OCEAN OBSERVATORIES INITIATIVE FACILITY BOARD

OOIFB

Lightning Talk Presentations

Shima Abadi, University of Washington

Tiago Carrilho Bilo, Scripps Institution of Oceanography, UCSD

Rob Fatland, eScience Institute, University of Washington

Melanie R. Fewings, Oregon State University

Derya Gumustel, University of Washington (Presenter: Wu-Jung Le, UW)

Artash Nath, Monitor My Ocean

Monica Nelson, Scripps Institution of Oceanography, UCSD

Justin Stopa, University of Hawaii at Manoa

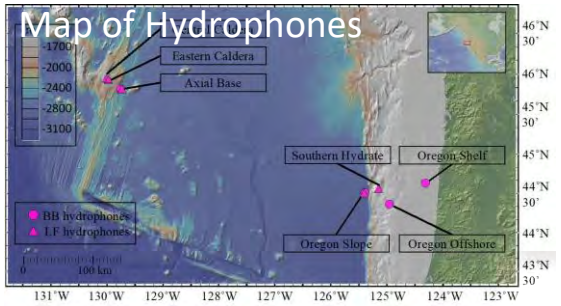
Please join the OOI Exhibit Booth on Thursday, March 3rd at 3pm ET for a Lightning Talk redux with time for discussion with the presenters.

Long-term Ambient Sound Correlation using OOI Acoustic Data

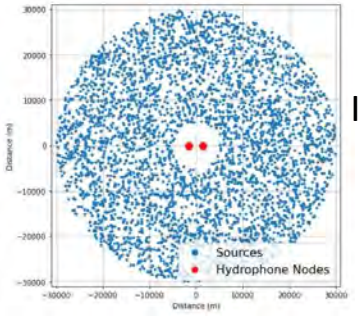
PI: Shima Abadi, University of Washington, abadi@uw.edu
Ph.D. Student: John Ragland, University of Washington, jhrag@uw.edu

Goal: To characterize the ocean ambient sound in NE Pacific Ocean
Data: OOI acoustic data at the Regional Cabled Array and Coastal Endurance Array

