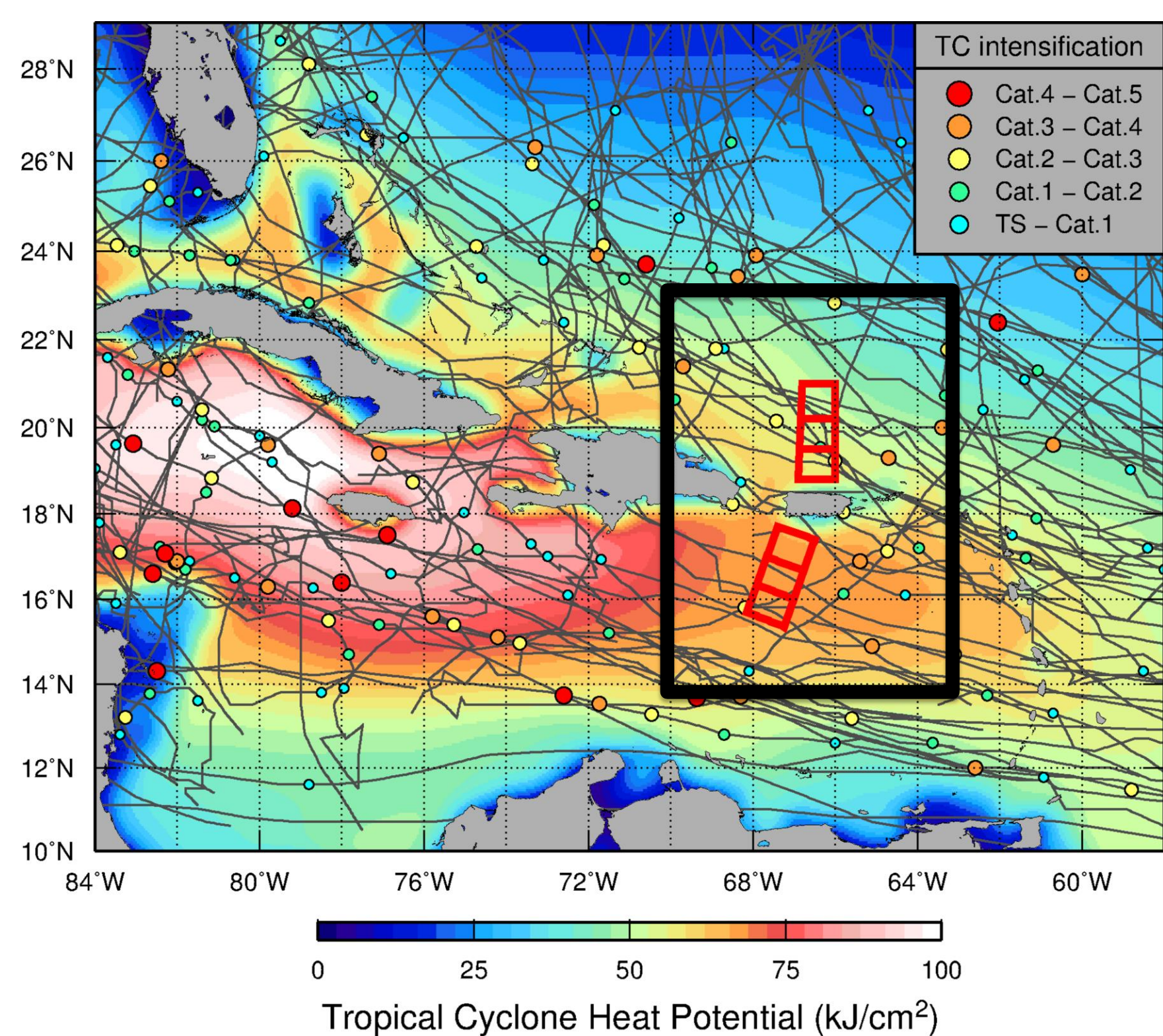
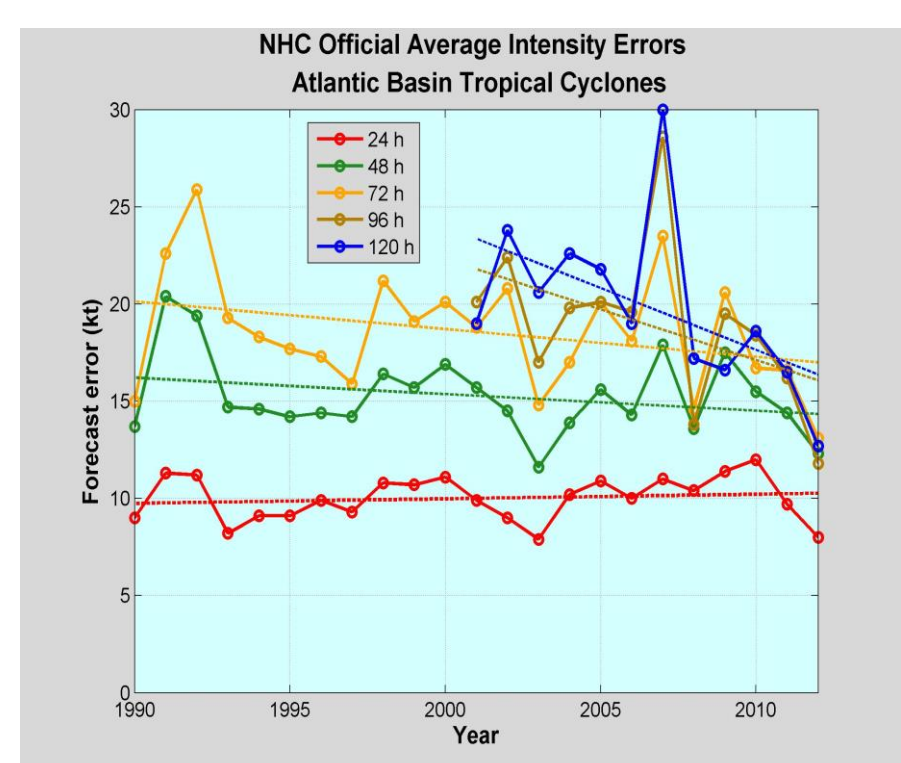
