

OOI Coastal & Global Scale Nodes



Woods Hole Oceanographic Institution



cev



CGSN Team at WHOI

- Project Manager
 - Derek Buffitt
- Project Scientists
 - Al Plueddemann (Coastal)
 - Bob Weller (Global)
- Engineering Leads
 - Sheri White (Systems Eng)
 - Stephanie Petillo (Software)
 - John Reine (Electrical Eng)
- Operations Leads
 - Peter Brickley (Operations)
 - Kris Newhall (Refurb, Mechanical)
 - Gary Cook (Surface Moorings)
 - John Lund (Subsurface Moorings)
 - Jennifer Batryn (Instruments)
 - Dee Emrich (Field Operations)
- Data Team
 - Sheri White, TBH, Jennifer Batryn, Collin Dobson



OOI Science Themes

OOI Science Themes		Pioneer	Global
A1	Global Biogeochemistry and Carbon Cycling	X	X
A2	Ocean-Atmosphere Exchange	X	X
A3	Ocean Circulation, Mixing and Ecosystems	X	X
A7	Climate Variability and Ecosystems	X	X
A9	Coastal Ocean Dynamics and Ecosystems – Hypoxia on Continental Shelves	X	
A10	Coastal Ocean Dynamics and Ecosystems – Shelf/Slope Exchange Processes	X	

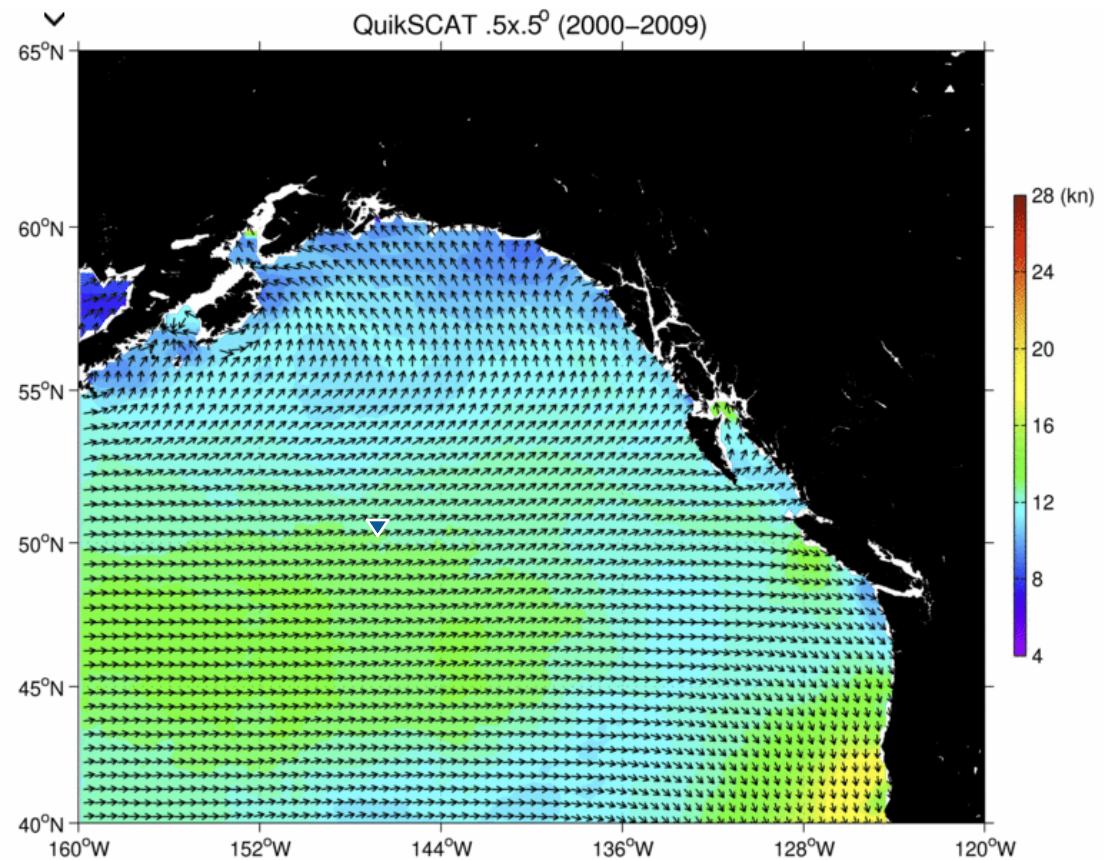
<http://oceanobservatories.org/major-science-themes/>

OOI Science Prospectus Oct 10, 2007



Global Station Papa Array

- 50° N, 145° W
 - Nominally 4250 m
 - Apex to the WSW
 - No OOI Surface Mooring
- Strong wind and waves
- Moderate to low eddy activity
- Long history of observation here (since 1949)
- Turn OOI moorings and gliders once a year in the Summer

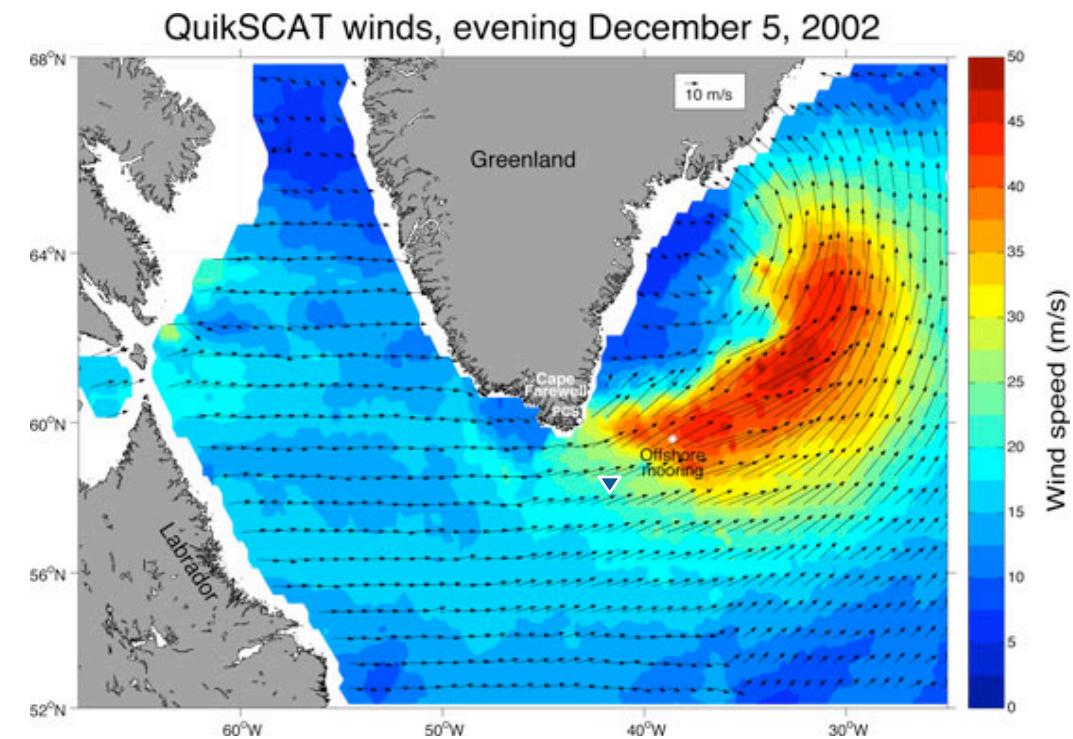


3203-00007 Station Papa Site Characterization Paper



Global Irminger Sea Array

- 60° N, 40° W
 - Nominally 2800 m
 - Apex to the NNE
 - Flanking Moorings inline with OSNAP moorings
- Strong wind and waves associated with tip jet
- High eddy activity
- Source of North Atlantic Deep Water
- Turn OOI moorings and gliders once a year in the Summer



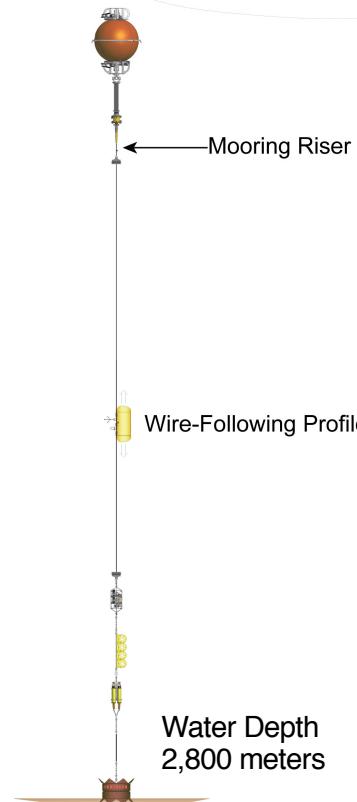
3202-00007 Irminger Sea Site Characterization Paper



