CARICOOS

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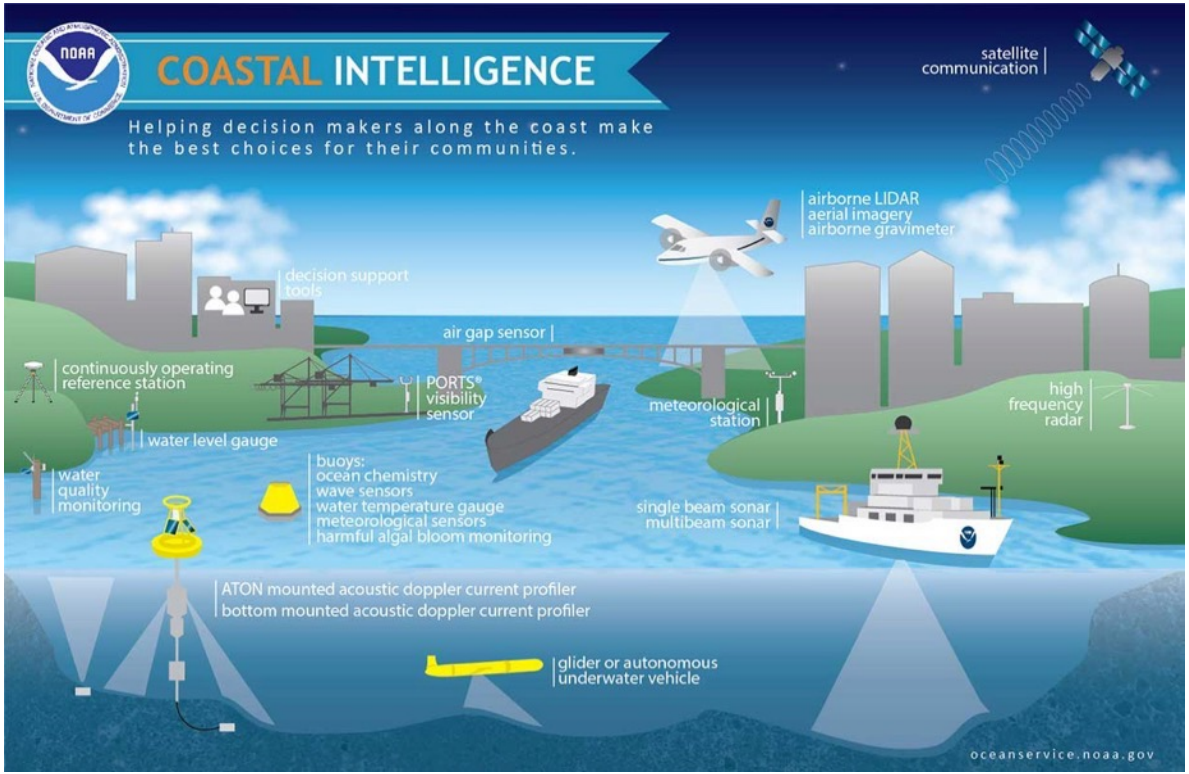
CARICOOS: A SUSTAINED REAL-TIME OBSERVATION AND FORECAST SYSTEM

Julio Morell & CARICOOS Team

ABOUT CARICOOS | US CARIBBEAN

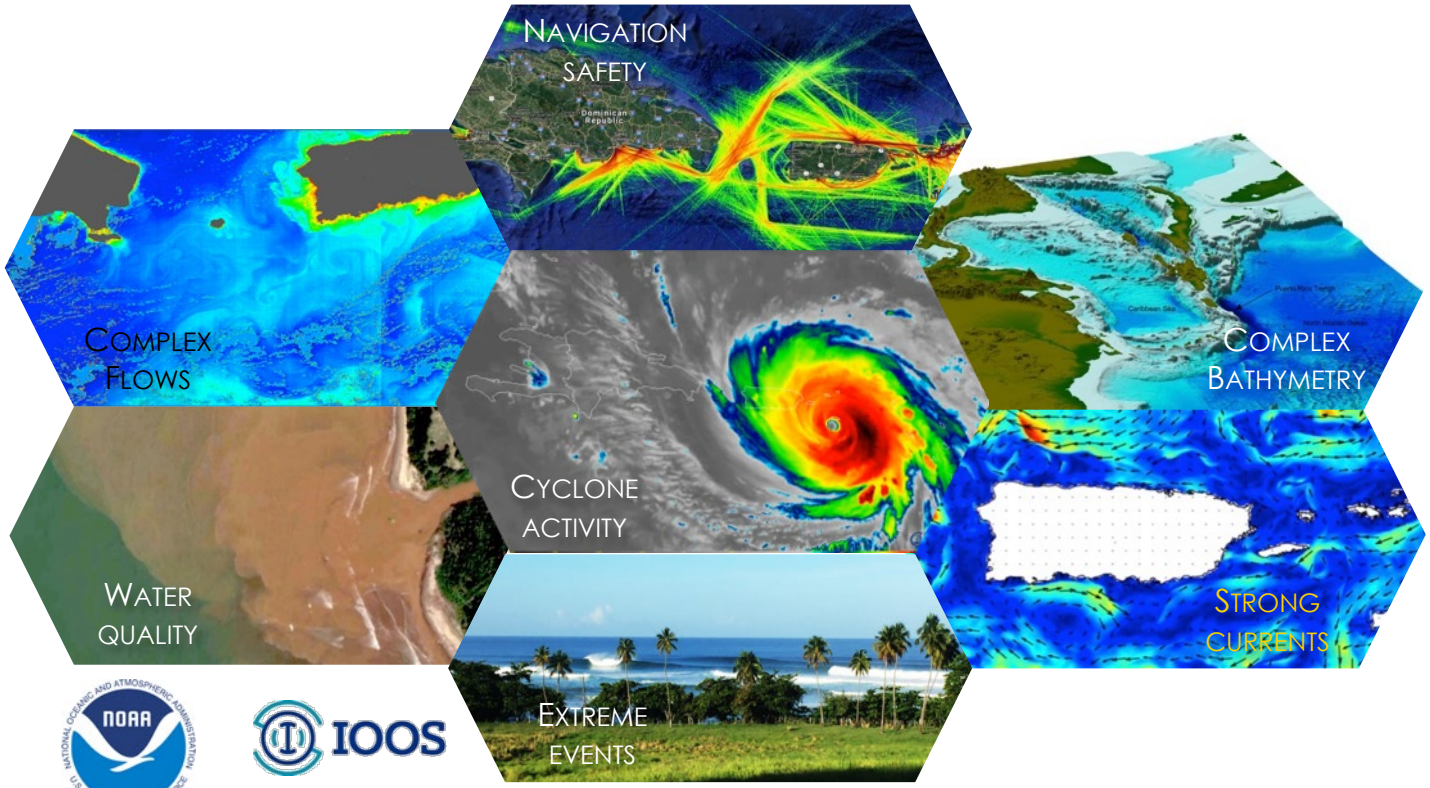
- CARICOOS is the Caribbean Coastal Ocean Observing System, an effort primarily funded by the National Oceanic and Atmospheric Administration (NOAA).

