

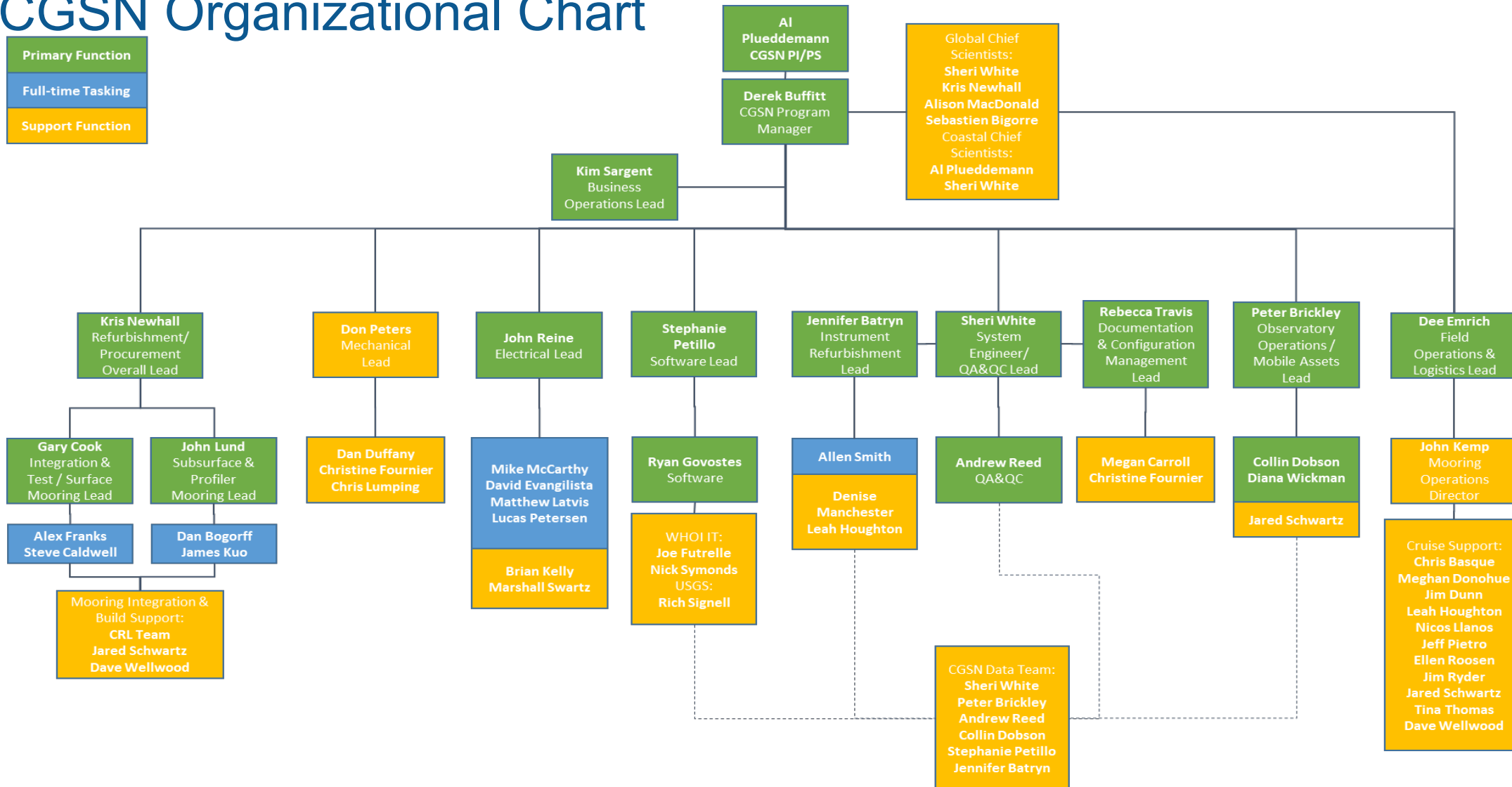


Ocean Observatories Initiative

CGSN Status

OOIFB/DDCI Meeting, May 2019
Al Plueddemann and Derek Buffitt

CGSN Organizational Chart



CGSN Operations

- **Refurb/Mechanical:** Kris Newhall
- **Electrical:** John Riene
- **Software:** Stephanie Petillo
- **Instruments:** Jennifer Batryn
- **System Engineering:** Sheri White
- **Documentation/Config. Management:** Rebecca Travis
- **Platform Operations:** Peter Brickley
- **Logistics:** Dee Emrich

