

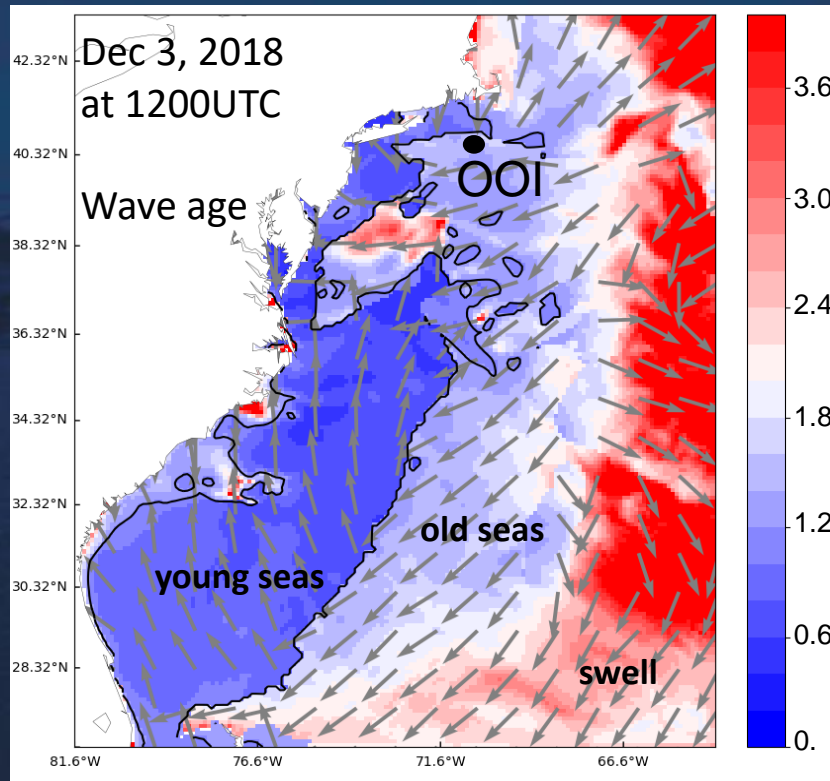
# Impacts of Surface Waves on Air-Sea Flux in the North Atlantic Ocean



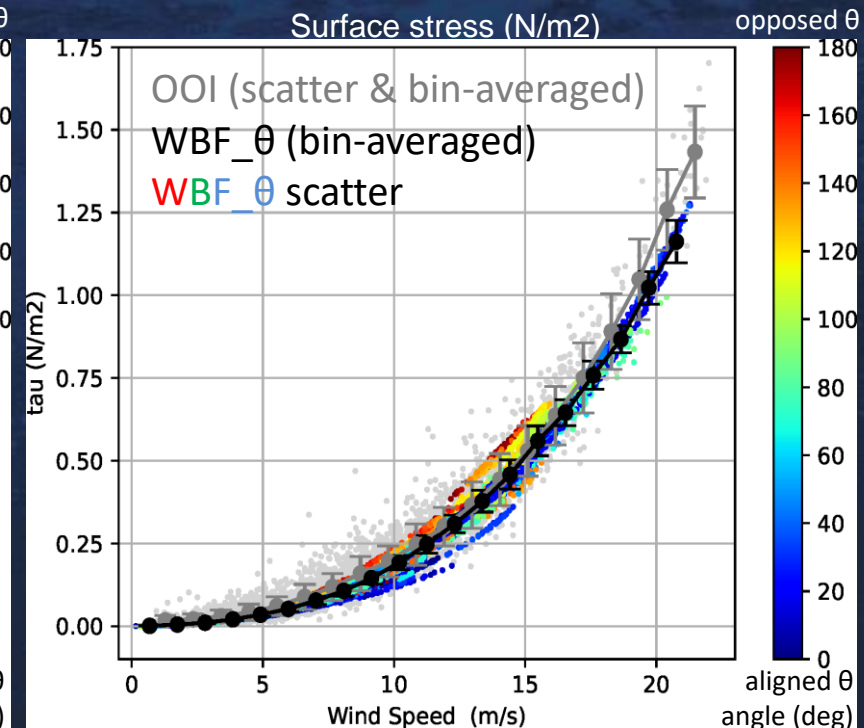
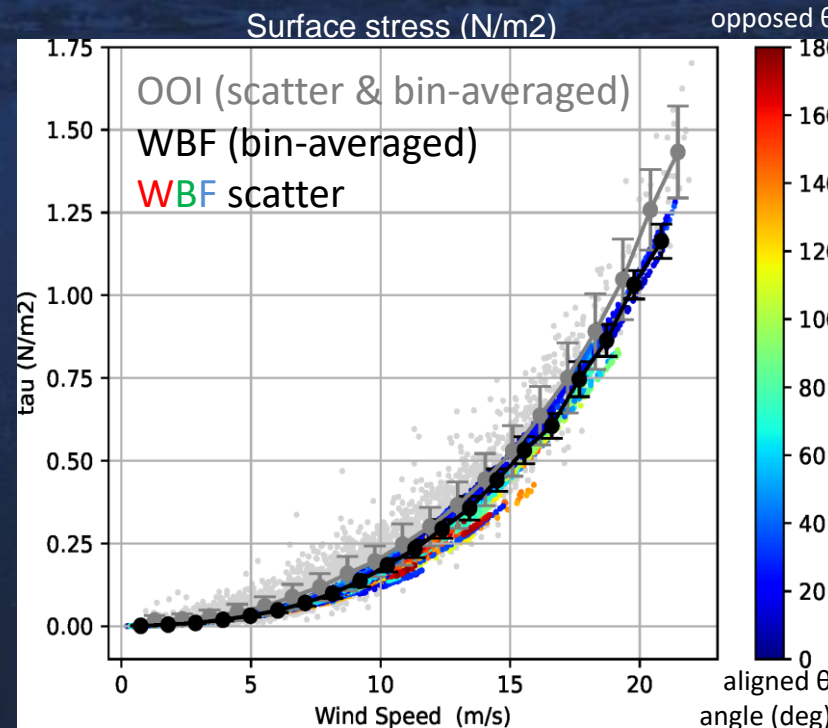
César Sauvage, Hyodae Seo, Carol Anne Clayson and James B. Edson, WHOI | csauvage@whoi.edu  
 AGU 2022 | OOIFB Town Hall December 12, 2022