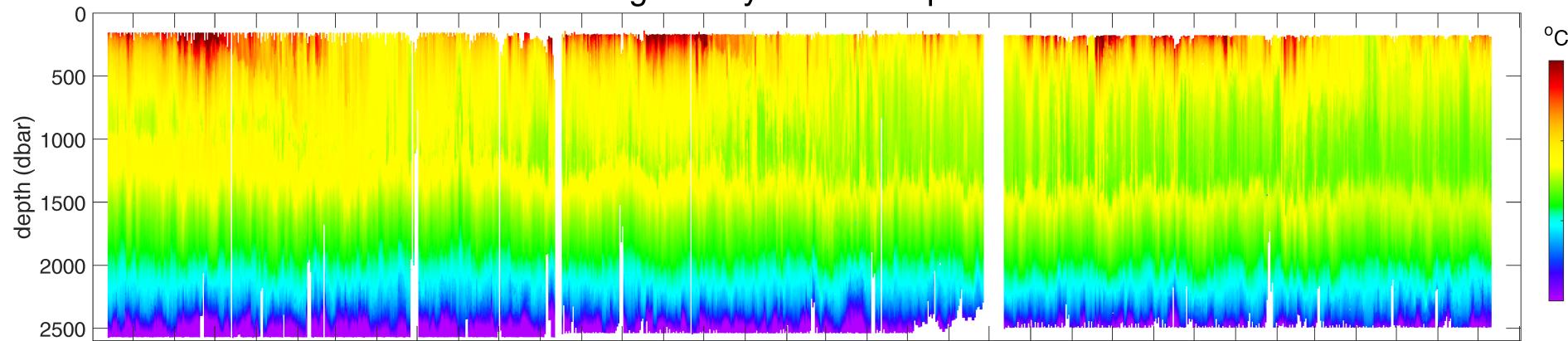
Global Irminger Sea Array

Site Location

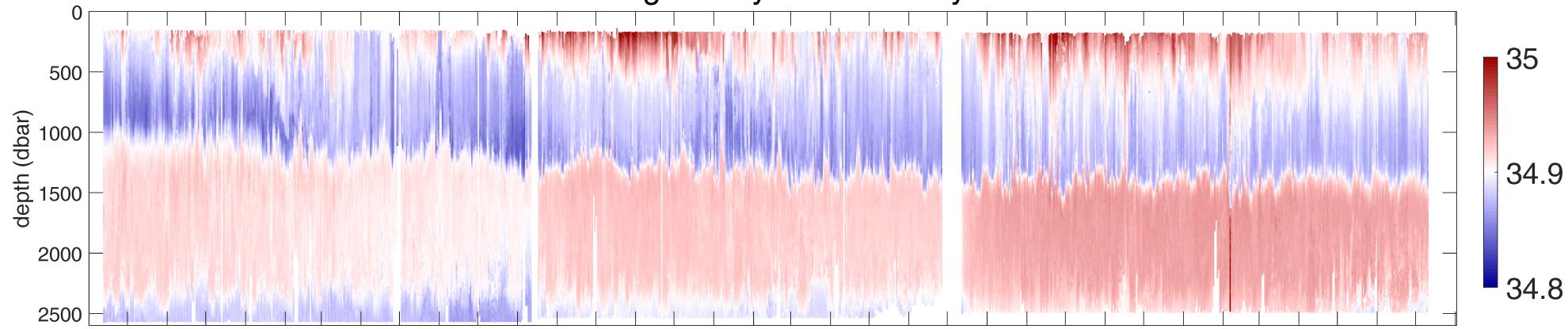
59.9695° N, 39.4886° W



Irminger Daily Mean Temperature



Irminger Daily Mean Salinity



2014

2015

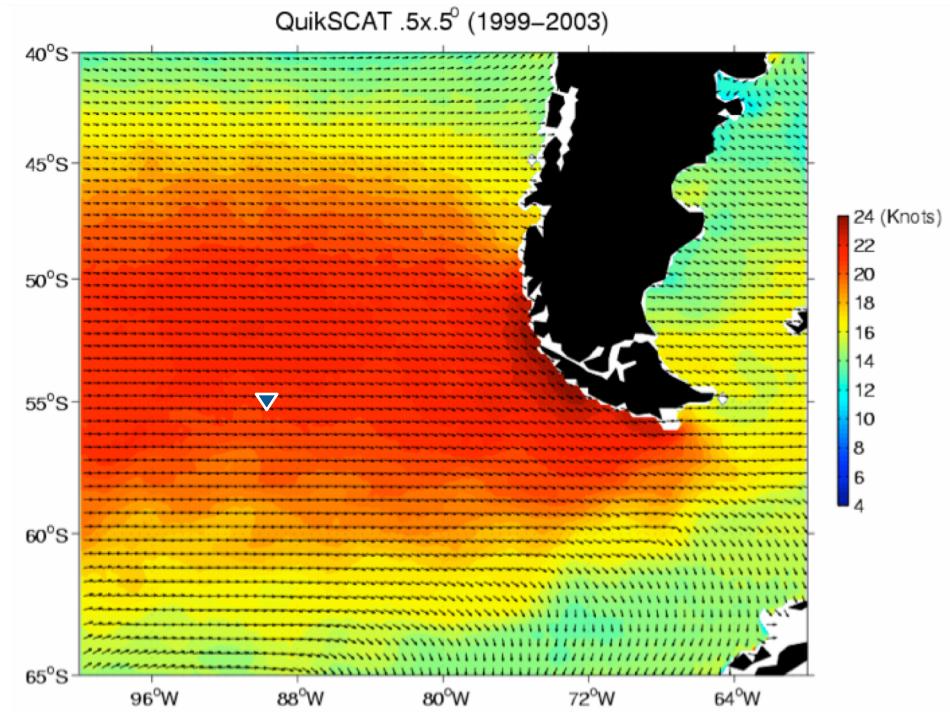
2016

2017



Global Southern Ocean Array (ending in 2019)

- 55° S, 90° W
 - Nominally 4800 m
 - Apex to the South
- Strong wind and waves, strong atmospheric forcing
- Antarctic Intermediate Water formed here
- Turned OOI moorings and gliders once a year in the southern Summer

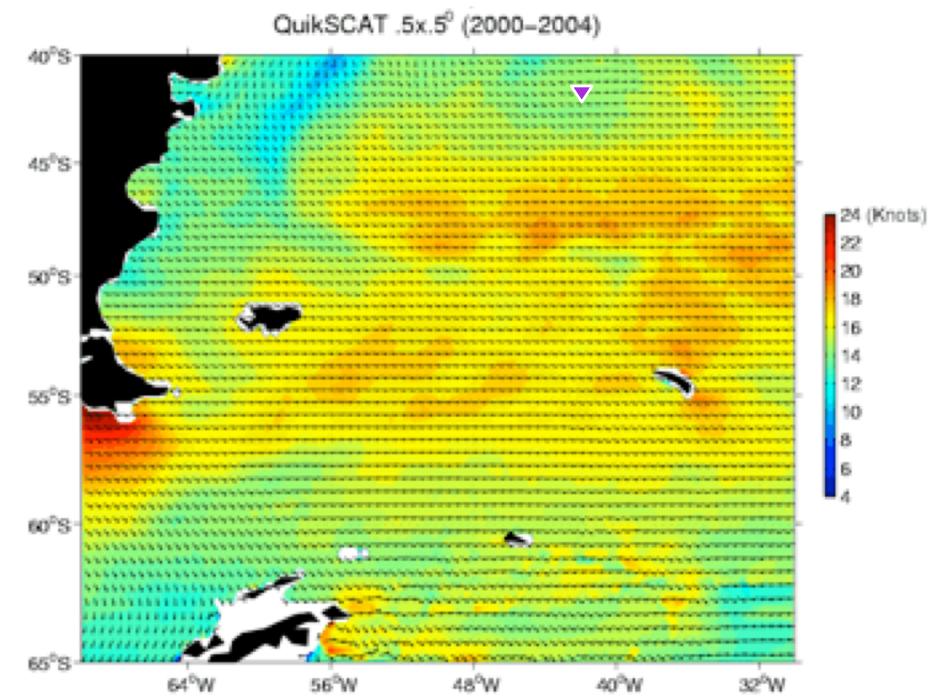


3201-00007 Southern Ocean Site Characterization Paper



Global Argentine Basin Array (ended Jan 2018)

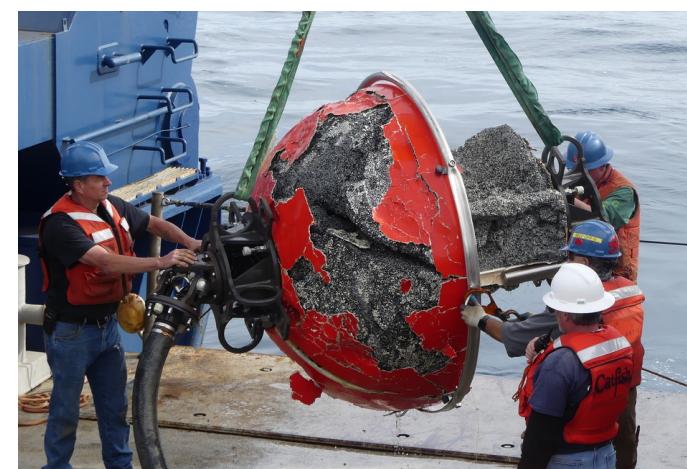
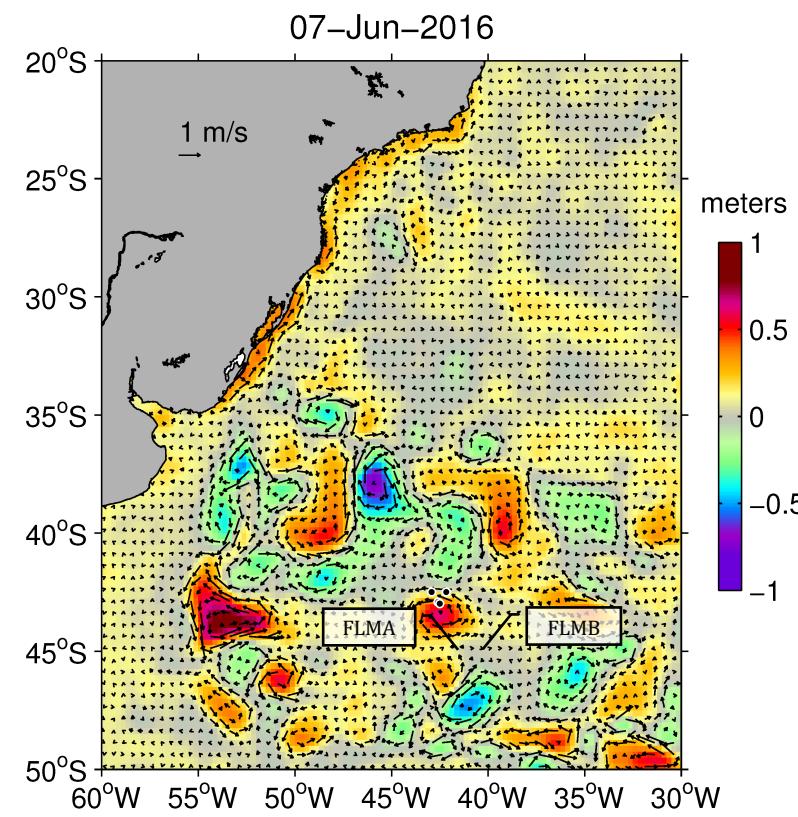
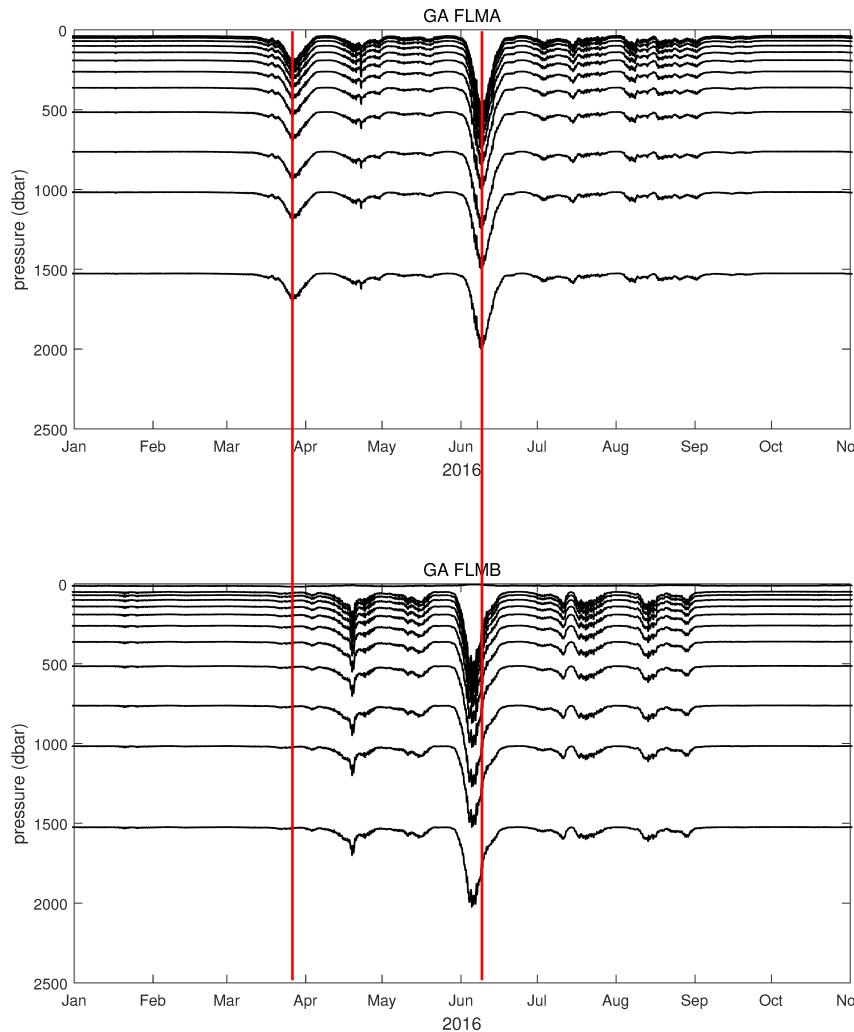
- 42° S, 42° W
 - Nominally 5200 m
 - Apex to the South
- Strong wind and waves, atmospheric forcing
- High eddy activity
- Bathymetric “mud waves” found here
- Turn OOI moorings and gliders once a year in the southern Summer



