

# Subsurface Monitoring

March 7, 2013

Ru Morrison

Becky Baltes

# AGENDA

1. Introduction(5 min)
2. Glider Network(5 min)
3. Buoys and other Technologies (5 min)
4. Candidate Issues for Discussion (5 min)
5. Discussion (30 min)
6. Next Steps / Action Items (10 min)

# INTRODUCTION/ RATIONALE

- “Integrated Coastal Intelligence Network”
- Need for subsurface monitoring
  - IOOS user requirements
  - Gap in observing coverage
  - NOP Milestones
- Coordinated Synergistic Approach
  - Right variables, Right scales
  - Use in products, assimilation, validation

# Length

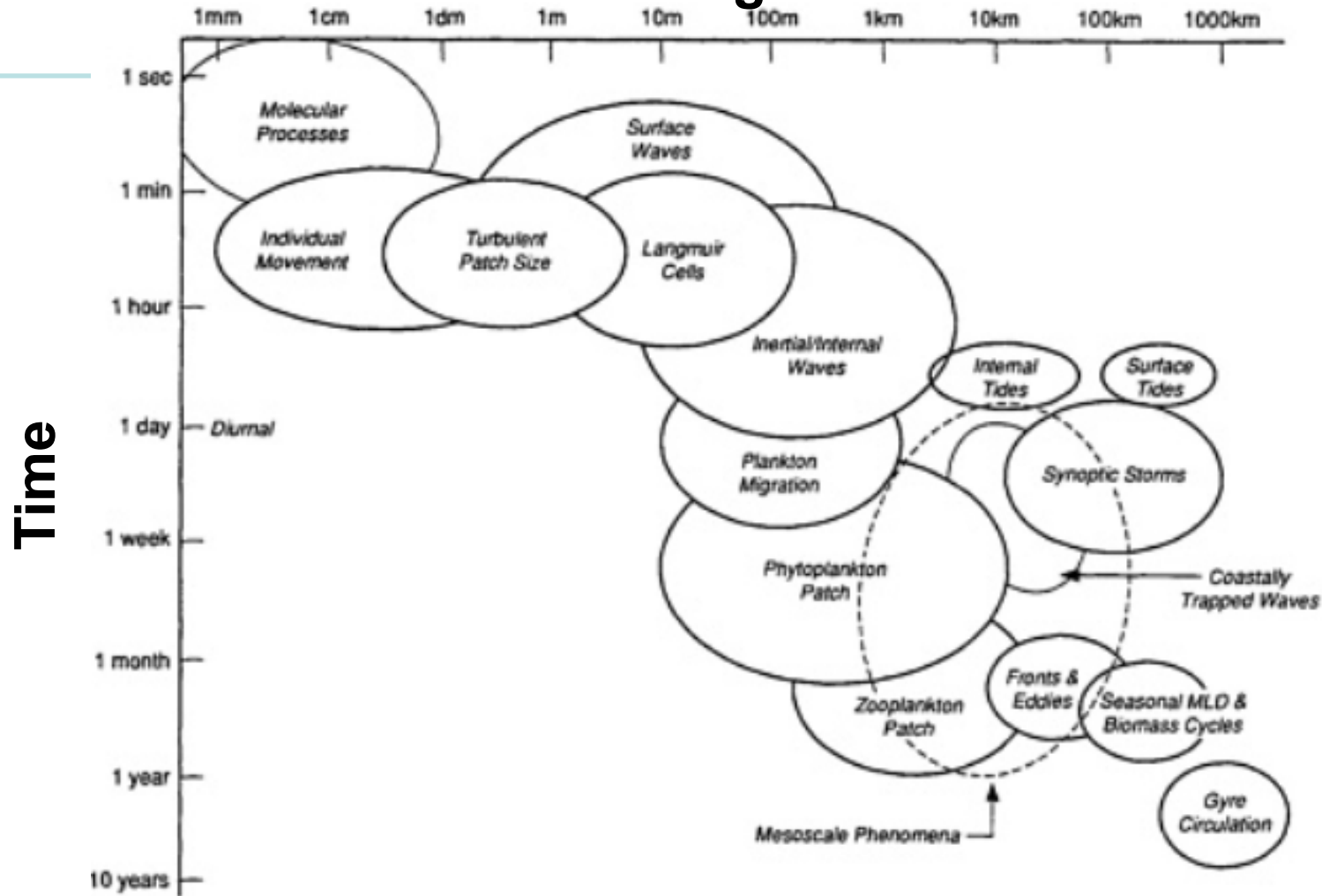
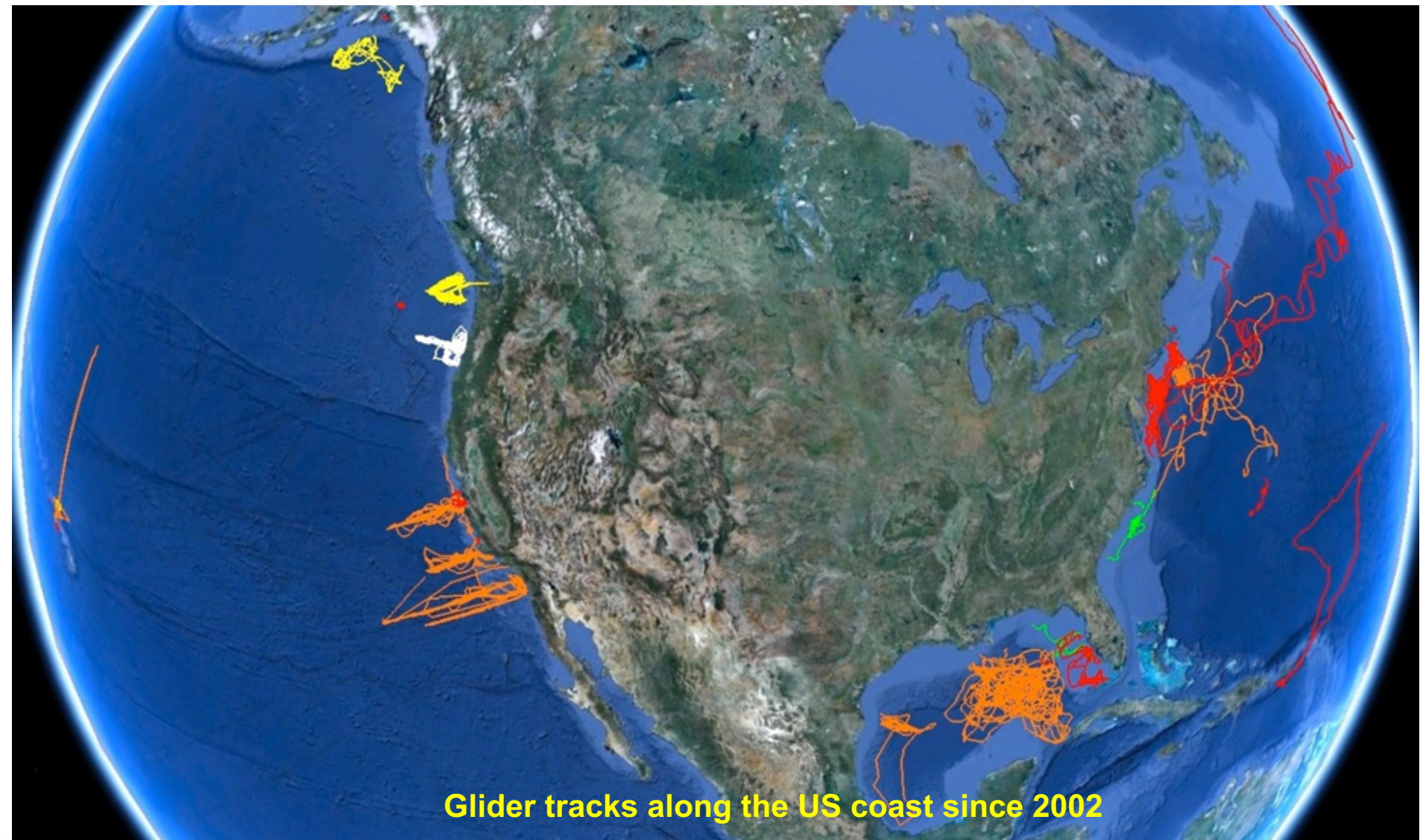


