

17th

SESSION IOCARIBE

UNCREWED SYSTEMS IN THE TAC



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Intergovernmental
Oceanographic
Commission

Sub-Commission for the Caribbean
and Adjacent Regions

Subcomisión para el Caribe y
Regiones Adyacentes

Bogotá, Colombia
May 08 - 11, 2023

SCOTT GLENN

RUTGERS UNIVERSITY, USA



GOBIERNO DE COLOMBIA



COMISIÓN
COLOMBIANA
DEL OCEANO

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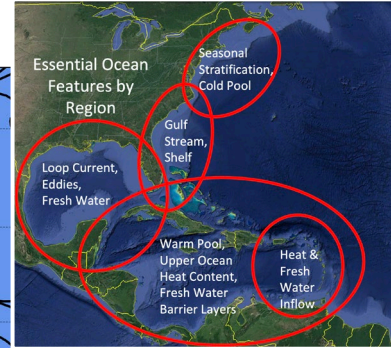
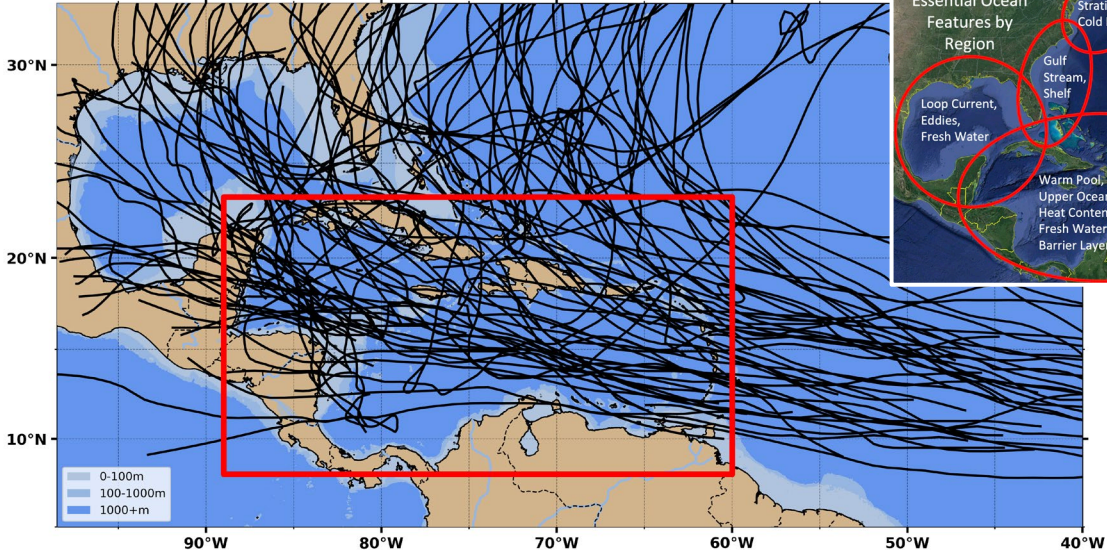


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Hurricane Tracks & Essential Ocean Features

Caribbean - 2000 to 2022 - 99 Hurricanes

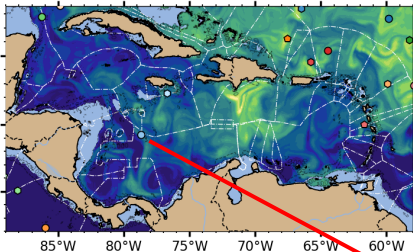


Essential Ocean Features impacting hurricane intensity are known

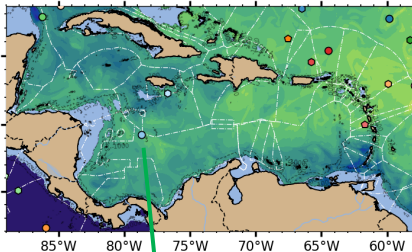
Operational Forecast Model Differences

Salinity (150 m) - 2023-04-10 12:00:00

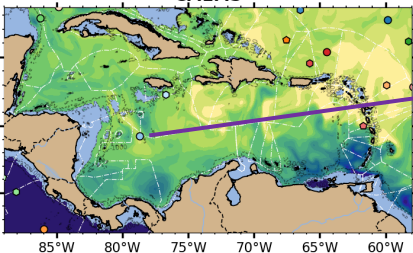
RTOFS



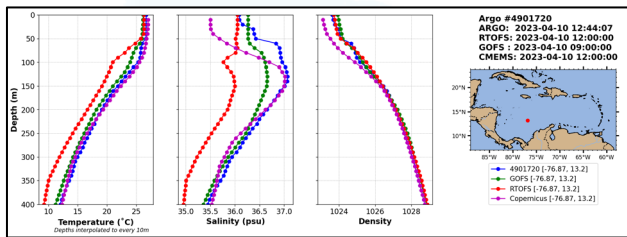
GOFS



CMEMS



Salinity (psu)