Map of Hydrophones

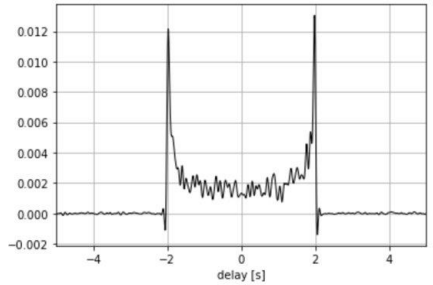


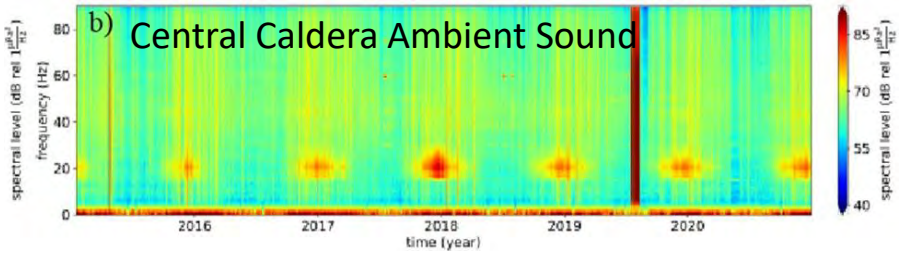
Uniform Source Distribution

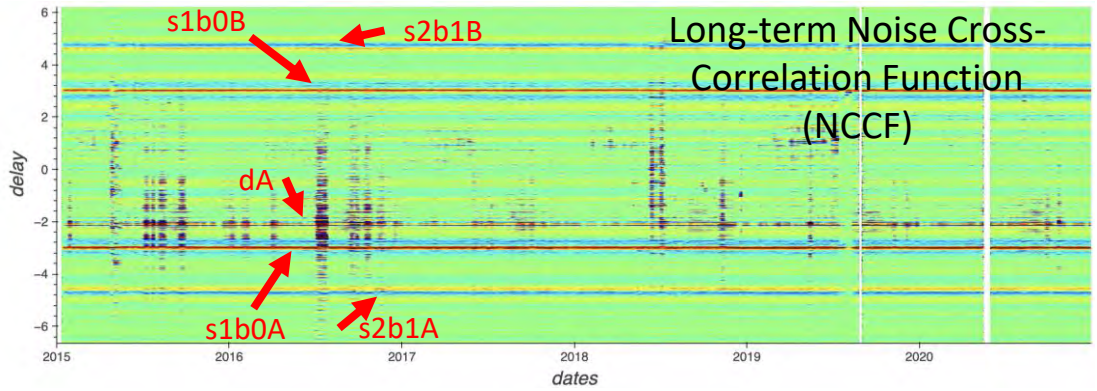


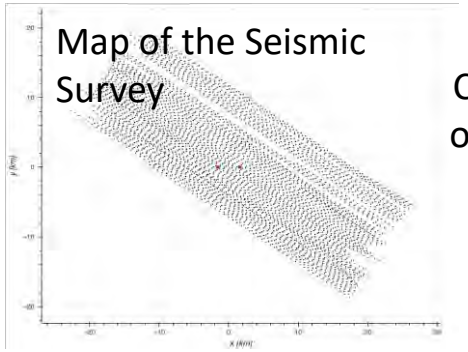
Noise Interferometry

Time Domain Green's Function

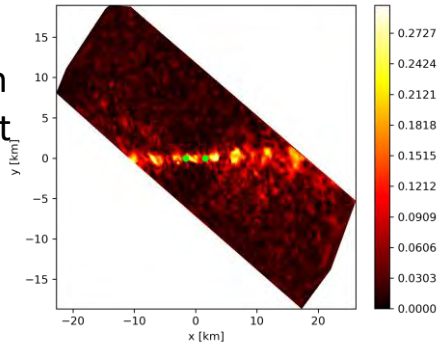








Contribution of each point on NCCF



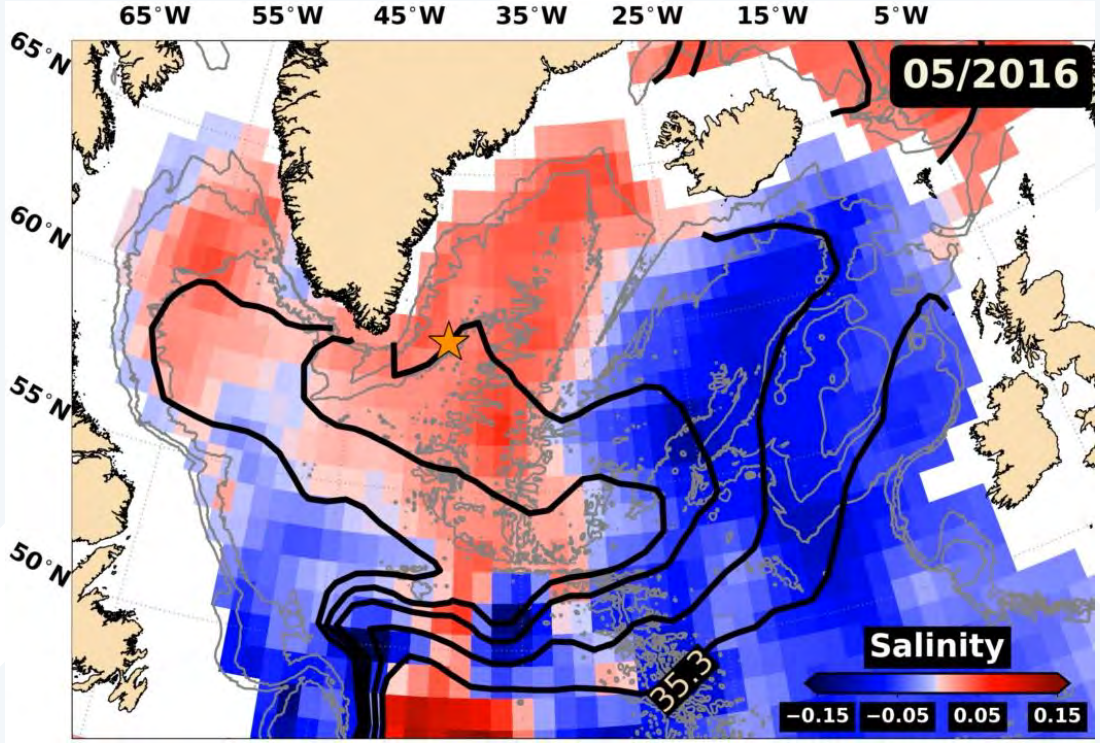
A Python toolbox for analyzing the OOI acoustic data

1. Ragland, Abadi, Sabra, (2022). "Long-term noise interferometry analysis in the northeast Pacific Ocean," JASA, 151, 194–204.
2. Ragland, Schwock, Munson, Abadi, "An overview of ambient sound using Ocean Observatories Initiative hydrophones," JASA, in review.

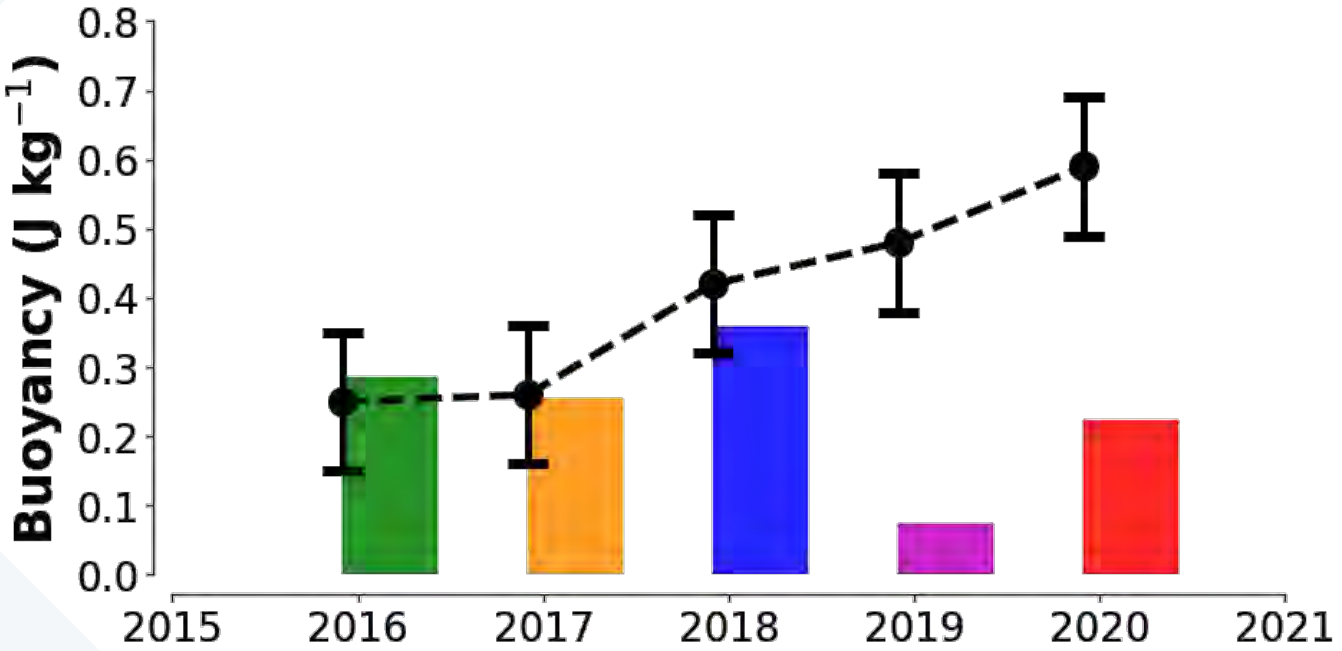
ARRIVAL OF NEW GREAT SALINITY ANOMALY WEAKENS CONVECTION IN THE IRMINGER SEA

Tiago Carrilo Biló[1], Fiammetta Straneo, James Holte, and Isabela Le Bras
[1]tcarrilhobilo@ucsd.edu

