) PYFC and l-n) MABO.

RELATED PROJECTS

None

PUBLICATIONS & PRODUCTS

1. Roarty, Prakash, Evans (2018) "Observations of the Surface Circulation Around Puerto Rico" Marine Technology Society Meeting, Charleston, SC, October 22-25, 2018