Coupled Ocean – Atm. – Wave experiment (WBF)

- WBF over-emphasizes the old seas and swell impacts under moderate to high wind inducing low stress bias.
- Taking into account the angle between wind and waves (WBF\_θ) allows to alleviate the low stress bias induced by old seas.



Model validation against direct eddy covariance flux measurements at the OOI mooring during December 2018 and January 2019.



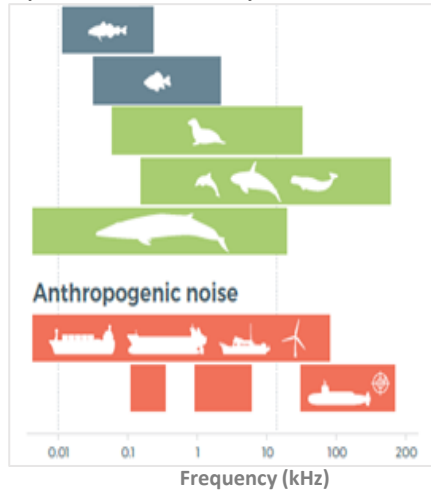
# Acoustic Impact of COVID-19 Lockdown on Underwater Ocean Noise

Artash Nath, Founder, MonitorMyOcean.com, Grade 11, Toronto, Canada [Artash.Nath@gmail.com](mailto:Artash.Nath@gmail.com) Twitter: @wonrobot

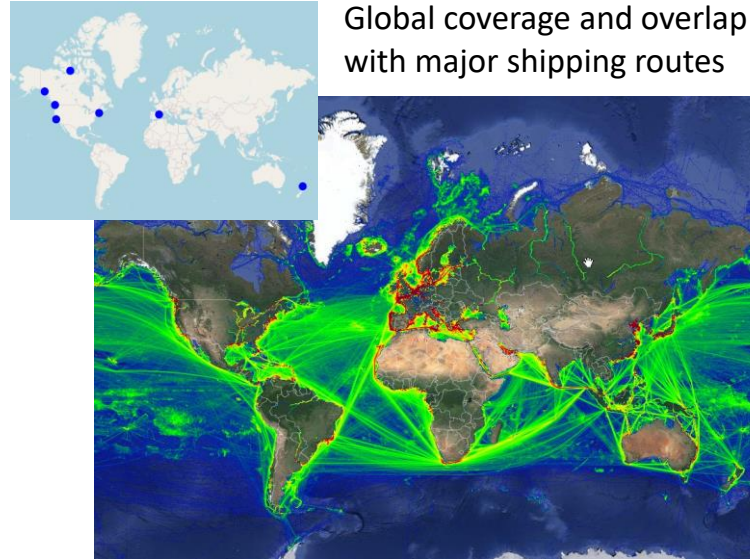
12 December 2022

## Problem

Underwater noise overlaps with frequencies used by marine mammals



## Hydrophone Locations



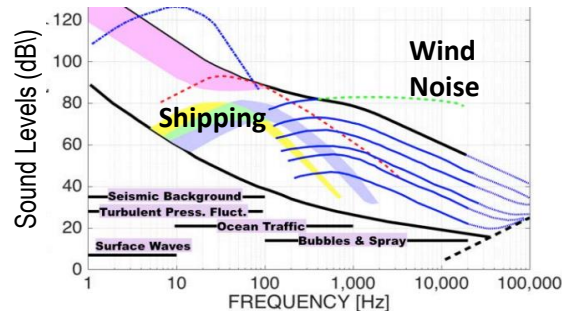
Global coverage and overlap with major shipping routes