- We are one of eleven coastal observing systems which, along with federal agencies, constitute the US Integrated Ocean Observing System (IOOS).



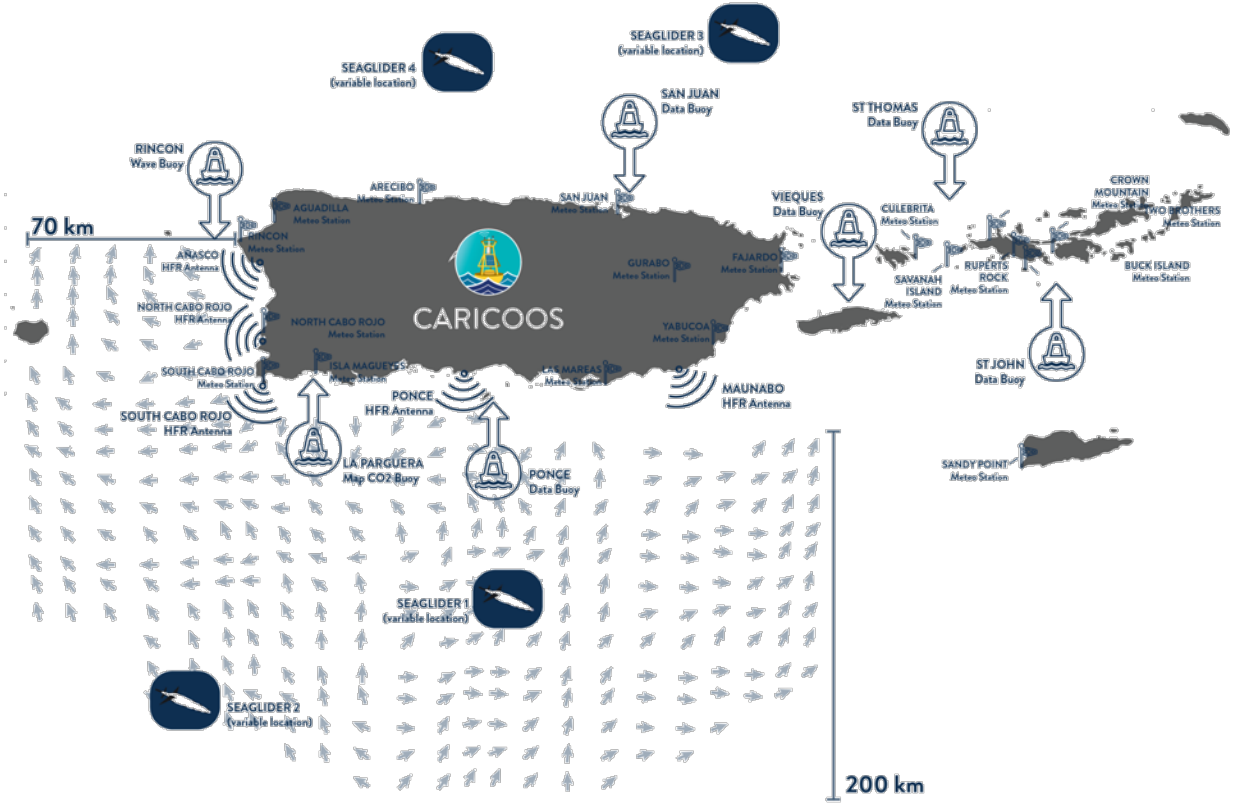
ABOUT CARICOOS | US CARIBBEAN

- We bring together coastal ocean data and forecasts from a variety of sources including satellites, ocean instruments, and numerical models to give the user an integrated view of past, present and forecasted ocean conditions in the US Caribbean.



CARICOOS OBSERVATIONAL ASSETS

- CARICOOS currently operates and maintains five (5) operational directional wave buoys, sixteen (16) land-based meteorological stations, five (5) land-based high-frequency (HF) radar arrays, repeated underwater glider deployments, and a MapCO^2 buoy



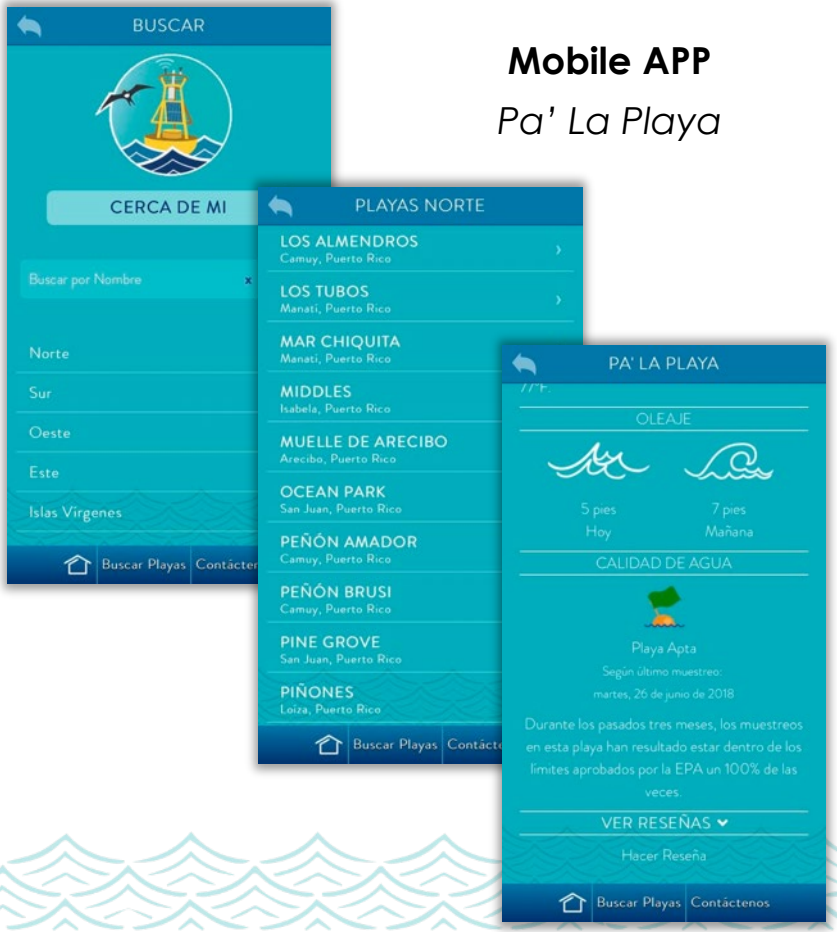
HOW DO WE COMMUNICATE THIS INFORMATION TO YOU?