FIGURE 2.1 A schematic diagram illustrating the relevant time and space scales of several physical and biological processes important to the physics and ecosystem of the upper ocean.

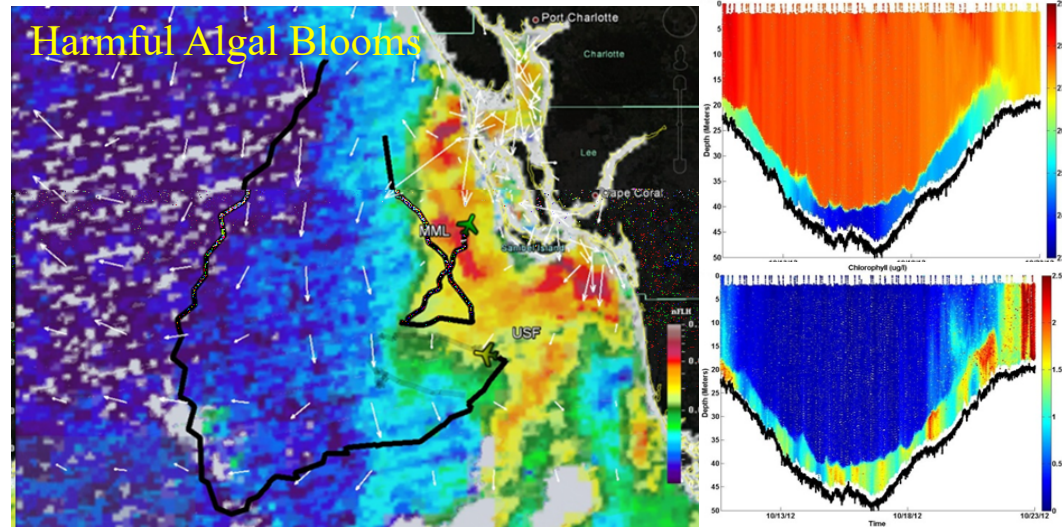
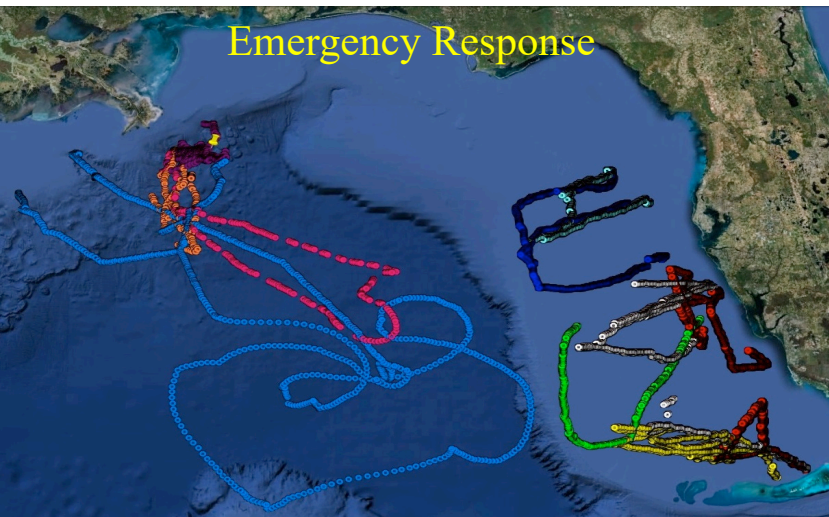
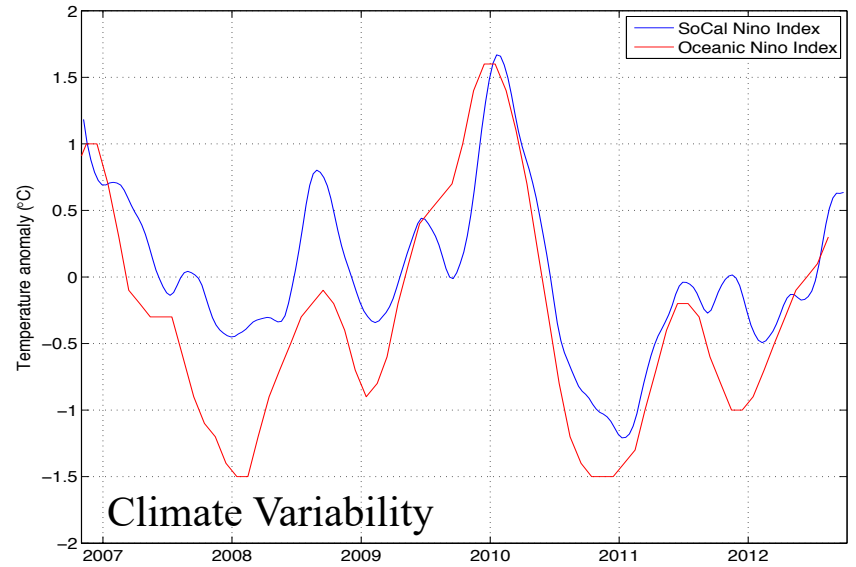
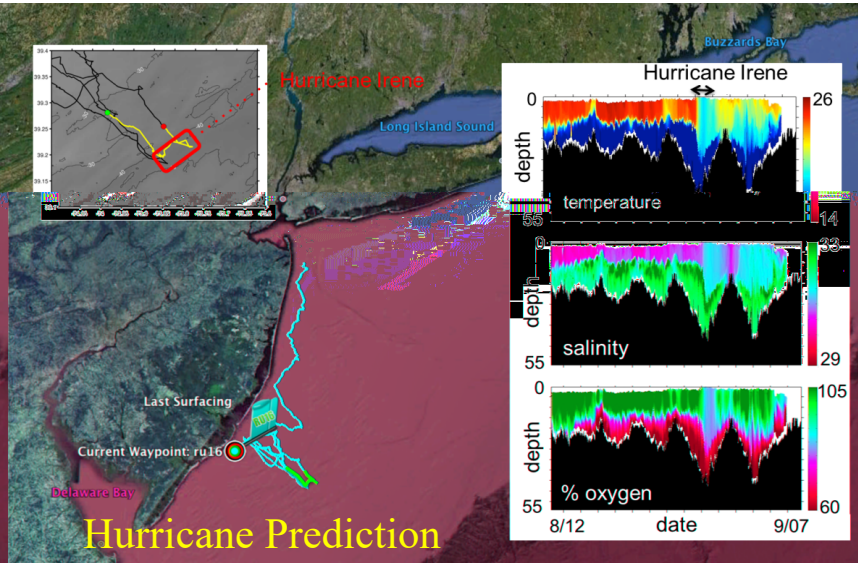
Reprinted from Dickey (1990, 1991) with permission.

# NATIONAL GLIDER NETWORK



Glider tracks along the US coast since 2002

# Rationale



# IOOS Gliders

## Summary of Glider Days for 2008-2012

Year	Glider-days of data collected annually by glider operators. (Glider-day = 1 glider in the water collecting data for 1 day)	Glider-days completed outside of the EEZ	Glider-days supported by IOOS
2008	4007	890	349
2009	4739	1132	337
2010	4944	1329	990
2011	5740	1663	772
2012	6292	1793	715
<b>2008 – 2012 Totals</b>	<b>25722</b>	<b>6807</b>	<b>3163</b>