3206-00007 Argentine Basin Site Characterization Paper

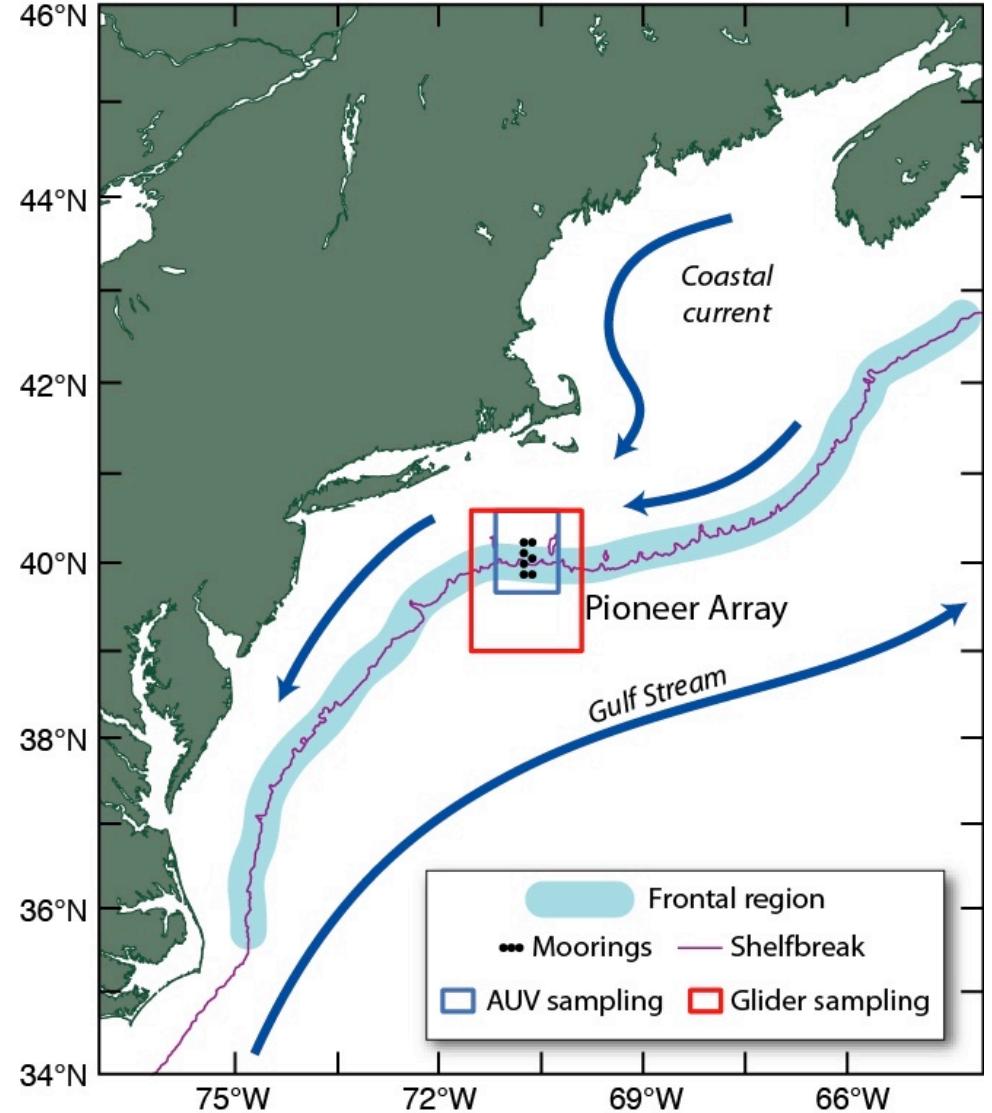
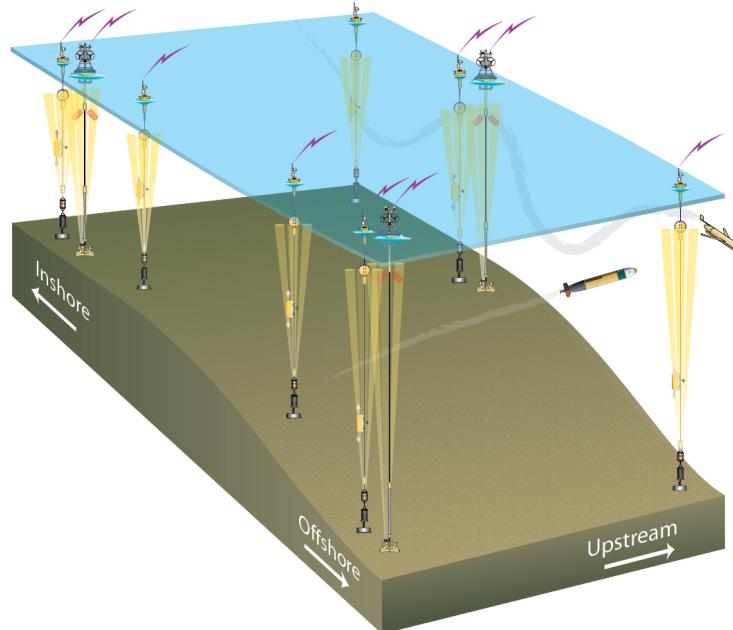