Webpage

www.caricoos.org

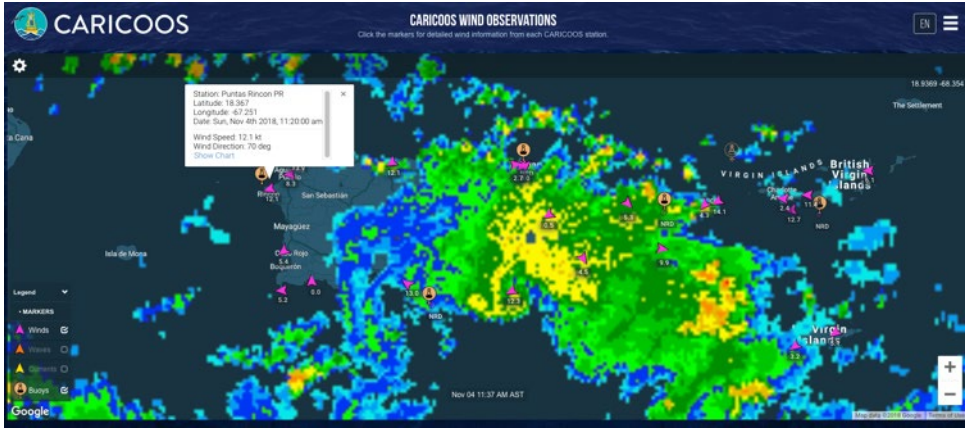
Mobile APP

Pa' La Playa



HOW IS THE WIND? CARICOOS METEOROLOGICAL STATIONS

- The meteorological stations measure wind speed and direction, barometric pressure, and air temperature.
- These measurements can provide us an idea of the sea surface state.

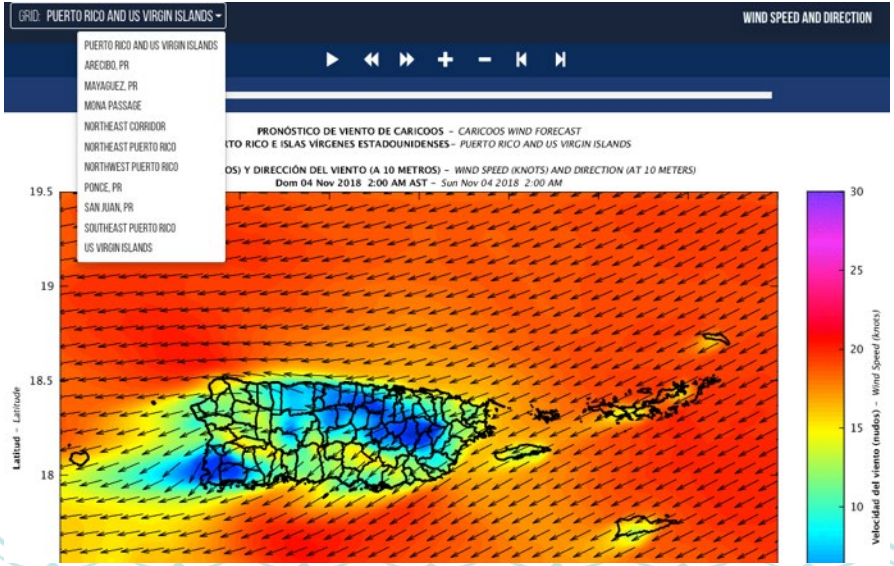


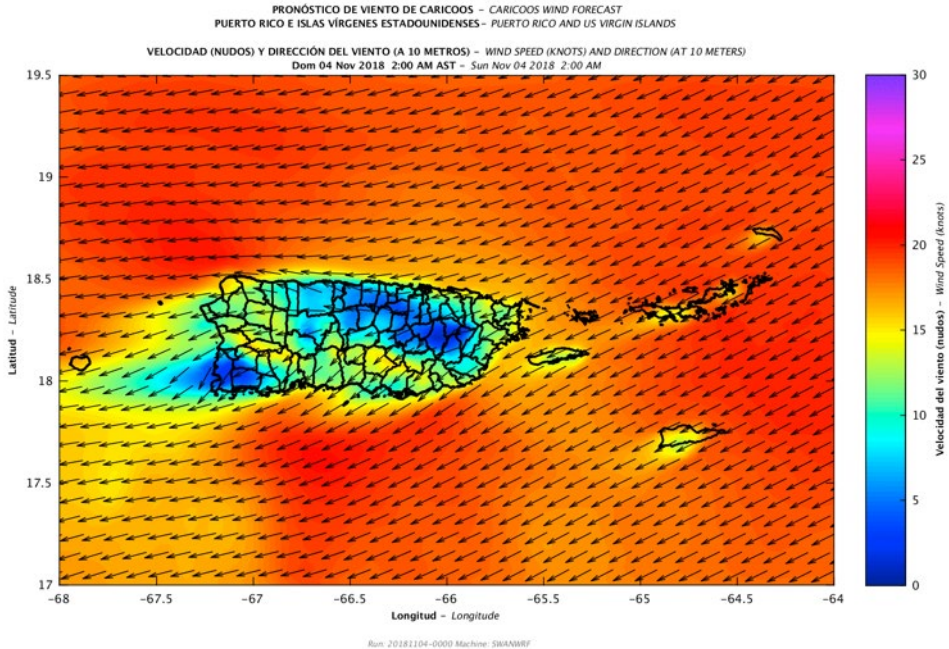
HOW WILL THE WIND BE? CARICOOS WIND FORECAST MODELS

- CARICOOS numerical weather prediction (NWP) utilize the **Weather Research and Forecasting (WRF) model** to generate the high-resolution meteorological forecasts.