Argo salinity anomalies (0-200 m)



FLB-mooring: upper ocean buoyancy (dots)
ERA5 buoyancy removed during wintertime (bars)



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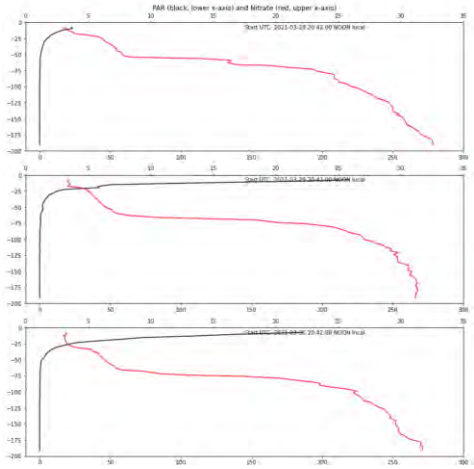
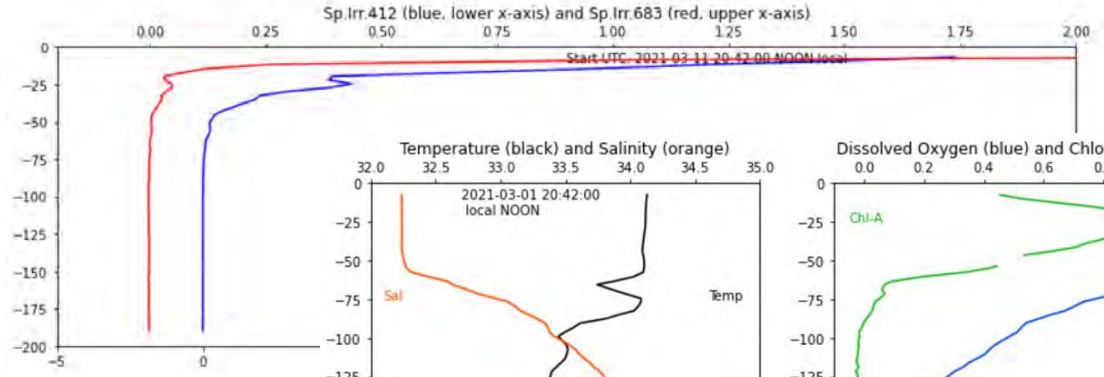
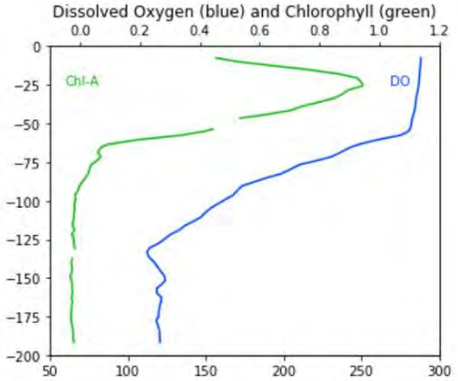
OOI Regional Cabled Array: Open Data Analysis

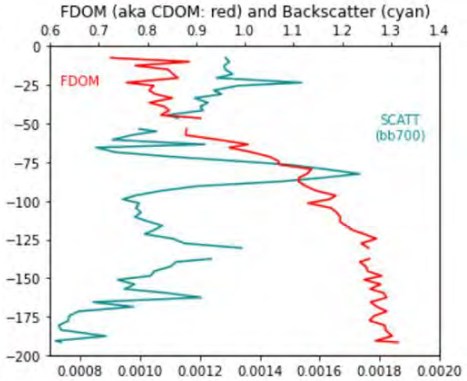
Rob Fatland, Research Computing Director, University of Washington: rob5@uw.edu

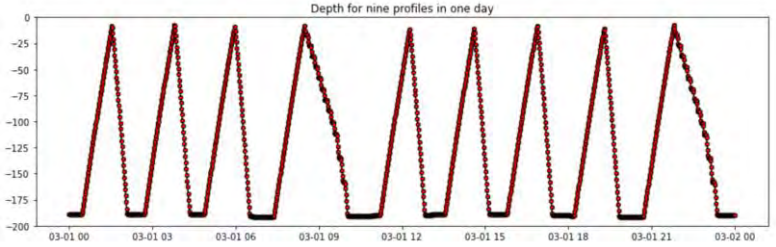
https://github.com/robfatland/ocean binder sandbox: https://mybinder.org/v2/gh/robfatland/ocean/HEAD