Global Argentine Basin Array



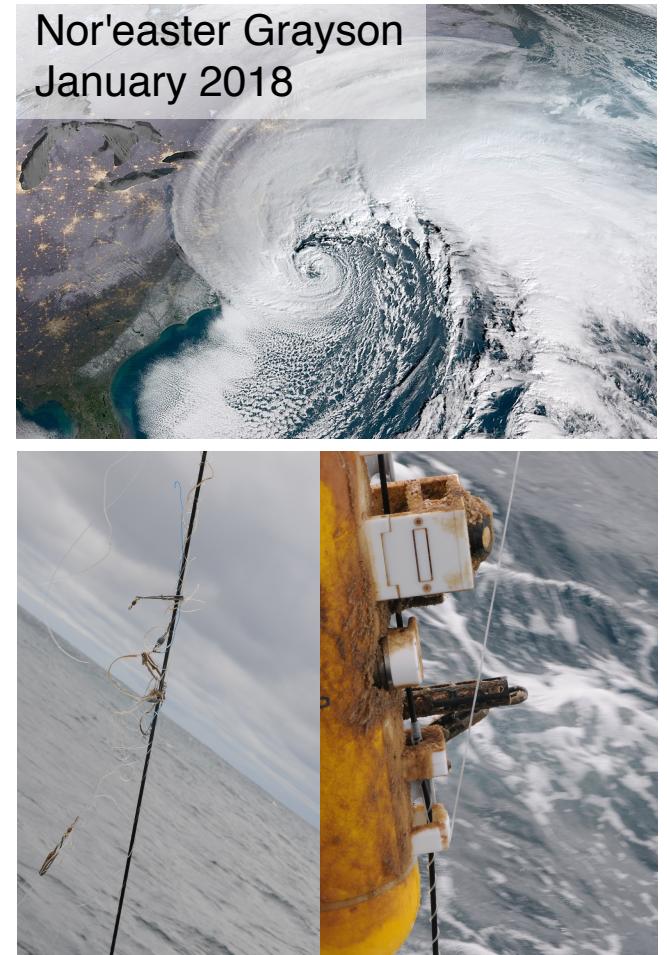
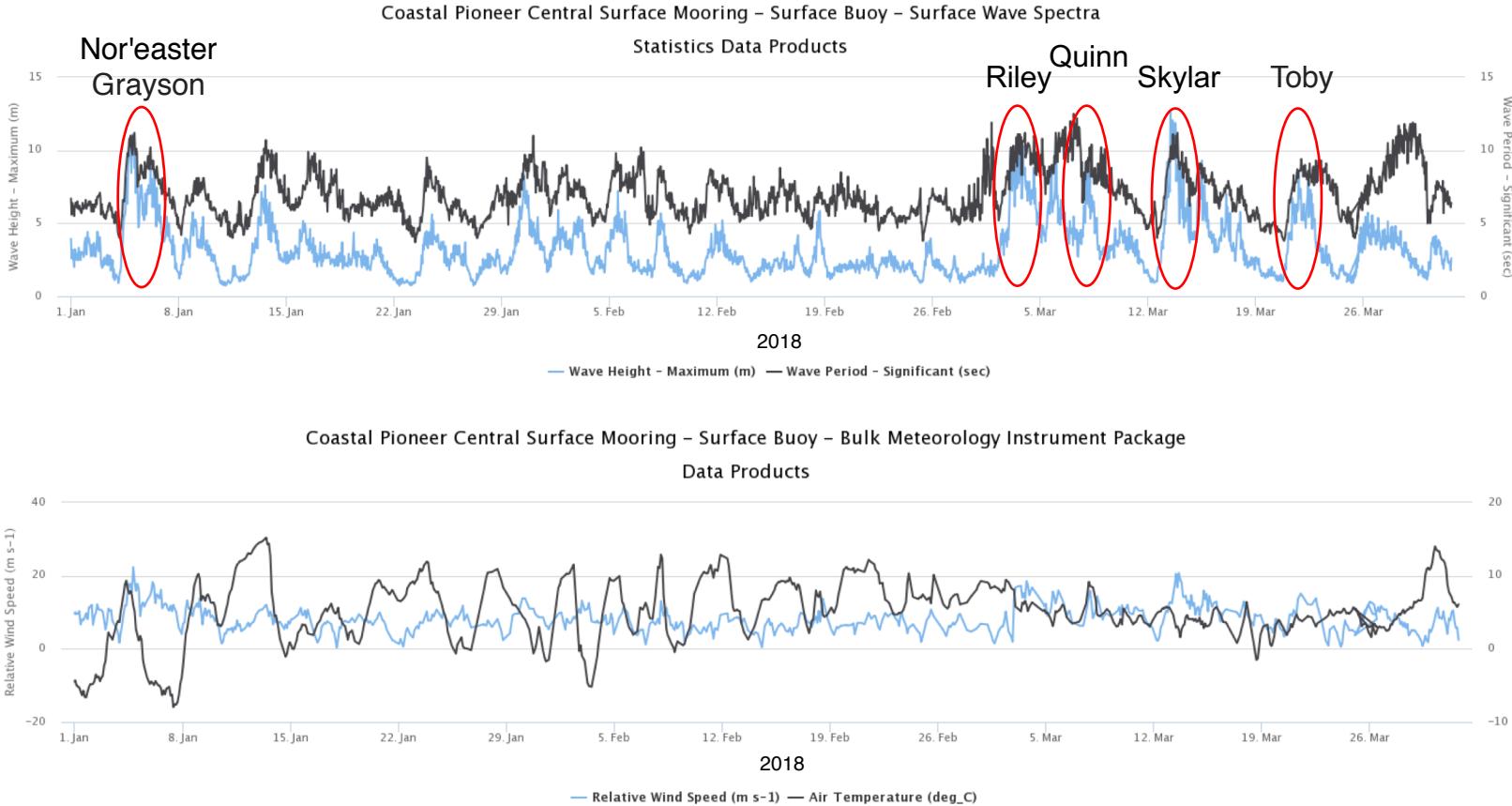
Coastal Pioneer Array

- Spans the shelfbreak front on the northwest Atlantic continental shelf
- 40° N, 71° W
- 91.5 m to 450 m
- Turn OOI moorings twice a year, and gliders every 2-3 months



3204-00007 Pioneer Site Characterization Paper

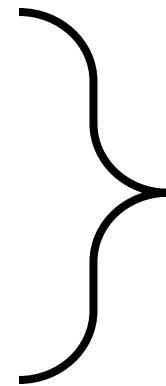
Coastal Pioneer Array



Mooring Details

- Mooring Types

- With Surface Expression
 - Coastal Profiler Moorings
 - Coastal Surface Moorings
 - Global Surface Moorings

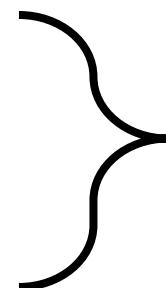


Common design:

- Power generation on Surface mooring
- Platform control/data logging
- Satellite and line-of-sight communications

- Subsurface Moorings

- Global Profiler Moorings
- Global Flanking Moorings



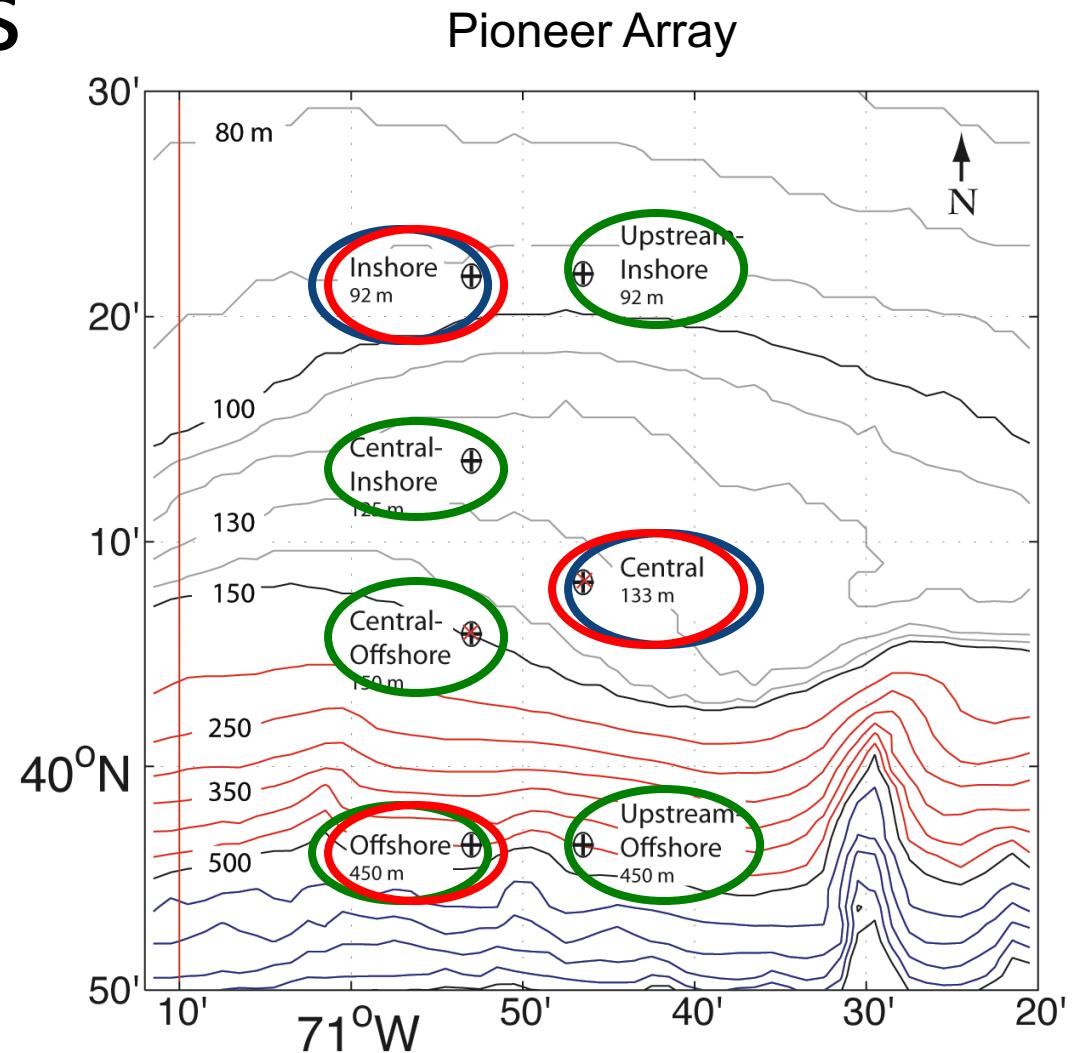
Common design:

- Battery powered
- Low-power platform control/data logging
- Acoustic communications