- Computational domains:

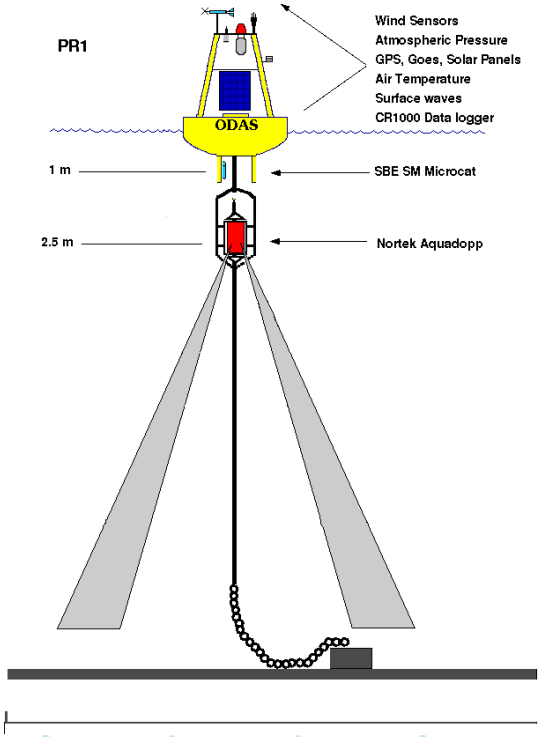
    - Horizontal grid spacing of 6 km, 2 km and 1 km.





HOW ARE THE WAVES / WINDS / CURRENTS? CARICOOS BUOYS

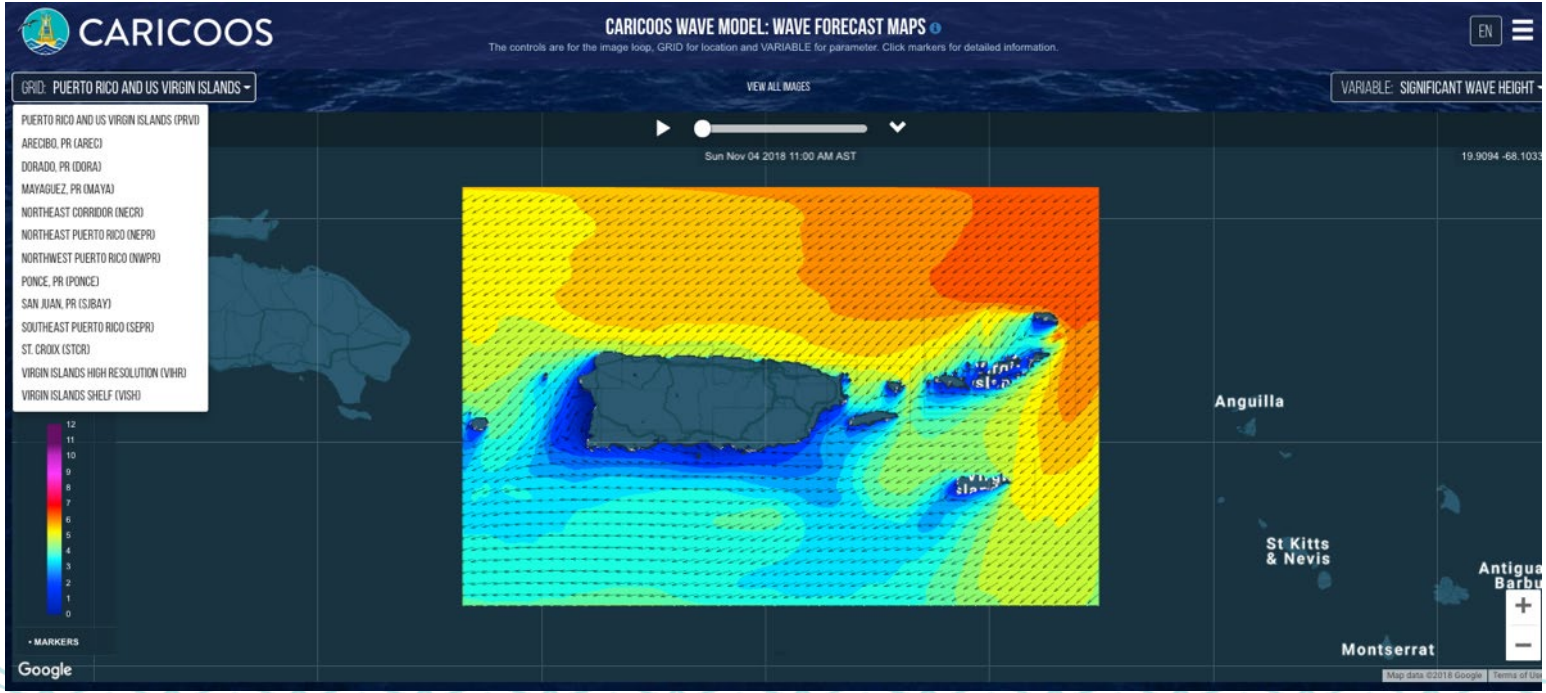
- Efficient design minimizing observing assets that meet stakeholder needs for coastal information.
- Strategic buoy placement to capture dominant wave directions.



HOW ARE THE WAVES / WINDS / CURRENTS? CARICOOS BUOYS

HOW WILL THE WAVES BE? CARICOOS WAVE MODELS

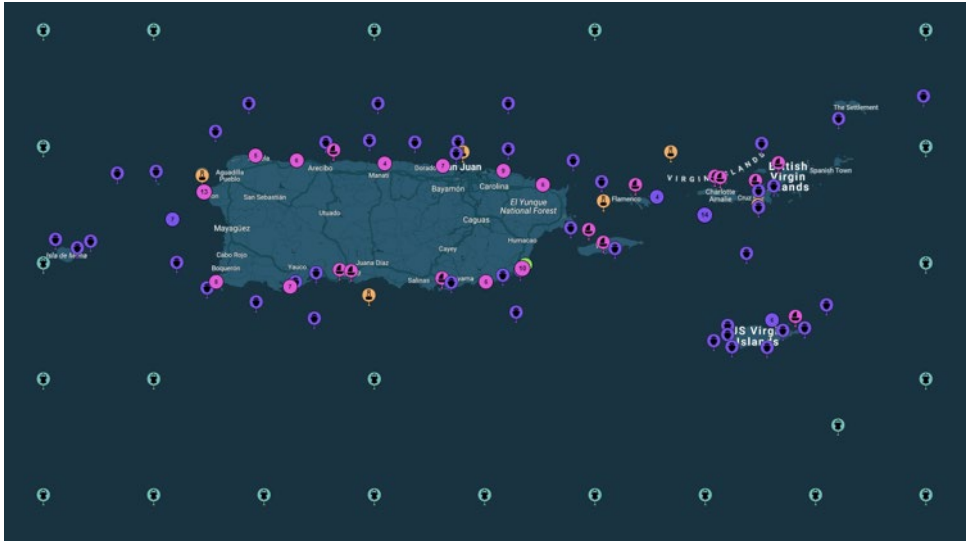
- The CARICOOS Wave Model is an operational wave model with nested grids at a spatial resolution ranging from 1.1 km to 30 meters.
- 12 nearshore grids at resolution from 240 meters to 30 meters