CGSN Status: Pioneer

Operations

- CP03ISSM: GPS is non-functional, currently operating on internal clocks, all other systems operational
- CP04OSSM: Fully-functional
- CP01CNSM: One solar panel disconnected prior to deployment, currently charging from wind and remaining solar, all other systems operational
- CP02PMXX and CP04OSPM: all profiler moorings functional; PMCO telemetry failed most likely due to bad CF card, remaining instruments functional.
- Up to date on ingestion of available telemetered data, recovered data from Pioneer 11 in progress

Platform	Infrastructure %	Instruments %	Delivered XMIT %	Data Collected %
CP01CNSM	96%	100%	100%	100%
CP03ISSM	96%	100%	100%	100%
CP04OSSM	100%	100%	100%	100%
CP02PMCI	100%	100%	100%	100%
CP02PMCO	43%	100%	0%	100%
CP02PMUI	100%	100%	100%	100%
CP02PMUO	100%	100%	100%	100%
CP04OSPM	100%	100%	100%	100%

Mobile Assets

- 2 of 7 planned gliders in the field
- Glider 387 and 336 on tracklines
- Glider 379 just recovered
- AUV cruise scheduled for 6/17

Refurbishment

- All moorings completed refurbishment on time for Spring cruise. Equipment breakdown and instrument shipments to vendors underway for Fall cruise.

Cruise

- RV Neil Armstrong mobilized 4/2
- Leg #1 4/4 -12 completed. 1x anchor recovery successful with new ROV. CNSM, ISSM, OSSM turned; winter profiler CNPM recovered; AUV surveys completed; 2 x gliders deployed; LTER and SUNA testing ancillary activities undertaken.
- Leg #2 4/13-24 completed. PMXX and OSPM turned; winter profiler ISPM recovered; LTER and SUNA testing ancillary activities undertaken.

CGSN Status: Southern Ocean

Operations

- GSM is currently functional; GPS is non-functional, currently operating on internal clocks
- Deterioration of instrumentation on IMM, inductively-coupled instruments batteries depleting
- PCO2W sensor troubleshooting success, data now being delivered
- NOC CUSTARD sensors continue to function normally
- Up to date on ingestion of available telemetered and recovered data

Platform	Infrastructure %	Instruments %	Delivered XMIT %	Data Collected %
GS01SUMO	91%	46%	48%	48%



Refurbishment

- Shipments from Punta Arenas received, commenced shipments of instruments to vendor for refurbishment under CUSTARD budget. Remaining items will be refurbished as needed for other GSMs or placed into storage.

Cruise

- Global Surface Mooring turned in December 2018, bottom sections of flanking moorings recovered
- RRS Discovery to be mobilized in January 2020 for GSM recovery only

CGSN Status: Irminger

Operations

- Manually operating turbines and monitoring battery charging. Wind turbines shutdown during storm events successfully saving units for use.
- CTDBPs and PCO2A experiencing failures, working with vendor to understand failure modes, team attempting troubleshooting, will require review upon recovery
- PCO2W sensor troubleshooting success, data now being delivered
- Power system controller, partial functionality
- Up to date on ingestion of available telemetered and recovered data

Platform	Infrastructure %	Instruments %	Delivered XMIT %	Data Collected %
GI01SUMO	95%	60%	60%	60%

Mobile Assets

- 1 of 3 planned gliders in the field
- Glider 363 (Nicholsen/Pavelsky) heading east for recovery during upcoming Armstrong cruises