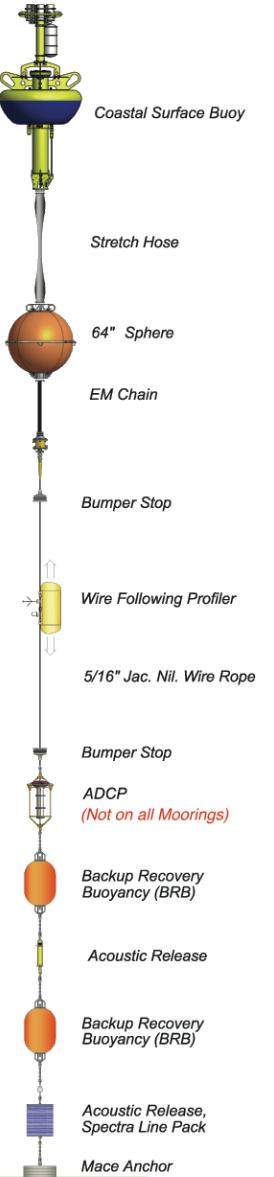


Coastal Pioneer Moorings

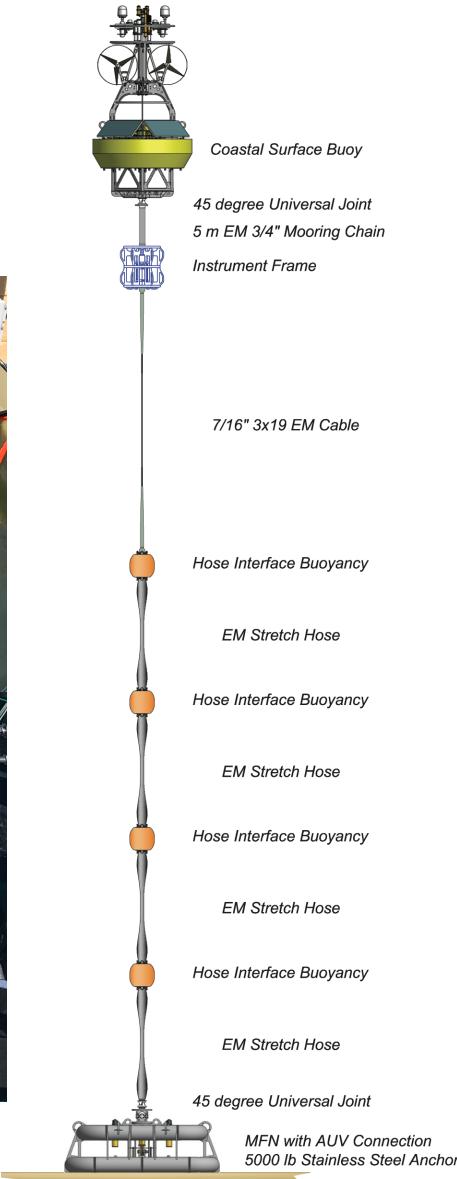
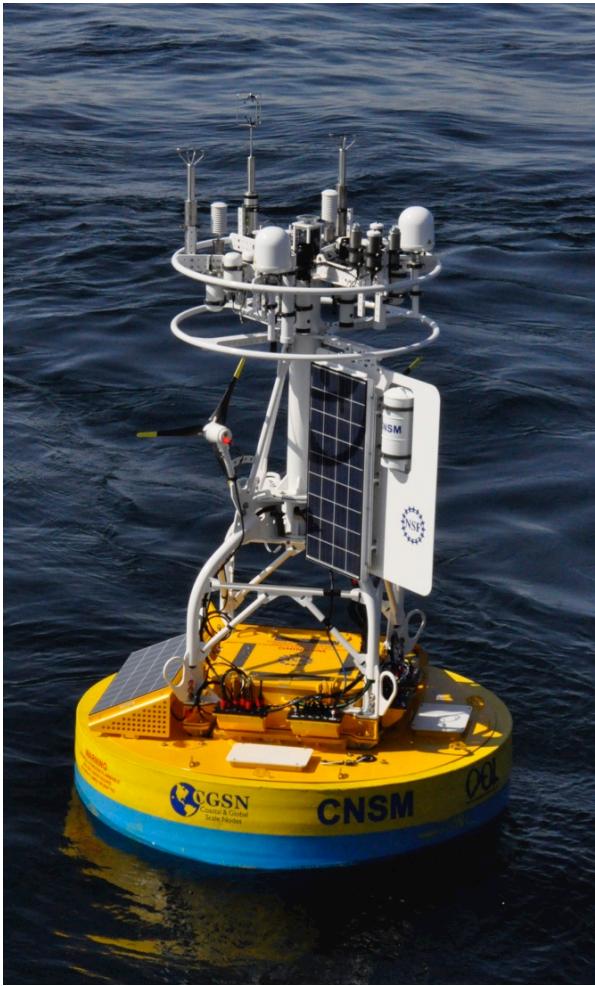
- 3 Surface Moorings
 - Inshore (95 m)
 - Central (135 m)
 - Offshore (450 m)
- 7 Profiler Moorings
 - Central Inshore (125 m)
 - Central Offshore (150 m)
 - Upstream Inshore (95 m)
 - Upstream Offshore (450 m)
 - Offshore (450 m)
 - Inshore (95 m) – Winter only
 - Central (135 m) – Winter only