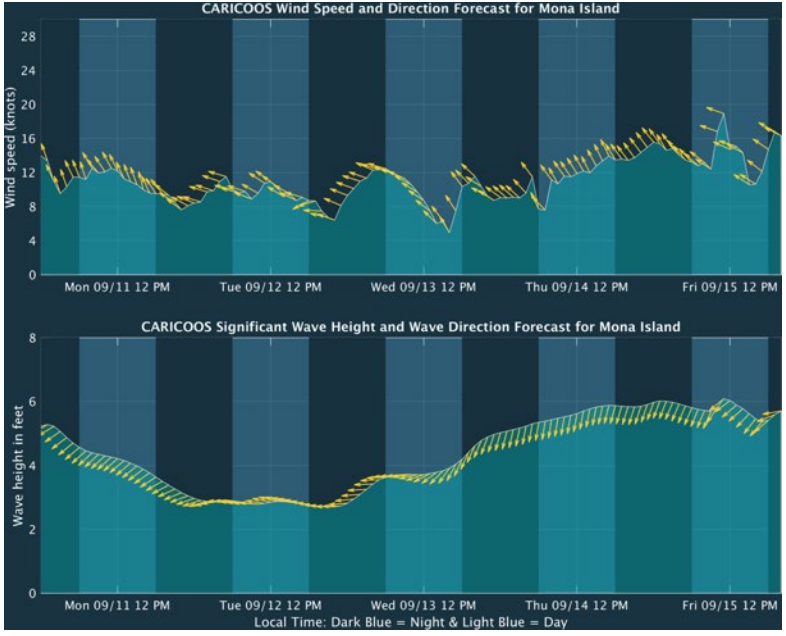
HOW WILL THE WAVES BE? CARICOOS WAVE MODELS

Improvement to the CARICOOS Wave Model include:

- **Improvements to several grids (USVI HR, etc.)**
- **Improvements in graphical output and a new web interface**
- Implementation of 2D spectral partitioning capabilities

