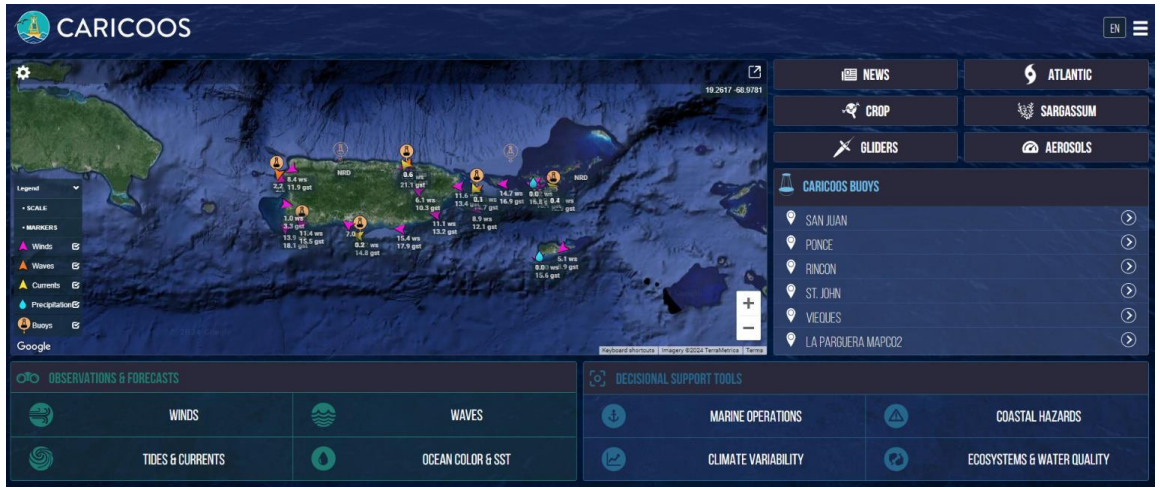
THE CARIBBEAN COASTAL OCEAN OBSERVING SYSTEM (CARICOOS):