Refurbishment

- Early shipment departed to Reykjavik 4/29, received 5/9
- Instruments completed refurb and delivered to Integration, 1 x FDCHP pending final testing
- Integration completed 5/12, currently in burn-in till 6/18
- Shipments to mobilization port commence 6/19

Cruise

- RV Neil Armstrong to be mobilized 7/31
- Cruise scheduled for 8/2 – 8/25
- Mob Port: Reykjavik
- Demob Port: WHOI
- All mobilization & cruise personnel identified

CGSN Status: Papa

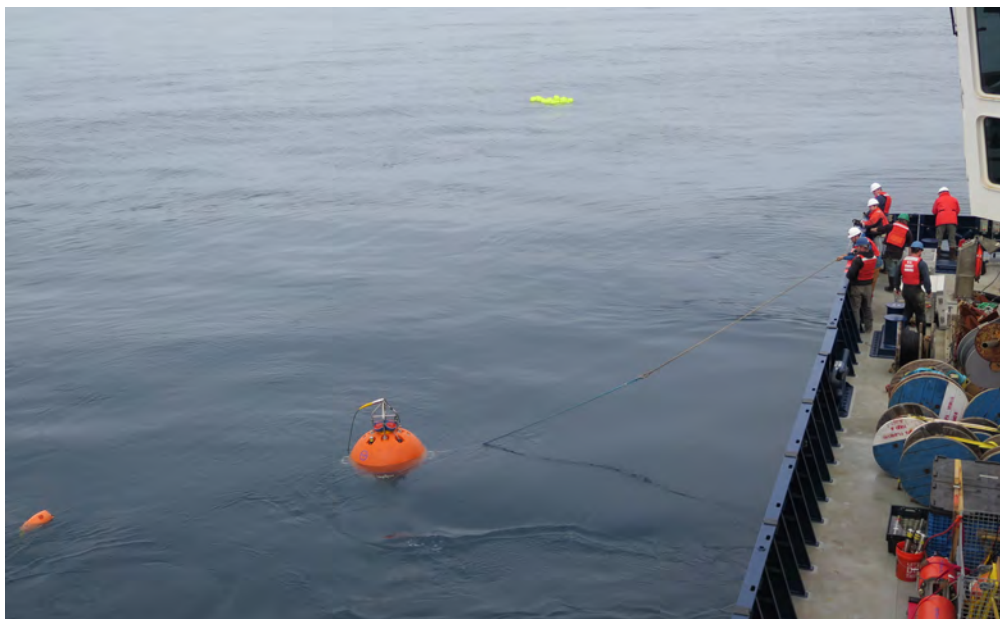
Operations

- All subsurface moorings in operation
- No issues
- Up to date on ingestion of available telemetered and recovered data



Mobile Assets

- 1 of 3 planned gliders in the field
- Glider 469 planned recovery option on RV Sikuliaq
- Last data transmission from moorings via gliders in March



Refurbishment

- Ramping up build
- Instrumentation refurbishment ongoing and on track
- MMP QCTs complete
- Integration scheduled for 6/15 to 7/13
- Burn-in scheduled for 7/14 – 8/14

Cruise

- RV Sikuliaq to be mobilized 9/15
- Cruise scheduled for 9/18 – 10/5
- Mob Port: Newport, OR
- Demob Port: Newport, OR
- All mobilization & cruise personnel identified

Technical Developments

- **ROV:** Falcon DR ROV procurement in 2018 through competitive bid
 - Successful deployment and anchor recovery on Pioneer 12 (April 2019).
 - Planned future use by Pioneer and Endurance.
- **Power generation:** Testing higher efficiency solar panels on Pioneer and EA.
 - Updated design for obsolete panels
 - Should allow greater power generation from shaded cells.
- **Power System Controller (PSC):** Targeted use of COTS equipment
 - Increase reliability, reduce number of custom components
 - Successful interim deployment of PSC 2.0 on Pioneer and EA
 - Developing final requirements for PSC 3.0.
- **Glider refurbishment:** Negotiated service agreement with TWR
 - Should allow for better advance planning by TWR
 - Should increase turnaround speed for glider refurb.