## MonitorMyOcean.com App (UN Ocean Decade Endorsed)

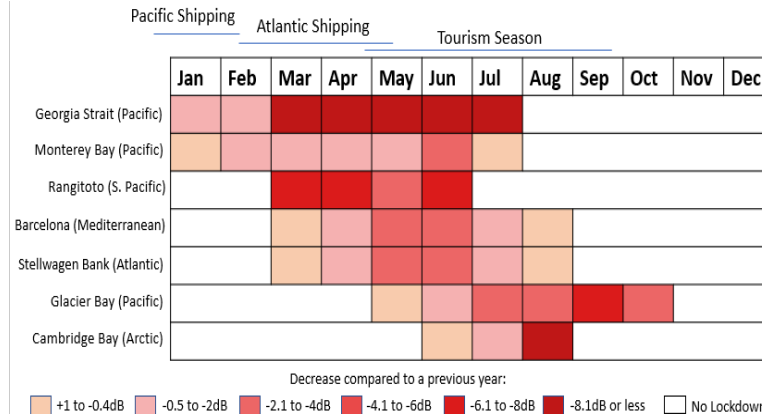
Monitor My Ocean app interface showing various data visualizations and analysis tools. The app provides real-time data on underwater noise levels and shipping activity.

## Noise Sources vs Frequency

Wenz Curves: highest underwater sound levels are between frequencies of 10–100 Hz



## Silence of Global Oceans During COVID-19 Lockdown



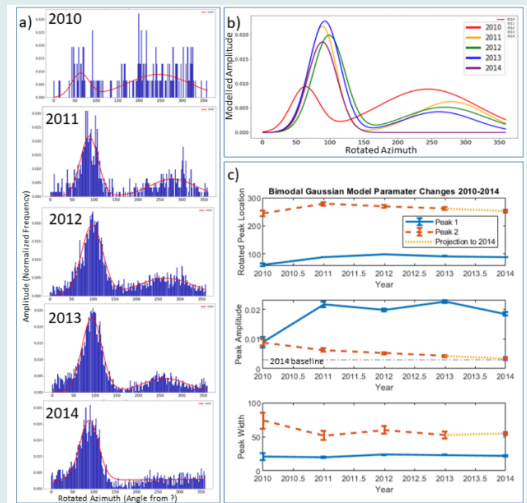
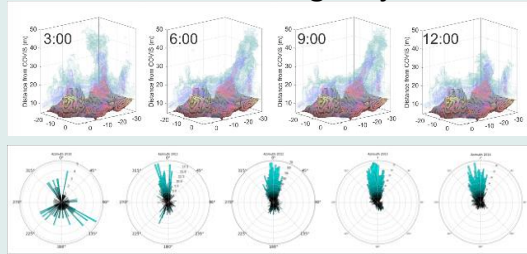


# Using OOI Data to Teach Data Wrangling

Karen Bemis

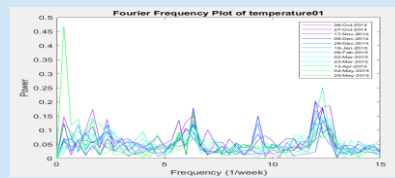
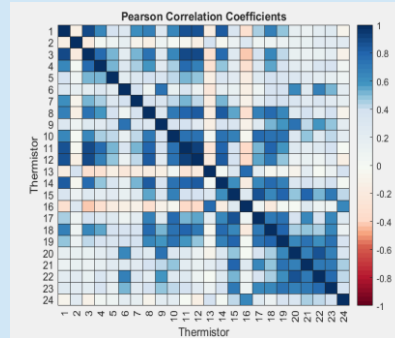
Rutgers, The State University of New Jersey

## Starting a Partnership with Queens College: Plume Bending Project



- Joint authorship with 2 students  
<https://doi.org/10.3389/feart.2022.938675>
- Participation from 5 students over 3 years

## 3D Array Study: Intern



- One-on-one
- Focus on skills student had
- Great results but no paper

3D Array Study  
Reprised:  
Partnership with  
Rutgers' MBS  
Externship



## What I've learned

- Undergraduates can do useful and productive research IF initial step is training – data wrangling, python or other tools, ocean & geo-science
- Regular meetings, clear tasks, and expectations of commitment can be critical for success
- Short, pre-specified timelines are most likely to give good results if tasks and goals simple and clearly laid out
- Focus on skills students have or can learn quickly yields research results
- Paper publication requires significant mentor input

## Partnership with APL-UW and Queens College: Vent Site Characterization



Spotting the vents: easy to hard

- Weekly meetings with 4 students across 2 (soon 3) universities
- Mixed emphasis on building basic skills, developing learning activities, and conducting research tasks
- Active involvement of 2 (soon 3) principal investigators