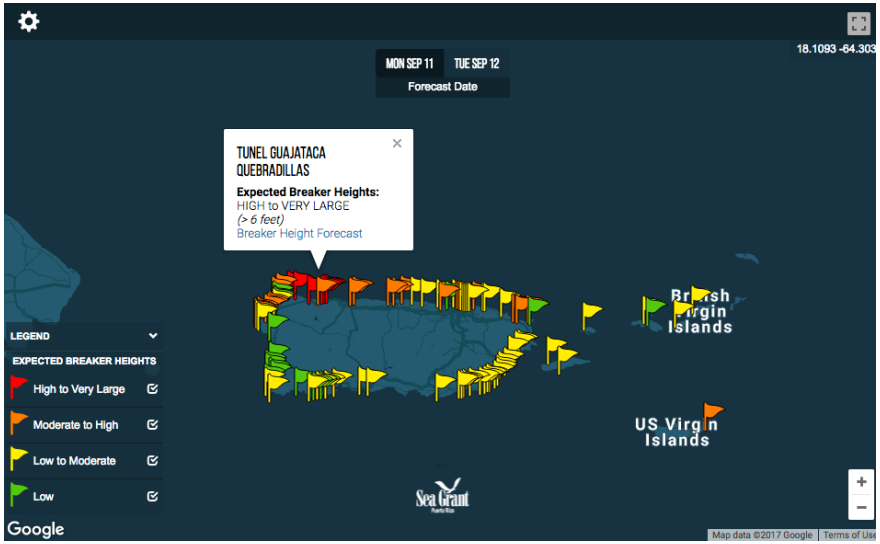


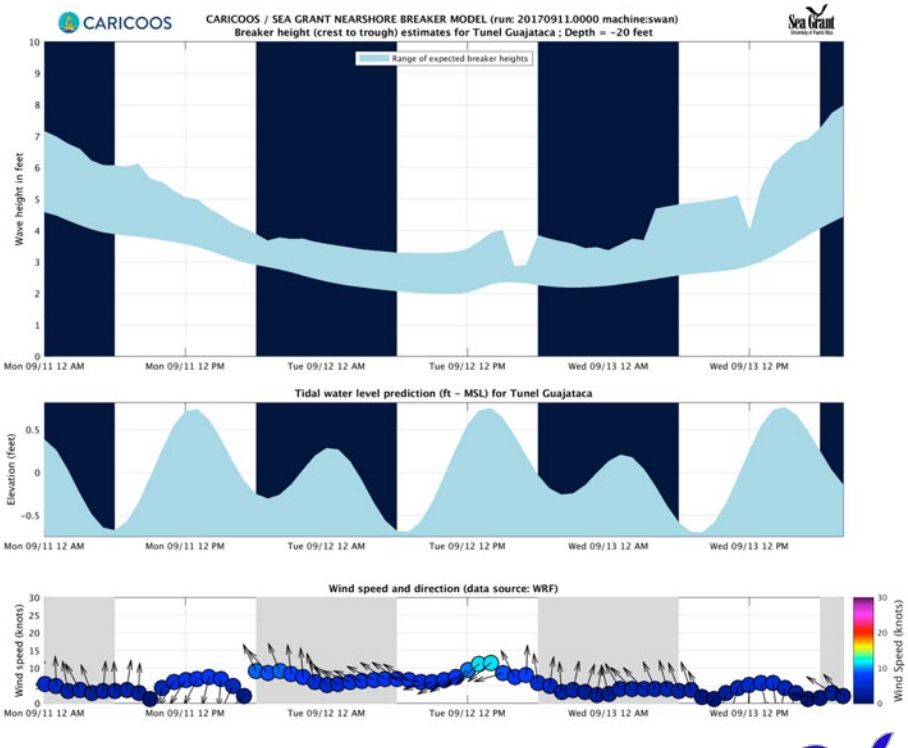
POINT FORECAST



HOW WILL THE WAVES BE? CARICOOS WAVE MODELS

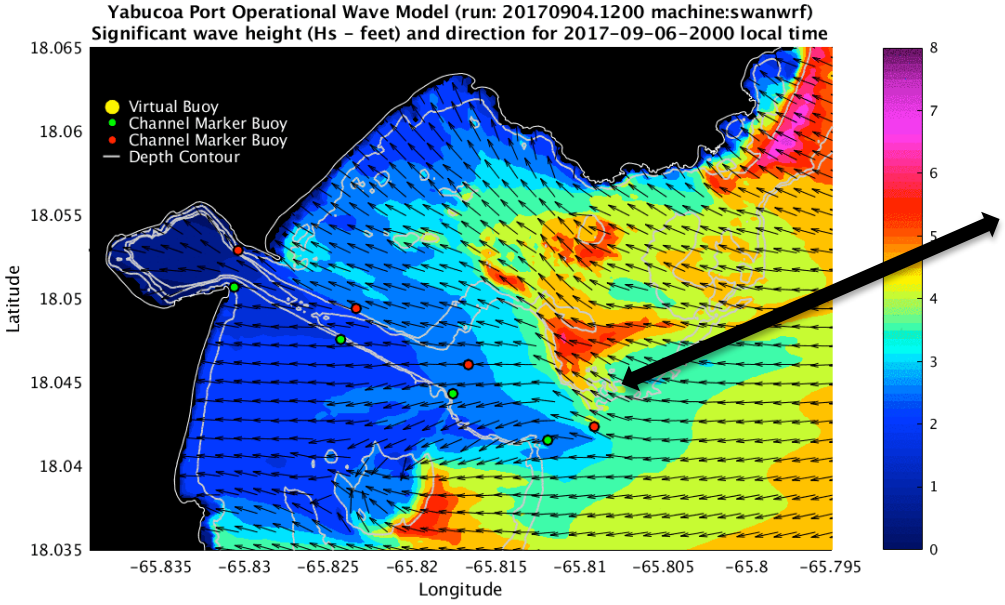
- CARICOOS Breaker Height Forecast provides estimates of breaking wave heights (face value, crest to through) for many of the most popular beaches in Puerto Rico.

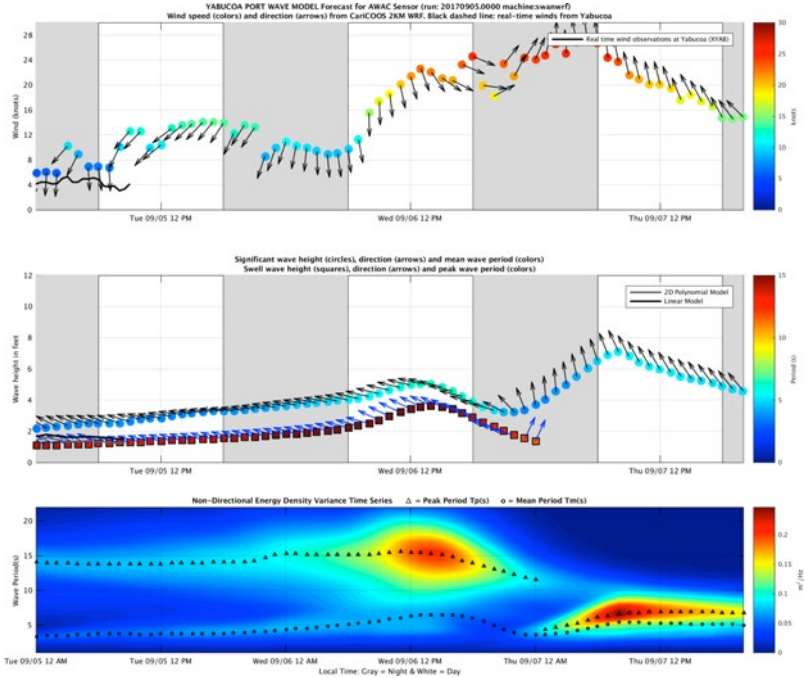




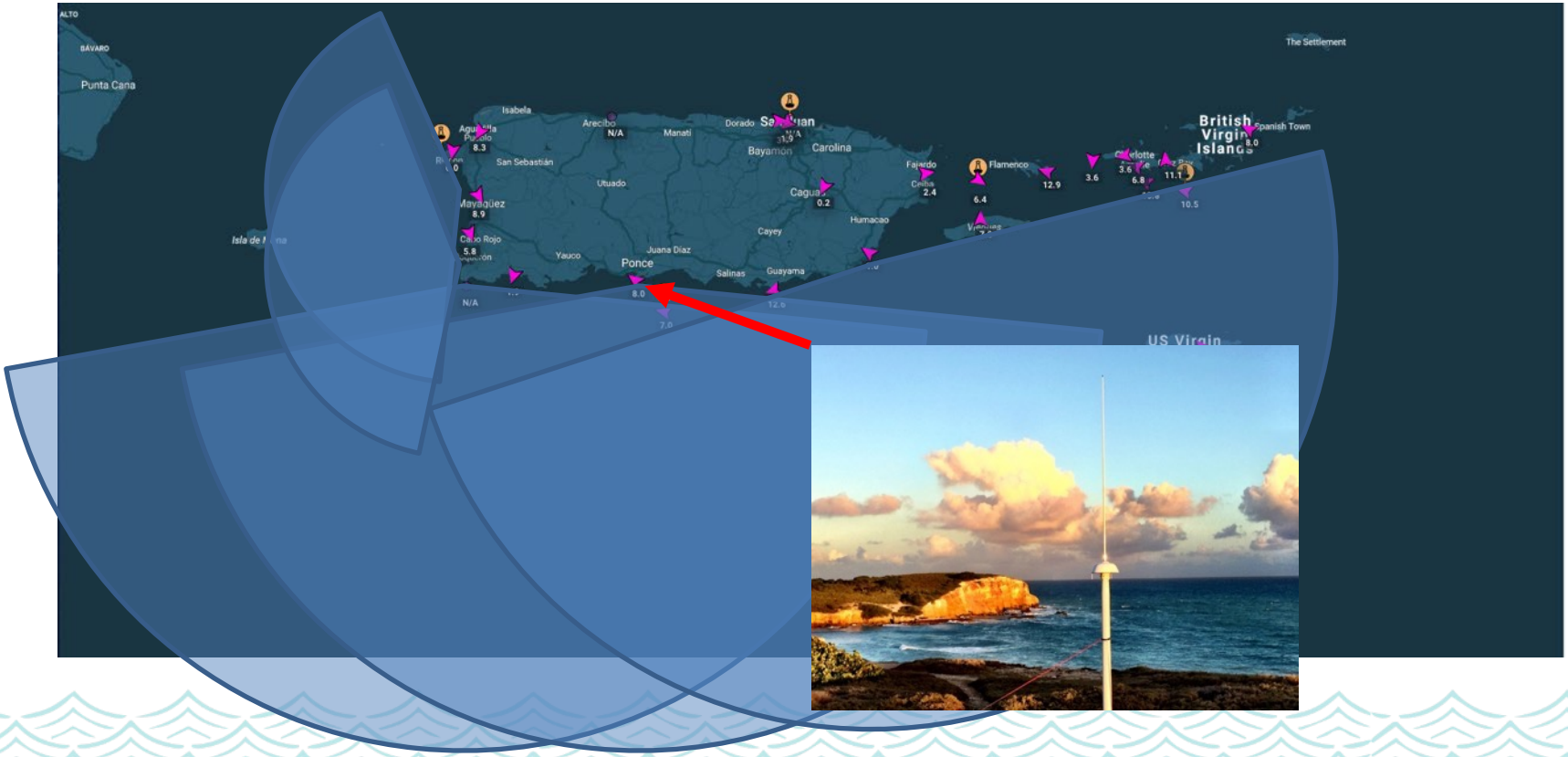
HOW WILL THE WAVES BE? CARICOOS WAVE MODELS