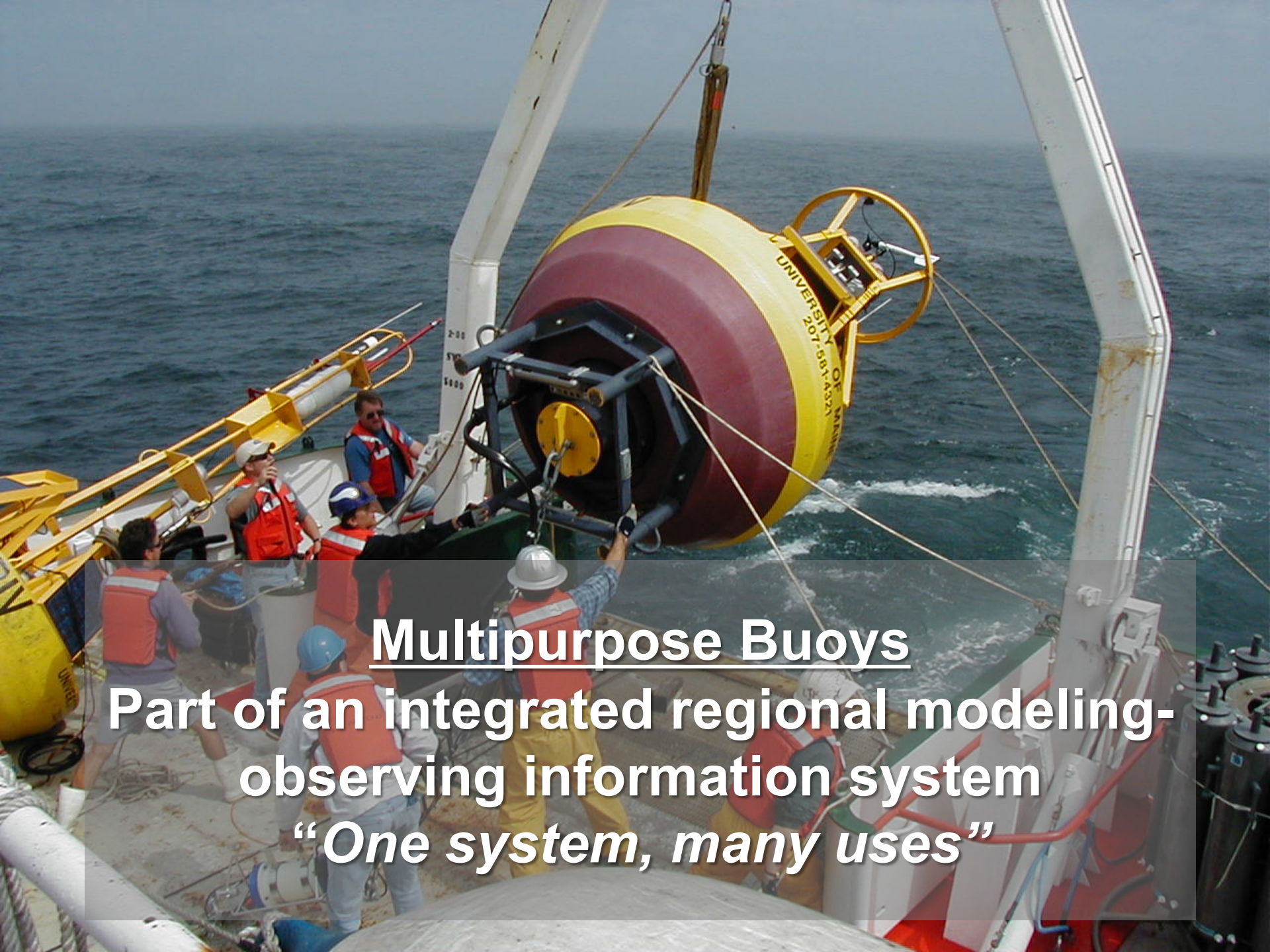
# Network Elements

- Gliders Capital (Min 60)
- Glider Operations
- Fleet Maintenance
- Data Assembly Center Personnel
- NGN Program Manager
- Annual Travel for 1 NSG Meeting



# Data Assembly Center

- Glider data standard format
- Align with IMOS as much as possible
- Standard ready for NODC, NDBC
- Put glider data on GTS
- Show and share data at through DAC
- Improved visualization and access
  - Less work for operators



## Multipurpose Buoys

Part of an integrated regional modeling-  
observing information system

*“One system, many uses”*

# Marine Operations



Dec 3, 2012 - Dec 3, 2012: ● Visits

Dec 3, 2011 - Dec 3, 2011: ● Visits



*"The forecasts are instrumental in planning both training and routine operations, especially in winter... I cannot imagine operating without this buoy. We check it constantly throughout the day." - USCG*

*"I trust the weather buoys with my life. Thank you." - Maine Fisherman; "Love your service...I believe your service is a lifesaver. Thanks!" -Dave, Pilot; and "I would like you to know that information you are providing us not only aids us in our work, it almost certainly has saved lives." -Roy Atkinson, Fisherman.*