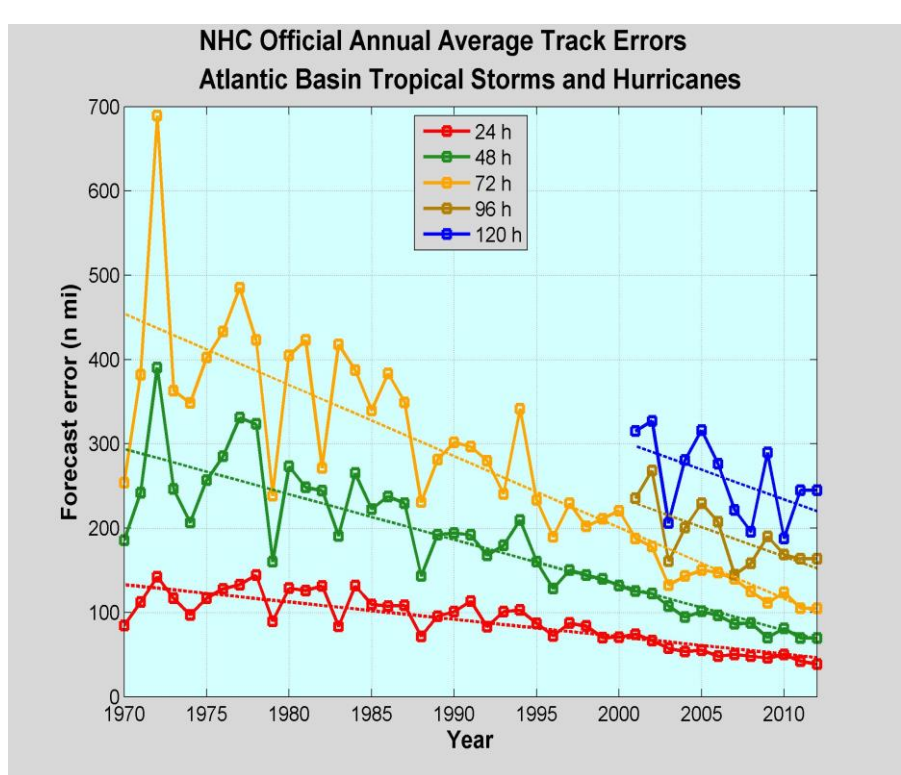