Coastal Profiler Mooring

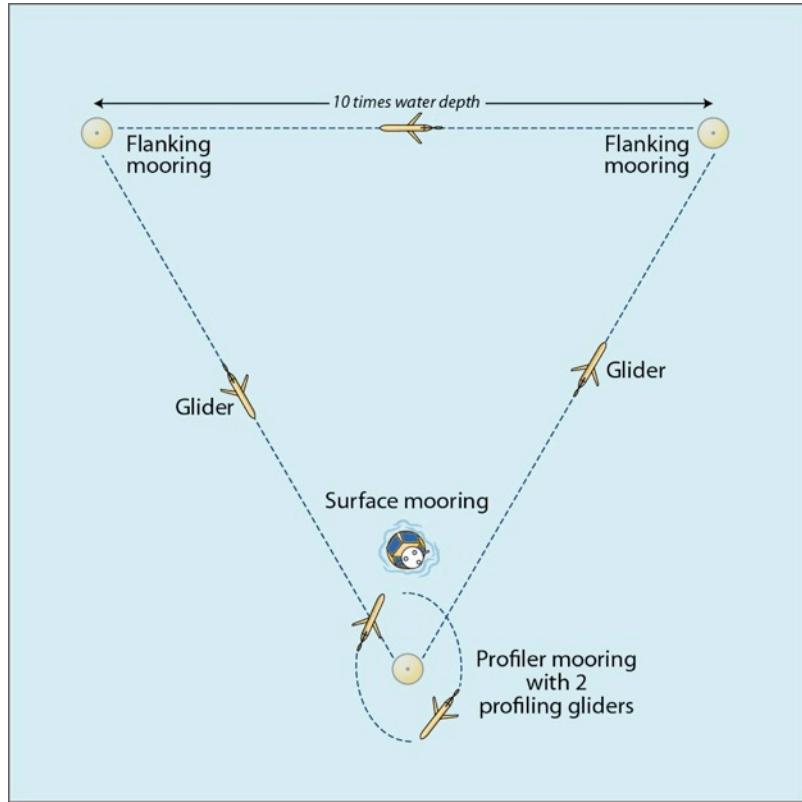


Coastal Surface Moorings

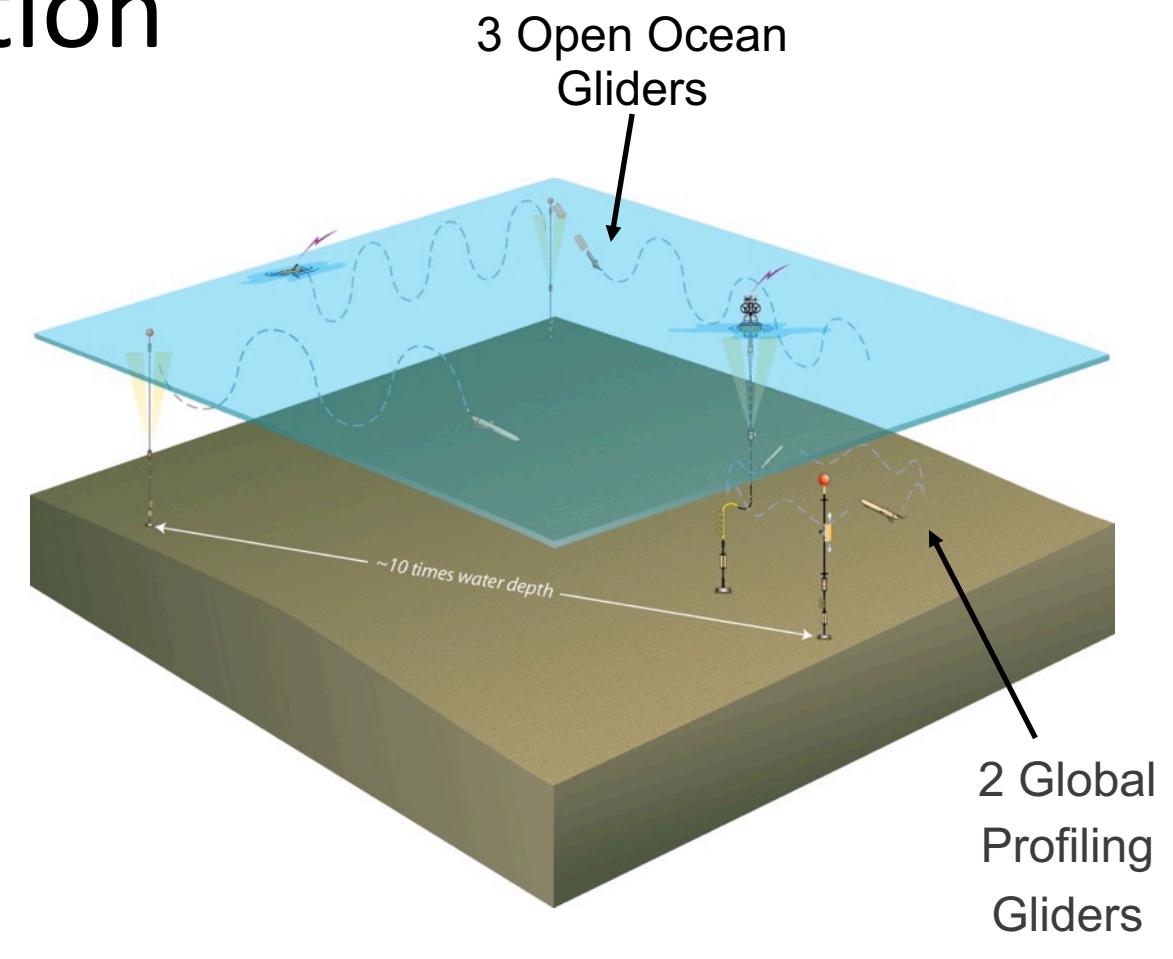


Global Array Configuration

FLANKING A

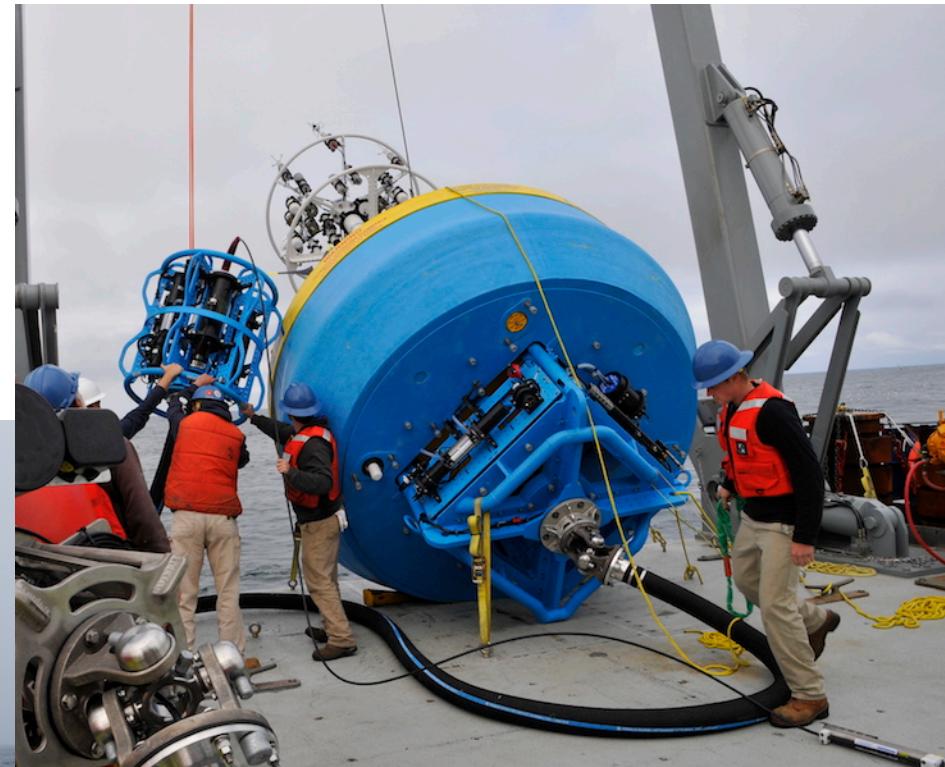
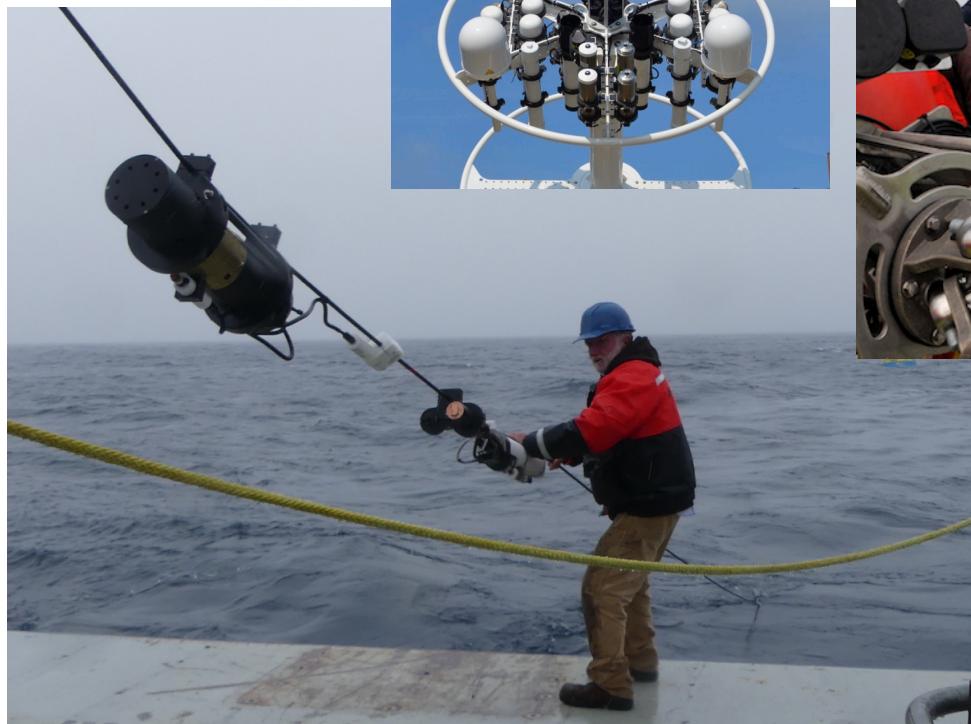
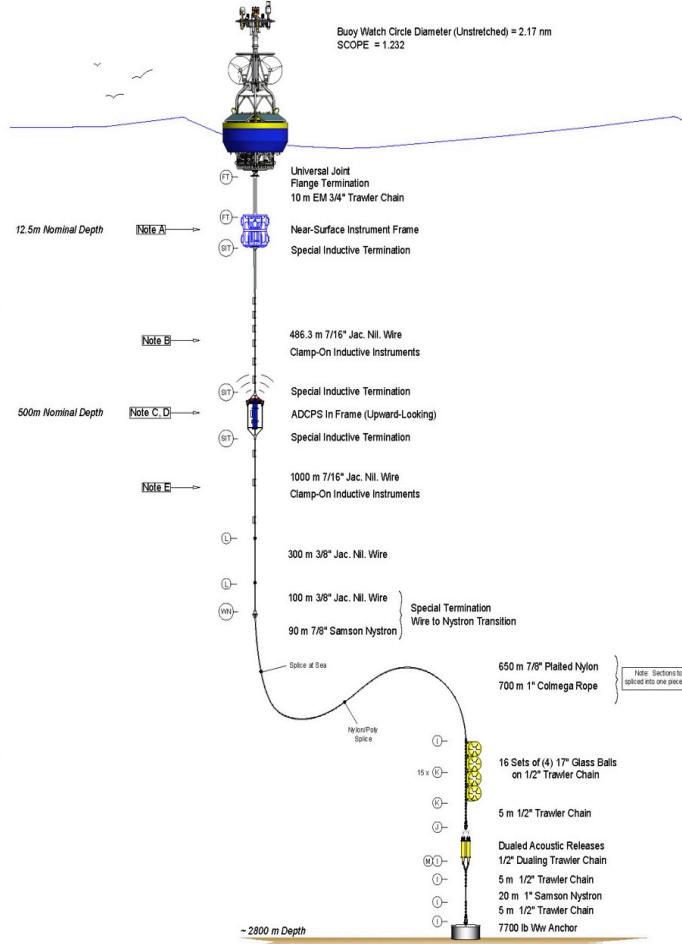