A RESPONSIVE STAKEHOLDER-DRIVEN OBSERVING SYSTEM ADDRESSING REGIONAL AND NATIONAL NEEDS IN THE US CARIBBEAN

Navassa

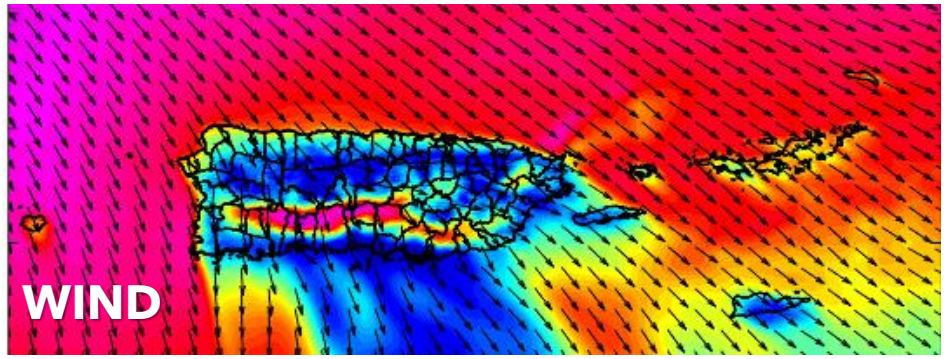
CARICOOS

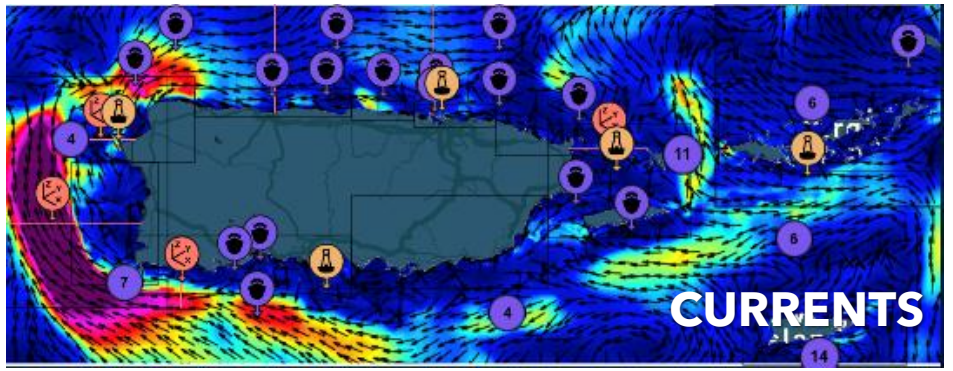


CARIBBEAN COASTAL OCEAN OBSERVING SYSTEM

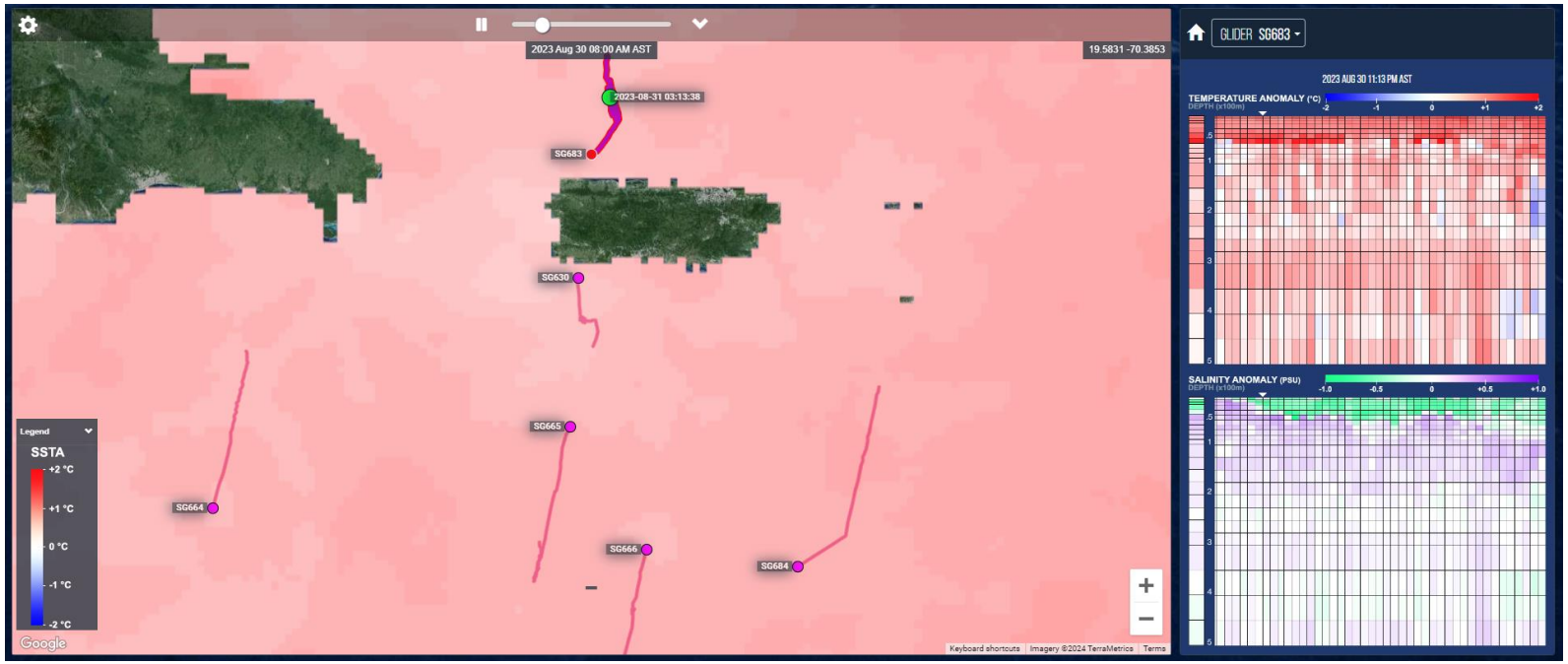
» Observations (buoys, gliders, HF radars, meteo stations) at strategic locations and for model validation.
» Fill observational gaps with numerical models (global, regional, and nested high resolution)

