



OCEAN
OBSERVATORIES
INITIATIVE

OOI Station Papa Array

AI Pluedemann

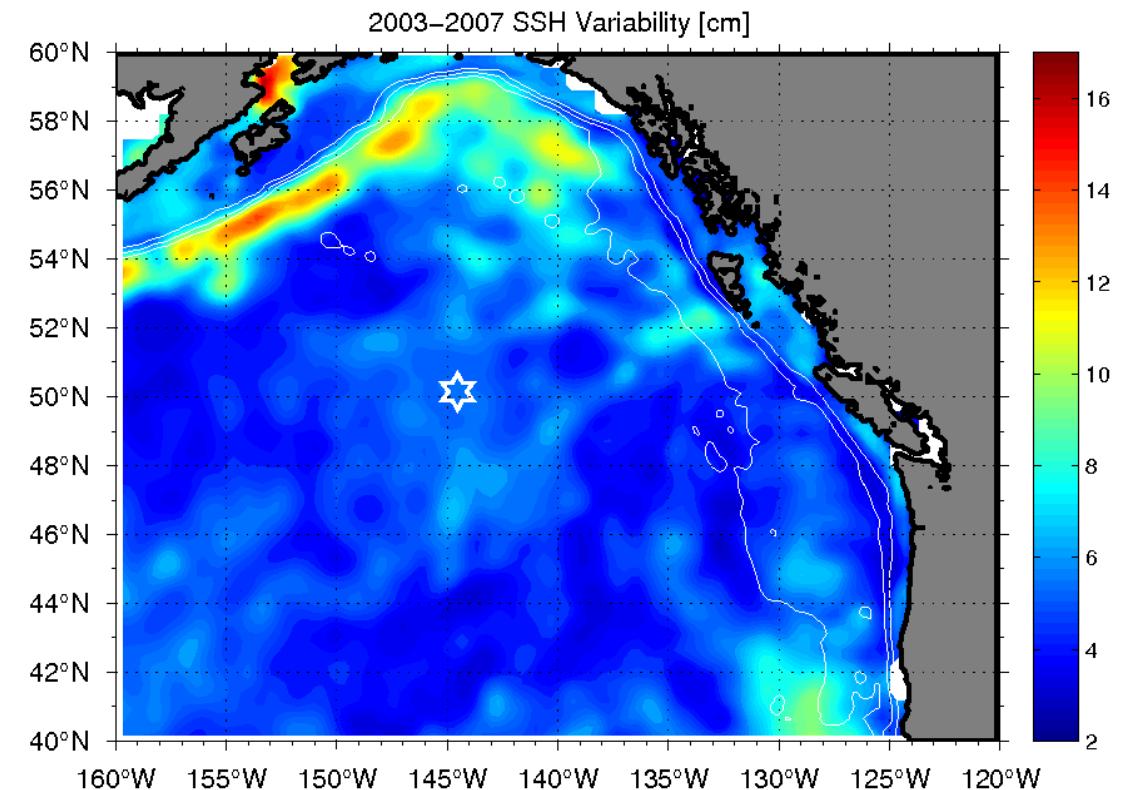
7 June 2022





OOI Station Papa Array

- 50° N, 145° W, 4250 m depth
 - Triangular array
 - Subsurface moorings and gliders
- Distinct seasonal cycle
- Moderate to low eddy activity
- Historical continuity
- Regional connectivity
- Collaborative site



Station Papa Site Characterization Paper

Historical Continuity

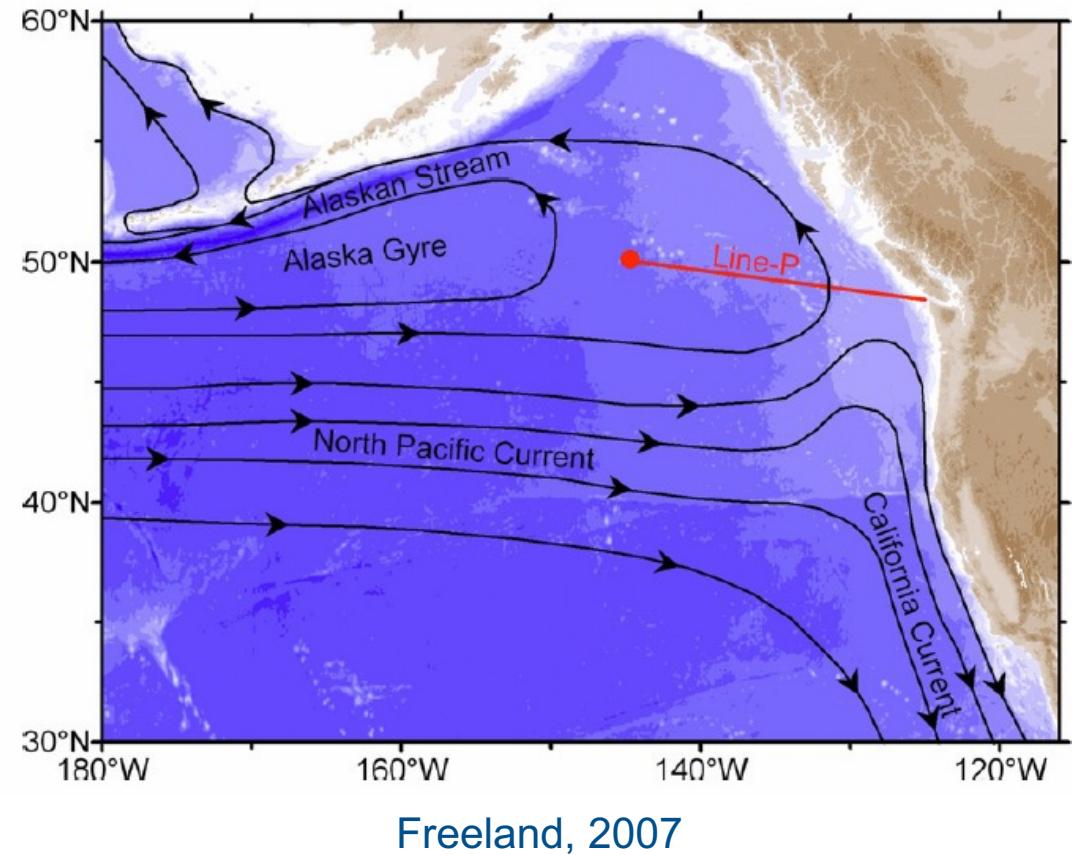
- Ships 1943-1981
 - Navy, USCG, Canada
- Line P 1959-
 - DFO, Canada
- NOAA surface mooring 2007-
 - PMEL, UW, DFO
- UW/APL
 - Glider, 2009; Waverider, 2013-
- OOI Papa Array 2013-
 - Moorings, gliders



