

CARICOOS Field Operations
















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Performance Period: June 1, 2020 – November 30, 2020

LONG-TERM GOALS

Monitor, operate and maintain CARICOOS network of observing assets.

MILESTONES / OBJECTIVES

The following table includes the milestones/tasks as included in the FY20 scope of work and their status.

MILESTONE / TASK	Q1	Q2	Q3	Q4	STATUS (%)	ORIGINAL COMPLETION DATE	STATUS	NOTES
Operate the CARICOOS data buoy network					 50	Continuous	On-Track	
Operate the CARICOOS HFR network					 50	Continuous	On-Track	
Operate the CARICOOS MESONET and WINDNET					 50	Continuous	On-Track	
Quarterly inspections of CARICOOS Rincón wave buoy					 50	Continuous	On-Track	
Yearly maintenance of the CARICOOS-U Maine data buoys					 0	November 2020	Delayed	Delayed due to the restrictions related to COVID-19 outbreak. The new anticipated data of completion for this milestone is May 2021.
Yearly maintenance of the CARICOOS Rincón wave buoy					 100	August 2020	Completed in August 2020	
Yearly maintenance of the La Parguera Map CO ₂ buoy					 100	September 2020	Completed in September 2020	
Install a new data buoy to replace the UVI owned buoy in St. Thomas destroyed by Hurricane Irma					 0	May 2021	On-Track	
Operate La Parguera Map CO ₂ buoy and provide data dissemination					 50	Continuous	On-Track	
Deployment, retrieval and refurbishment of NOAA-AOML, CARICOOS and US Navy underwater gliders					 100	November 2020	Completed in November 2020	
Install a new HFR system in Puerto Rico and St. Thomas					 0	May 2021	On-Track	
Beach pathogen monitoring					 50	May 2021	On-Track	
Bi-weekly carbonate chemistry sampling					 50	May 2021	On-Track	
Monitoring acidification/hypoxia by Sargasso inundation					 50	May 2021	On-Track	
Continue the implementation of a remotely sensed video system to monitor coastal zone changes, provide information for beachgoer safety, storm damage safety and beach water quality					 25	May 2021	On-Track	

WORK COMPLETED

- CARICOOS St. John buoys was recovered to repair the communication system. Buoy data stream stopped on St. John buoy in July 2020 because both communication



systems failed. OCOVI personnel repaired the buoy by replacing the electronics and sensors damaged. The buoy was redeployed in August 26, 2020.

- Tuning, deployment, and recovery of 9 AOML-CARICOOS hurricane gliders and 2 NAVO gliders which sampled lines off the region's Caribbean and Atlantic coasts from the west of Puerto Rico to the east of the US Virgin Islands during the 2020 Atlantic Hurricane Season.
- After the eleven underwater gliders were recovered, they underwent through a partial refurbishment to start preparing them for the 2021 Atlantic hurricane season. Refurbishment involved the replacement of batteries and the extensive checkout of internal/external sensors. Several electronics and sensors damaged during the last mission or in need of calibration were shipped to the manufactures. This task was moved ahead of schedule because companies that manufactures and services (i.e. Hydroid, SeaBird) many of the internal and external sensors with which gliders are outfitted, reported long repair turnaround times. The purchases of all materials needed to complete the refurbishment and deployment of the underwater gliders for the upcoming season were also moved ahead of schedule.
- The underwater gliders collected data for a total of 1,165 glider-days. The collected data will support data assimilation into hurricane forecast models as well as ocean model validation.
- U.S. Navy glider (NG609) had mechanical issues in September 2020 and was unable to continue its mission. An emergency recovery was performed to recover the glider south of Guayama, Puerto Rico.
- The Rincón wave buoy (Hull – 30780, Top hat – 70083) was removed from its mooring for annual maintenance and refurbishment on August 4th, 2020. The spare wave buoy (Hull – 30934, Top hat – 70384k) was successfully deployed in the same location on August 10th, 2020.
- A new outdoor electronics enclosure was installed in September at the CDDO HF Radar site, replacing the one damaged from Hurricane Maria.
- The MABO HF Radar site was offline between July and mid-September due to the unavailability of replacement parts for the power grid and from Tropical Storm Laura. Power was restored on September 22nd, 2020.
- Several areas within the San Juan, Puerto Rico area have been scouted for the anticipated first site installation as part of the HF Radar network northern expansion.
- The MapCO₂ annual refurbishment was completed between September 1 and September 11, 2020.
- García-Troche and Luis Rodríguez replaced the SAMI pH sensor on the MapCO₂ buoy on July 15, 2020.
- García-Troche and Orlando Espinosa replaced another SAMI pH sensor on October 8, 2020.
- The laboratory analyses and field cruises at UPR-Mayaguez restarted on June 30, 2020, and July 7, 2020, respectively. Operations were on hold since March 16, 2020, due to the COVID-19 pandemic. We completed five cruises to collect surface water samples and CTD profiles throughout La Parguera.