# Partnering with the National Weather Service

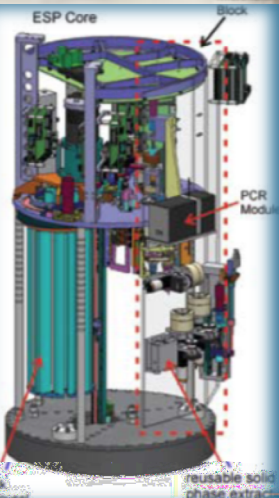


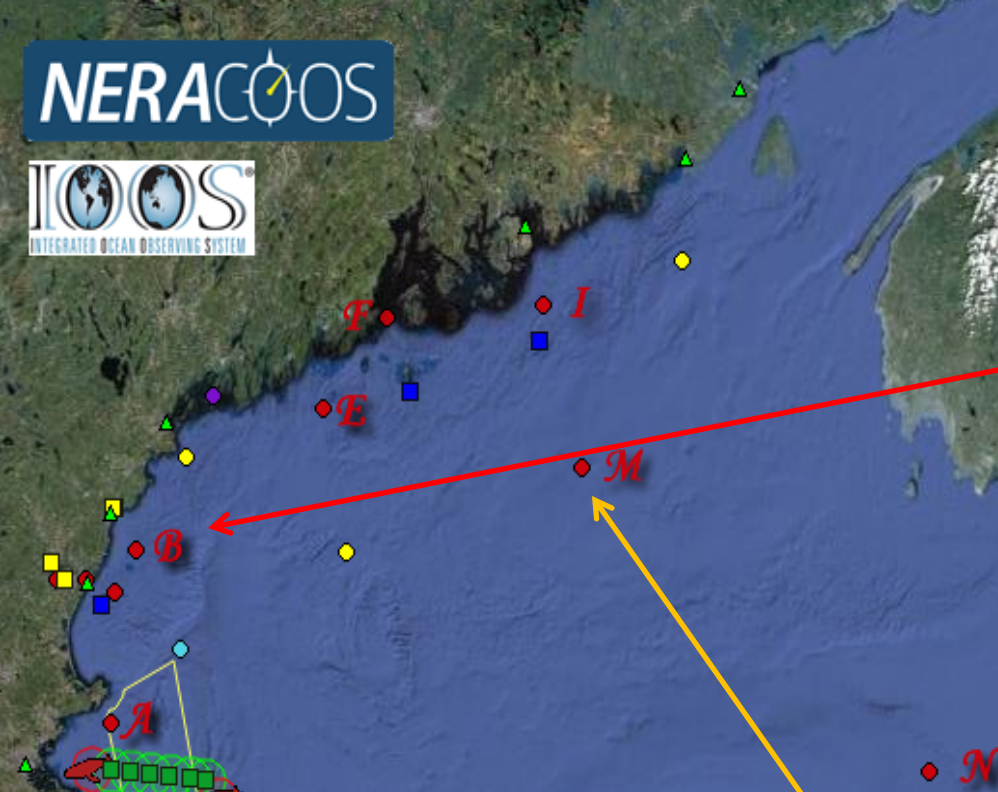
During Irene “Buoy “A” and “B” were our focus at NWS Gray, Maine for this storm ... the real time information was crucial for our needs” John Cannon, NWS WFO Gray ME

Bob Thompson from the Taunton, Massachusetts office noted that “the IOOS buoy data were invaluable for Sandy,”

## *Harmful Algal Blooms -*

*“... having uninterrupted access to these ... mooring time series is critically important to our Alexandrium forecasts.” - Don Anderson, WHOI.*



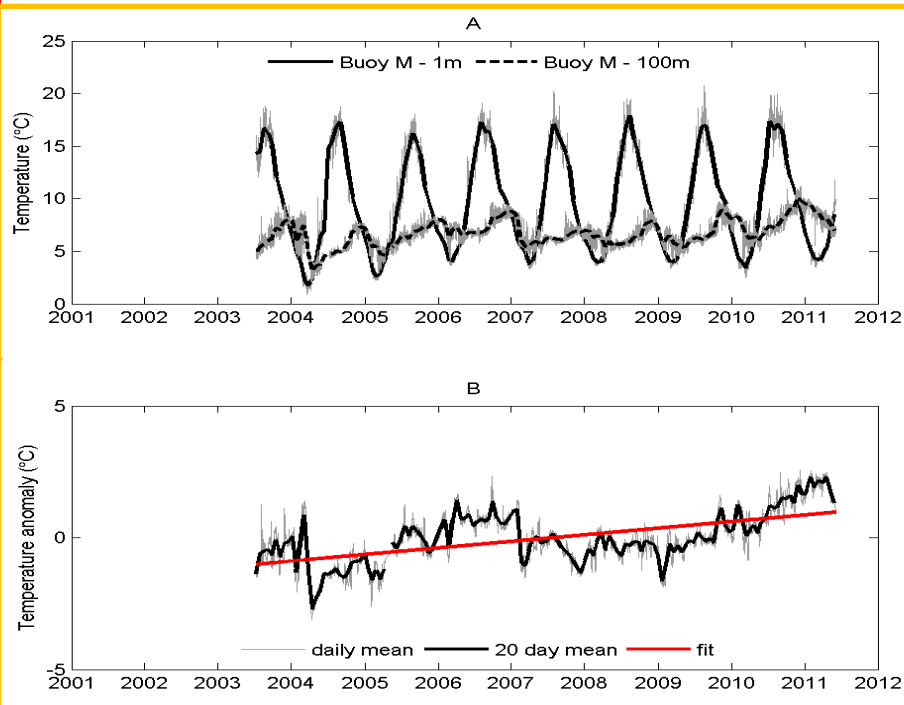
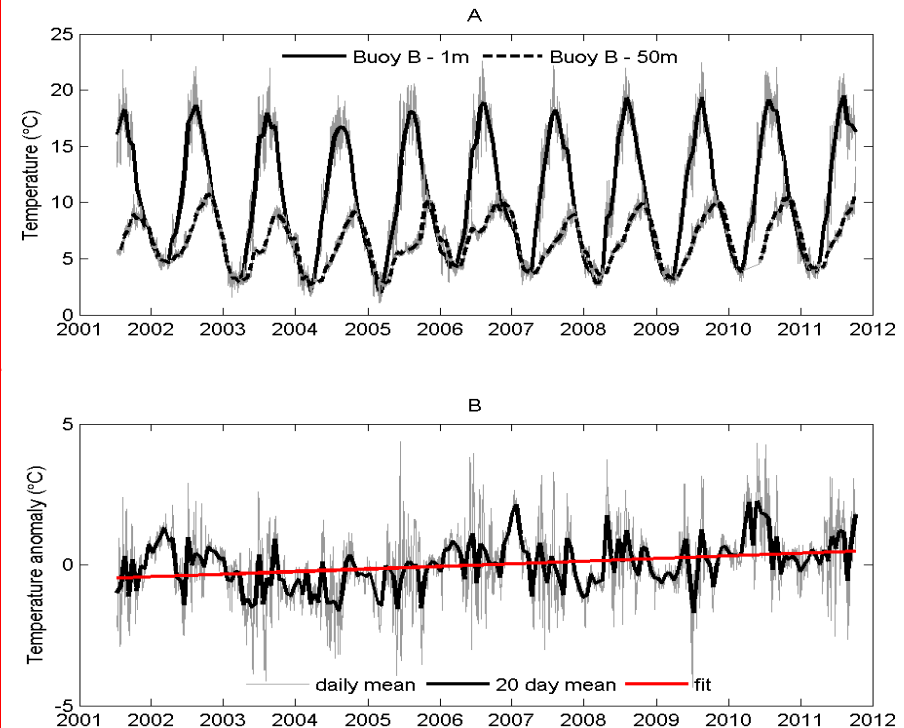