Argo Data

RTOFS - NOAA

GOFS - Navy

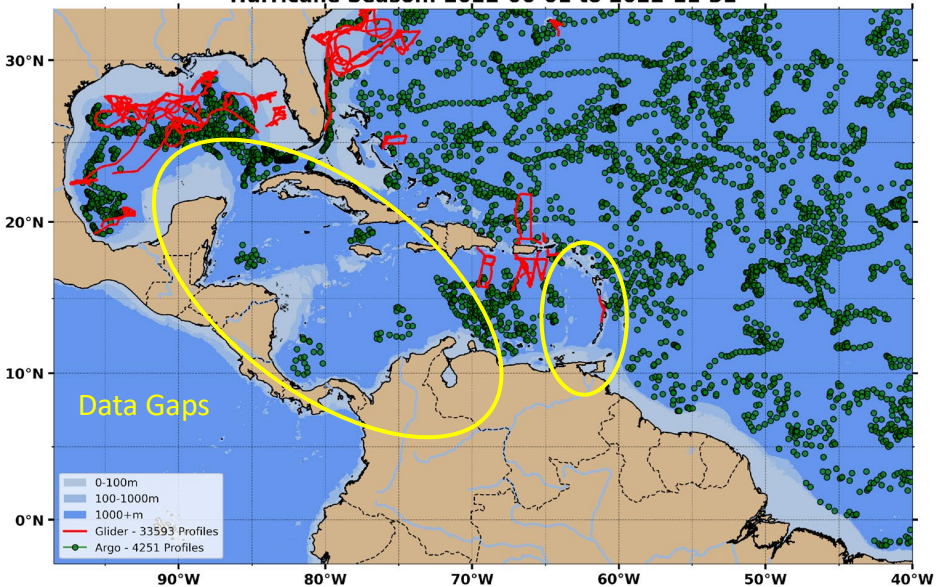
CMEMS - European

Quote from NOAA
Environmental Modeling
Center: "We are limited by a
dearth of subsurface ocean
data for assimilation"



2022 Ocean Subsurface Profile Data

Hurricane Season: 2022-06-01 to 2022-11-31



Green: Argo Float Profile Locations (Global)

Red: Underwater Profiling Glider Tracks (US, Mexico, Bermuda, Bahamas, Puerto Rico, Virgin Islands, Dominican Republic, Martinique)





Pilot Study Regions



- » **Tropical Americas & Caribbean Region (TAC)**
- » **North Pacific Ocean and Marginal Seas (NPOMS)**
- » **North East Indian Ocean (NEIO) - Bay of Bengal**
- » **South West Indian Ocean (SWIO)**

Benefits

- Co-designed, regionally distributed ocean observing pilot studies - *to develop collaborative capacity and demonstrate mutual value*
- Increased coverage and delivery of ocean data to forecasting centers and scientists – *to expand critical observations across international boundaries*
- More accurate characterization and understanding of essential ocean-atmosphere features and processes – *to improve Earth System Models and tropical cyclone forecasts*

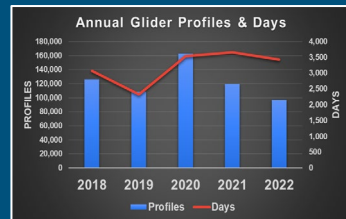
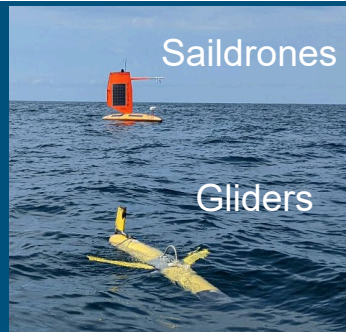
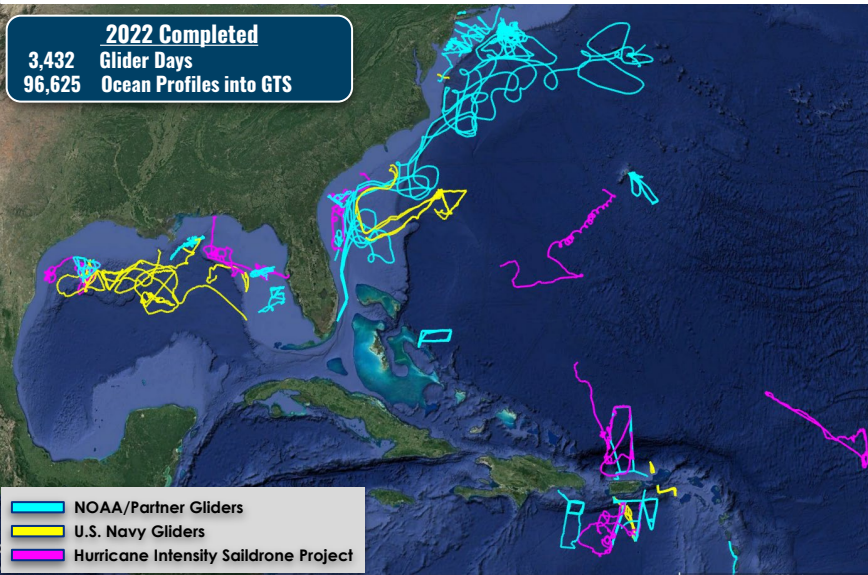
2022 NOAA Operations Overview