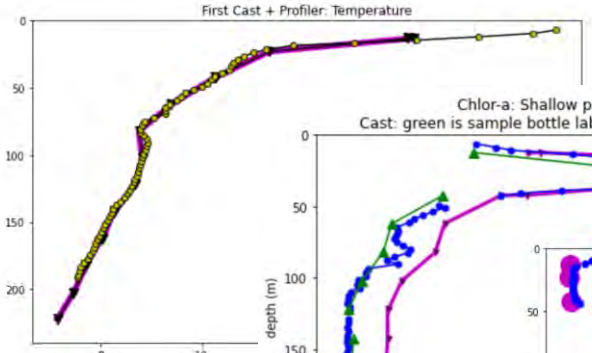


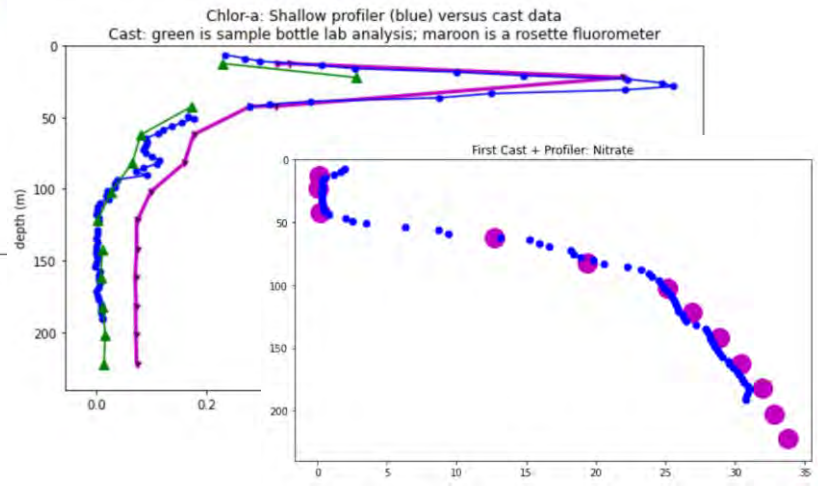


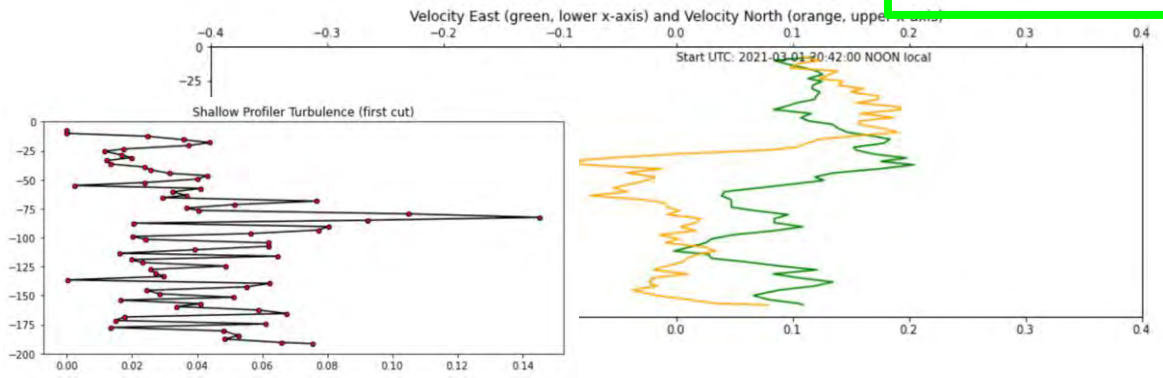




Code, analysis, animations, data, methods, explanations: Freely available via GitHub and binder







Marine heat waves in the Northern California Current System

Melanie Fewings (melanie.fewings@oregonstate.edu), **Brandy Cervantes**, **Craig Risien**, Oregon State University; **Jennifer Fisher**, NOAA/NWFSC

Background

- Marine heat waves (MHW) impacted the northeast Pacific in 2014-16 and 2019-2020 (Bond et al. 2015, Jacox et al. 2016, Amaya et al. 2020).
- In the NCC, the subsurface expression of the MHWs is not well-characterized.

Data and Analysis

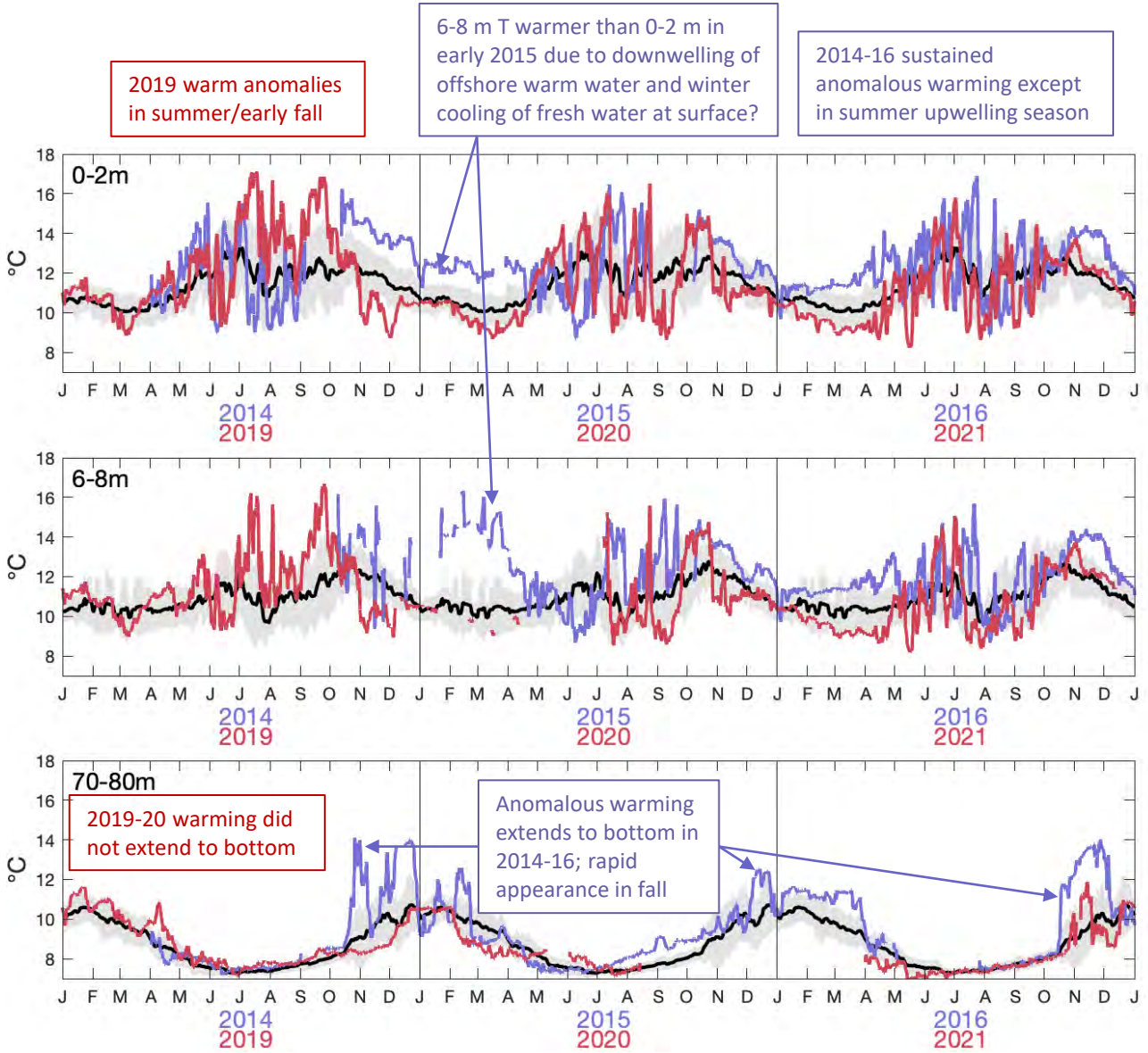
- At **NH-10 on the 80-m isobath off Oregon**, six observing programs collected hydrographic and velocity data during 1997-present: OSU-NOPP, GLOBEC-LTOP, OrCOOS, NANOOS, CMOP, **OOI Endurance Array**
- We concatenated these data sets into a single, consistent 24+ year record.
- We calculated best-fit climatological cycles, subsurface temperature (T) anomalies, and MHW characteristics following Hobday et al. (2016).