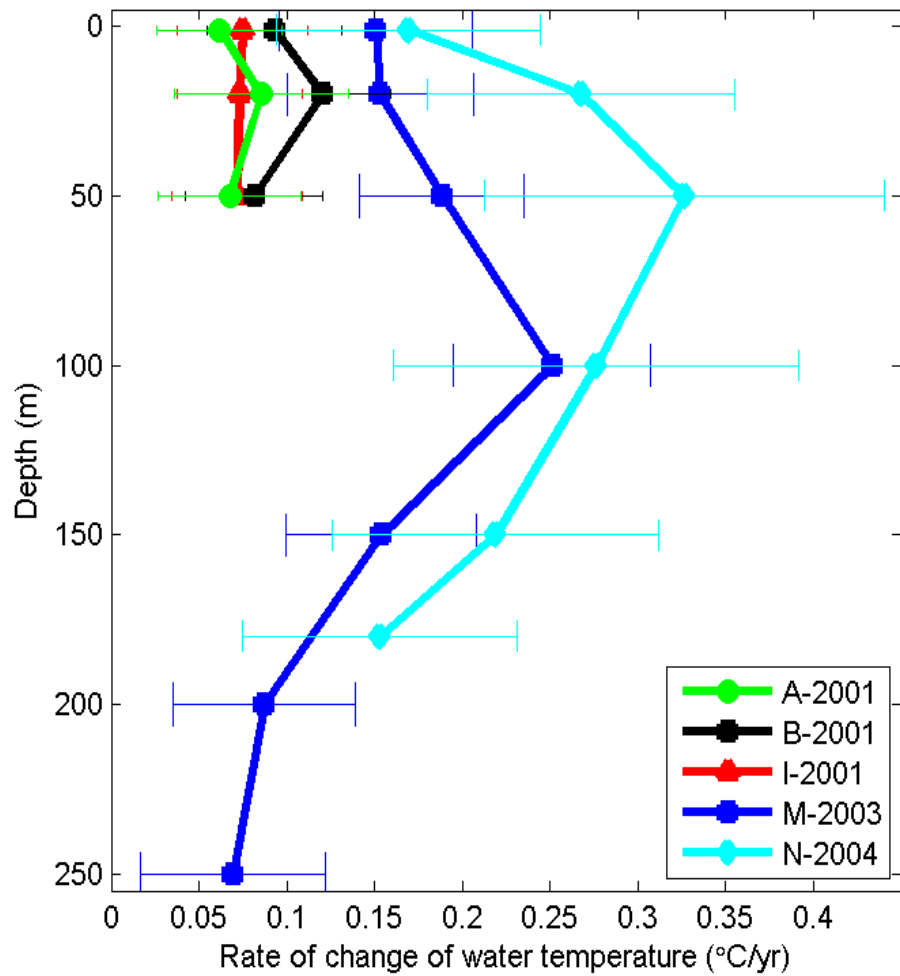
**Legend**

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Gulf of Maine Array	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Long Island Sound
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> CDIP Buoys	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> MVCO Sea Node
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Bowdoin Buoy	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> NERRS Stations
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> NOAA Buoys	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> NOAA CMAN
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> NOS Tides	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Charybdis Tides
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<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Inactive Buoys		