FLANKING B



<http://oceanobservatories.org/array/global-argentine-basin/>

Global Surface Moorings

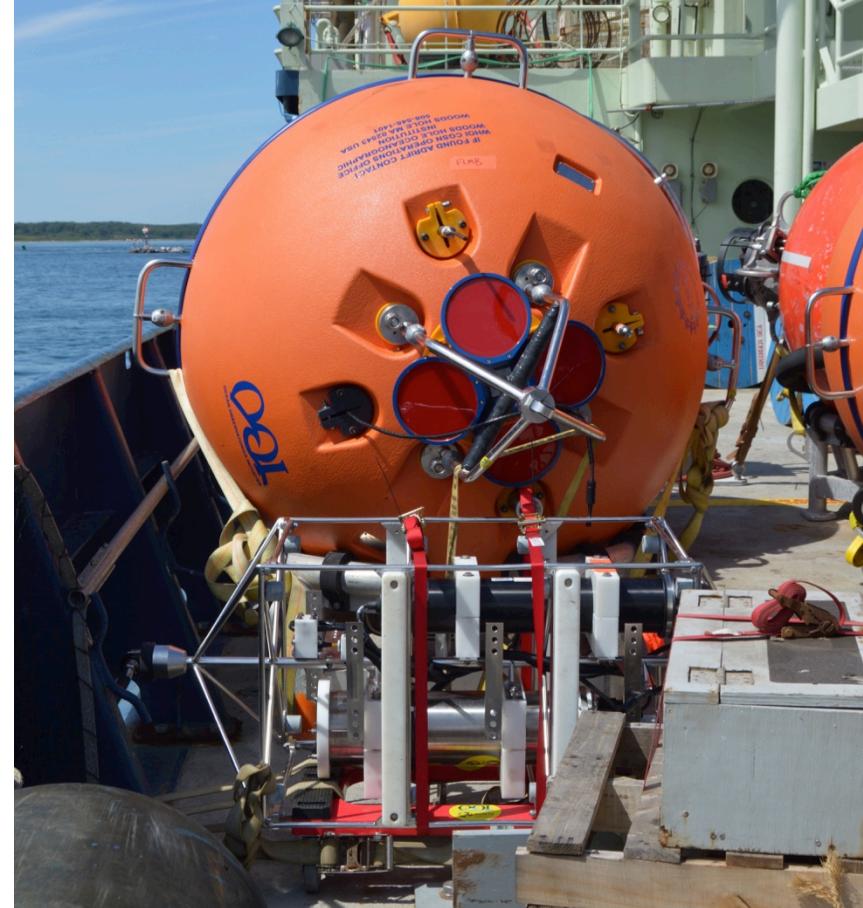


Depth 30 m

Global Flanking Mooring



Depth 499 m

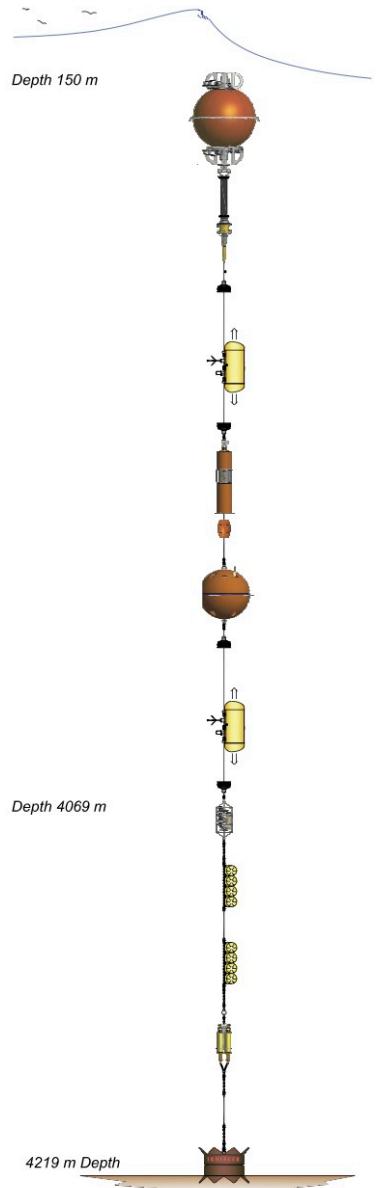
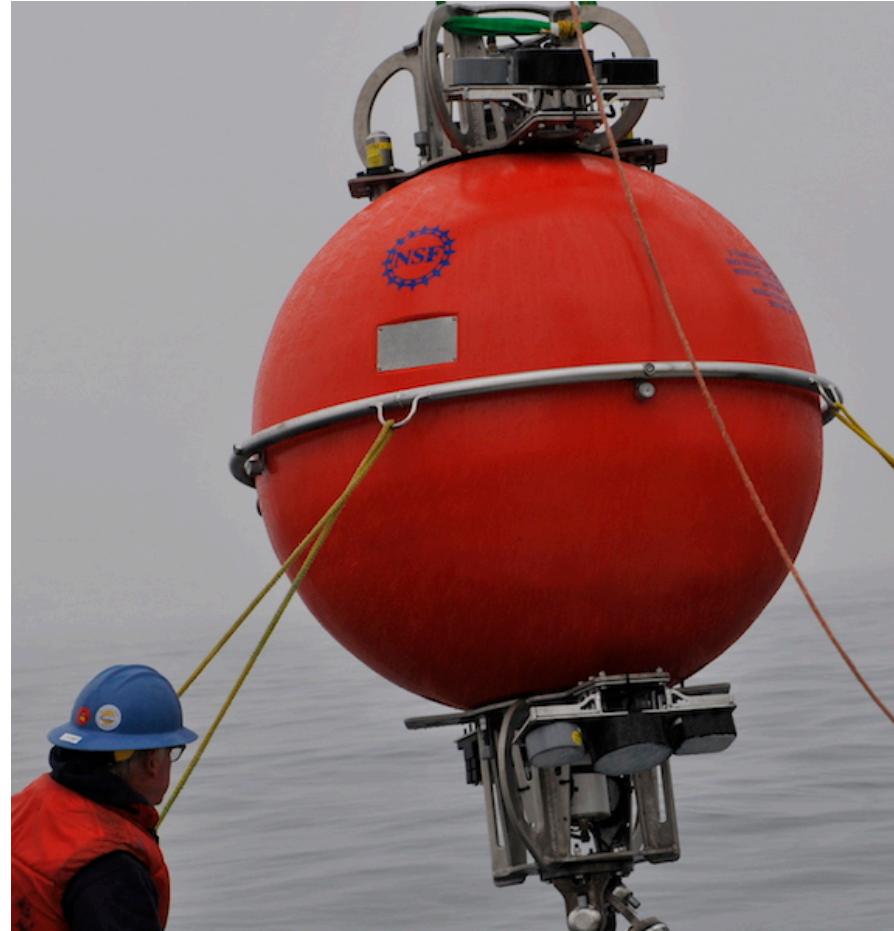


Depth 1507 m

4127 m Depth



Global Profiler Mooring

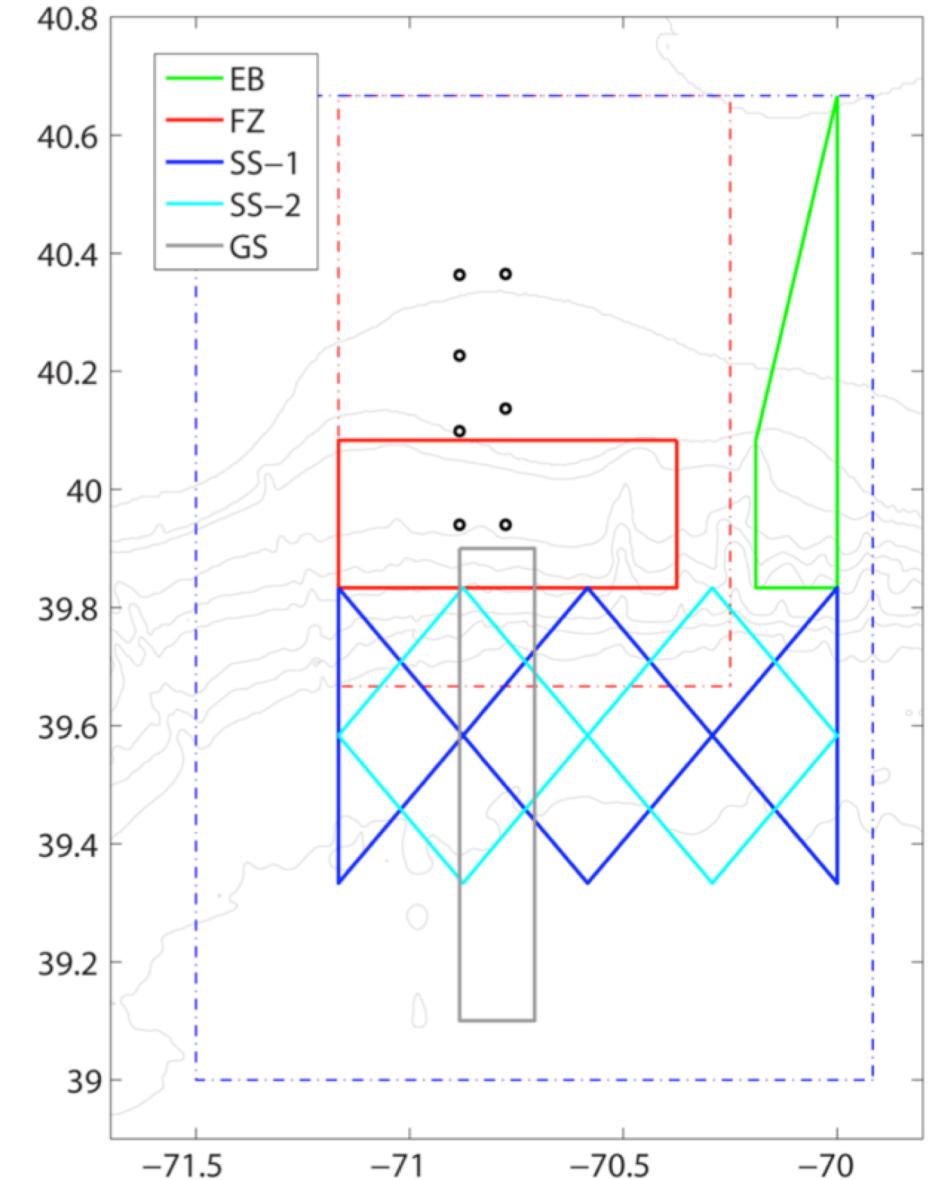


Pioneer Coastal Gliders

- Teledyne Webb G2 Glider
 - 200 and 1000 m

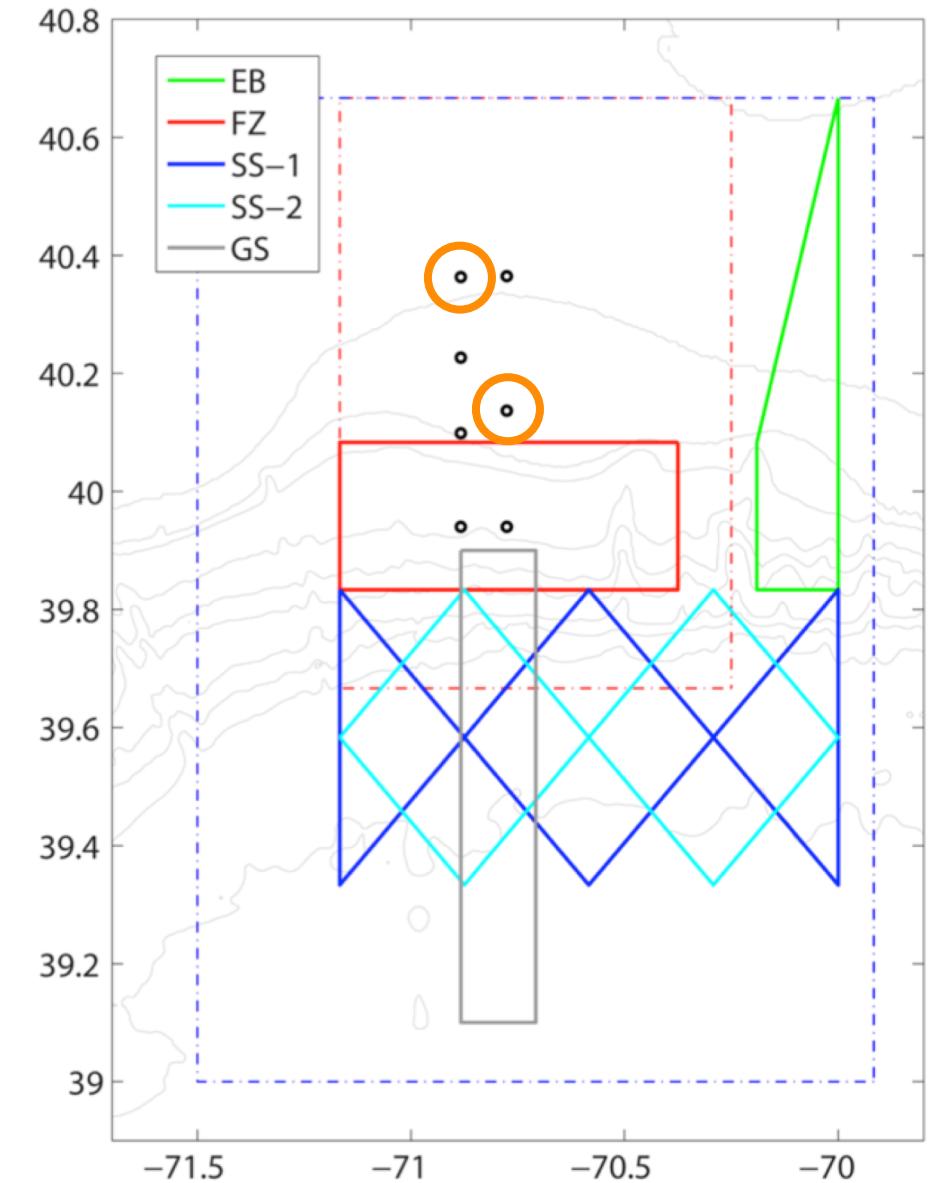
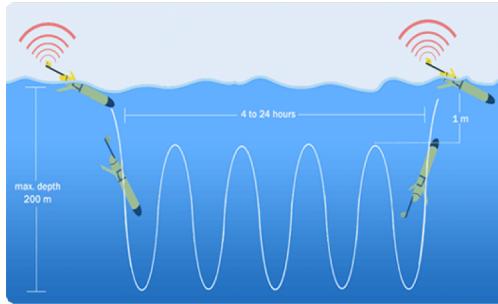