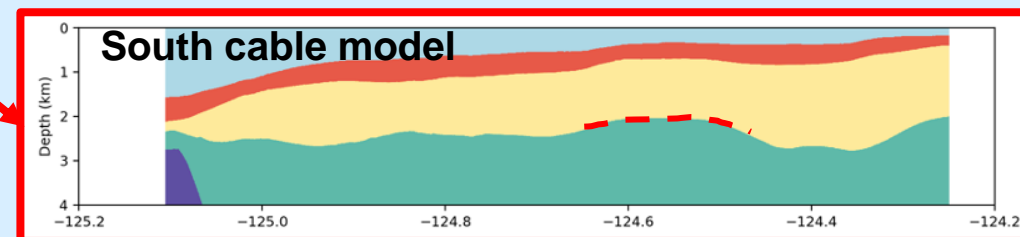
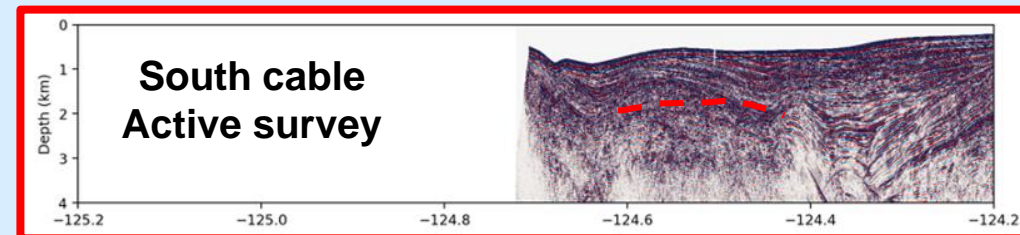
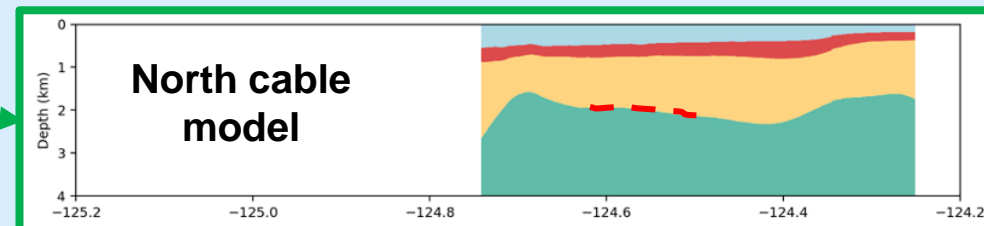
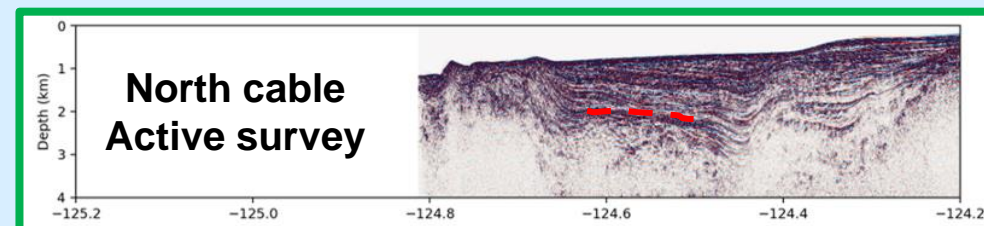
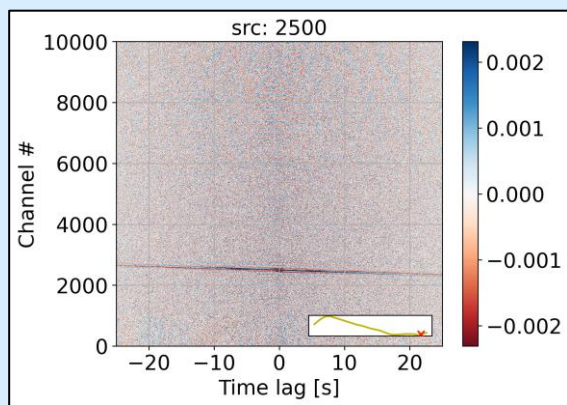
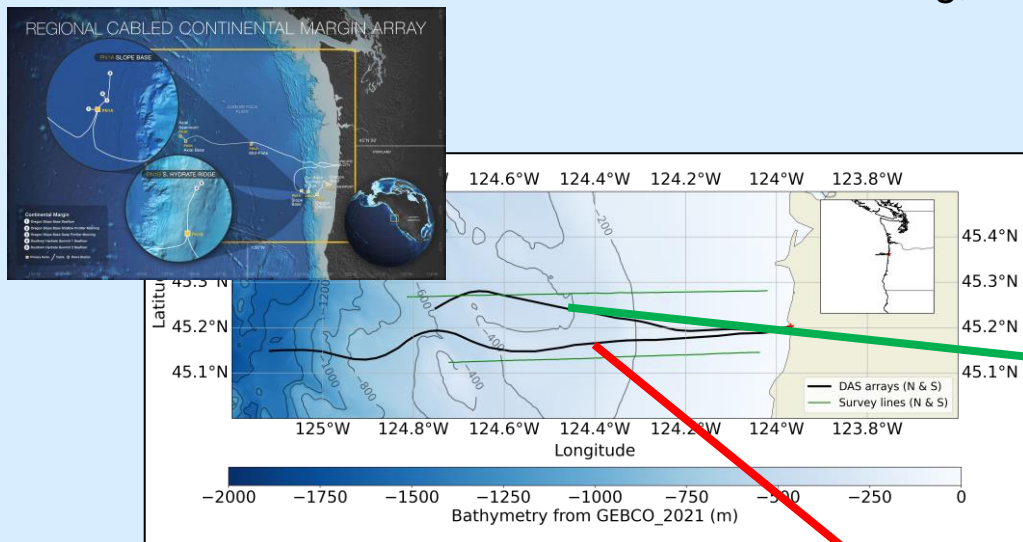
- Semester format challenging
- Needed to teach basic data skills
- I still learned something about the data