Findings

- MHWs increased in **frequency** and **intensity** at **all depths** during 1997-2021.
- The surface, near-surface, and subsurface expressions of the MHWs all differ.
- The seasonal timing and vertical structure of T anomalies was not the same in the 2014-16 and 2019-20 MHWs.

Significance

- This multi-program ocean observing record spans >24 years, approaching a climate science community standard: a 30-year base period for statistically robust climatology & anomalies.
- The depth-varying structure of the T anomalies indicates satellite observations are insufficient to characterize MHW in the NCC and must be supplemented by subsurface observations.



Thanks to NOAA/NWFS: Bill Peterson, Kym Jacobson; OSU/CIMRS: Michael Banks, LeAnne Rutland; OSU/CEOAS: Ted Strub, Phil Barbour, Mike Kosro, Jack Barth. **Funded By:** NOAA Climate Observations and Monitoring Program, NASA Ocean Vector Winds Science Team

OCEAN SCIENCES MEETING 2022

UNIVERSITY of WASHINGTON

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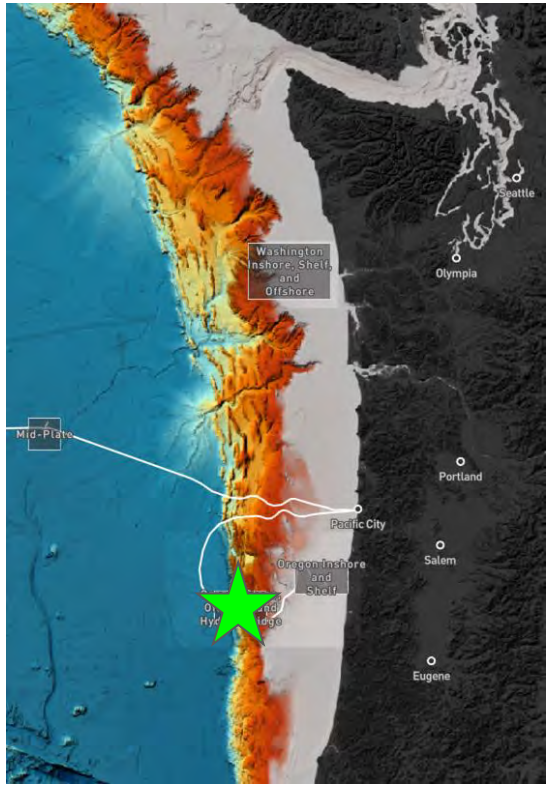
Low-Dimensional Representation of Temperature and Salinity Profiles Captures Seasonal Water Column Variability

Derya Gumustel, Wu-Jung Lee, Valentina Staneva, Emilio Mayorga
University of Washington, contact: deryag@uw.edu

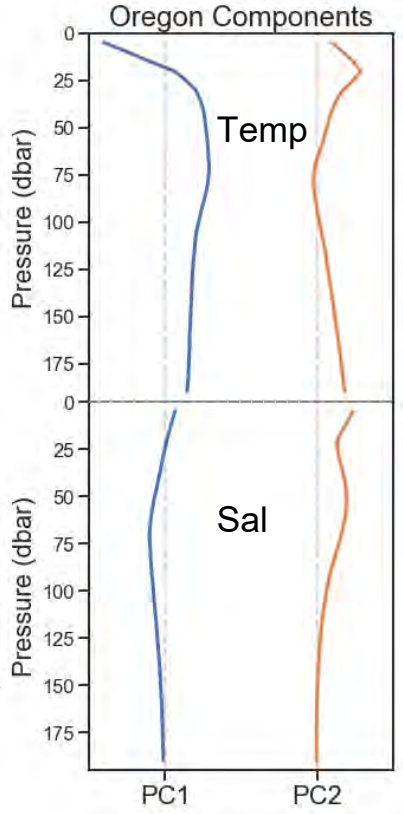
Goal: Develop a data-driven workflow to characterize intrinsic seasonal structures in water column data.