Technical Developments

- **Surface Mooring Stretch Hoses:** Re-designed, with re-wiring of terminations
 - Provides redundancy for power & comms
 - Decreases risk of shorts causing a system failure
 - More robust design will decrease need to purchase new hoses each turn
- **Profiler Mooring Stretch Hoses:** Re-design to increase strength
 - Will mitigate failures on Pioneer and EA due to storms, vessels, and short period wave motion
 - Will decrease need to purchase new hoses for each turn
- **EM Cable Terminations:** Re-designing terminations and performing motion analysis
 - Should allow purchase of more commonly available cable and decrease costs

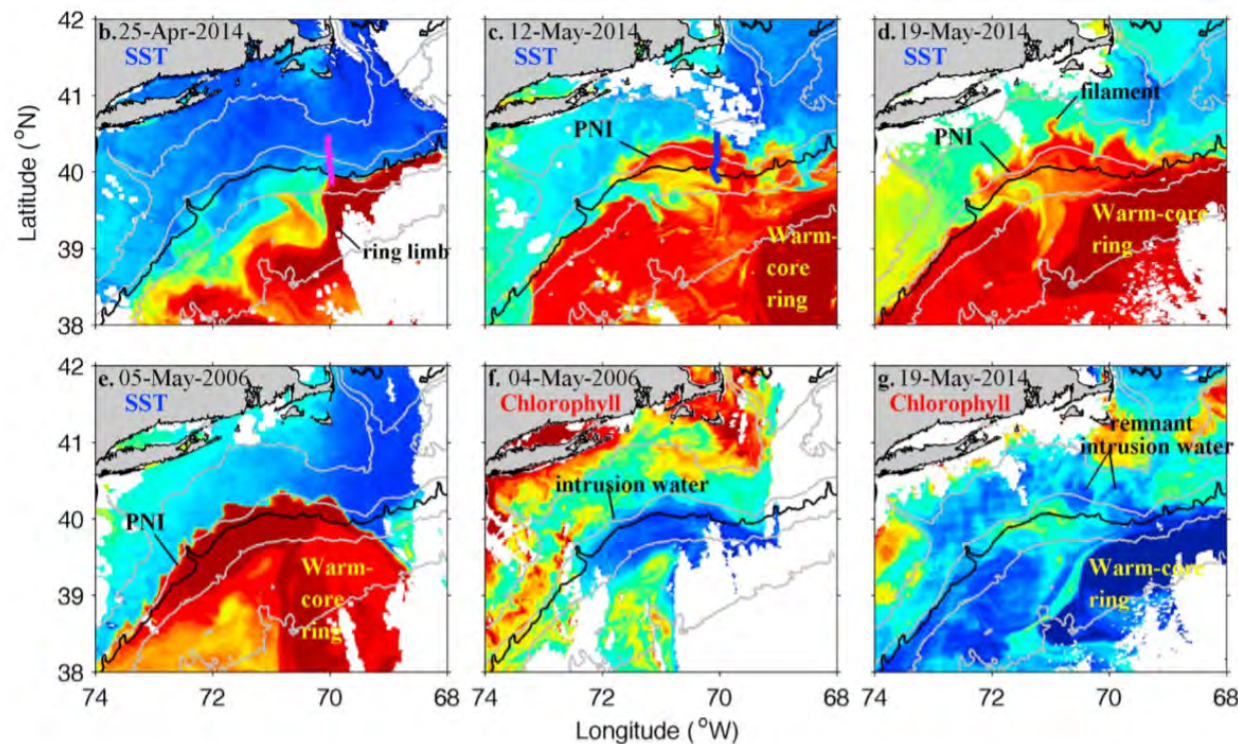
PY2 AWP Highlights

- **Response to a reduced operating budget**
 - WHOI overhead increase, increased ship costs, inflation
 - CI improvement effort (-2.5%)
- **Efficiencies realized**
 - Technical developments, Process improvements
- **One-Time cost savings**
 - Equipment re-use, instrument spares pool, deferred refurbishment
- **Proposed scope changes:**
 - Reduce profiling gliders from 2 to 1 at Irminger and Papa
 - Reduce trackline gliders from 3 to 2 at Irminger and Papa