- Instruments
 - CTDGV – SBE CTD
 - DOSTA – AADI 4831
 - PARAD – Biospherical QSP 2150
 - FLORT – WET Labs ECO triplet
 - ADCPA – RDI Explorer 600 DVL



Pioneer Profiling Gliders

- Teledyne Webb G2
 - 200 m engine
- Operations
 - Hold position @ 130 m
 - Profile at least 4 profiles / day
- Instruments
 - CTDGV – SBE CTD-GP
 - DOSTA – AADI 4831
 - NUTNR – Satlantic SUNA
 - PARAD – QSP-2155 PAR
 - FLORT – ECO FLBBCD
 - FLORT – ECO BB3

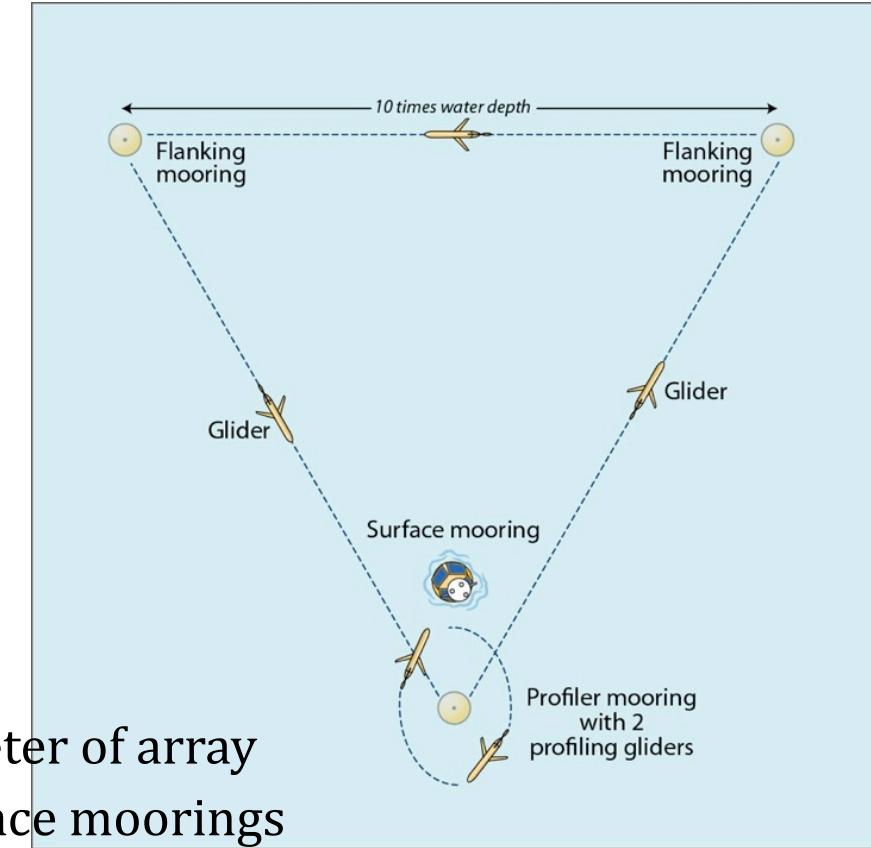


Global Gliders

- Teledyne Webb G2
 - 1000 m engine
- Global Profiling Glider
 - Hold position @ 1000 m
 - Profile 200 m, 2 x 24 hours
- Instruments
 - CTDGV – SBE CTD-GP
 - DOSTA – AADI 4831
 - NUTNR – Satlantic SUNA
 - PARAD – QSP-2155 PAR
 - FLORT – ECO FLBBCD
 - FLORT – ECO BB3



- Open Ocean
 - Transit around perimeter of array
 - Data mule for subsurface moorings
- Instruments
 - CTDGV – SBE CTD-GP
 - DOSTA – AADI 4831
 - FLORD – ECO FLBB

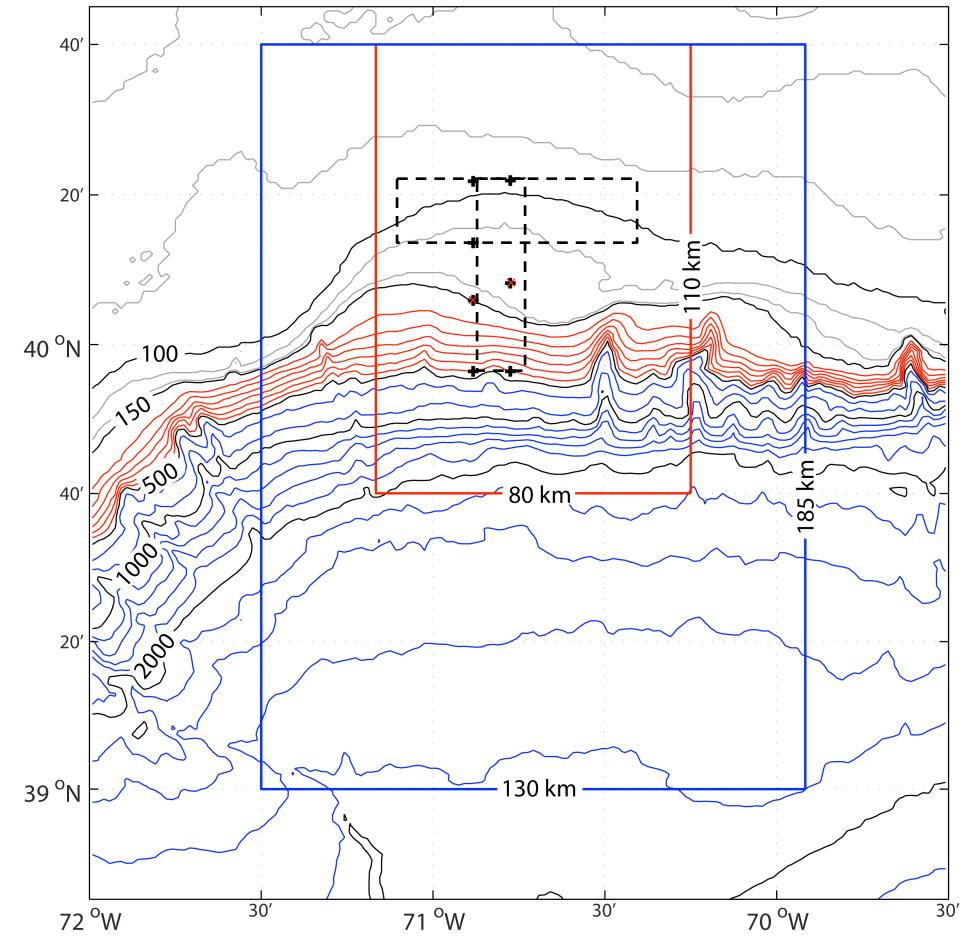


Autonomous Underwater Vehicle (AUV)



- Instruments

- CTDAV – Seabird CTD
- DOSTA – AADI Optode 4330
- PARAD – Biospherical QSP 2150
- FLORT – WET Labs Eco triplet
- NUTNR – Satlantic SUNA
- ADCPA – RDI Navigator 600



Opportunities

<http://oceanobservatories.org/information-for-researchers/>

1. Connect new instruments to the observatory network
 - a. Connect self-powered, self-logging instruments
 - b. Connect instruments to CGSN infrastructure
2. Sample rate modification for existing instruments/platforms/vehicles
3. Ancillary work during normally scheduled OOI cruises

1. Other
 - a. Add platform (mooring or vehicle) to Array(s)
 - b. Add engineering capabilities (power, comms, etc.)
 - c. Add calibration techniques for deployed instruments
 - d. Etc.



Process for connecting new instruments

- Identification of candidate instruments
- Consultation with CGSN/EA engineers on viability
 - CGSN Staff will provide letter confirming technical feasibility, recommended schedule and costs
- Shiptime request (as needed)
- Funding of proposal
- Researcher development of instrumentation
- Integration and test at CGSN/EA
- Deployment

<http://oceanobservatories.org/information-for-researchers/#connecting>





Questions?



Core Instruments Details

<http://oceanobservatories.org/instruments/>

CGSN & EA Core Science Instruments

Instrument	OOI 5-Letter Code	Vendor	Model
Conductivity, Temperature, Depth (CTD)	CTDBP	SeaBird	SBE 16plusV2
	CTDMO	SeaBird	SBE 37-IM
	CTDPF	SeaBird	SBE 49, SBE 52MP
	CTDGV, CTDAV	SeaBird	SBE GP
Seafloor pressure	PRESF	SeaBird	SBE 26plus
Dissolved Oxygen	DOFST	SeaBird	SBE 43F
	DOSTA	Aanderaa	AADI optode 4831, 4330
Acoustic Doppler Current Velocity (ADCP)	ADCPA	Teledyne RDI	Explorer 600 DVL, Navigator 600
	ADCPS, ADCPT	Teledyne RDI	WorkHorse, LongRanger
Single Point Velocity	VELPT	Nortek	Aquadopp
3-D Velocity	VEL3D	Nortek	Vector
Surface Wave Spectra	WAVSS	Axys Technologies	TRIAAXYS
Direct Covariance Flux	FDCHP	WHOI	DCFS
Bulk Meteorology	METBK	Star Engineering	ASIMET



CGSN & EA Core Science Instruments, cont.

Instrument	OOI 5-Letter Code	Vendor	Model
Multi-Channel Fluorometer	FLORD	WET Labs	ECO Puck FLBB
	FLORT	WET Labs	ECO Triplet, ECO Puck FLBbcd, ECO Puck BB3
Optical Attenuation and Absorption	OPTAA	WET Labs	AC-S
Photosynthetically Available Radiation (PAR)	PARAD	WET Labs	ECO PAR
	PARAD	Biospherical	QSP
Spectral Irradiance	SPKIR	Satlantic	OCR507
Nitrate	NUTNR	Satlantic	ISUS, SUNA
Partial Pressure of CO2 in Air & Water	PCO2A	Pro-Oceanus	pCO2-PRO with ATM
Partial Pressure of CO2 in Water	PCO2W	Sunburst Sensors	SAMI-CO2
pH	PHSEN	Sunburst Sensors	SAMI-pH
Bio-Acoustic Sonar	ZPLSC	ASL Environmental	AZFP
	ZPLSG	ASL Environmental	AZFP
Camera	CAMDS	Kongsberg	

