Real-Time Monitoring the Upper Ocean Conditions using Profiling Glider Technology

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Profiling Glider Technology

- Glider bleeds oil from external bladder to dive.
- Movement of Battery Pack provides pitch and roll.
- Waypoints, Dive Depth, and Sensors can be configured shoreside during mission.

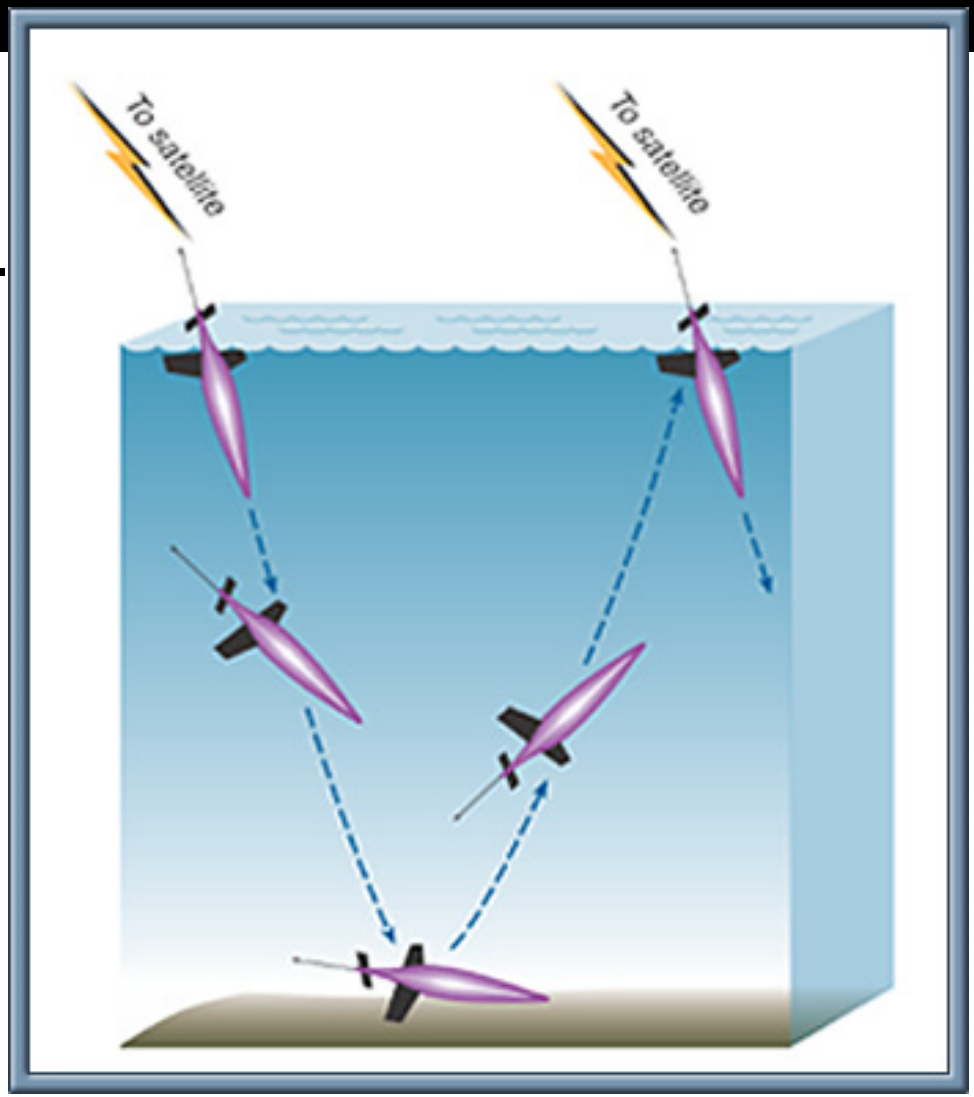


Image Taken from: UW APL Seaglider Site

Profiling Glider Performance

- Speed through water at 25-35 cm/s
- Typical Gulf of Mexico duration at 5-6 months.
- Collecting 10-12 profiles per day with ~180-380 km excursion.

Mission Objective

- Collect Real-Time Temperature & Salinity profiles in areas of interest, including other oceanic parameters such as Chlorophyll.
- Easy alter navigation in real-time during mission. Suitable to observing oceanic conditions before approaching a storm.