Science Highlights

- **Pioneer – New shelf/slope exchange mechanisms**

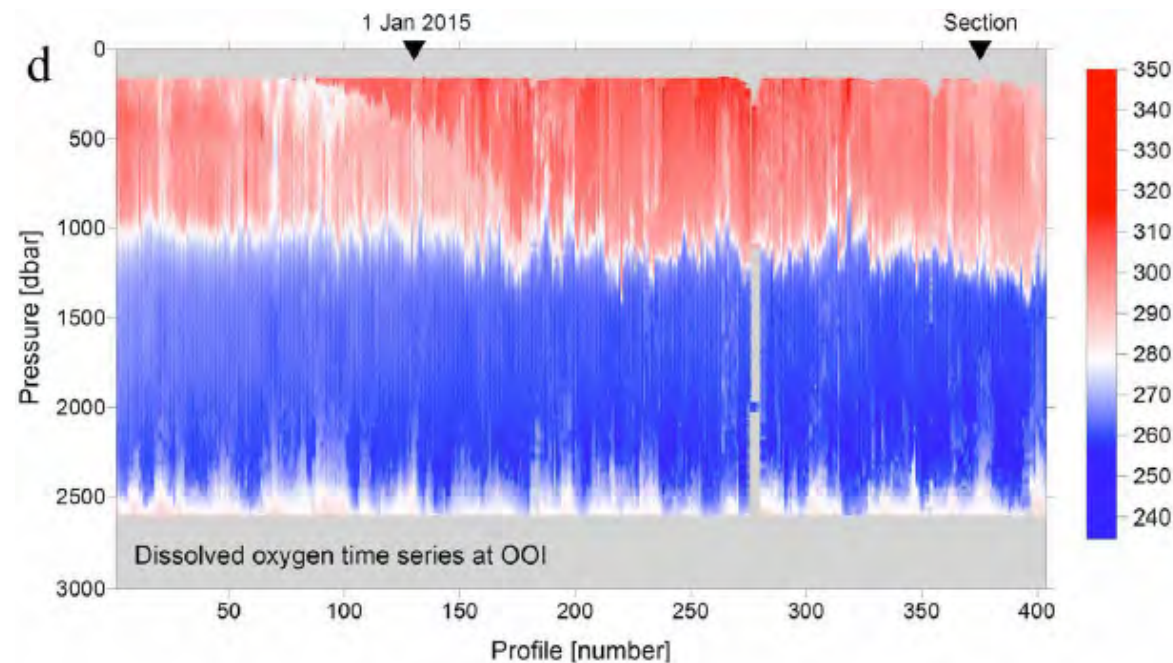
- Active Pis: Gawarkiewicz, Zhang, Todd, Chen, Palter, Vaillancourt
- Projects: SPIROPA, LTER
- Example:
 - Zhang & Gawarkiewicz
 - Slope water intrusion
 - New mechanism
 - Data from Pioneer gliders