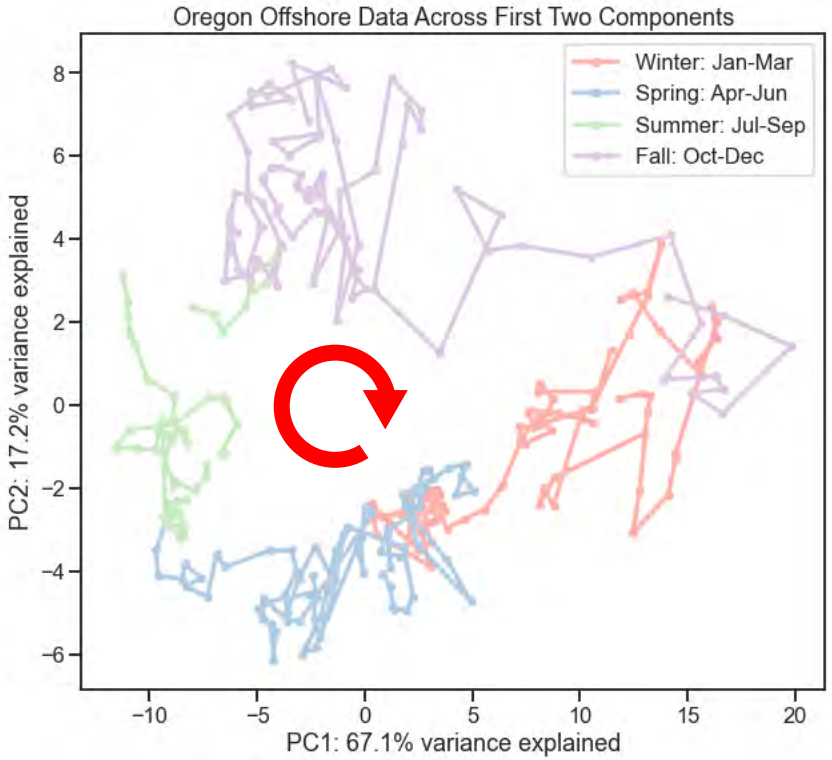


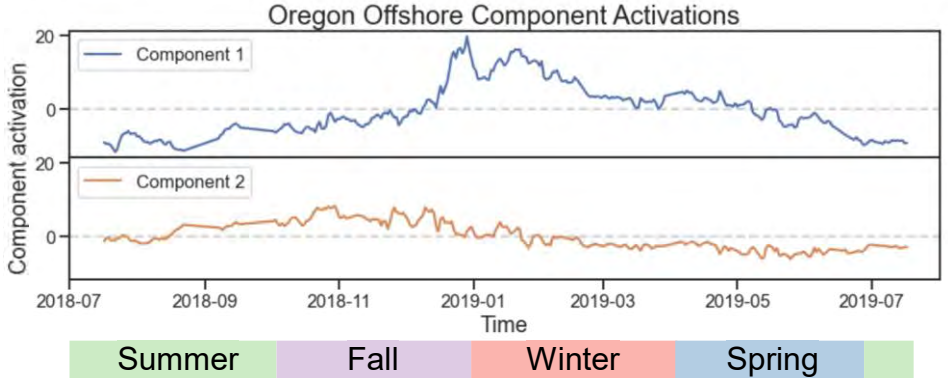
app.interactiveoceans.washington.edu/map

Long-term datasets from the OOI Coastal Endurance array Oregon Offshore profiler were smoothed and gridded. Principal component analysis (PCA) is applied to standardized temperature and salinity profiles to find structures along depth across time.

PC1 and PC2 jointly explain 84% of the variance. The components capture variation in different parts of the water column and differ in their patterns of temporal activation.







The time series of activations captures seasonal trends in the data. Similar seasonal variability was observed when applying PCA to WA coast offshore profiler data.