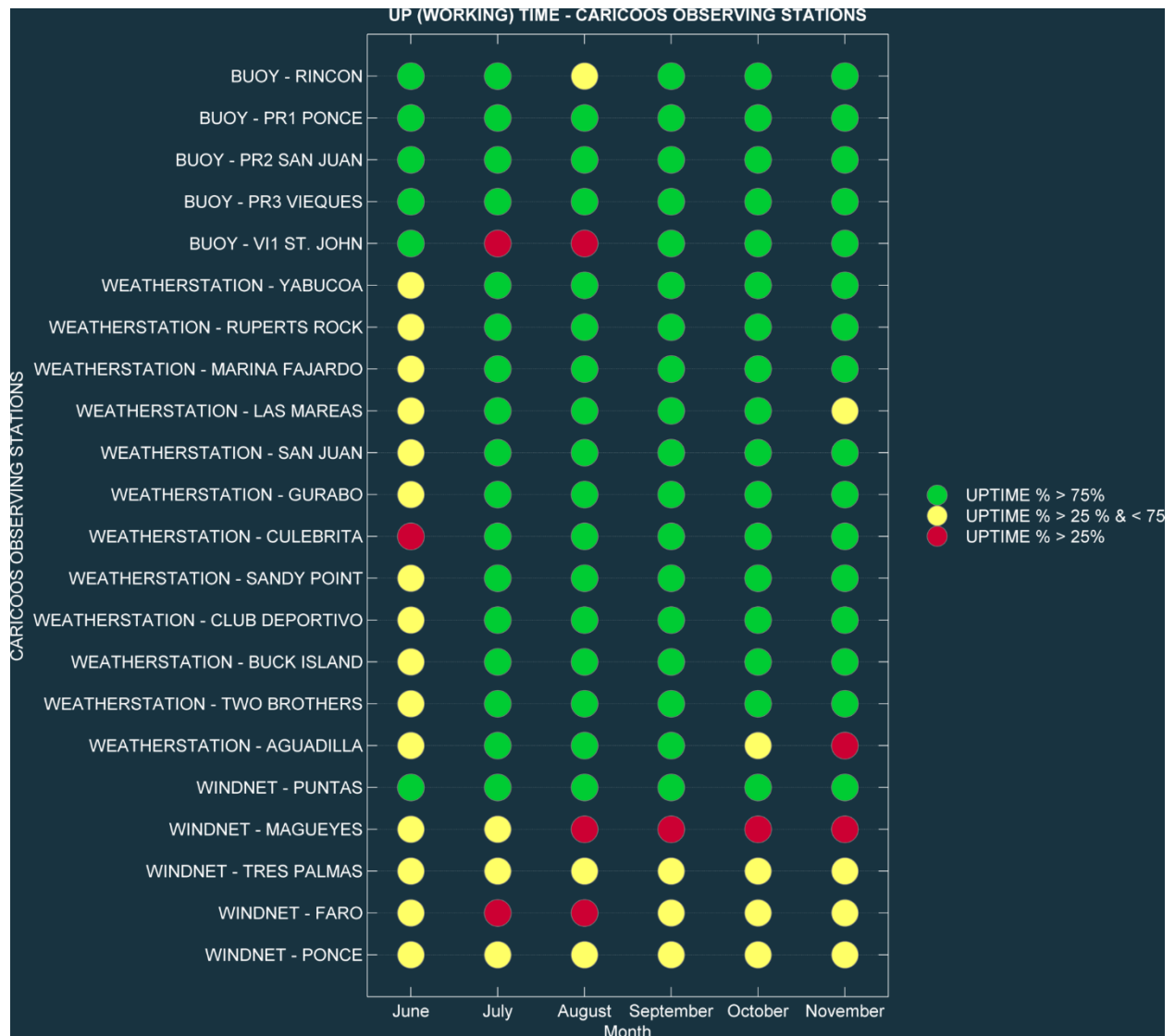


CARICOOS

CARIBBEAN COASTAL OCEAN OBSERVING SYSTEM

MAJOR OUTCOMES

During this performance period most of CARICOOS observing assets were able to operate efficiently and reliably with minimal downtime. The wind station in Magueyes, La Parguera, Lajas is temporarily out of service for repairs. Buoy data stream stopped on St. John buoy on July 7, 2020 because both communications systems failed. Due to the temporary restrictions on travel, shipping and field work related to COVID-19 outbreak, the repair of such buoy was delayed for almost two months waiting for authorizations allowing field operations. OCOVI personnel repaired the buoy by replacing the external and internal sensors damaged. The St. John buoy was redeployed on August 26, 2020.



The HF Radar network performed sub-optimally during this progress period due to power outages and communication dropouts, specifically during July – September 2020.

Site	Latitude	Longitude	CF	2020-06	2020-07	2020-08	2020-09	2020-10	2020-11
FURA Ideal	18.29190	-67.19828	13.45	97.78% 704/720	97.41% 724/744	59.54% 443/744	97.64% 703/720	98.39% 732/744	90.97% 655/720
CDDO Ideal	18.10100	-67.18968	13.45	51.11% 368/720	56.59% 421/744	32.53% 242/744	47.08% 339/720	56.45% 420/744	53.19% 383/720
FARO Ideal	17.93336	-67.19200	4.35	85.28% 614/720	31.05% 231/744	15.86% 118/744	49.44% 356/720	79.44% 591/744	72.92% 525/720
FARO Meas	17.93336	-67.19200	4.35	85.28% 614/720	31.05% 231/744	15.86% 118/744	49.44% 356/720	79.44% 591/744	72.92% 525/720
PYFC Ideal	17.96276	-66.61833	4.513	82.50% 594/720	97.04% 722/744	58.60% 436/744	86.25% 621/720	92.74% 690/744	92.78% 668/720
PYFC Meas	17.96276	-66.61833	4.513	79.72% 574/720	96.64% 719/744	58.60% 436/744	83.47% 601/720	90.99% 677/744	92.78% 668/720
MABO Ideal	17.98813	-65.88500	4.35	90.42% 651/720	7.39% 55/744	0% 0/744	21.39% 154/720	47.31% 352/744	69.44% 500/720