NOAA Emerging Technologies Conference, Washington DC, July 2016

1. Motivation



- Tropical Cyclone (TC) track forecast error has reduced over the last two decades, while the intensity forecast error has not shown substantial improvements
- In the North Atlantic Ocean and Caribbean Sea, there is not a sustained ocean observing system in place to support TC forecast
- These areas are characterized by large UOHC, which, under appropriate atmospheric conditions, may play a role in TC intensification. Therefore, a network of gliders was setup.

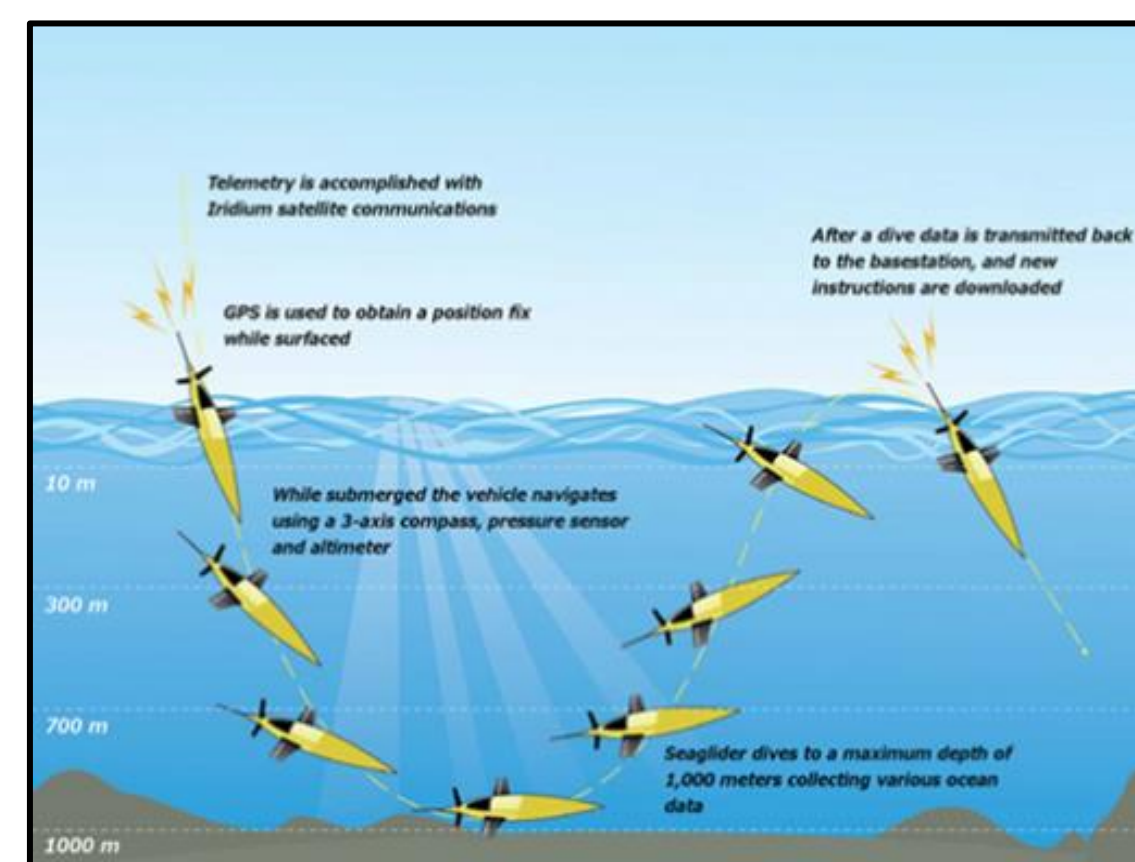
2. Goal

Enhance our understanding of air-sea interaction processes during hurricane force wind events

Objectives

- Assess impact of hurricane force winds on upper ocean density structure, and
- Assess impact of ocean profile data from underwater gliders in hurricane intensity forecasts