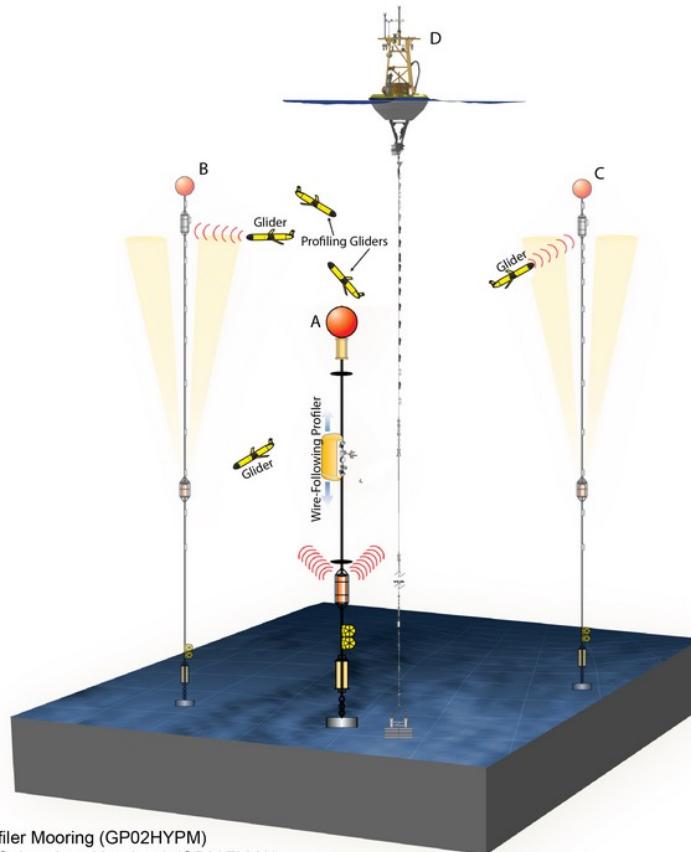
Canadian ship Stonetown, 1955

Regional Connectivity

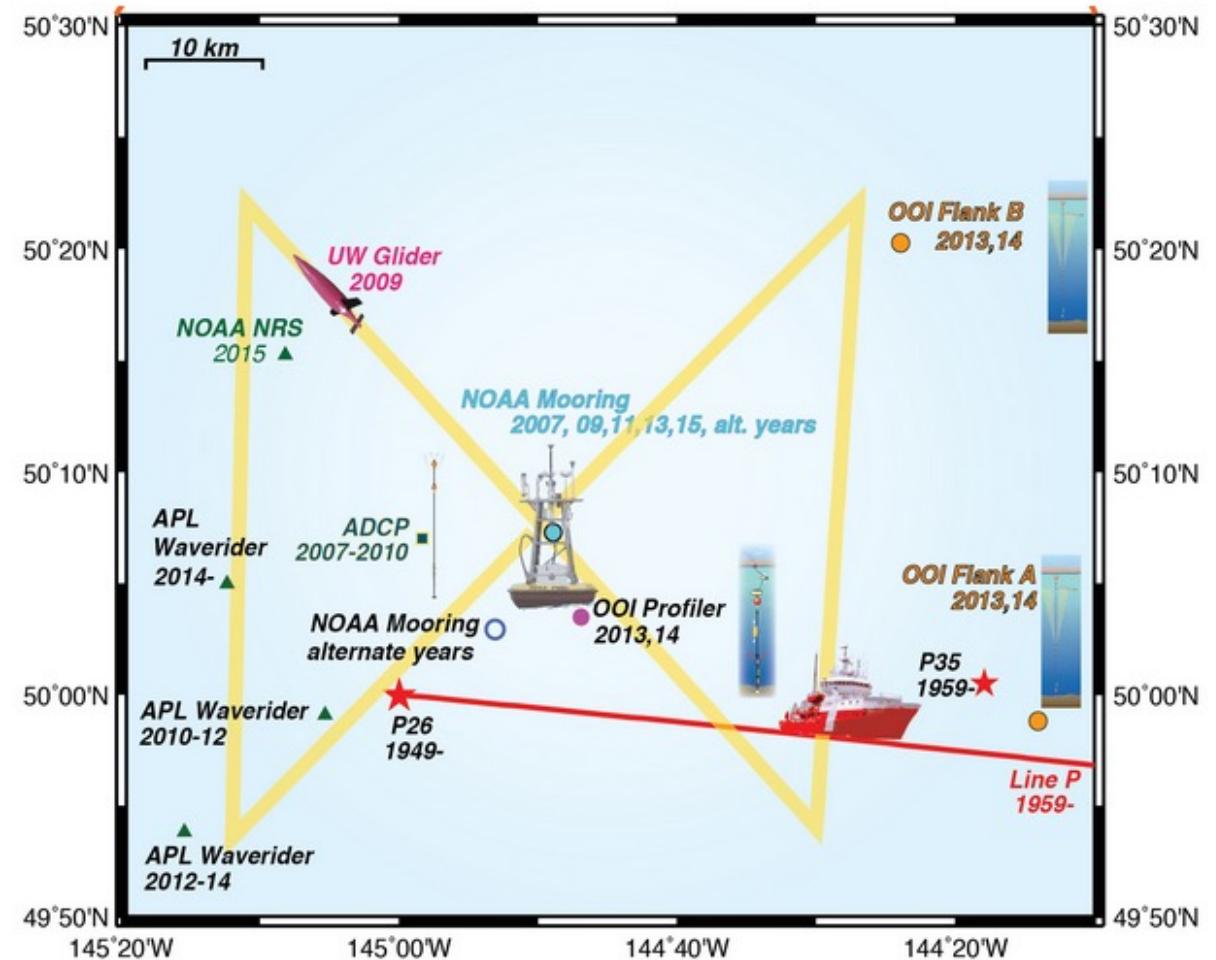
- Alaska Gyre
 - Recirc to Alaskan coast
- N Pacific Current
 - Connects basin to US west coast
- Regional observing
 - AOOS (Alaskan coast)
 - Canada/DFO
 - NANOOS (Pacific Northwest)
- OOI RCA and EA



