

Improving Hurricane Forecasting with Gliders

2022 Review and Look Ahead to 2023

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Hurricanes and Gliders

Essential Ocean Features (EOFs)

Linked to rapid intensification and weakening
May occur close to populated and vulnerable coastlines.

Key Point:

EOFs are challenging for models because:

Highly dynamic nature
Very limited sub-surface observations to initialize models

Glider Operations

Sustained and targeted observing
Real-time ocean observations to improve ocean representation in the models
Demonstrated to reduce error in hurricane intensity forecasts

Essential Ocean features in the Atlantic Basin



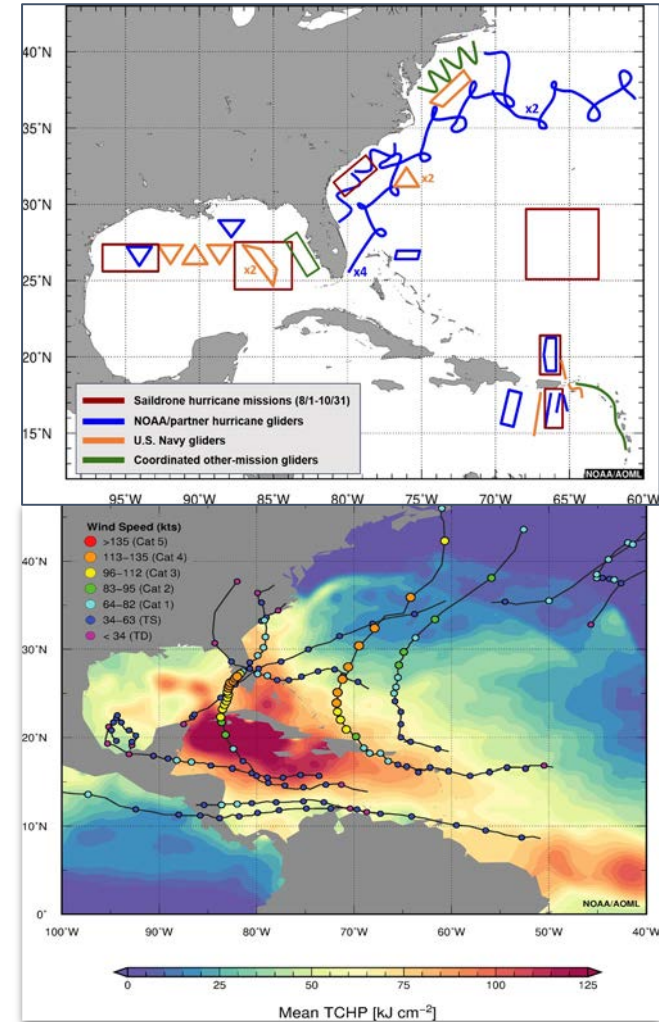
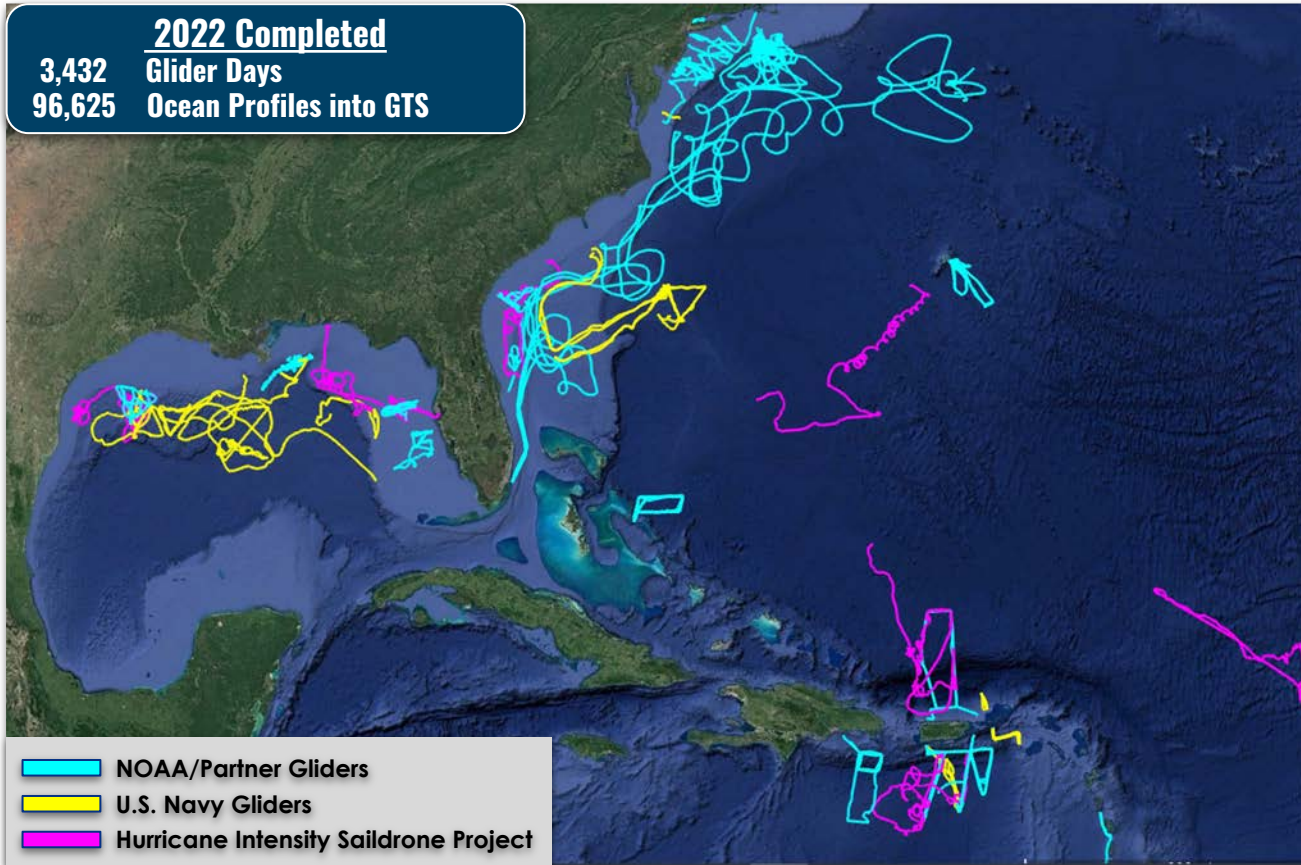
Partnerships make it possible