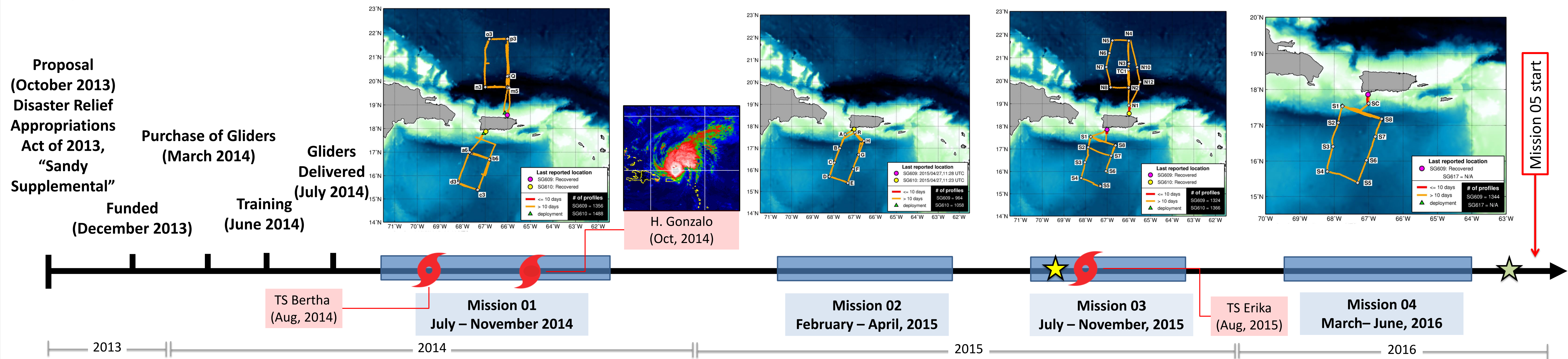
3. Underwater Gliders



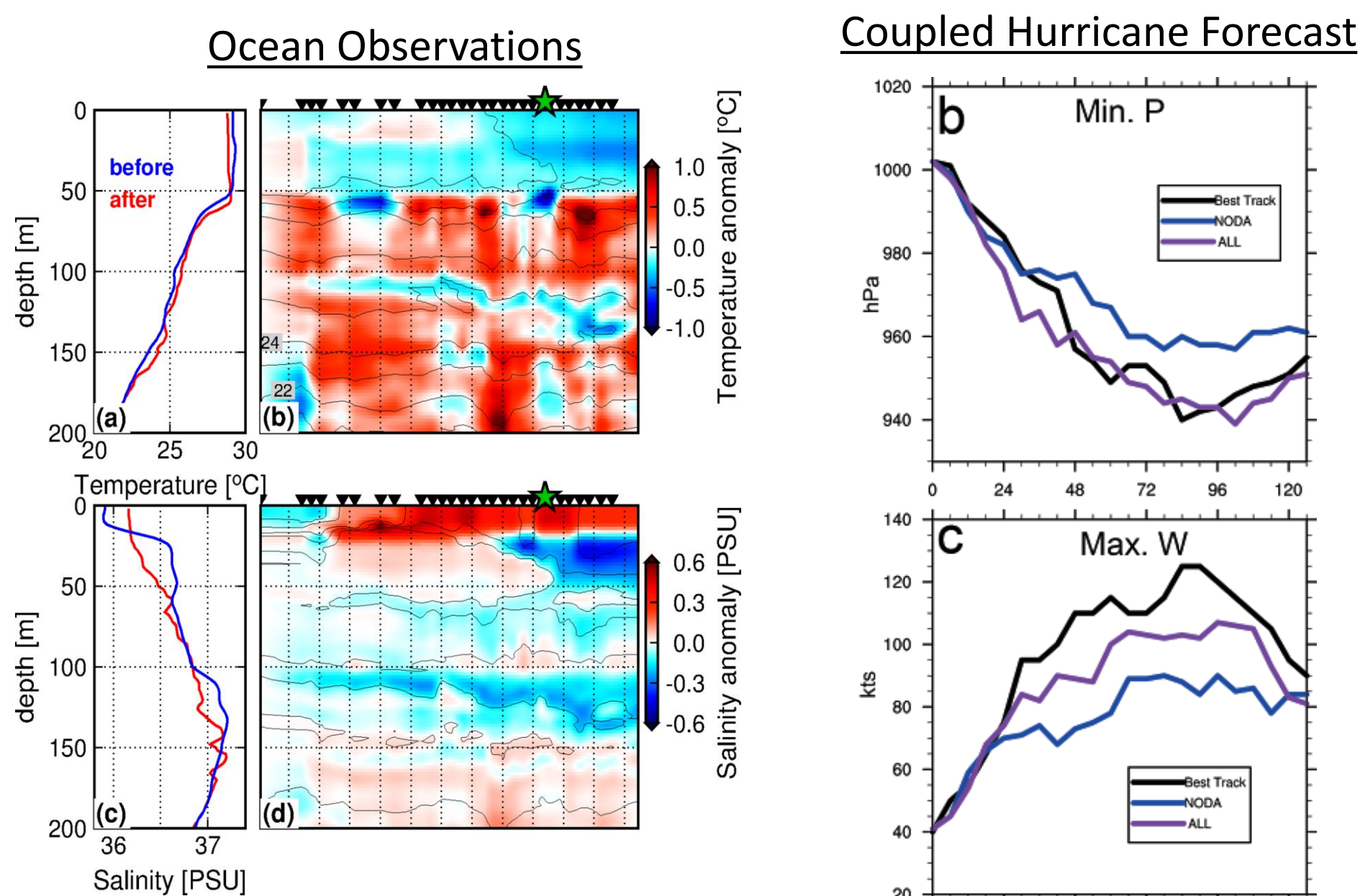
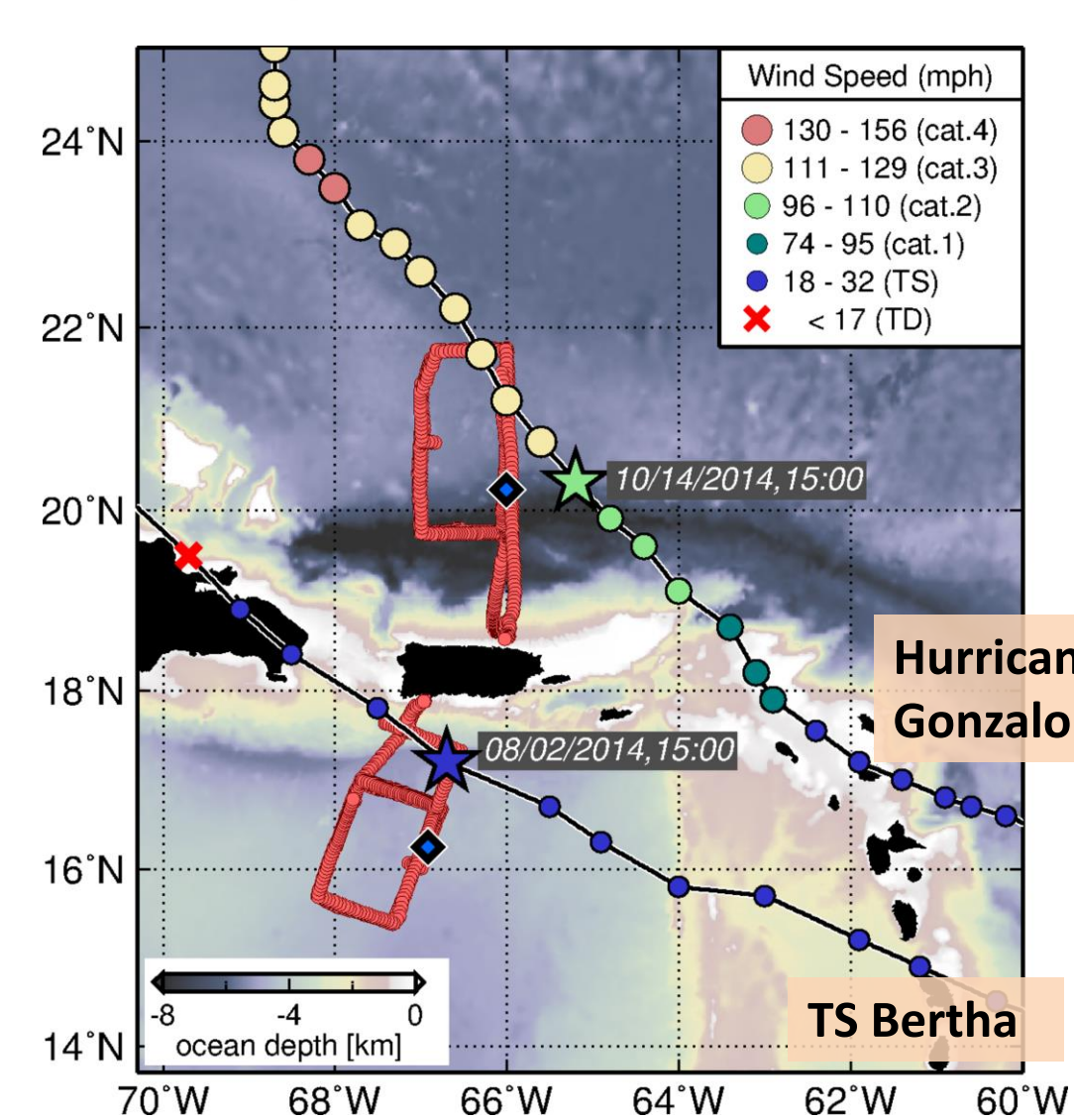
Underwater gliders are autonomous underwater vehicles (AUVs) that can be remotely operated under TC wind conditions. They can be configured with different oceanographic sensors, from which, most common configurations include sensors to measure temperature, salinity, and dissolved oxygen.