MABO Meas	17.98813	-65.88500	4.35	92.78% 668/720	7.53% 56/744	0% 0/744	21.39% 154/720	47.45% 353/744	61.39% 442/720

CHANGES/PROBLEMS

- The following milestones/tasks have been delayed due to the restrictions related to COVID-19 outbreak:
 - Yearly maintenance of the CARICOOS oceanographic data buoys
 - Installation of the new oceanographic data buoy in St. Thomas
 - Installation of the new HF Radar system in Puerto Rico and St. Thomas
 - Installation of the coastal video monitoring system

WORK PLAN FOR UPCOMING PERFORMANCE PERIOD (December 01, 2020 – May 31, 2021)

- Maintenance services to CARICOOS oceanographic data buoys.
- Install the coastal video monitoring system in the selected sites.
- Install new wave buoy off Arcibo, Puerto Rico.
- Install HF Radar system in St. Thomas to expand CARICOOS surface current observations within the Vieques/St. Croix channel.
- Establish contacts at HF Radar sites as part of the proposed north coast network expansion for necessary permission requirements.
- Install HF Radar system in San Juan Bay, Puerto Rico to initiate the north coast expansion to cover marine traffic lanes.
- Install a new oceanographic data buoy to replace the UVI owned buoy in St. Thomas destroyed by Hurricane Irma.
- Continue to operate and maintain CARICOOS network of observational assets.
- Activities delayed due to the restrictions related to COVID-19 outbreak.



CARICOOS

CARIBBEAN COASTAL OCEAN OBSERVING SYSTEM

- A series of short-term OA assessments will be carried out in La Parguera, using a recently acquired sensor package capable of measuring temperature, salinity, dissolved oxygen, pH, pCO₂, and chlorophyll-a, turbidity, and colored dissolved organic matter. These assessments will better understand the spatial and temporal variability of coastal OA in La Parguera. The results from this effort will help understand the natural variability of OA and hypoxia and the impact of sargassum inundation events on coastal OA.

PUBLICATIONS & PRODUCTS

None