Region	Tropical Atlantic & Caribbean	Mid-Atlantic Bight	Gulf of Mexico	South Atlantic Bight
Operator				
Support				
Leveraged				
Lead by:				

2022 highlight:

Research and operations conducted through a multi-Institutional effort that includes sharing logistics and regional knowledge, resulting in cost-efficiency, enhanced productivity, and sharing of resources.

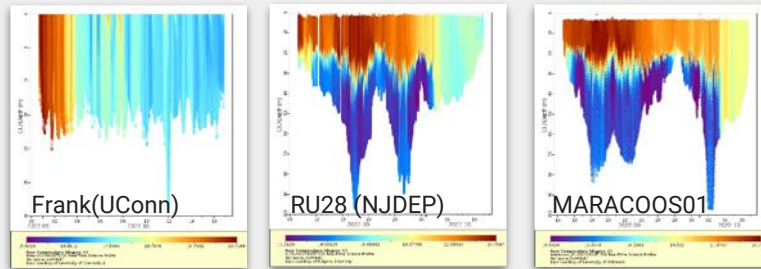
2022 Operations Overview



Regional Highlights

Mid Atlantic

- 1 Navy glider + heavily leveraged missions
- Gliders captured mixing and heat removal from Ian remnants - across 270 miles (Norfolk to Long Island Sound)



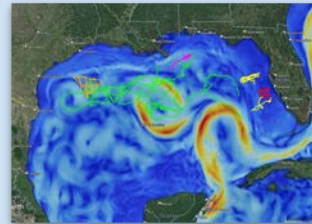
South Atlantic

- 2 Navy gliders + leveraged missions
- Co-located observations with saildrone
- Smooth operations with the Navy gliders & GOC
- Media event footage at Gray's Reef NMS used in local, regional, and national coverage of gliders, saildrones, and Hurricane Ian



Gulf of Mexico

- 2 hurricane gliders + 8 Navy gliders
- Saildrone co-location for 1st time
- Expansion of hurricane glider missions in eastern Gulf (USF)
- Mexican partners glider data added to GANDALF visualization tool



Tropical Atlantic and Caribbean Sea

- 6 hurricane gliders + 3 Navy gliders
- Co-located observations with saildrones
- 100% success rate in operations
- Ocean conditions and location of observational assets monitored through NEOS AOML OceanViewer
- AOML: Continuous assessment of RTOFS ocean model
- Data collected in/near 3 storms: Earl, Fiona, Nicole