Collaboration

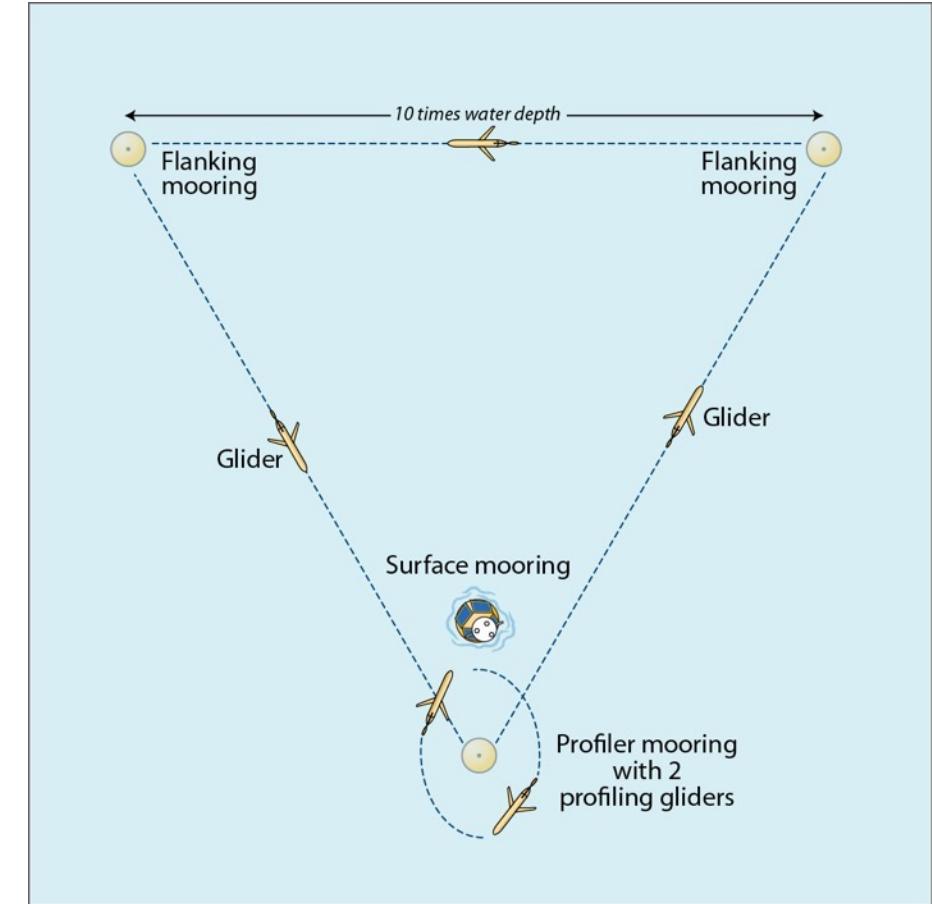
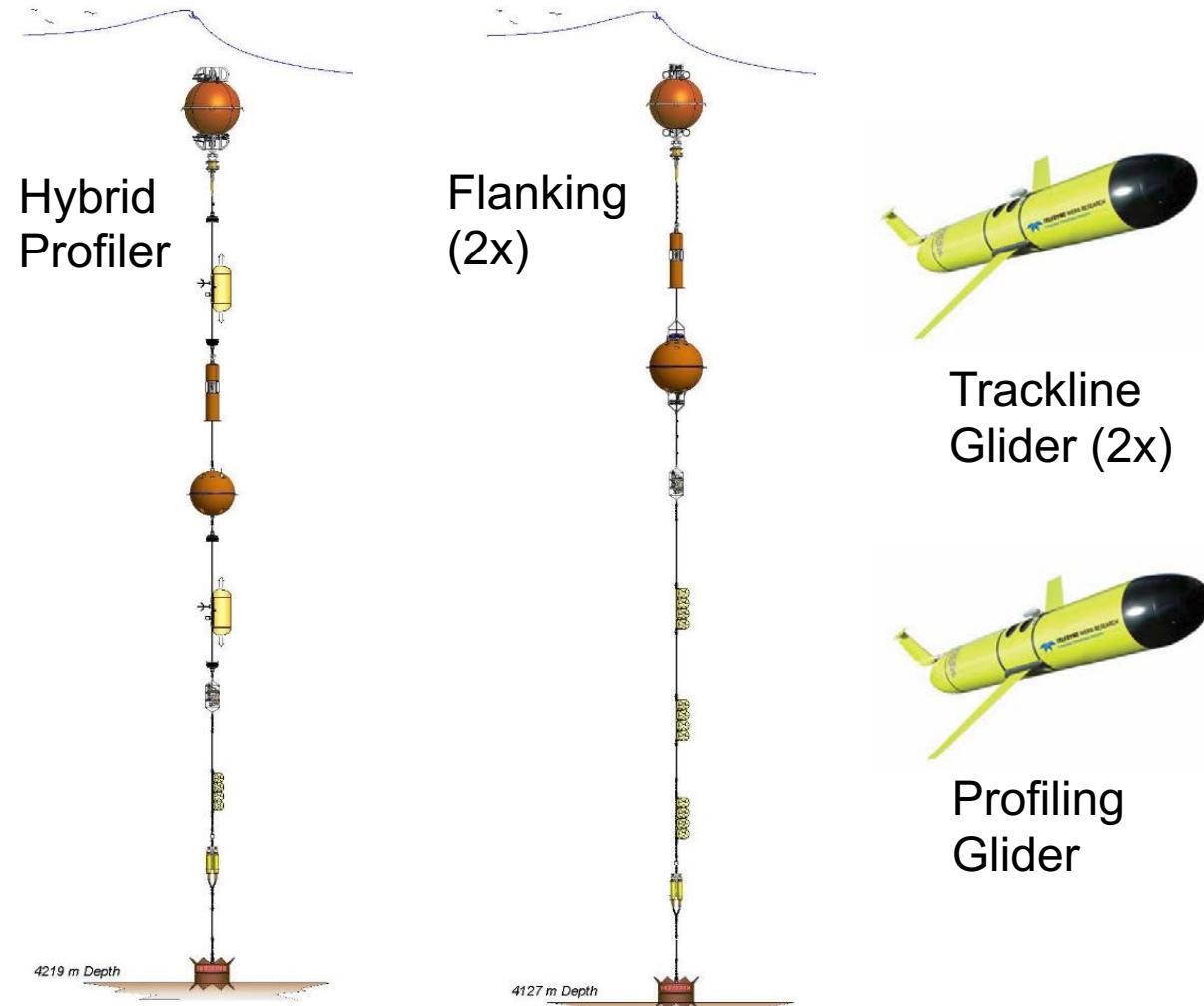