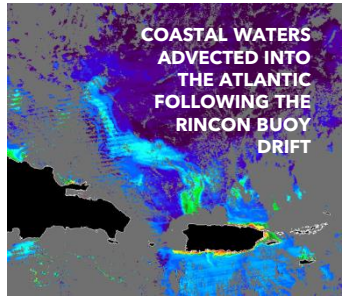
GLOBAL	REGIONAL & NESTED HIGH RESOLUTION
Copernicus	WRF (wind)
RTOFS	SWAN (waves)
AMSEAS	FVCOM (coastal ocean circulation)
GFS (waves & Wind)	

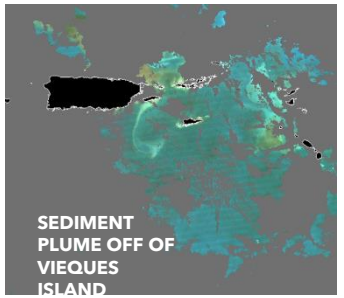




REGIONAL AND NESTED HIGH-RESOLUTION NUMERICAL MODELS





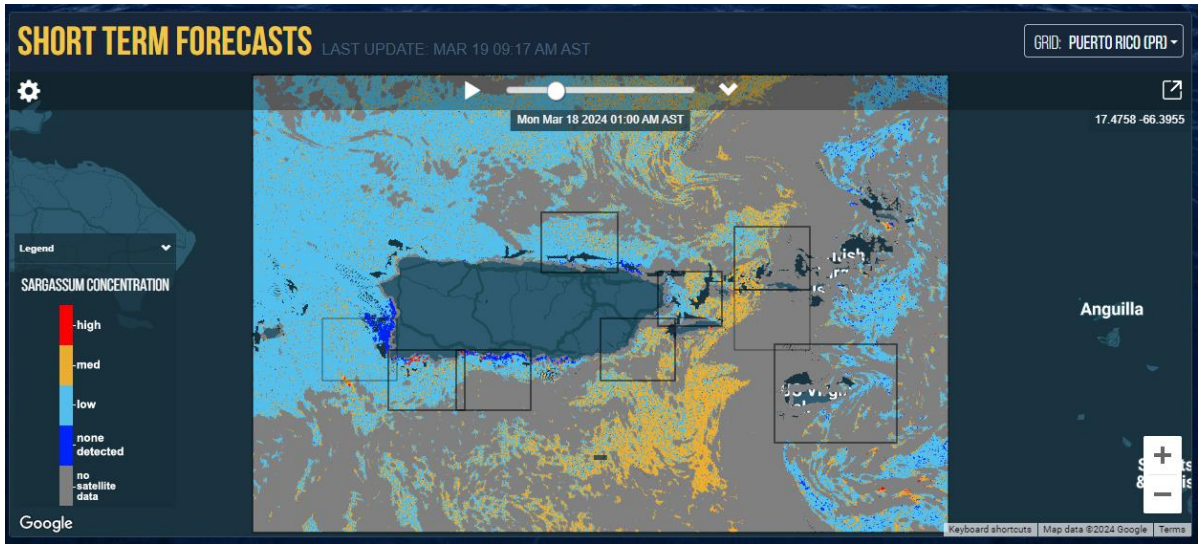


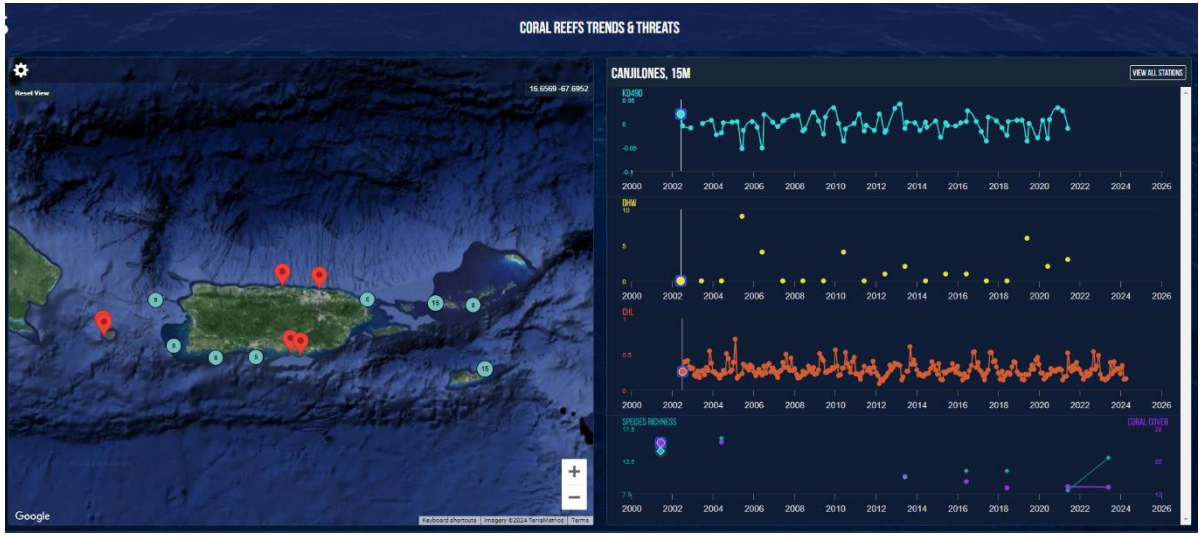