# Suboceanic fiber noise-based tomography of the Cascadia margin

Ettore Biondi\*: ebiondi@caltech.edu

Collaborators: Yan Yang, Jiaqi Fang, Ethan F. Williams, Zhongwen Zhan

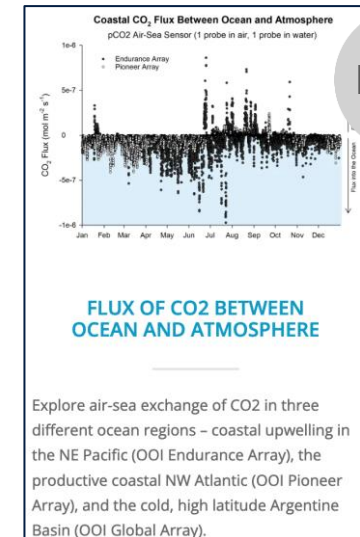
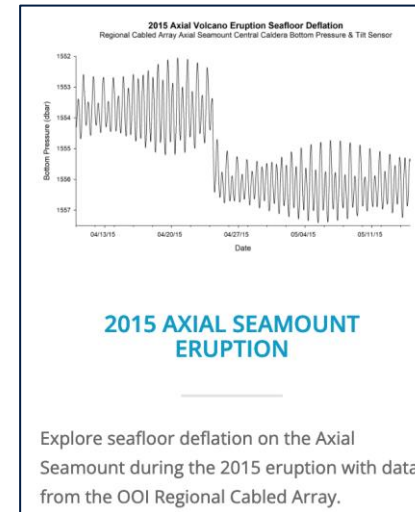


# Accessible Oceans - Exploring Ocean Data Through Sound



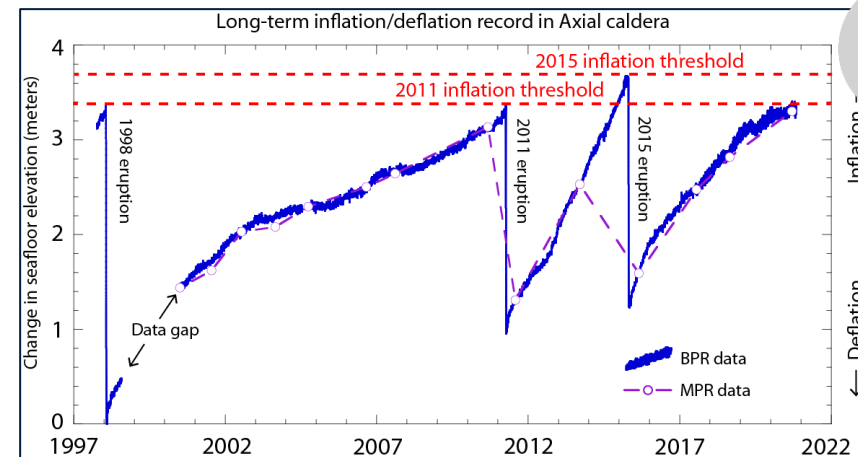
<https://accessibleoceans.whoi.edu/>

- Pilot auditory displays of ocean data (“data sonification”) to increase accessibility
- Authentic datasets from the OOI Data Nuggets
- Inclusively co-design - interviews & surveys with ocean experts, blind & visually impaired (BVI) adults, teachers of BVI students



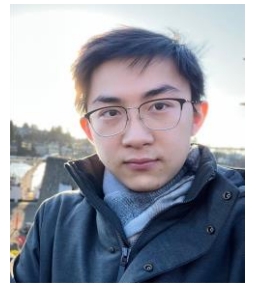
## An Interdisciplinary Team

- Amy Bower, WHOI
- Jon Bellona, Univ. Oregon, School of Music & Dance
- Jessica Roberts & Huaigu Li, Georgia Tech, School of Interactive Computing
- Leslie Smith, Your Ocean Consulting, LLC



<https://datalab.marine.rutgers.edu/data-nuggets/>

# Towards permanent DAS at OOI



W

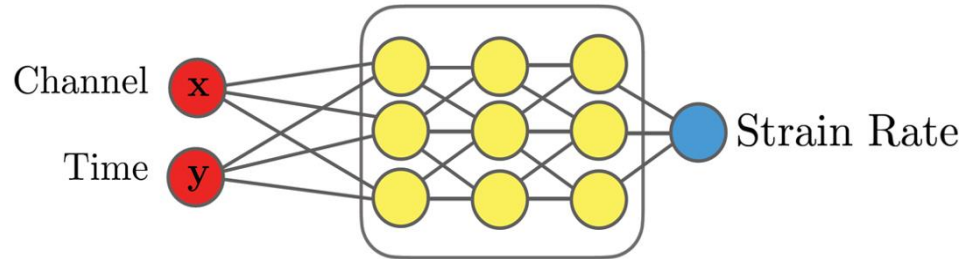
Marine Denolle, **Yiyu Ni**, Brad Lipovsky, William Wilcock, Nathan Kutz, Friedrich Knuth