Key Users

Modeling:

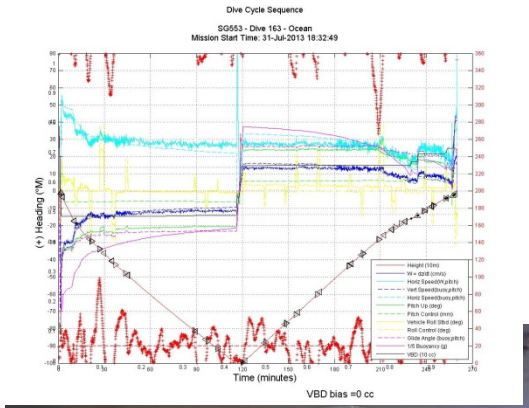
- NAVOCEANO
- NCEP/EMC

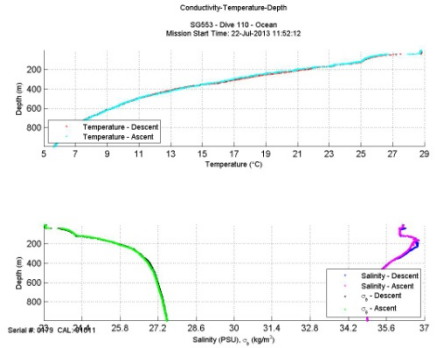
Satellite/Heat Content:

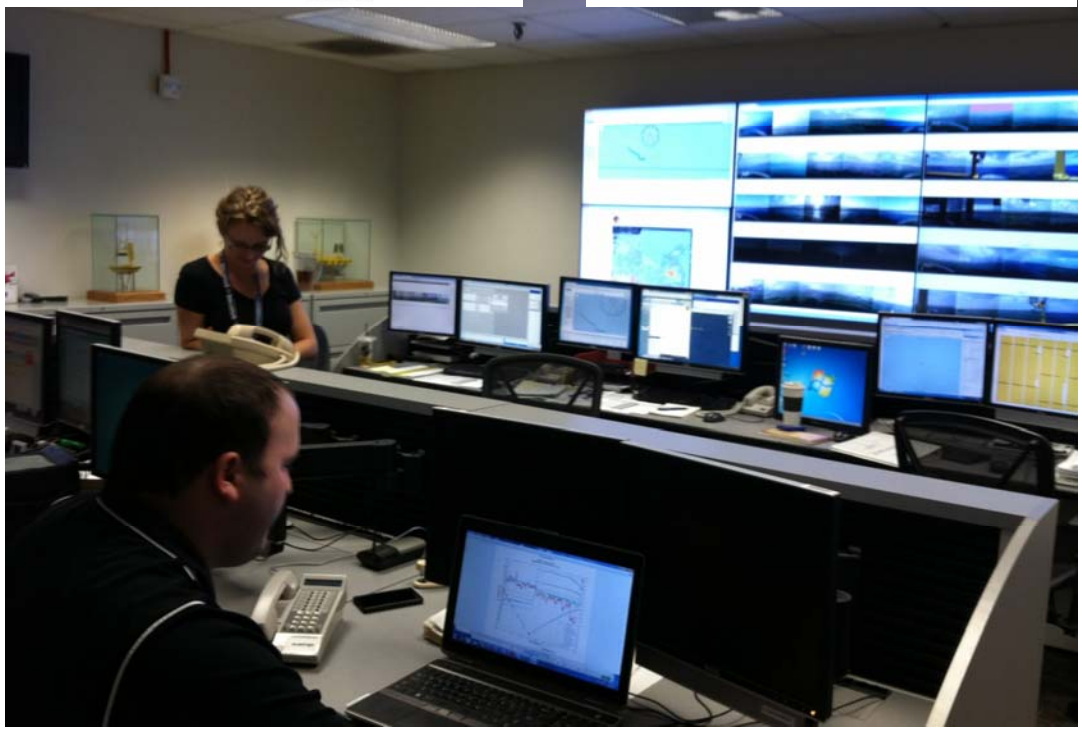
- NCEP/EMC

Mission Control

- Using the National Data Buoy Center Mission Control Center.
- Pilot on Duty 24/7.
- 2 Senior Pilots on call after hours.