» Data collected contribute to resolving, understanding, and monitoring upper-ocean dynamics to improve tropical cyclone intensification forecasts.

UNDERWATER GLIDER OPERATIONS IN THE CARIBBEAN SEA AND TROPICAL NORTH ATLANTIC TO IMPROVE TROPICAL CYCLONE INTENSIFICATION FORECASTS

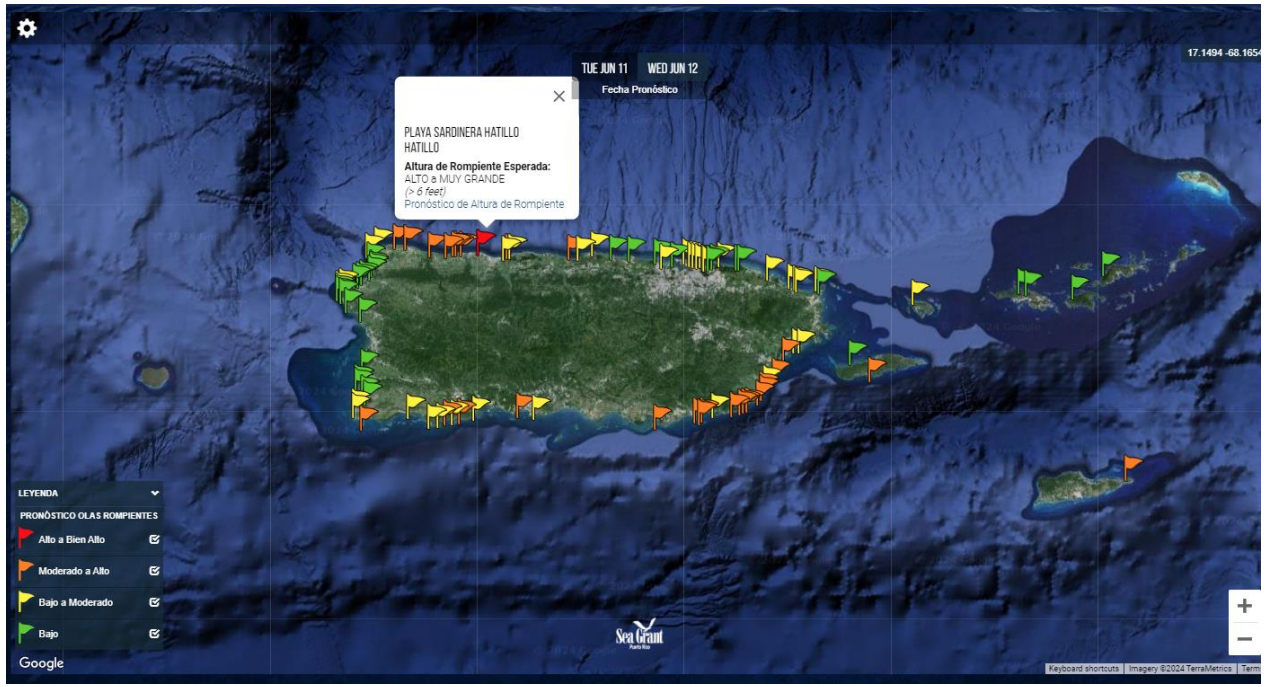
Data products:

- Sargassum Tracker Forecast Tool
- Coral Reefs Trends & Threats
- Water Quality Virtual Buoys - Near real time data into a multi-year time series of various water quality parameters

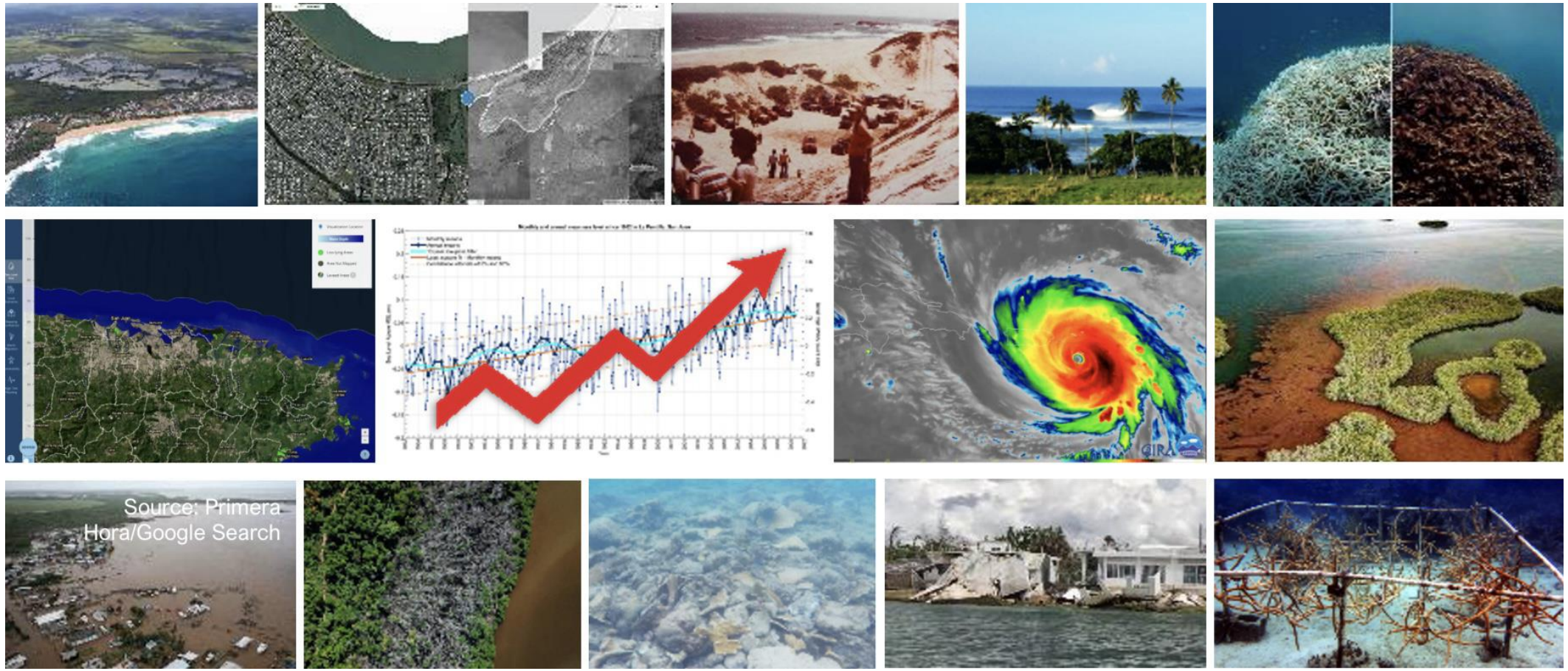




EXAMPLE: COASTAL AND MARINE ECOSYSTEMS

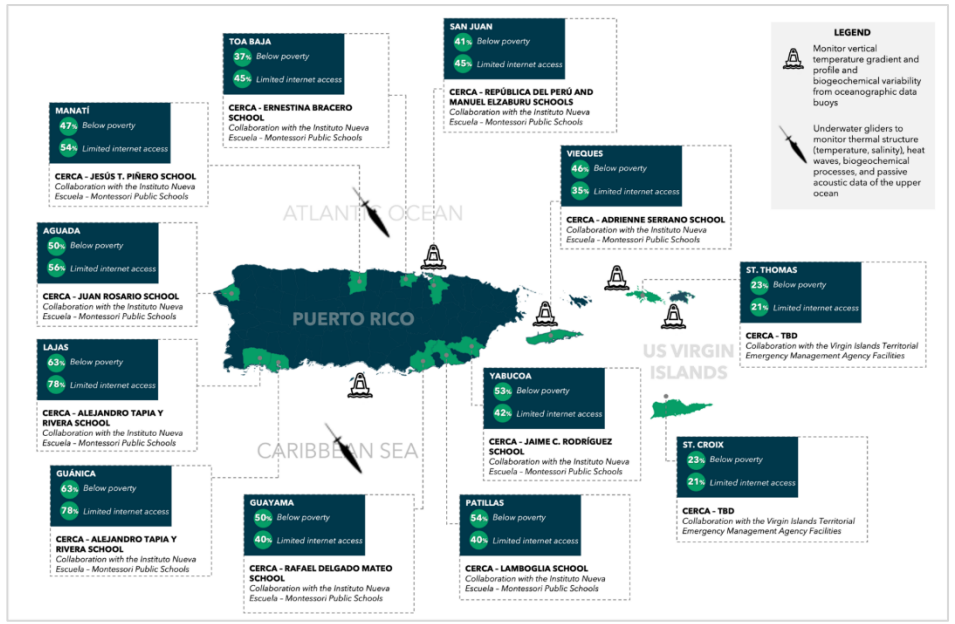


EXAMPLE: COASTAL HAZARDS

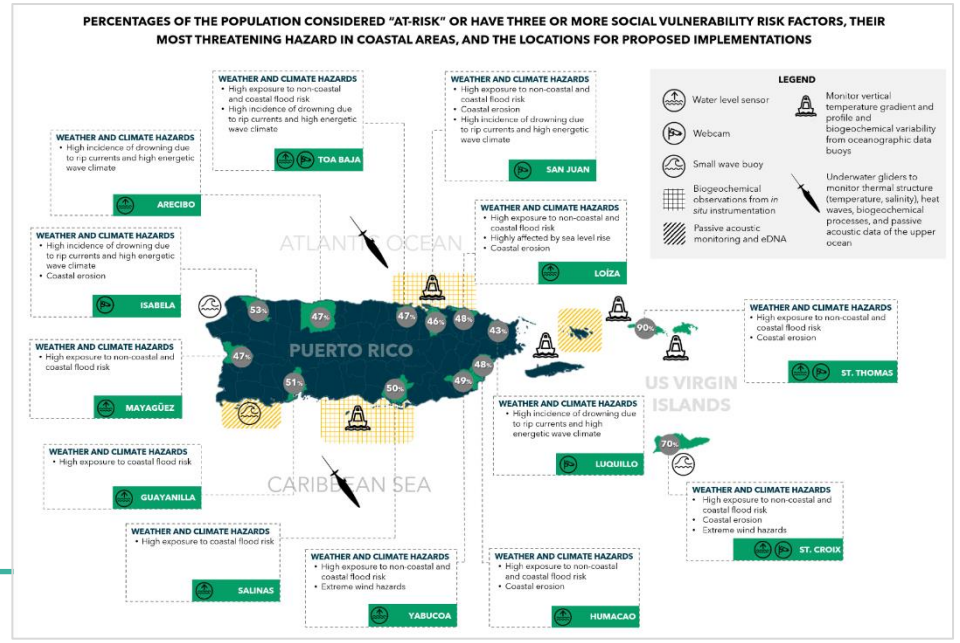


HOW DOES CARICOOS PLAN TO CONTINUE ADDRESSING REGIONAL AND NATIONAL OCEAN DATA INFORMATION NEEDS IN THE US CARIBBEAN?

- Island frontline communities—already overburdened and under-resourced—experience climate and weather impacts more intensely and recover from them less quickly and thoroughly.
- Bring in additional high-quality coastal environment data/information, helping communities/sectors be more well-informed to cope, prepare, and prevent weather and climate-related extreme impacts.
- Enhancing coastal resilience in the region demands efforts towards educating citizens on coastal hazards, their exposure to these, and official information they should be aware of when facing extreme weather threats.