Presentation session: OD05 #3
Room 15, March 1 2022, 5:00 PM ET

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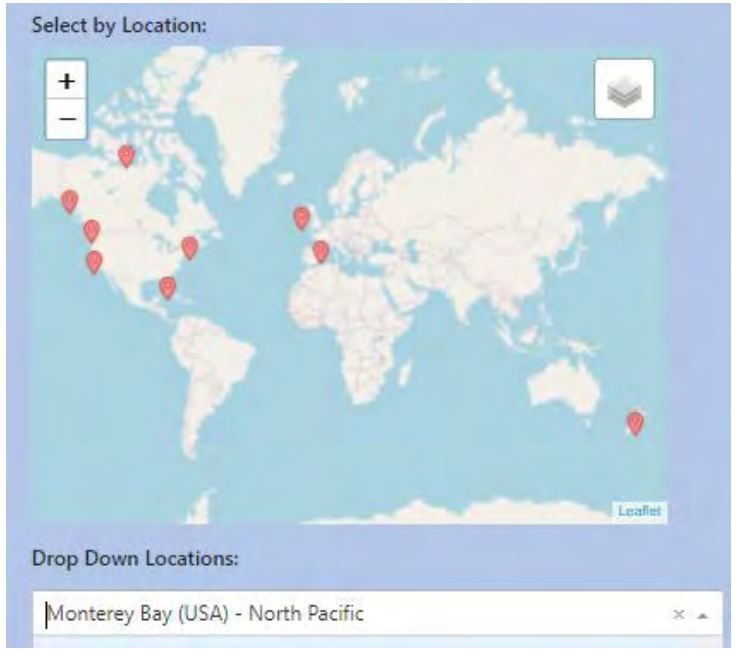
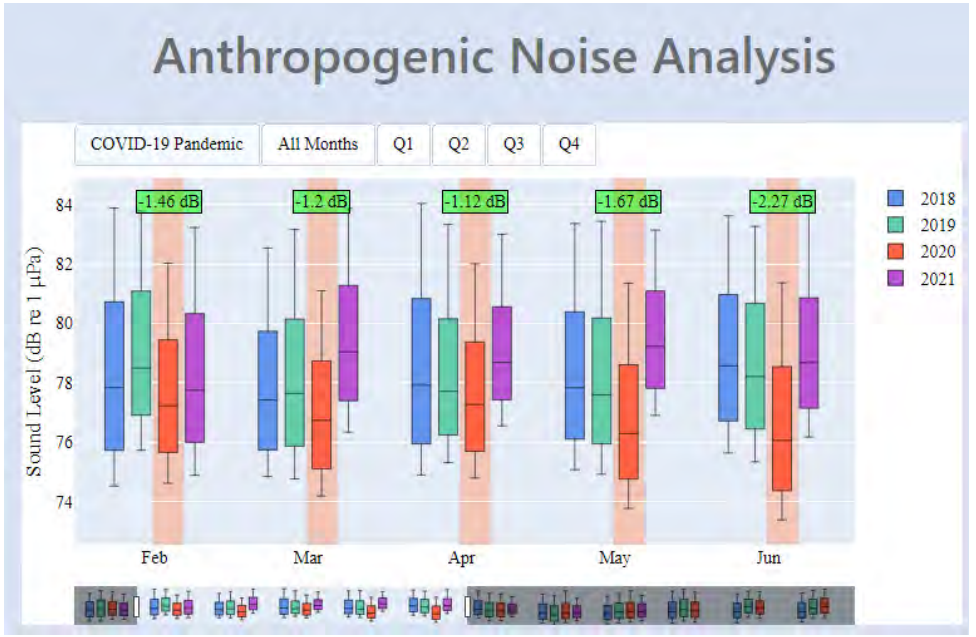
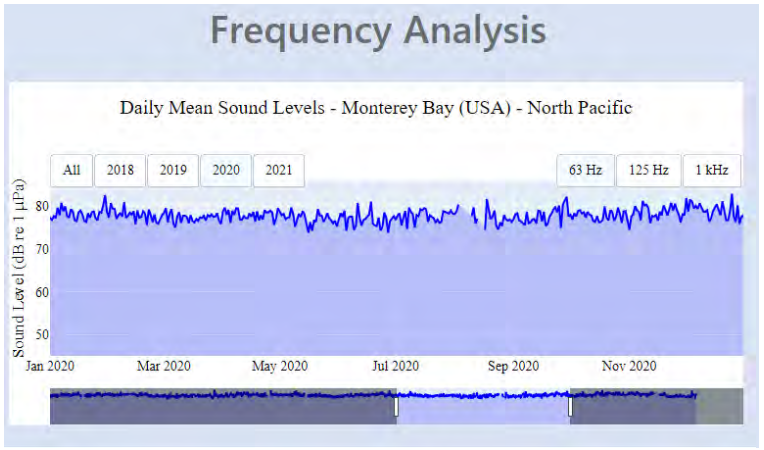
NSF

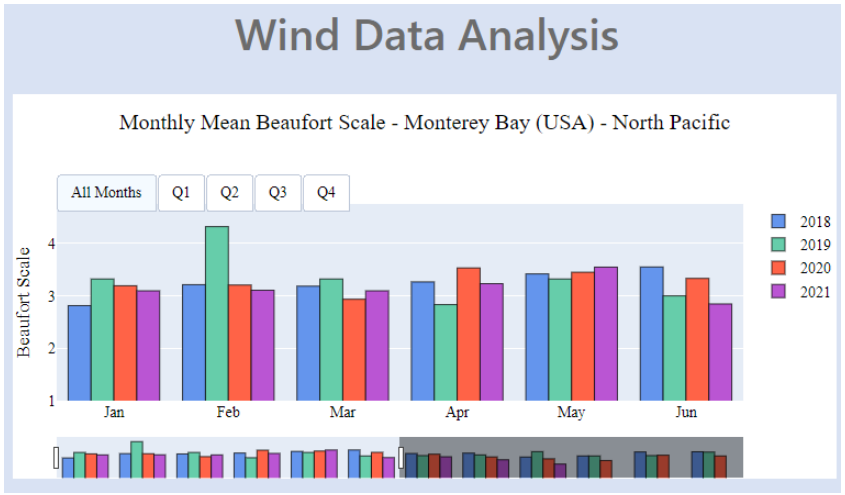
MonitorMyOcean.com Interactive WebApp

Measuring Anthropogenic Noise in Global Oceans: Using Hydrophone Data from 8 Locations









Artash Nath

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Feb 25th, 2022

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Annual heat budget at the OOI Irminger Array