4. Operations timeline



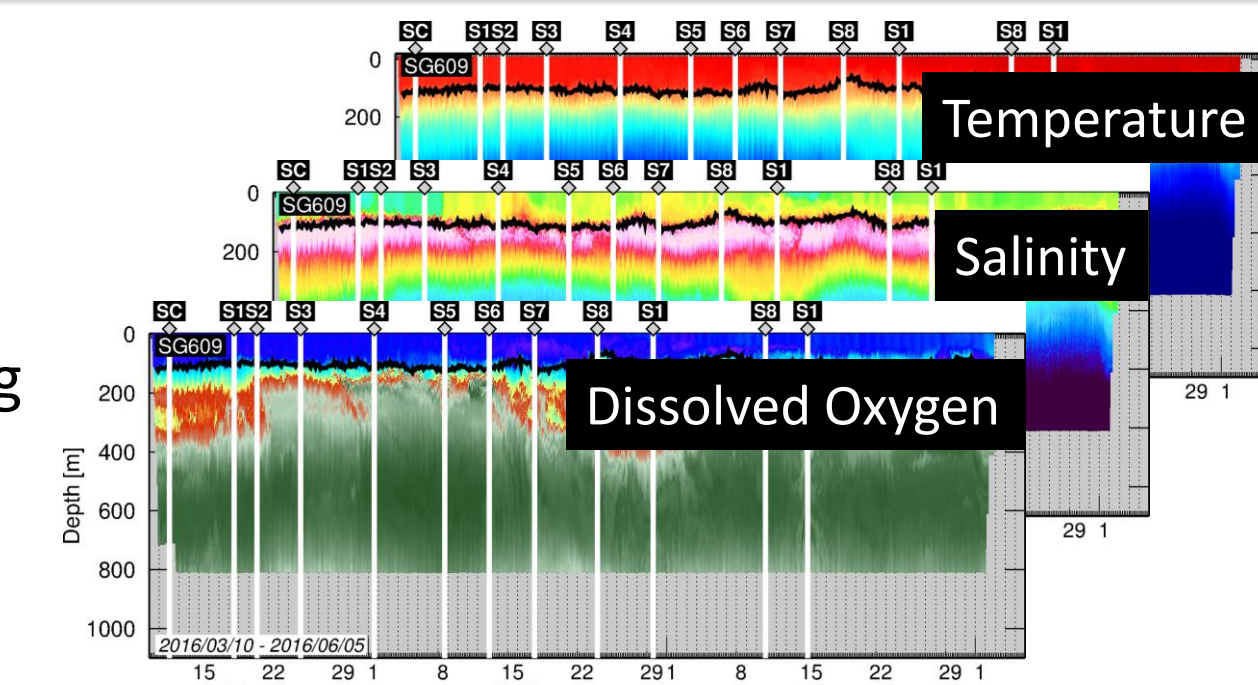
5. Key results



- During Hurricane Gonzalo, glider observation revealed that upper-ocean cooling was partially suppressed by a near-surface barrier layer, that characterized by enhanced stratification due to low salinity conditions.
- Assimilation of underwater glider data and along with other ocean observations had a positive impact on Hurricane Gonzalo intensity forecast using the next generation ocean-atmosphere coupled HYCOM – HWARF model.

6. Data Distribution

- Data is distributed in real-time the Global Telecommunication Systems (GTS), through NOAA-AOML webpages, and through NOAA Integrated Ocean Observing System (IOOS) Data Assembly Center (DAC)
- These data are also used to initialize Tropical Cyclone forecast models



7. Operation Highlights

- Four underwater glider missions were successfully completed up-to-date. The fifth mission during the North Atlantic Hurricane Season is currently underway featuring 4 gliders
- Approximately 10,000 profile observations of each parameter, including temperature, salinity, and dissolved oxygen, were collected during the first two years of operations, including unique datasets under TC wind conditions.

Publications

Domingues et al., (2015), Upper ocean response to Hurricane Gonzalo (2015): Salinity effects revealed by targeted and sustained underwater glider observations, Geophys. Res. Lett., 42.
Dong et al., (under review) Impact of underwater glider on Hurricane Gonzalo (2014) forecast. Manuscript currently under review at Weather Forecasting.

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Gliders Live Monitoring



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