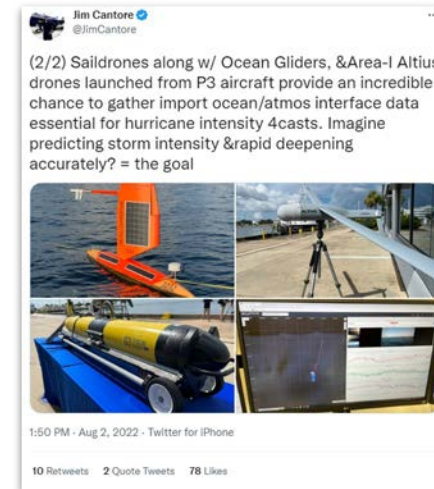


Navy Collaboration

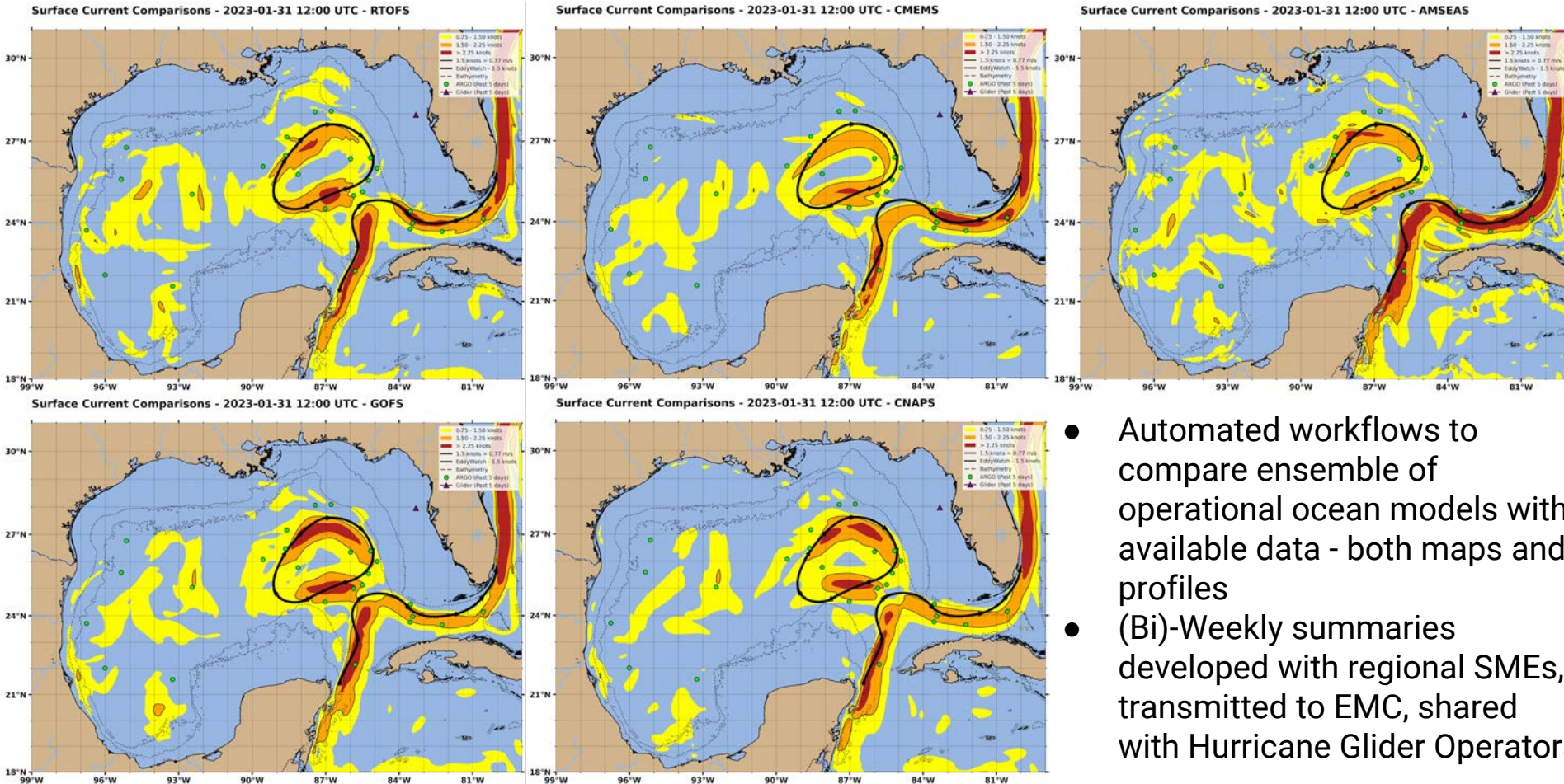
5th year of the NOAA-NAVY collaboration

Navy glider contributions are an important part of the coordinated hurricane glider effort

- 12 NAVY glider missions filled observing gaps
- Integrated, complementary observations captured by UxS during Hurricane Fiona (gliders, Saildrone, UAS, drifters)
- Glider co-location exercises with Saildrone
- Coordination of hurricane glider observations with NOAA research partners
- Included in a Global Ocean Observing System (GOOS) – Ocean Observing Co-design ‘Exemplar’ project
- Underwater Glider User Group workshop



IOOS Model/Data Comparisons



- Automated workflows to compare ensemble of operational ocean models with available data - both maps and profiles
- (Bi)-Weekly summaries developed with regional SMEs, transmitted to EMC, shared with Hurricane Glider Operators

2023 Plans