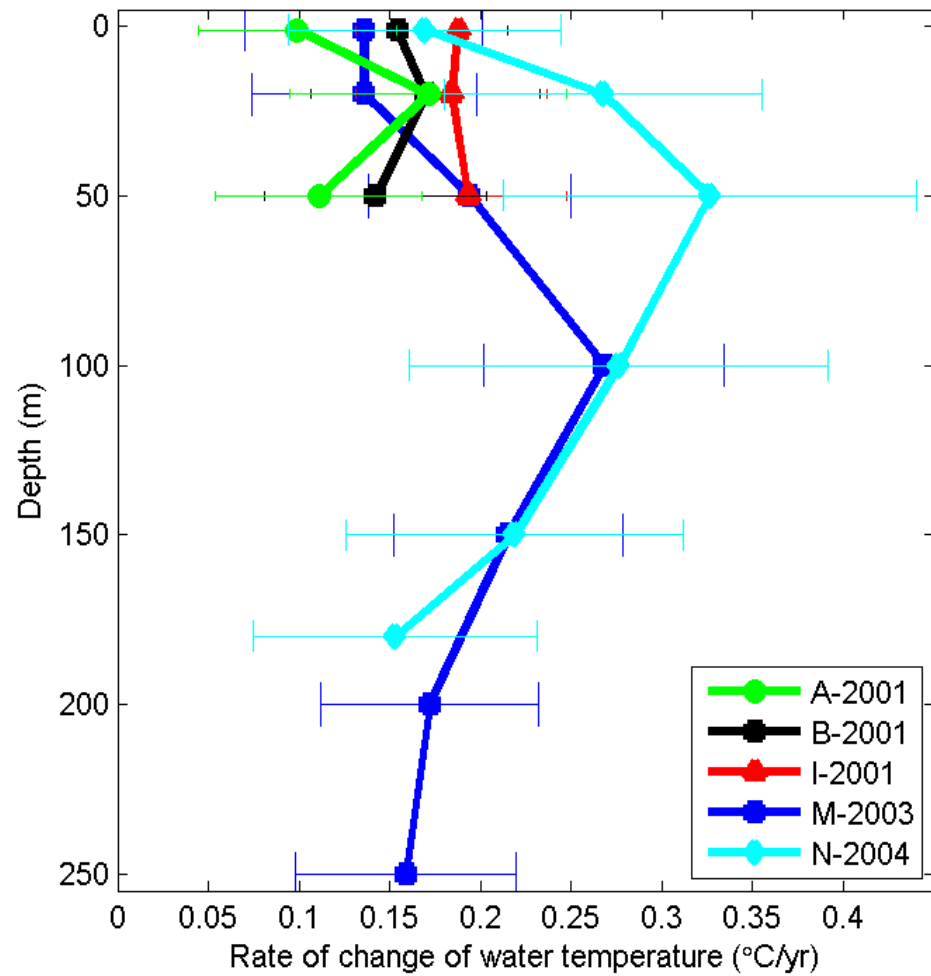
  

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Cornell Whale Array	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> No recent detections
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Recent detections		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Stellwagen Bank National Marine Sanctuary		