Percentages of the population (gray circles) considered "at-risk" or have three or more social vulnerability risk factors, their most threatening hazard in coastal areas (dashed boxes), and the locations for proposed implementations (refer to legend). The social vulnerability risk factors – capacity of the community to withstand a disaster - measured by the U.S. Census Bureau (2020) and Guannel et al. (2022) were based on poverty status, disability status, number of caregivers in the households, unit-level crowding, vehicle access, broadband internet, employment, education, age, and health insurance. The most threatening hazards for each selected site were obtained from the Puerto Rico Emergency Management Bureau (2021) and Guannel et al. (2023). Selected municipalities with a high percentage of the population (green circles) below the national poverty line and with limited internet access, the facilities to host the Coastal and Aquatic Hazards Education Centers (CERCA; dashed boxes), and the locations for proposed implementations (refer to legend). The U.S. Census Bureau (2020) and Guannel et al. (2022) measured the social vulnerability risk criteria.



ENHANCING DATA AND INFORMATION ACCESSIBILITY THROUGH TAILORED PRODUCTS FOR COASTAL COMMUNITIES

» To provide critical coastal environment data/information to vulnerable frontline low-income/underserved communities, CARICOOS proposes expanding its capacity to monitor water level, waves, heat waves, coastal hazards, and ecosystem change using accessible, modular, state-of-the-art instrumentation and co-design of data products and information to meet specific sector/communities' requirements.

Install up to ten (10) low-cost water level sensors

Increasing the availability and access to water level data in coastal areas/locations prone to flooding would improve people's awareness and reduce losses by issuing timely early warnings and effective response mechanisms.

Fill critical wave data gaps in coverage with short-term deployments of low-cost wave buoys

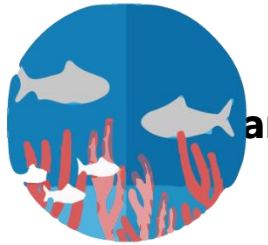
To calibrate and validate the CARICOOS operational wave forecast model in nearshore waters, particularly wave conditions during extreme events such as tropical and extratropical cyclones. The site selection criteria were wave runup and overtopping incidents, benthic habitats that dissipate wave energy, and locations that have never been measured.

Install and operate twelve (12) coastal webcams

Remote sensing video monitoring techniques can potentially monitor a wide range of processes and occurrences that could impact the safety and health of frontline/vulnerable communities, individuals/beachgoers, and ecosystems.

Install thermistor string assemblies on CARICOOS oceanographic data buoys mooring system

To monitor changes in temperature along the water column at all CARICOOS data buoy locations and collect data to develop the above forecast tool.



Passive Acoustic Monitoring (PAM) and eDNA for Coral Reef Biodiversity and Ecosystem Health

Provide information such as spatiotemporal changes in coral reef communities and anthropogenic sound (anthrophony) impacts on coral reef diversity.

Develop decision-support tools and ingest data and products to servers accessible to pertinent agencies

For emergency management and public safety, improve community preparedness regarding warnings, and increase understanding of risks and appropriate flood responses.

CENTRO EDUCATIVO DE RIESGOS COSTEROS Y ACUÁTICOS

Coastal and aquatic hazards education centers

Deployment and operation of educational infrastructure for the education of underserved communities on coastal hazards through an alliance with schools, emergency management offices, PR Sea Grant, the Puerto Rico Climate Change Council and the National Weather Service. Increase youth and community awareness of coastal hazards.