Data Collected:

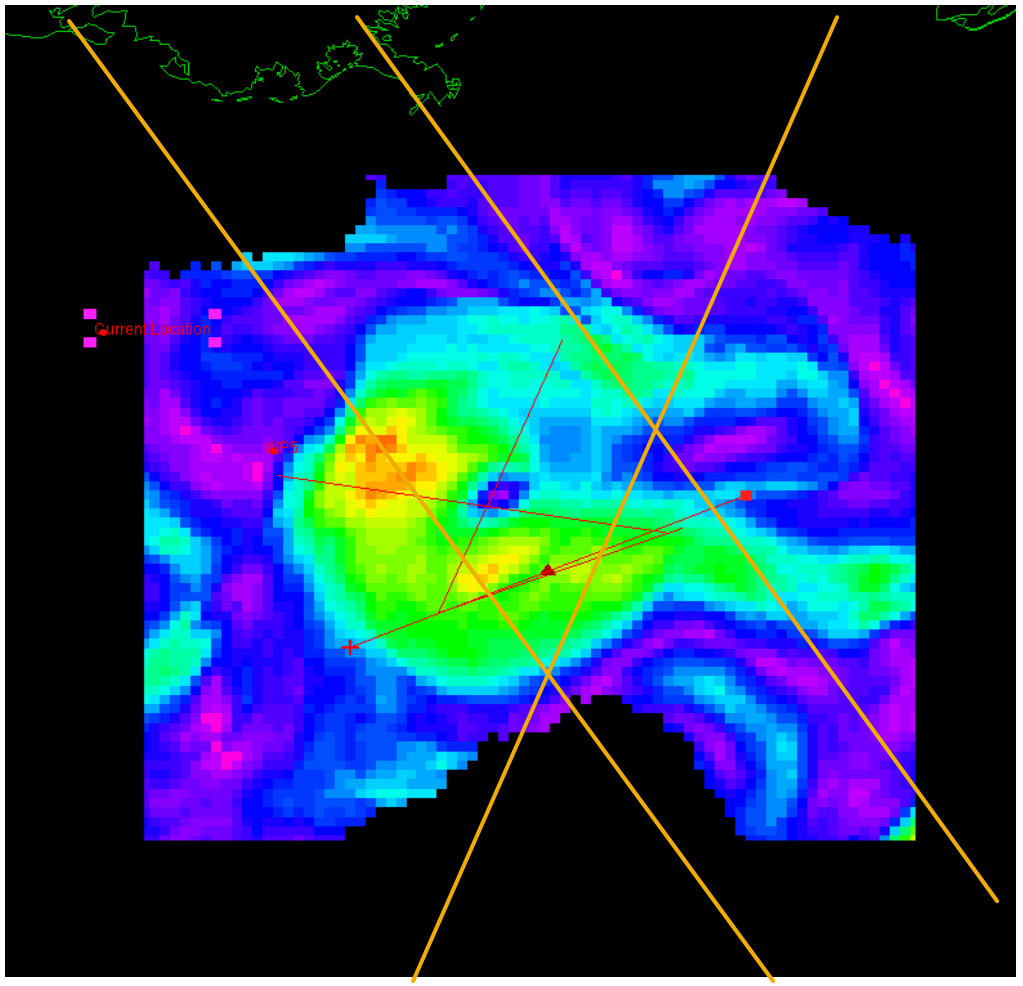
- Combined 6 month period. Collected 2000 Temperature & Salinity profiles throughout Gulf of Mexico down to 1000 meters.
- > 400 Dissolved Oxygen Profiles.
- > 106 CDOM Profiles.

- >98% Data Available within 1hr.

Adaptive Mission

Mission Plan Modified to include edges of the main Loop Eddy.

Scientists communicate Mission requests to Senior pilots who build the mission.