IOOS
Integrated Ocean
Observing System

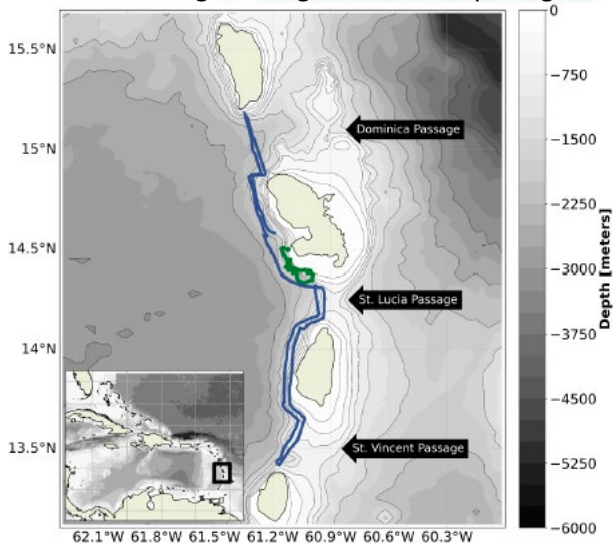


2022 Completed
3,432 Glider Days
96,625 Ocean Profiles into GTS



Vetlesen Foundation Contributions - Inflow

Hurricane Gliders observe transports of water, heat and salt through inter-island passages



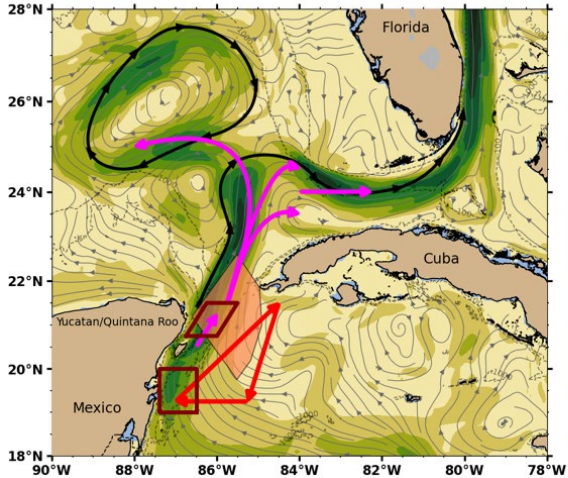
Hurricane Gliders, equipped with additional acoustic sensors, can also listen for whales



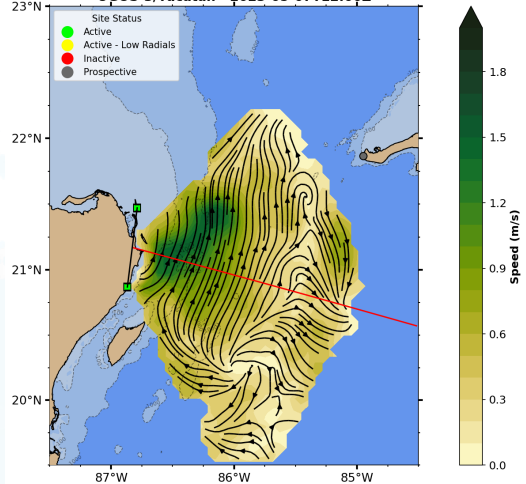
<https://rucool.marine.rutgers.edu/martinique/>

US National Academies Contributions - Outflow

RTOFS - Currents (0 m) - 2023-02-01 00:00:00 UTC



HFRadar - Surface Currents - OI UGOS-3/Yucatan - 2023-05-07T12:00Z



Yucatan Strait HF Radar

<https://rucool.marine.rutgers.edu/ugos-hfr/>

What Gaps Remain?

We have:

- An Intergovernmental Organization – IOCARIBE-GOOS
- A UN Ocean Decade-endorsed framework & approach – TAC-OOFS & Co-Design
- The Co-Design Tropical Cyclone Exemplar Pilot Study as a high-impact rally point
- Initial investments by NOAA, Vetlesen Foundation, National Academies, and others

We need:

- Continued investments in equipment and operations by governments and foundations
- Establish a network of Gliderports, Saildrone-ports, Float & Drifter deployment vessels, HF Radar sites
- Mechanisms to enable uncrewed systems to collect operational forecast data across national boundaries
- Training and Capacity Building across member states to sustain the network for years to come



Glider student training at UVI