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Melissa Melendez
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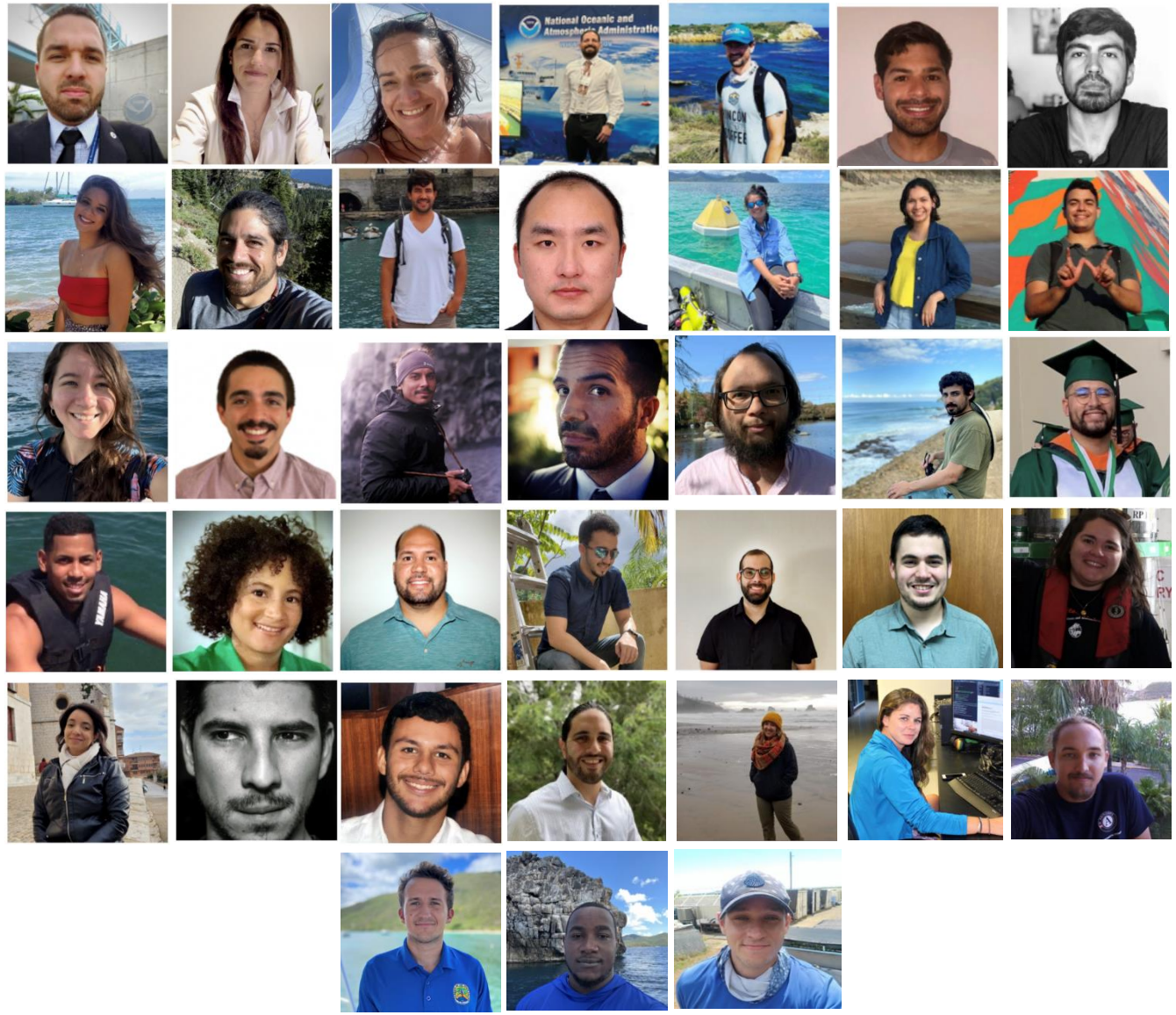
Jaynise Perez
Giovanni Seijo
Fabian García
Adail Rivera
Peter Rivera
Edward Cruz
Luis Pomales
Priscila Vargas
Loraine Martell
Omar López
José Santiago
Miguel Solano
Colin Evans
Argelys Monserrate
Daniel Martinez
Patricia Chardón
Luis Pérez
Nérida de Jesús
Alexandra Padilla
Ihan Acevedo
Jesiniel Nieves
Mary Acosta
Monique Lorenzo
Diego Capre
Haibo Xu
Francisco Velez
Priscila Molina
Andrew McGregor
Dishon Heyliger
Zachary Briggs
Antonio Farchette
Sonora Meiling
Amber Packard



INCREASING EQUITABLE ACCESS

THANK YOU!

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