- (A) Apex Profiler Mooring (GP02HYPM)
- (B) Flanking Subsurface Mooring A (GP03FLMA)
- (C) Flanking Subsurface Mooring B (GP03FLMB)
- (D) NOAA PMEL Station Papa Surface Mooring
- Mobile - Open Ocean Glider (GP05MOAS-GL)
- Mobile - Global Profiling Glider (GP05MOAS-PG)

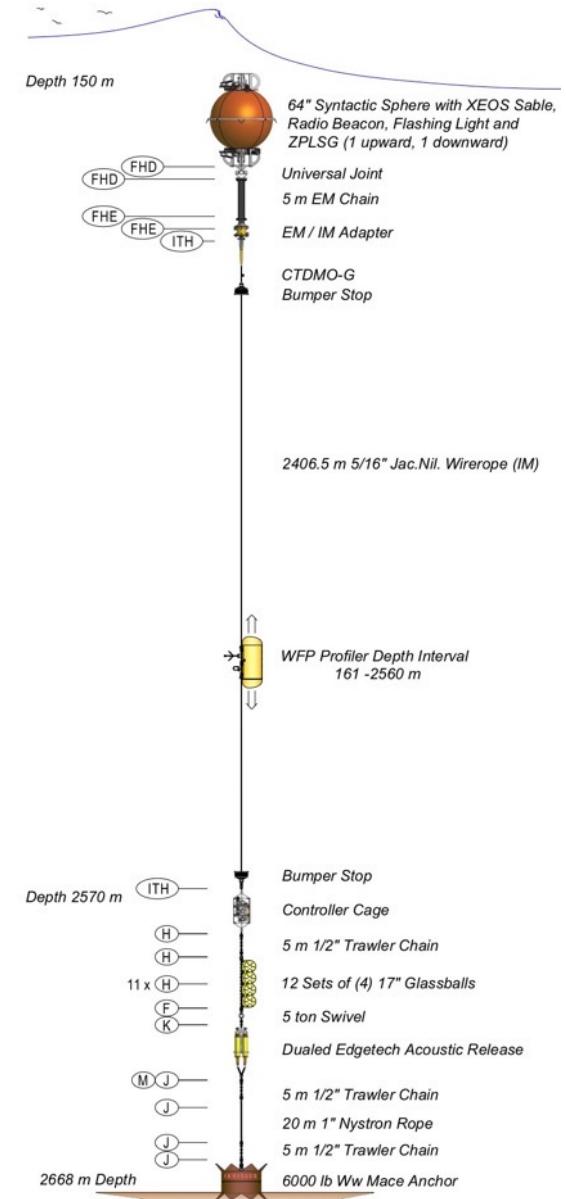
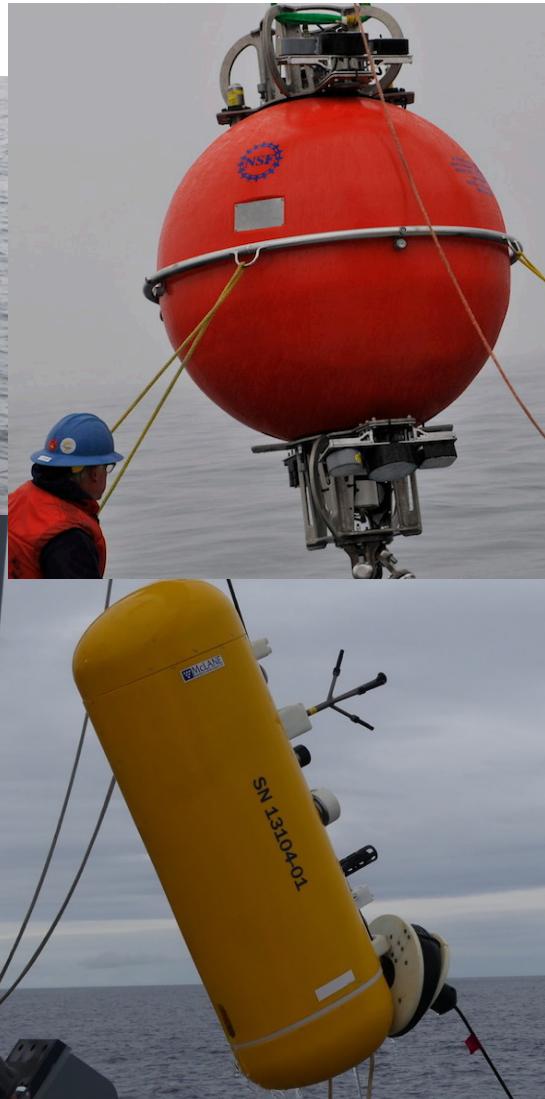
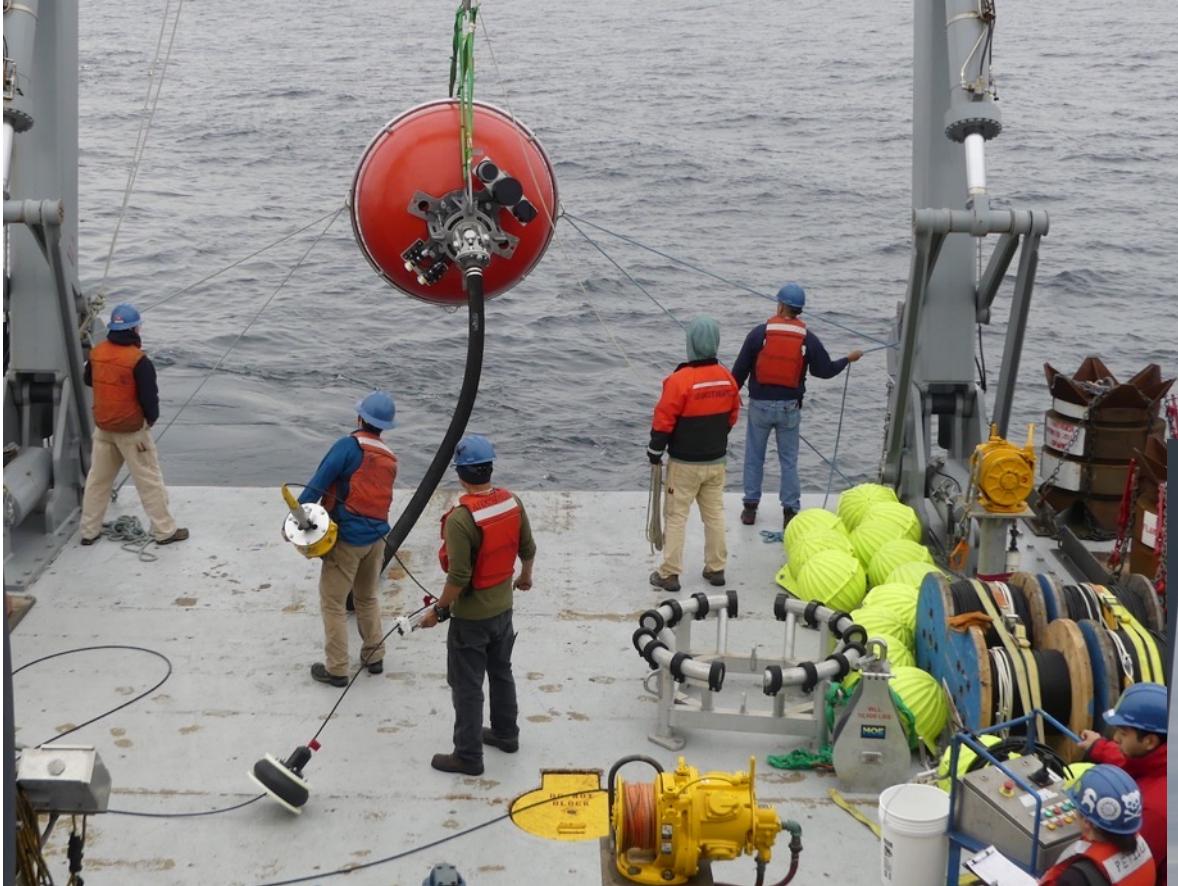