Adaptive Mission

Example:

Isaac (09L) 2012

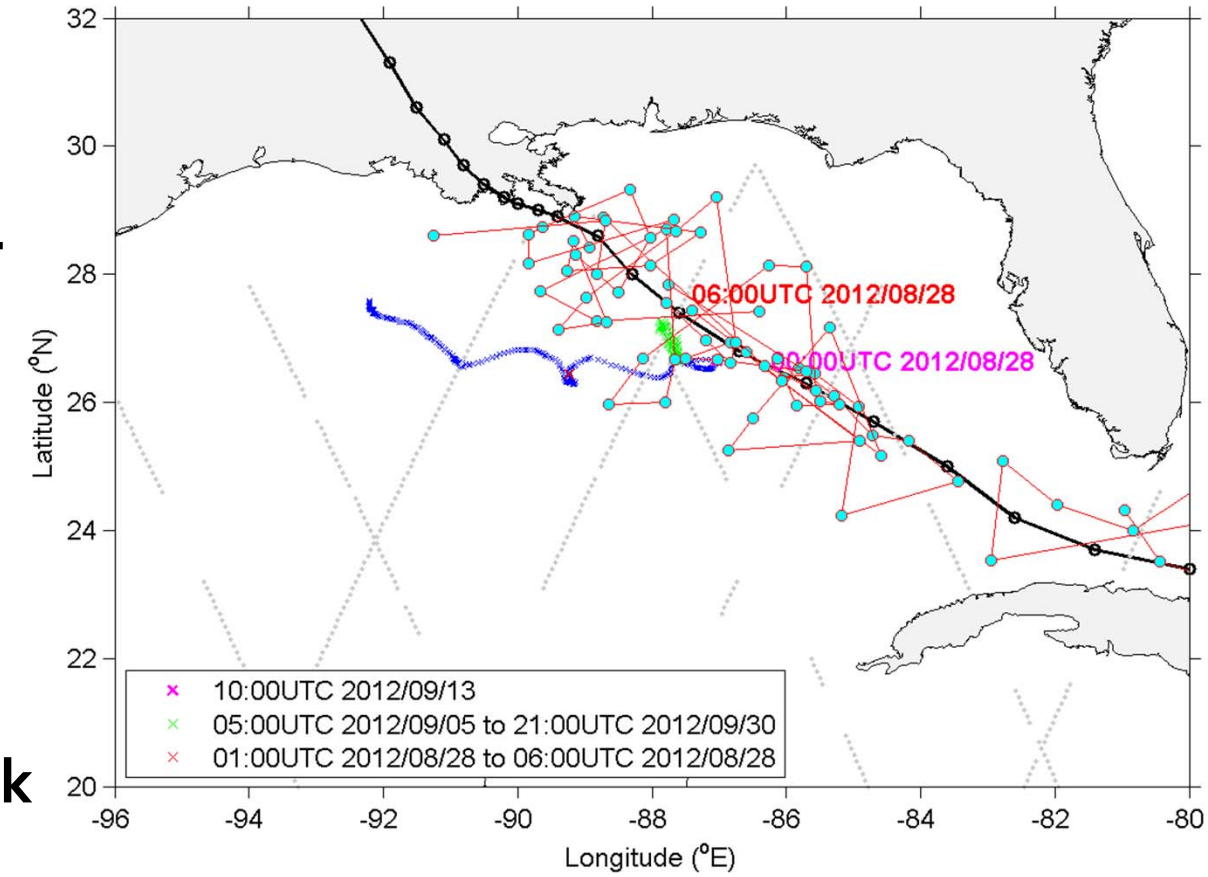
Hurricane Isaac track – thick black line

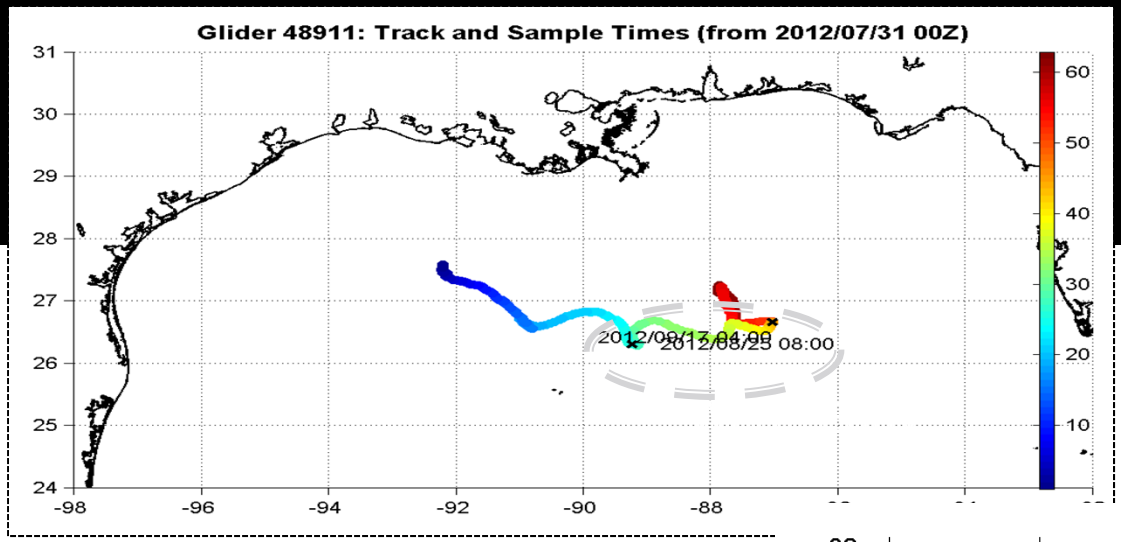
Obs.

