Observing the Gulf: How can the three countries bordering the GOM work on shared observation issues?

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Principles for Establishing Ocean Observational Program across Three Gulf Countries

Working across boundaries on common problem

Foundational and needed

Important to resources management, security, commerce and trade…but not restricted by policy or politics.

Opportunity for Capacity Building while meeting critical data needs
Mesoscale eddy field of the Gulf of Mexico
Long term changes in the Atlantic

Temperature and salinity changes in Sargasso Sea

• Bermuda Atlantic Time-series Study (BATS; 1988-)
  Hydrostation S (1954-)

Rod Johnson, BIOS, 2010
CO₂ changes Ocean Acidification

Ship sampling

Analyses at BIOS

Nick Bates, BIOS, 2010
Sea surface height Eddies
Ultra-Deepwater Mooring Options
Capturing Inflow/Outflow, LC, Eddy formation and Eddy decay (full water column)
Gliders, Vessels of Opportunity with Ferry Boxes (x-hull) and Continuous Plankton Recorders (towed)
NOAA Gliders GOM 2012 and 2013 temperature (courtesy NOAA)
Continuous Plankton Recorder (CPR)
Cost-effective Proven Reliable

- Designed by Alister Hardy in the 1920s.
- A robust device for collecting surface plankton over large spatial scales.
- Same methodology for 85 years - comparable data.
- Capable of operating at high speeds (>20 knots).
- Designed to be towed behind ships of opportunity.
- 270 µm silk filters (leno weave), but still captures the smallest microeukaryotes.
First evidence of large scale northerly movement of zooplankton

Calanus helgolandicus
Warm water species
Low lipid content
Less nutritious

Calanus finmarchicus
Cold water species
High lipid content
More nutritious

1000 km shift in 30 – 40 years!

North Sea

Plankton Science for Our Future Oceans
Summary Thoughts

• Start at the physics, build upward
• Shared problem: Loop Current eddy development and decay
• Solution: Ultra-deep water moorings; gaps filled with unmanned systems and VOOs
• Opportunity: Will be investment of NASEM money for Loop Current Study