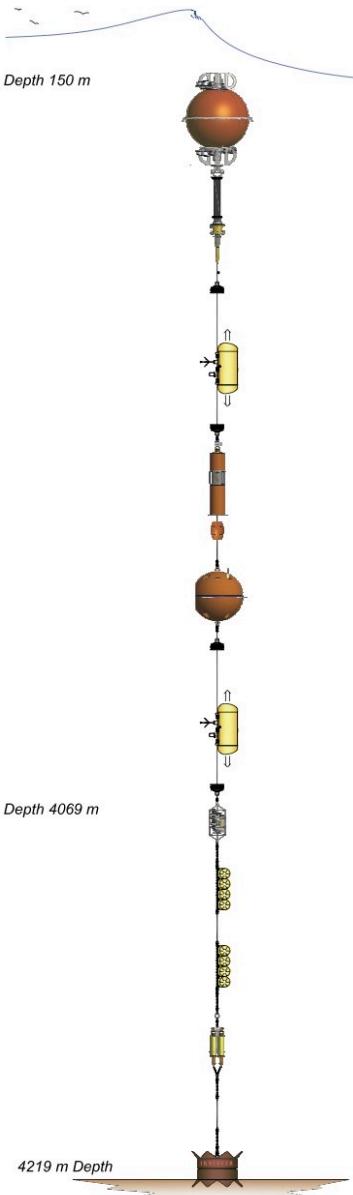
OCS and partner study initiatives near Ocean Station Papa as of 2016.