Data compression can help **transfer** and **storage**

Dong et al. (2022) Benchmark lossless compression: **compression ratio R= 0.6**

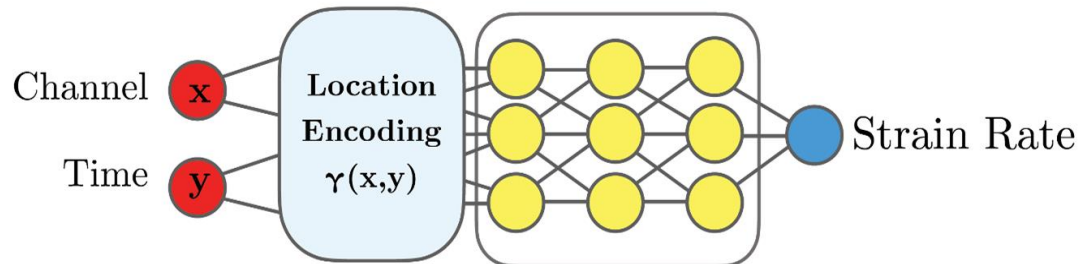
## Lossy data compression using neural networks

**SIREN**



- **R = 0.015**
- 400s to train on 600s of data
- 1GB GPU RAM
- not-generalizable

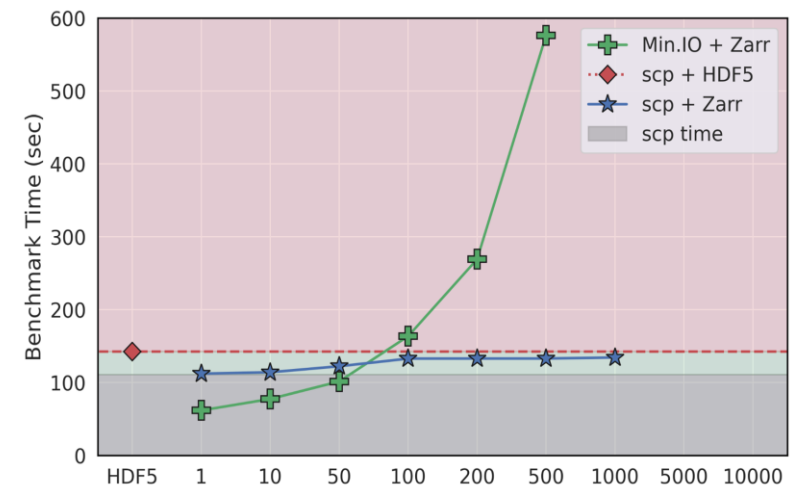
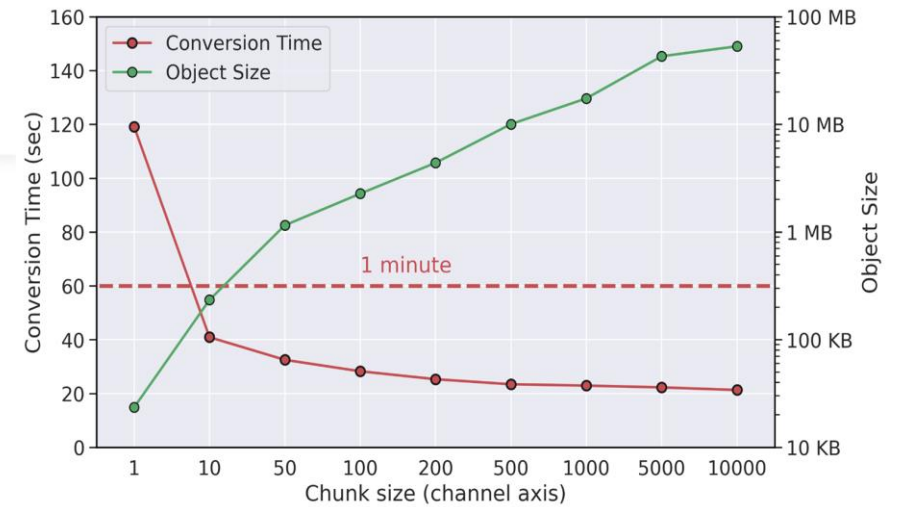
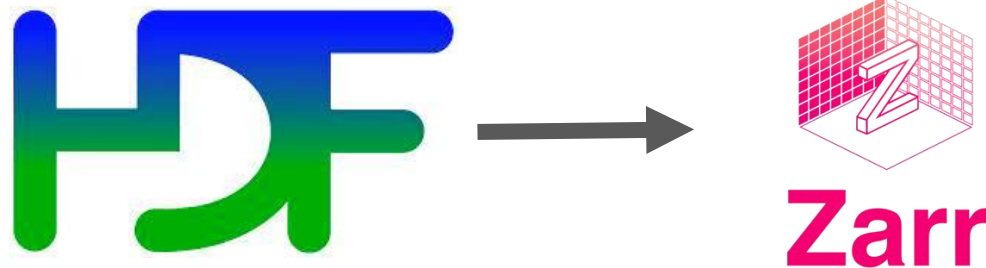
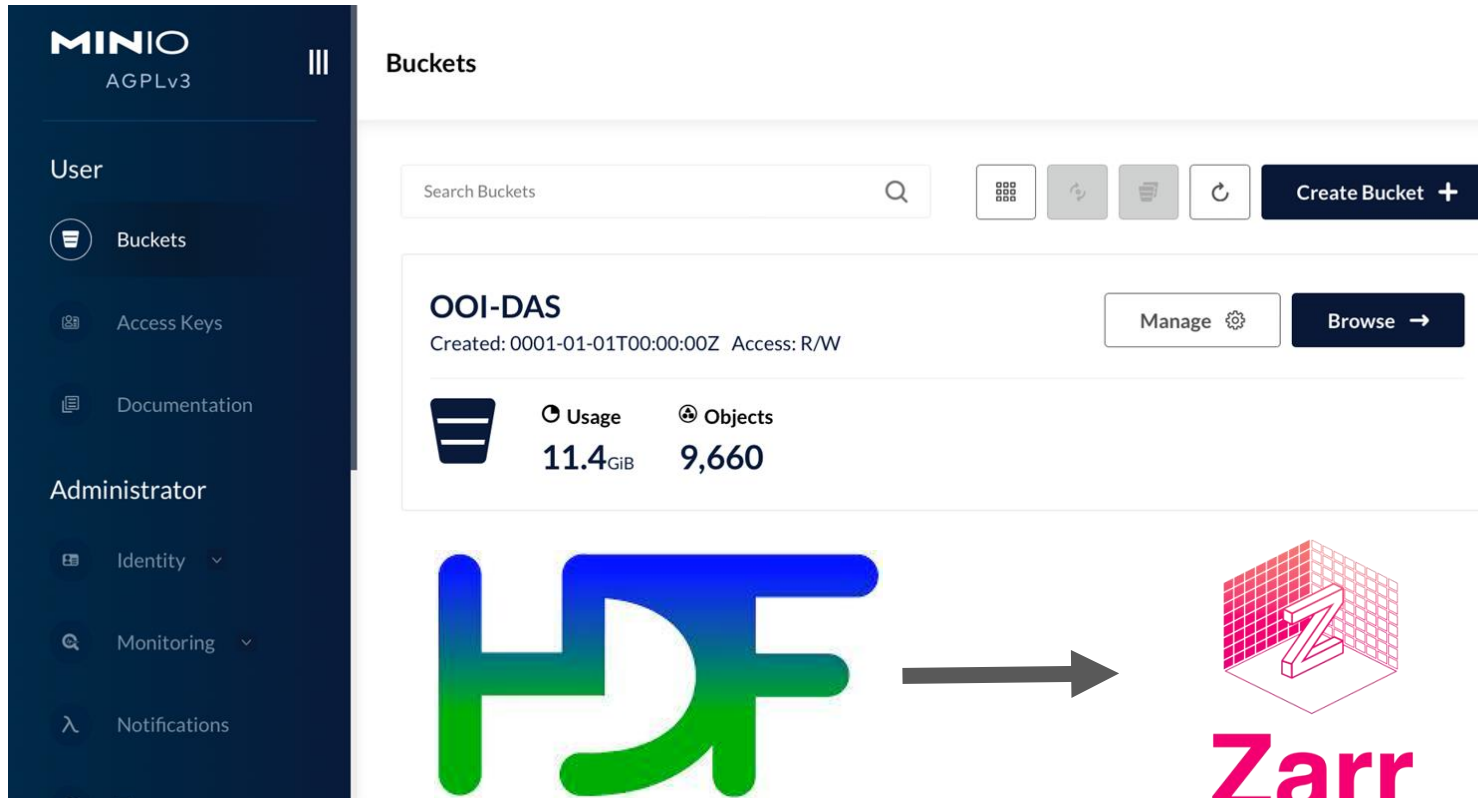
**Random Fourier Feature Network**



- **R = 0.08**
- 100s to train on 600s of data
- 9GB GPU RAM
- Not-generalizable (yet)