AXBT – solid circles on flight survey (red)

Glider – blue

Jason Ground Track – gray

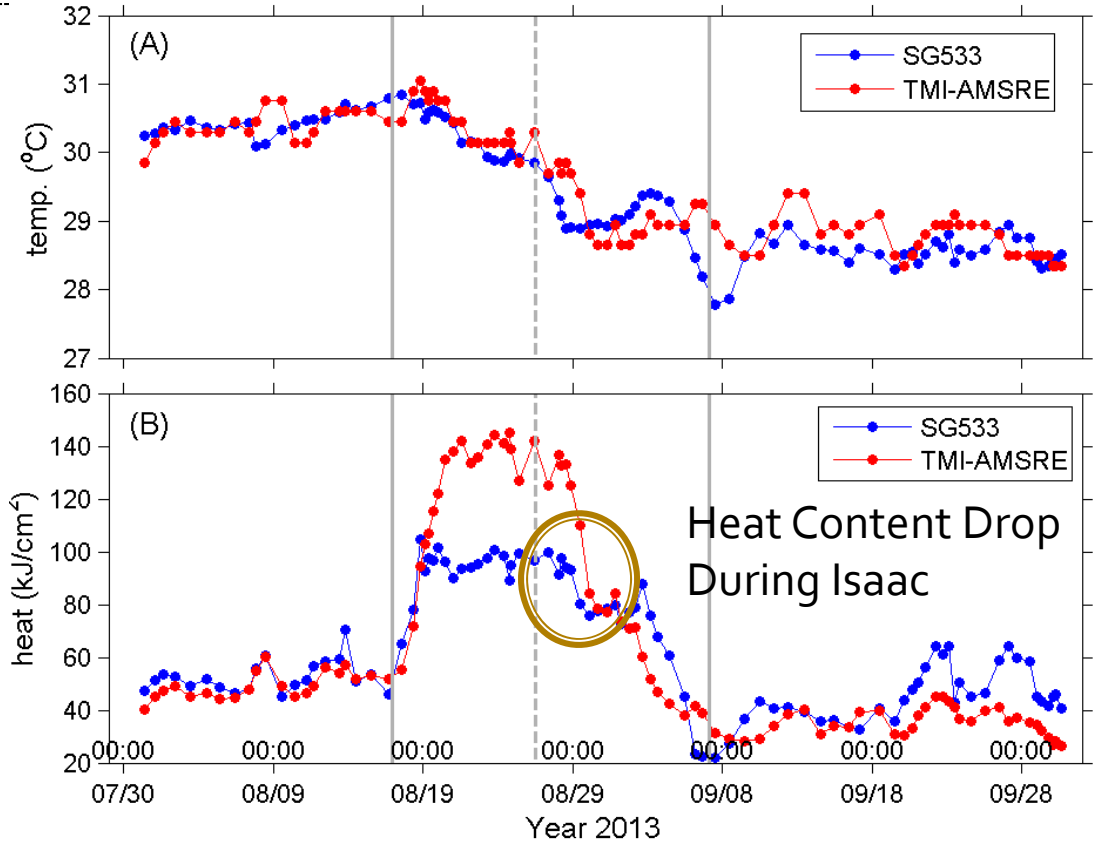




SG553 Mean = 29.42DegC
TMI-AMSRE = 29.54DegC
RMS = .4DegC
CC = .9

2012 Season

SG553 Mean = 62.88 kJ/cm2
TMI-AMSRE = 65.55 kJ/cm2