OOI Infrastructure at Papa



Global Profiler Mooring

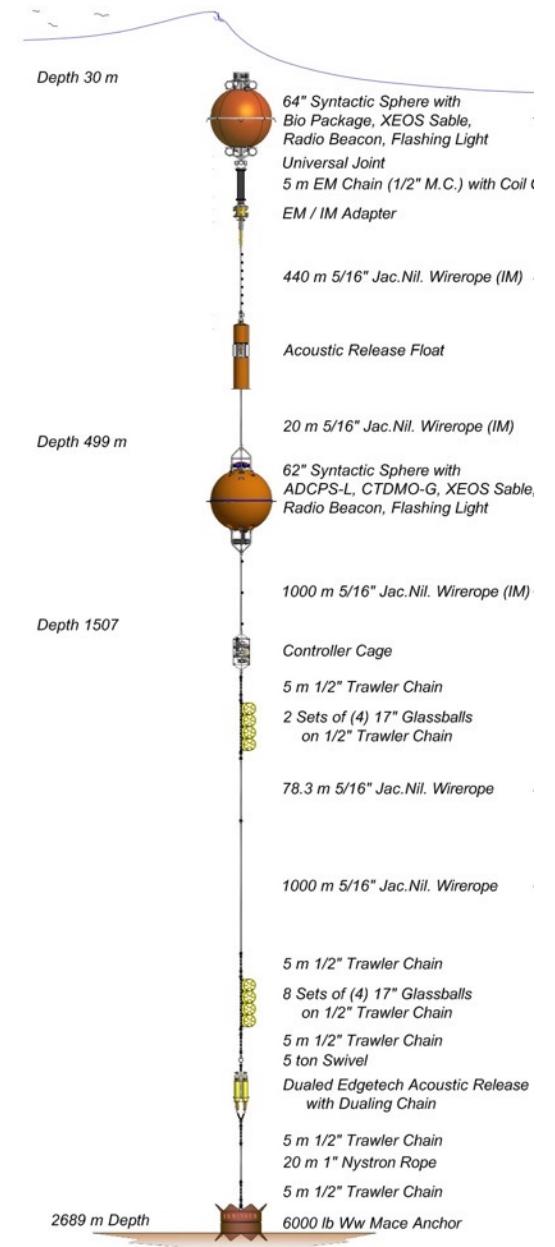


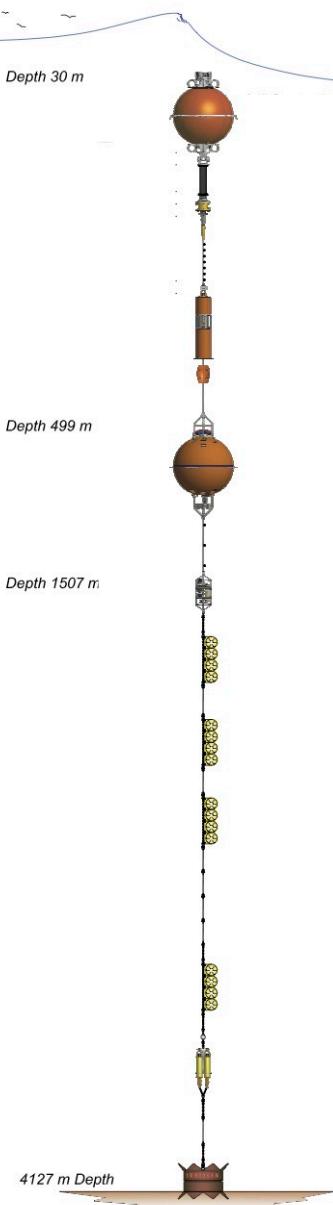


Global Profiler Mooring

Sub-System	Global Profiler Mooring Configuration
Platform Control	Main Controller in lower load cage
Telemetry	Inductive modem Acoustic modem (data to shore via glider)
Power System	Primary Batteries
Mooring Riser	64" Sphere, Inductive Wire Rope, In-line Release, Mid-water Flotation Sphere, Inductive Wire Rope, Load Cage, Glass Spheres, Anchor with Release Line Pack
Profiler	McLane Moored Profiler 2 (upper and lower)
Instruments (7-11 total)	CTDPF, DOSTA, FLORD, VEL3D on profiler(s) ZPLSG (2) in 64" Sphere at 150 m CTDMO on inductive rope above WFP

Global Flanking Mooring

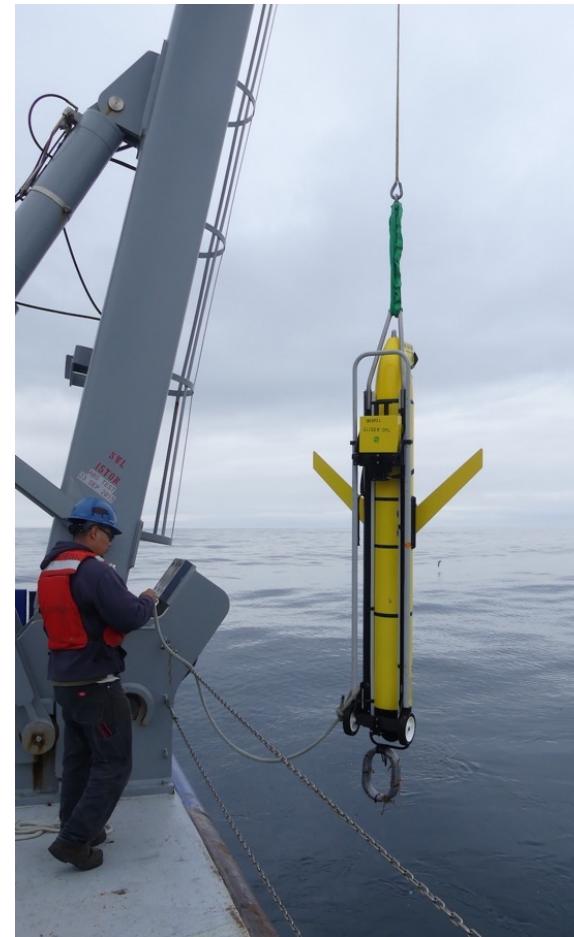




Global Flanking Mooring

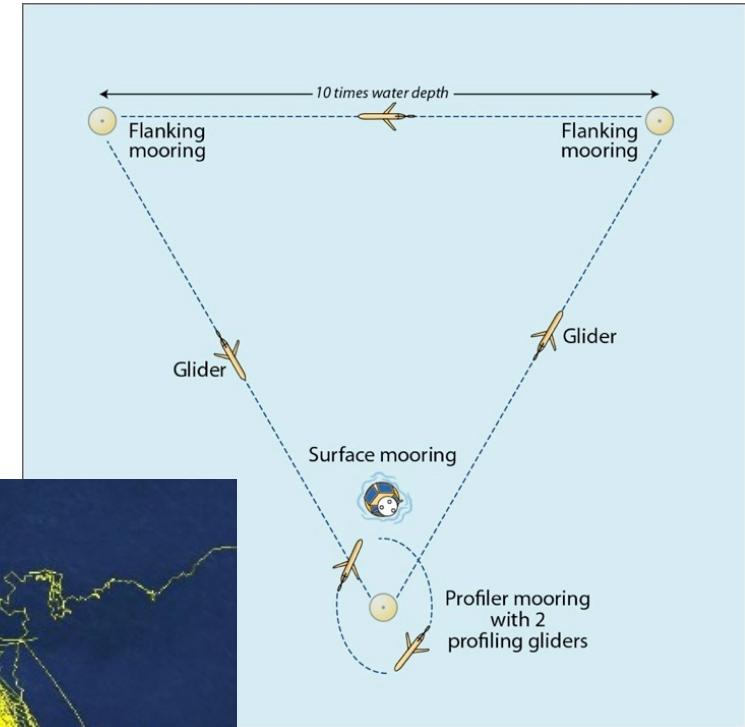
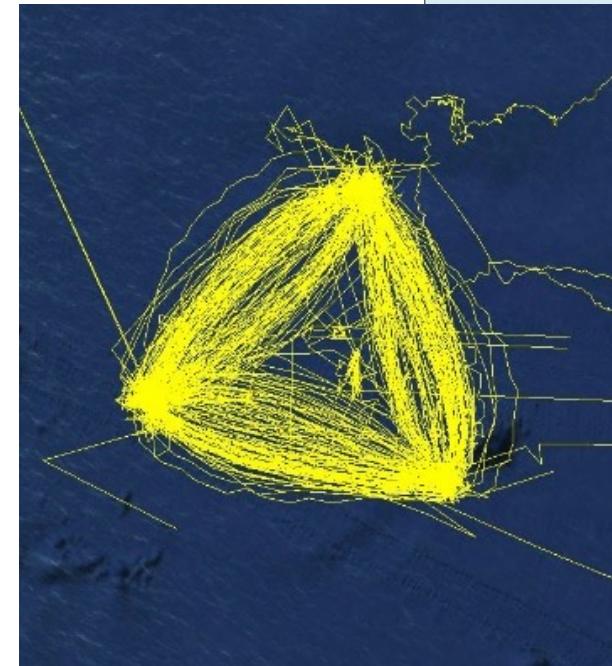
Sub-System	Flanking Mooring Configuration
Platform Control	Main Controller in lower load cage Secondary Controller in upper 64" sphere
Telemetry	Inductive modem Acoustic modem (data to shore via glider)
Power System	Primary Batteries
Mooring Riser	64" Sphere, Inductive Wire Rope to 1500 m, In-line release, ADCP Flotation Sphere, Load Cage, Glass Spheres, Anchor with Release Line Pack
Instruments (16-24 total)	CTDMO, DOSTA, FLORT, PHSEN in 64" Sphere at 30 m CTDMO (10) on inductive line ADCP, CTDMO in Flotation Sphere at 500 m