Science Highlights

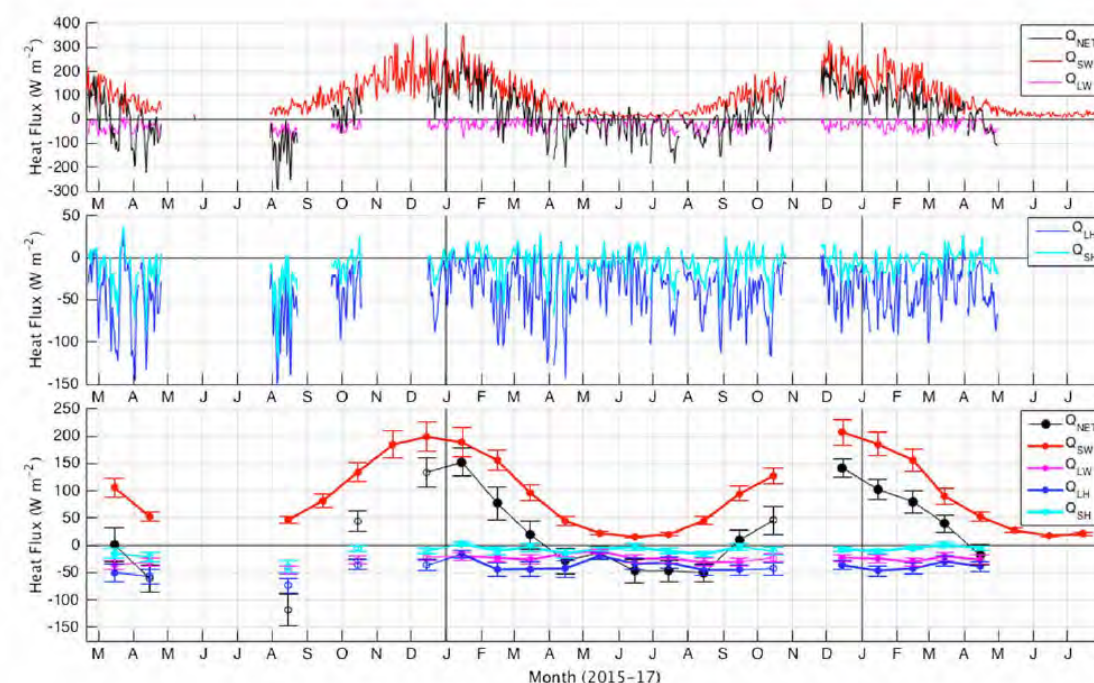
- **Irminger – Deep convection**

- Active PIs: Lozier, Bower, de Jong, Palevsky, Josey, Edson
- Projects: OSNAP, BCP, AtlantOS
- Example
 - de Jong & de Steur
 - Deep winter mixing
 - Due to local atm forcing
 - OOI DO confirms ventilation



Science Highlights

- **Southern Ocean – Episodic mixing**
 - Active PIs: Martin, Josey, Talley, Edson, Yu
 - Projects: NOC/CUSTARD, DC Flux, OA-Flux
 - Example:
 - Ogle et al.
 - First time-series view
 - Strong, episodic heat loss
 - Mixed layer response
 - Carbon sequestration



Science Highlights

- **Papa – Upper ocean processes**
 - Active PIs: Siegel, Cetinic, Toole
 - Projects: EXPORTS, Toole energy flux
 - Examples:
 - Carbon budget
 - Primary production
 - Near-inertial waves

Challenges

- **One-Time cost savings:** Many PY2 savings cannot be repeated in PY3
 - Increased challenge to the team for efficiencies
 - Continued re-use increases risk
- **Glider delivery:** TWR has difficulty delivering refurbished vehicles on time
 - New agreement supports TWR planning
 - Weekly management discussions provide greater visibility.
 - Mitigation for PY2 includes decreasing the number of planned glider deployments
- **Technical refresh:** Aging instruments and vehicle components
 - Replacements may impact software, electrical, and mechanical components
 - Options being reviewed include refurbishment of stored instruments, cannibalization of stored vehicles, replacement of G2 glider components with G3, and the need for purchase and replacement. This will be part of future PY2 spare plan and refresh roadmap.

Challenges

- **Ship schedule and cost:**
 - Uncertain schedules with potential impacts to shipping, labor and deployment risk
 - Increasing vessel costs; operational and port day rates.
 - Mitigation such as decreasing on-site build/burn-in and load days increases risk
 - This will be an ongoing risk to the program as rates increase year over year