# DASstore: an open-source object storage for Distributed Acoustic Sensing

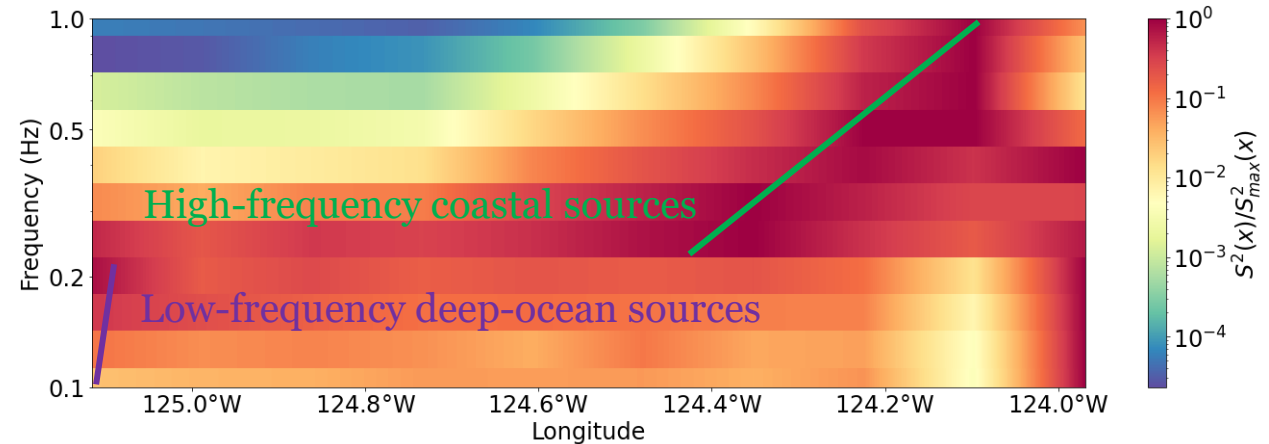
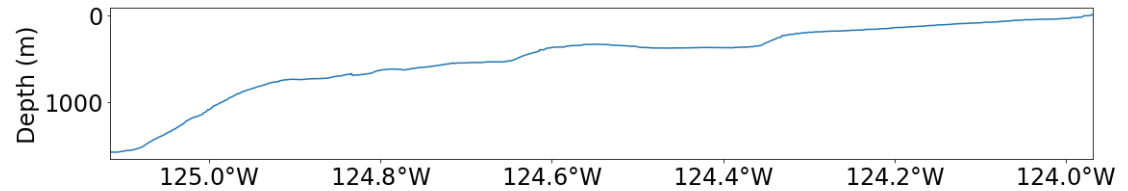
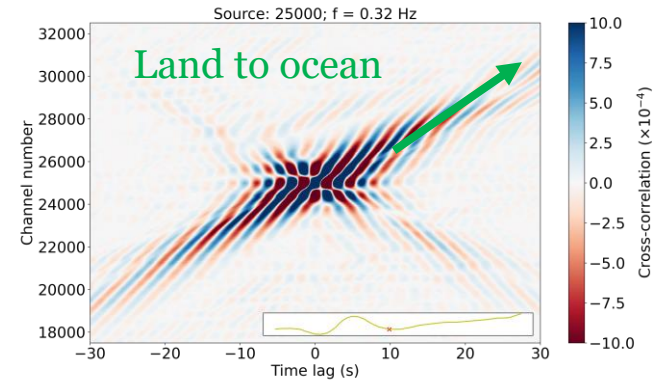
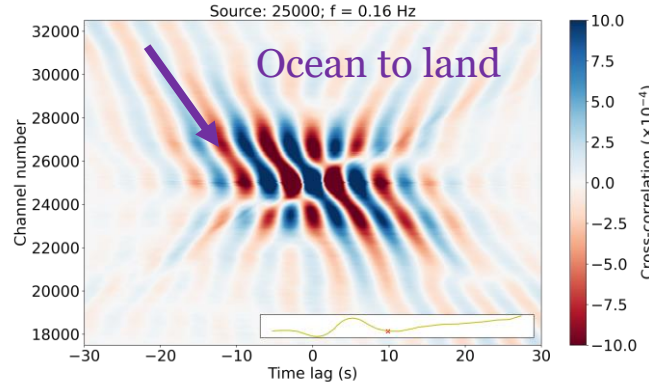
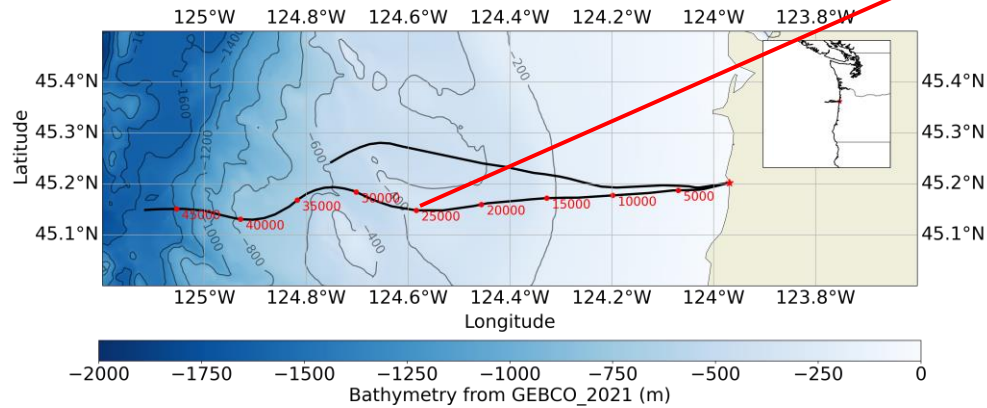


<https://github.com/niiyu/DASCompression>

<https://github.com/niiyu/DASStore>

# Unraveling the Distribution of Microseism Sources with Submarine Distributed Acoustic Sensing (DAS)

Jiaqi Fang (jfang@caltech.edu), Ethan F. Williams, Yan Yang, Ettore Biondi, Zhongwen Zhan  
 Seismological Laboratory, California Institute of Technology



For more details,  
 please check out  
 our posters!



Crustal imaging



Source inversion  
 (S52C-0077)