Global Gliders



Global Gliders

- Trackline following
CTD, DO
FLOR – ECO FLNTU
- Profiling (position holding)
CTD, DO
FLOR – ECO FLBBCD and BB3
PAR
Nitrate – Satlantic SUNA



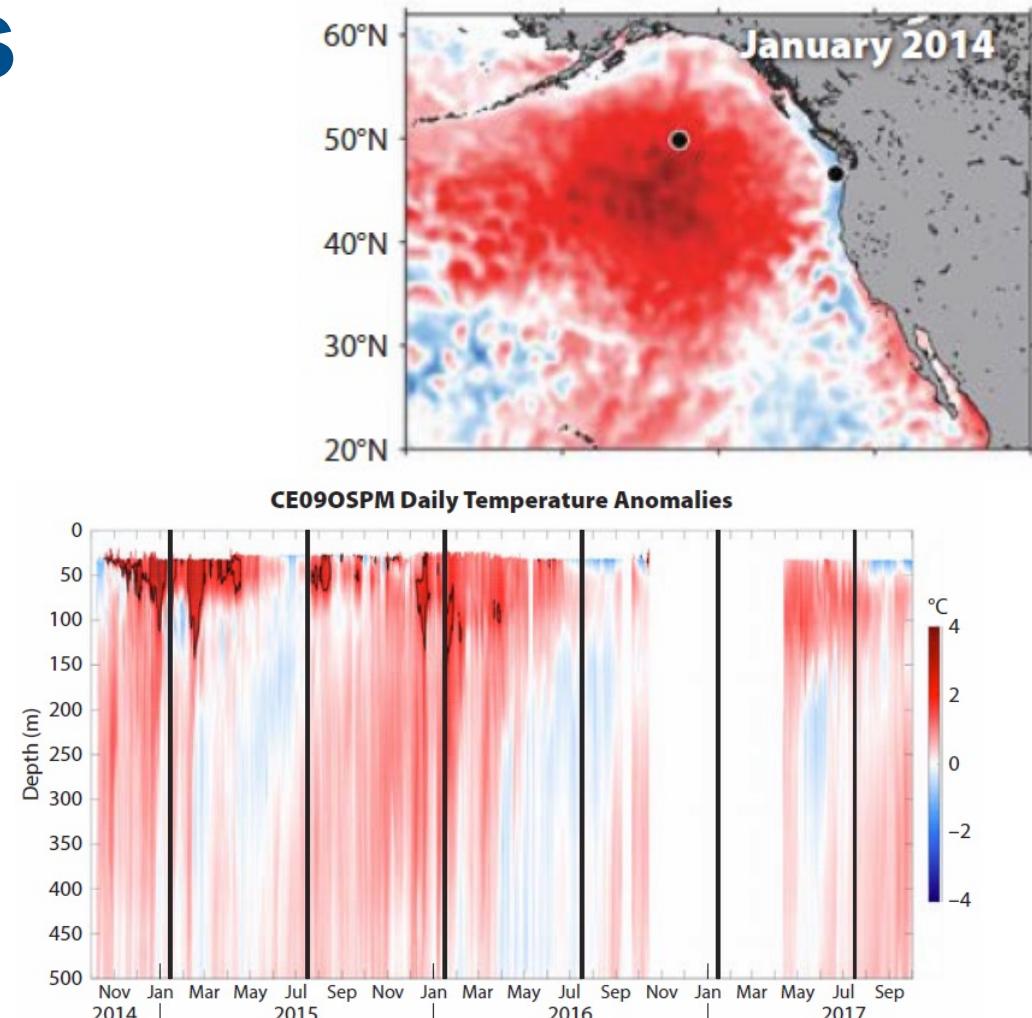


Papa Array Data Products

Data Product	Measurement Location			
	Hybrid Profiler	Flanking Moorings	Trackline Glider	Profiling Glider
Temperature	X	X	X	X
Salinity	X	X	X	X
Pressure	X	X	X	X
Dissolved O ₂	X	X	X	X
Chlorophyll a (phytoplankton biomass estimates)	X	X	X	X
Optical backscatter	X	X	X	X, X, X
Colored Dissolved Organic Matter		X		X
Apparent optical properties (PAR)				X
Nitrate concentration				X
Water velocity	X	X		
pH (ocean acidity)		X		
Bio-acoustics (zooplankton biomass estimates)	X			