All Data

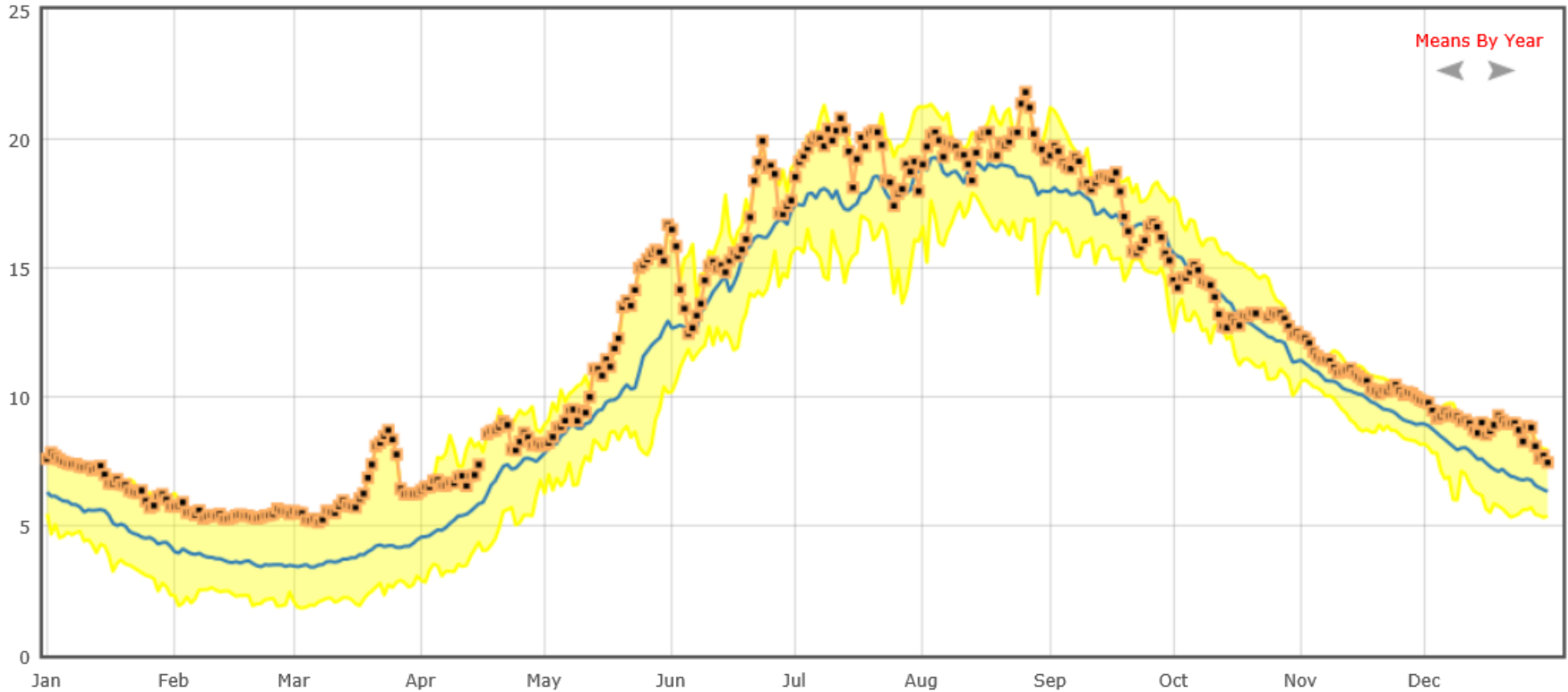


Since 2004

# Climatology Tool

Mean Water Temperature 1 meter depth at A01 for 2001 thru 2013

Daily Means for 2012

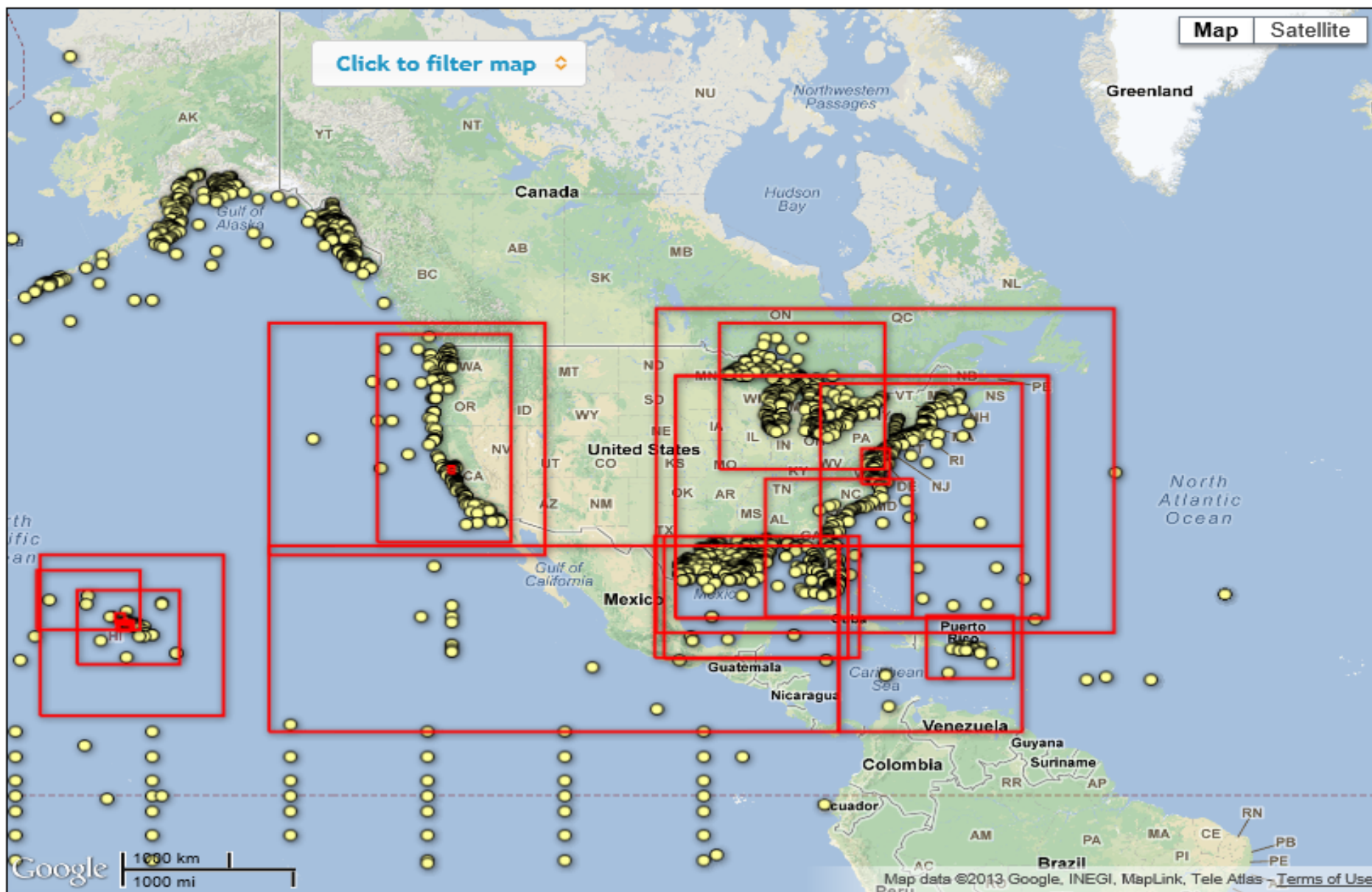


2012

- Range of Daily Means 2001 thru 2013
- Mean 2001 thru 2013
- Daily Means By Year

[View Climatology Data Table](#)

There are currently 2482 observation platforms and 39 bounding boxes surrounding various gridded data fields 





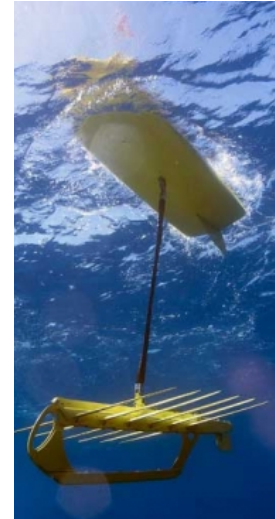
# IOOS Buoys

Represents the IOOS Regional Component Buoys

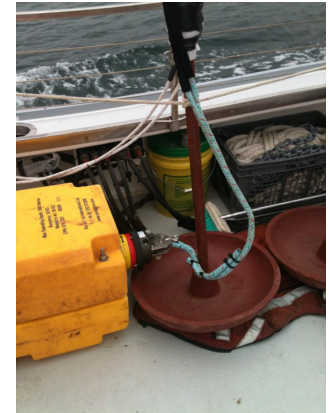
<b>Summary of Buoy Days</b>			
Year	Buoys	Number	Buoy Days
2011 Asset Inventory	Single and Multi-purpose	195	71,175
2013 IOOS Association data call – 8/11 reporting	Multi-purpose buoys-subsurface obs	33	12,405
	Wave buoys	25	9125
	Total	58	21,530
Build Out plans	Single and Multi-purpose	530	193,450

2008-2012: IOOS Funded Multi-purpose Buoy days in 8 out of 12 regions estimate: 62,025

# OTHER TECHNOLOGIES



Waveglider,  
<http://edlu.com/news>



Sonardyne Fetch node  
[www.neracoos.org](http://www.neracoos.org)



# DISCUSSION TOPICS

- What is the IOOS contribution to the “Integrated Coastal Intelligence Network”?
- How integrated should/could we be?
- How to develop this?
  - Way Forward (workshop?)
  - Time Frame
  - Steps to get there
- What should be in this?
  - Need for base capacity in each region?

# NEXT STEPS

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- Timeline
- Steps