- Maritime Operations





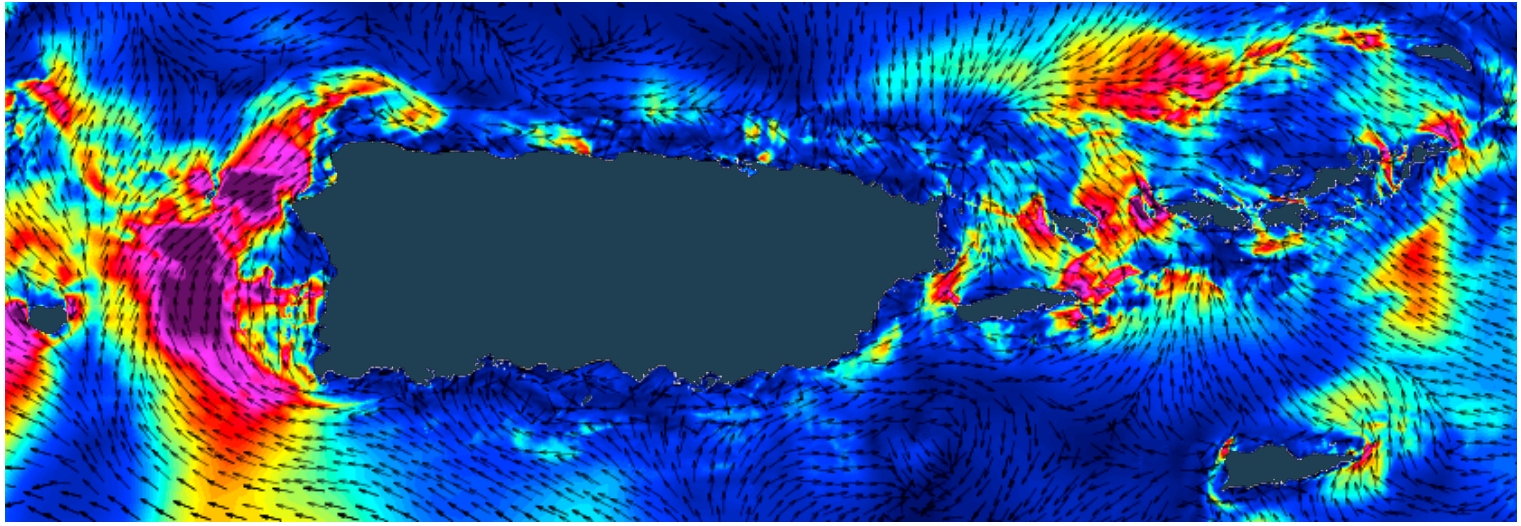
HOW ARE THE CURRENTS? CARICOOS HF RADARS



HOW ARE THE CURRENTS? CARICOOS CURRENT MODELS

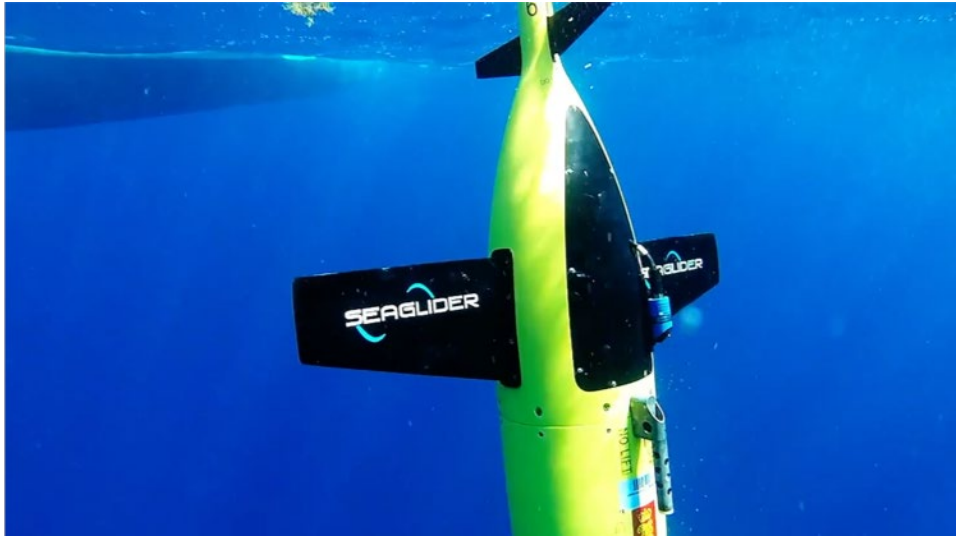
- Forecasting currents has remained a challenge, mostly due to the complex circulation patterns and the physical constraints imposed by the Global Ocean Models(e.g., AMSEAS, HYCOM, RTOFS).
- The numerical model will provide high-resolution predictions of currents, temperature, and salinity.