Regional Processes

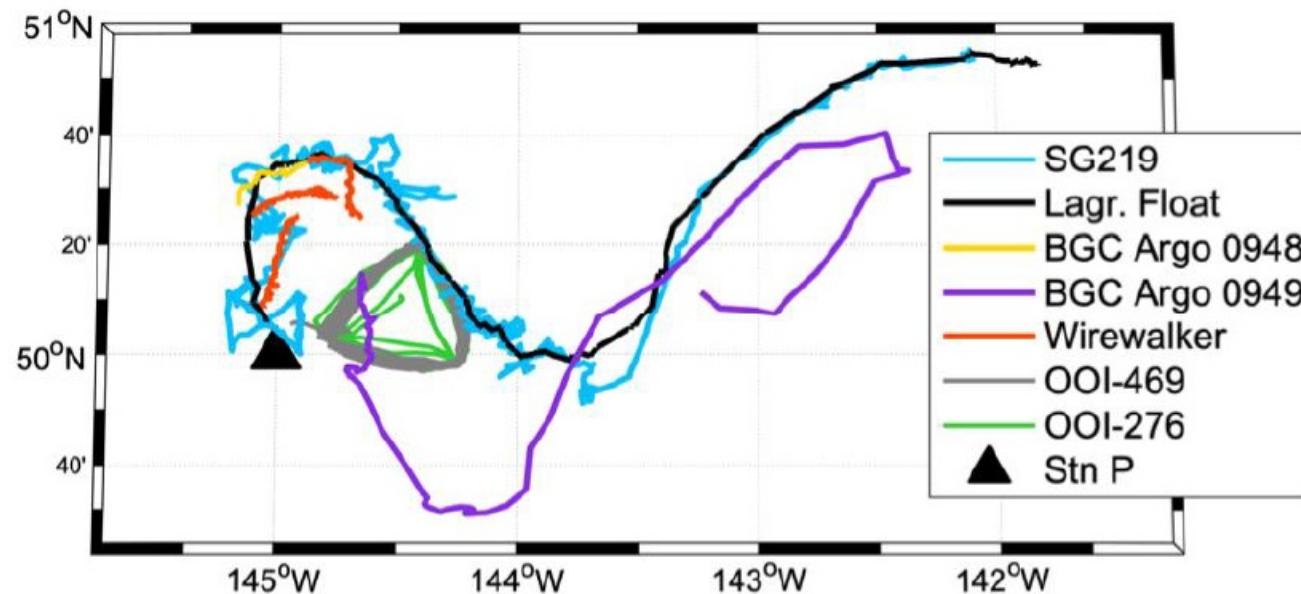
- NE Pacific Warm Blob 2014
 - SST change observed at Papa
 - Anomaly tracked by satellite
 - Vertical extent (150 m) seen by Endurance Array Offshore profiler
- Ecosystem impacts
 - Low chlorophyll
 - Zooplankton changes
 - Enhanced algal blooms
 - Fisheries impacts



Barth et al., 2018

Regional Processes

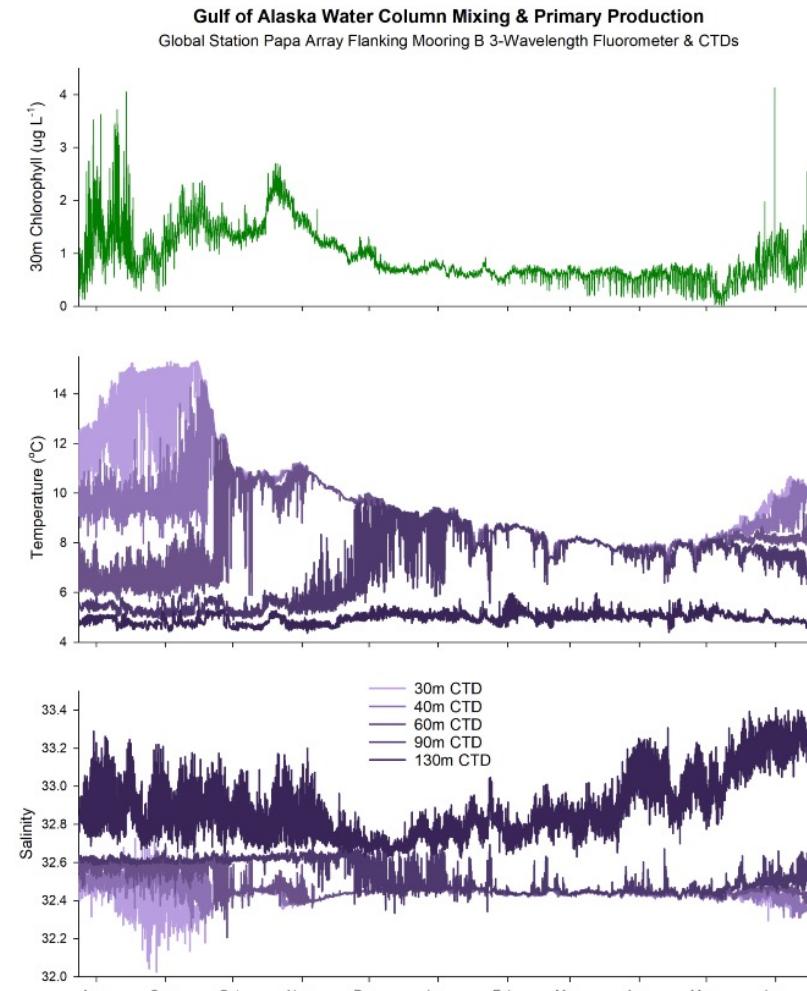
- NASA EXPORTS
 - Science: Fate of primary production; Approach: Lagrangian reference frame
 - Logistics: Leverage existing field assets, initial field work at Station Papa



Siegel et al., 2021

Regional Processes

- Seasonal Cycle of Primary Production
 - Links among stratification, nutrient availability, and production
- Opportunities
 - Education: Rutgers Ocean Data Lab
 - Validation: Glover et al., 2017, validation of satellite ocean color (low variability)
 - Longevity: Henson et al., 2017, potential to detect change in spring bloom timing



Rutgers Ocean Data Lab

OOI Opportunities

- Use the data: oceanobservatories.org
 - GUI data portal, raw data archive, M2M interface, ERDDAP
- Modify the sampling
 - Change glider or AUV track, change sample timing
- Add instruments to a platform
 - Self-contained or connected to OOI infrastructure
- Add platform to an Array
 - Supplemental glider, nearby mooring
- Ancillary work on OOI cruise

Helpdesk @
Oceanobservatories.org



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Thank you!