RMS = 21 kJ/cm2
CC = .9

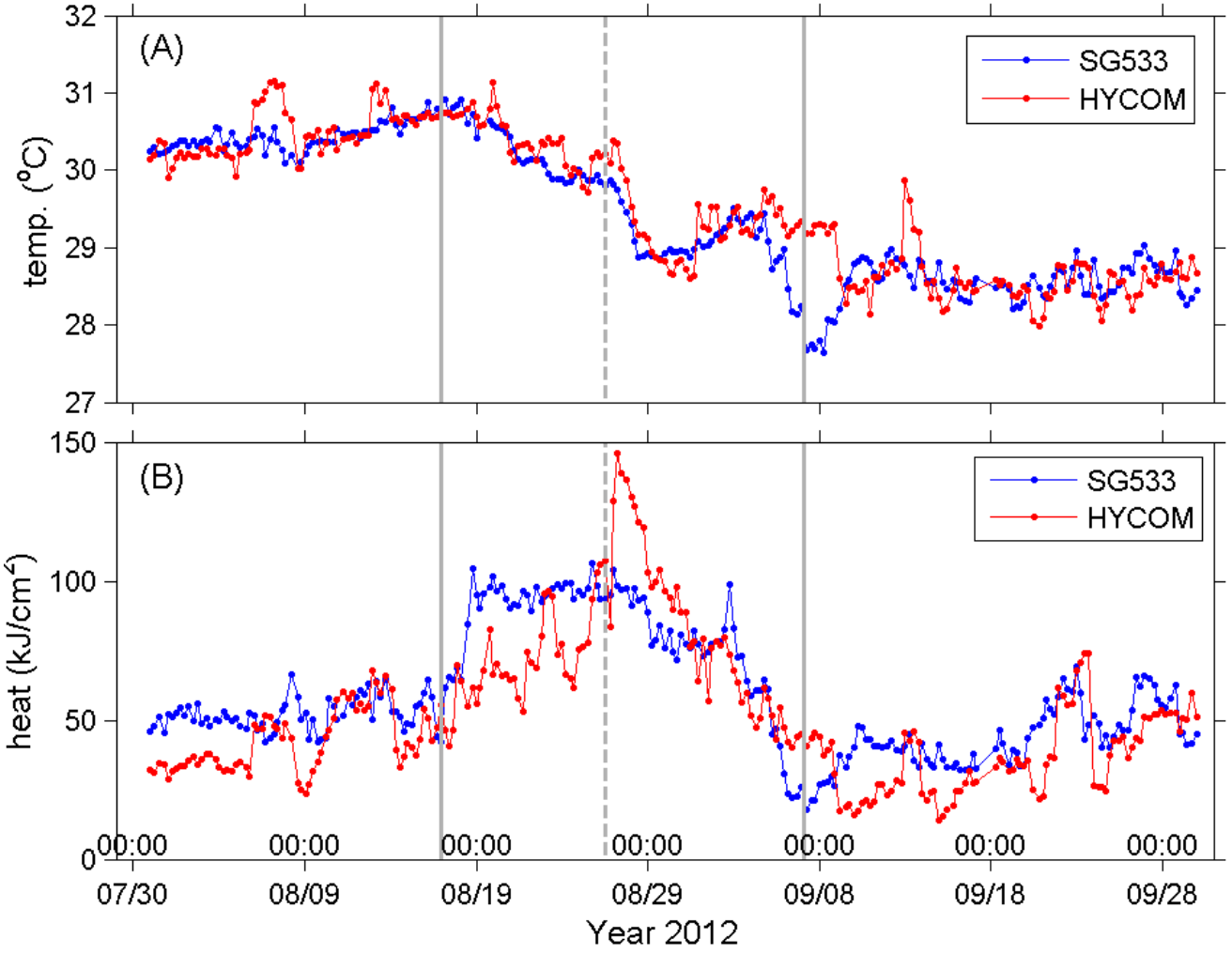


HYCOM Comparison

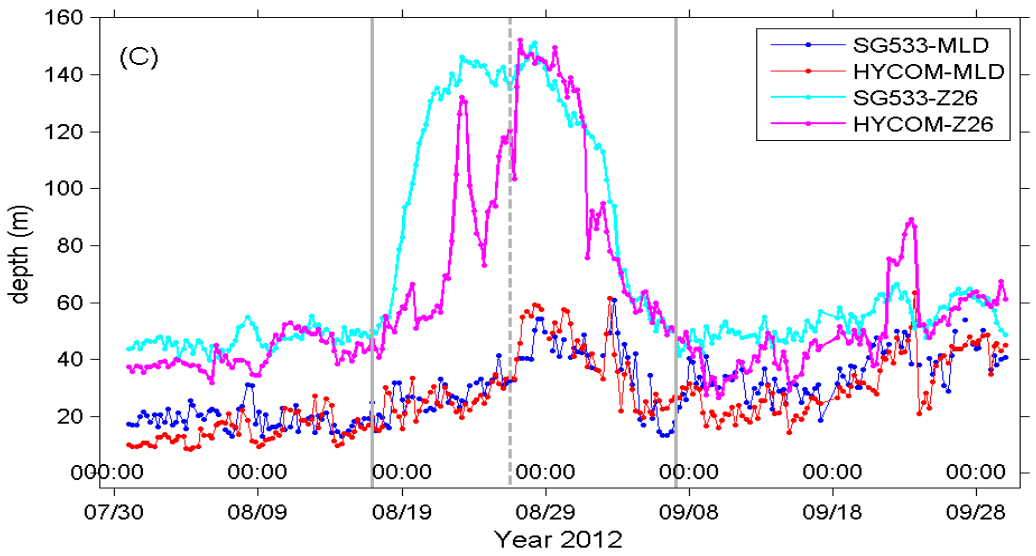
SST (A) and OHC (B)

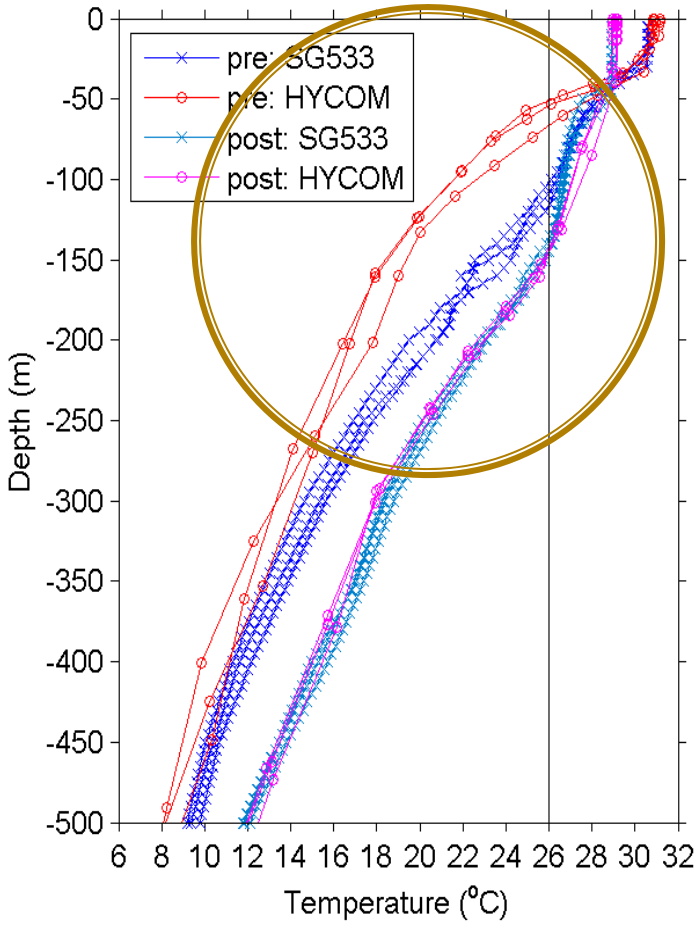
SG553 Mean = 29.42DegC
HYCOM Mean = 29.56DegC
RMS = .4DegC
CC = .9

SG553 Mean = 62.55 kJ/cm2
TMI-AMSRE = 52.18 kJ/cm2
RMS = 25 kJ/cm2
CC = .78



HYCOM Comparison





T-profile changes due to Hurricane Isaac: Blue and red lines are before (8/20), and light blue and magenta are after Hurricane Isaac (8/29).