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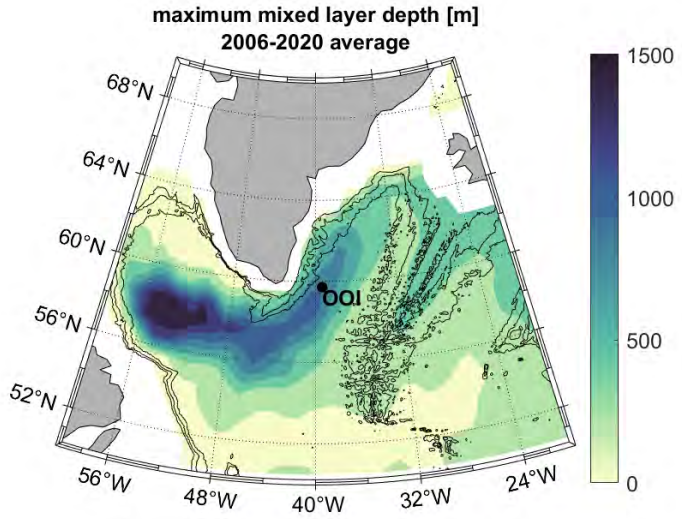
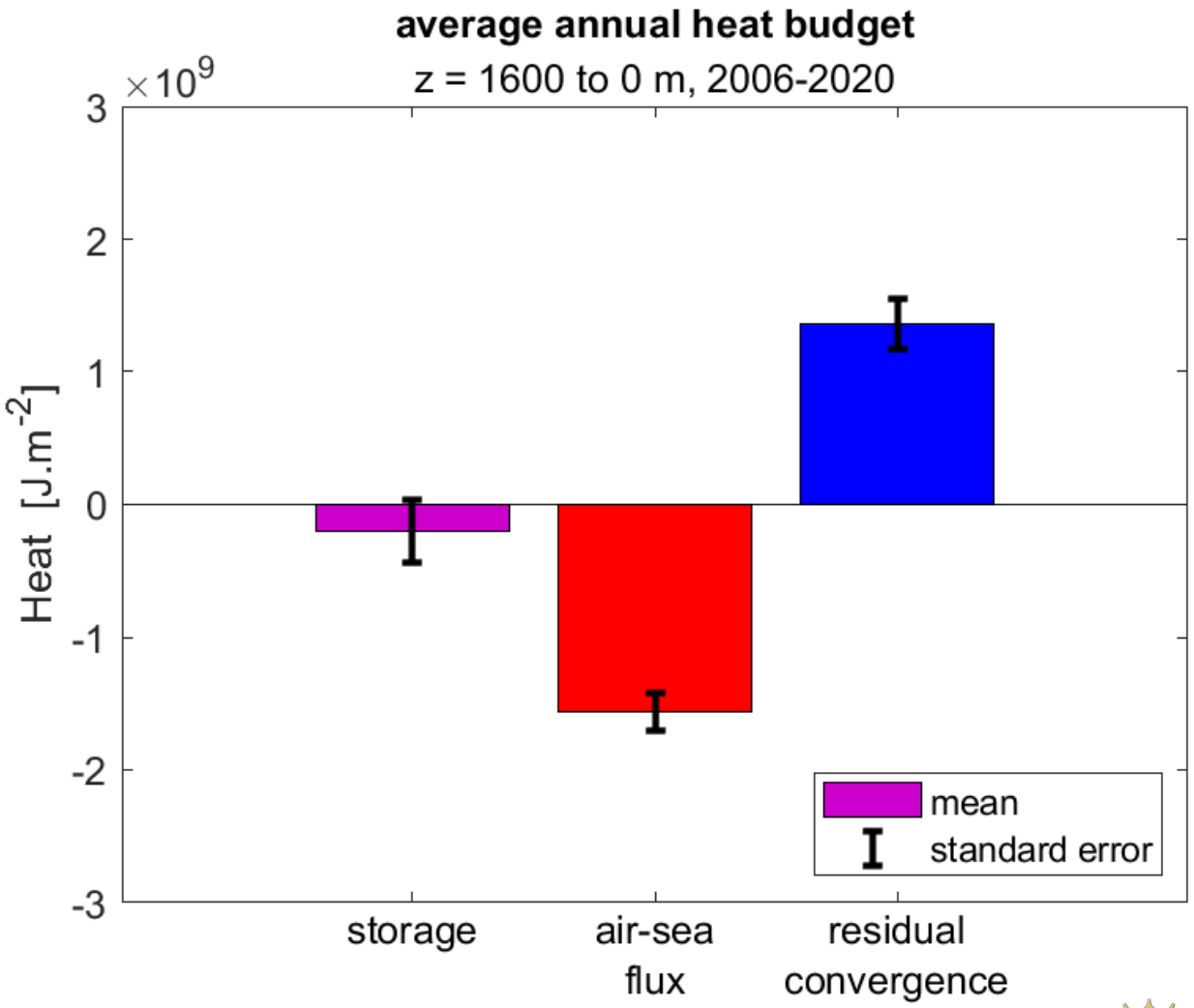
stored heat = air-sea heat flux + horizontal heat convergence

Data:

- OOI data
- Roemmich and Gilson Argo product
- ERA5 reanalysis





- Heat loss to the atmosphere balanced by horizontal advection of heat
- A lot of year-to-year variability
- No clear regime changes with the recent mid-depth cooling

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Monica Nelson (m3nelson@ucsd.edu), Fiamma Straneo, Sarah Purkey

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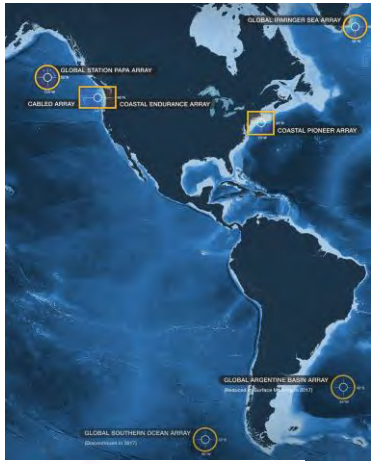
Justin Stopa : stopa@hawaii.edu

Ocean Resources & Engineering, SOEST, The University of Hawai'i at Mānoa



Method: Map sea surface roughness from satellite to atmospheric stability - Richard Number (*Ri*)

- *Ri* - expresses the ratio of buoyancy to the flow shear
- Model improvements/hand-labeling - *Who is correct!?*
- OOI buoy contain the necessary info to estimate *Ri*
- 298 S-1A co-locations at Global Array SO OOI

$$Ri = \frac{g}{T_{10v}} \frac{z_{10}\left(T_{10v} - SST_v\right)}{U_{10N}^2}$$