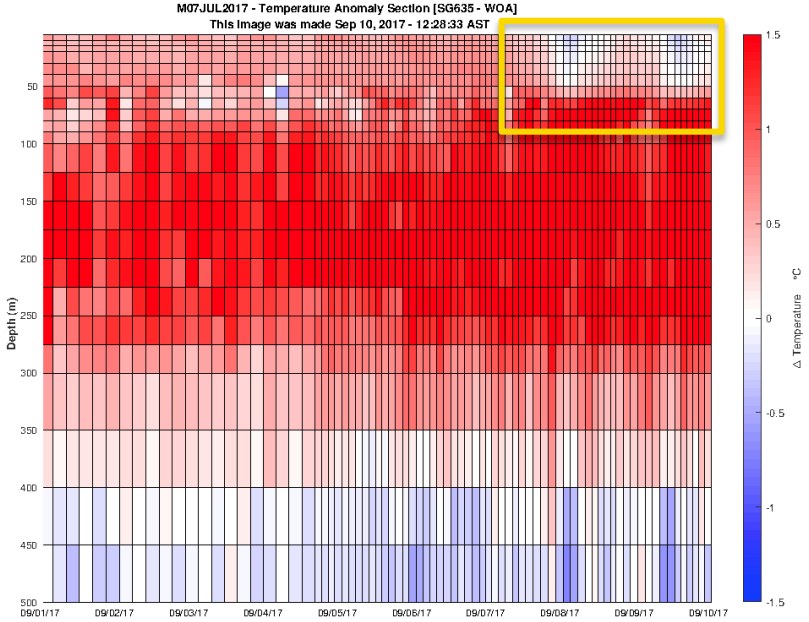
CARICOOS FVCOM



HOW ARE OUR OCEANS CHANGING?

- The autonomous underwater vehicles (known as gliders) dive to depths of up to 1,000 meters and travel hundreds of kilometers across the Atlantic Ocean and Caribbean Sea to study the air-sea dynamics during tropical storms.

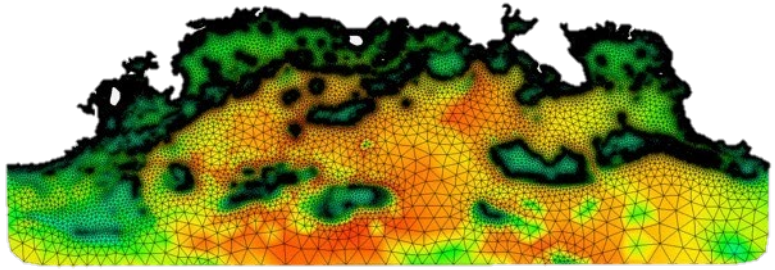


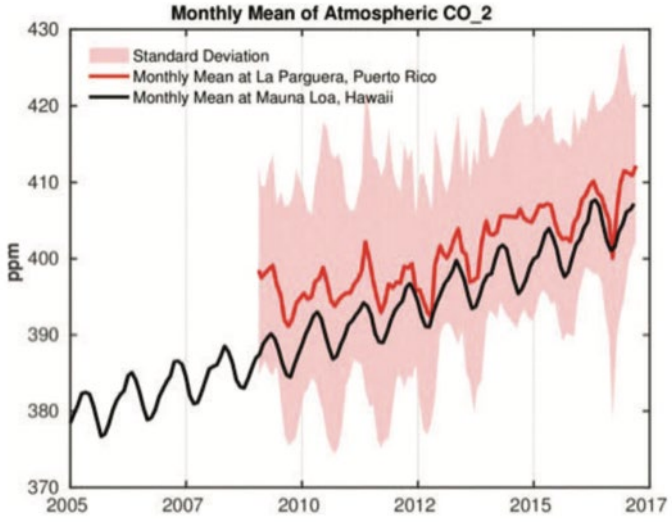


HOW ARE OUR OCEANS CHANGING?

- The Cayo Enrique CO^2 buoy, one of only eleven in the entire world, measures CO^2 in the air and seawater, along with seawater temperature and salinity in the coral reef area of La Parguera, Lajas.

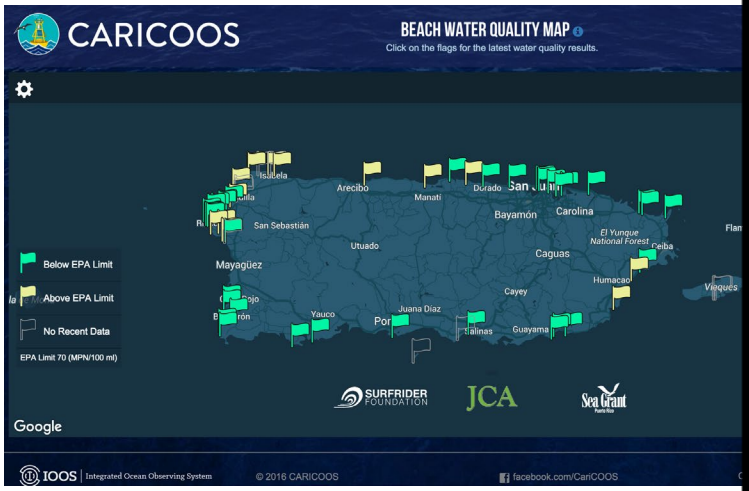
- The data provided by the buoy serves to identify seasonal and annual variations in seawater chemistry at the regional and local levels.

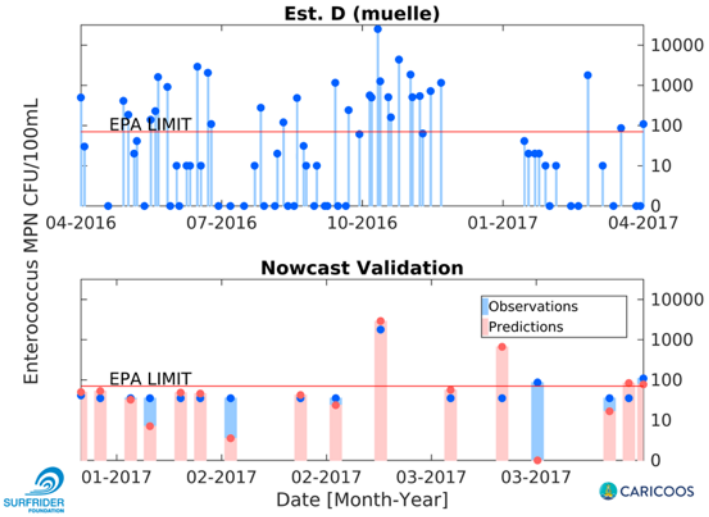




HOW IS THE QUALITY OF THE WATER AT THE BEACHES?

- CARICOOS Beach Water Quality Grade System provides a forecasting tool to predict the potential for unallowable bacteria levels in beach water, and therefore, assess safe swimming conditions on a daily basis.





ALL THIS MADE POSSIBLE BY

CARICOOS TEAM AND …

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THANKS!