Future Activities

- Continued Gulf of Mexico Missions
  - Primarily Loop Current
  - Partnering for more gliders.
- Atlantic & Caribbean (supported by the Sandy Supplement)
  - 2014 &2015 Seasons: +(U,V) for the 2015 season.
  - T,S Profiles for Seasonal & Hurricane Prediction.
  - Lead PI: Dr. Goni, AOML

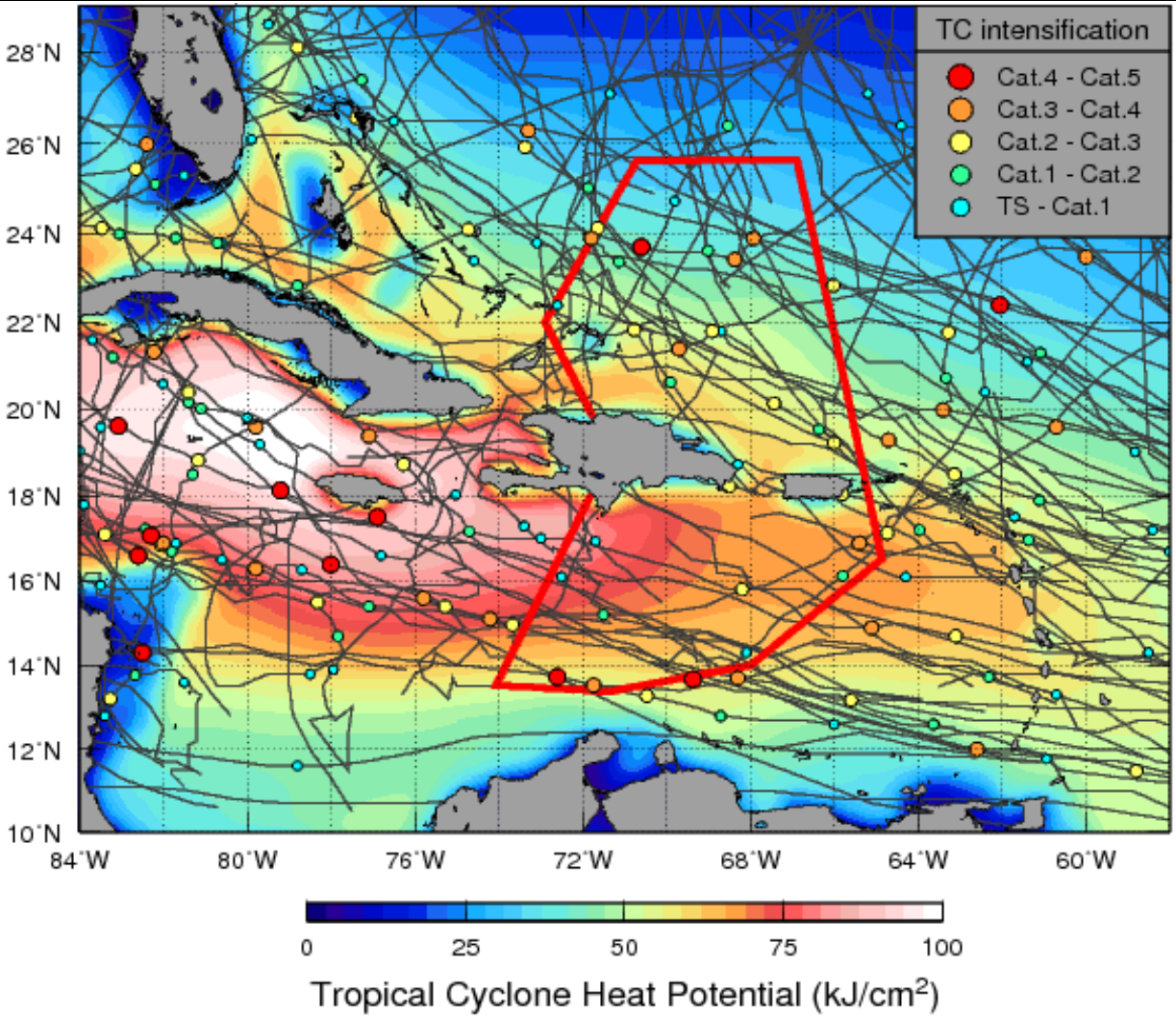
Atlantic & Caribbean

Targeting Waters around Puerto Rico and Dominican Republic.

Operate: June-November/December

February – May

Focus on Atlantic Warm Pool & Heat Exchange during Hurricanes.



Questions?

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