OOIFB Town Hall

Lightning Presentations
February 13, 2018
USE OF OOI CABLED ARRAY DATA FOR GROUND DEFORMATION STUDIES AT AXIAL SEAMOUNT

William Chadwick (NOAA/PMEL, william.w.chadwick@noaa.gov) and Scott Nooner (Univ. North Carolina, Wilmington)

REAL-TIME PLOTS OF OOI BOTPT DATA: www.pmel.noaa.gov/eoi/rsn/
Time-series analysis of Cabled Array HD video with computer vision

Aaron Marburg,  
Univ. of Washington Applied Physics Laboratory,  
amarburg@uw.edu

with  
Tim Crone @LDEO  
Friedrich Knuth @Rutgers

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Poster OD24D-2741
Geophysical Studies with the Cable Array – William Wilcock

April 24, 2015 eruption of Axial Seamount
- >100,000 earthquakes on ring fault
- Caldera inflation and deflation
- Explosive signals discovered
- Improved observations of the next eruption

Cascadia Subduction Zone
- M9 earthquakes
- Offshore central Oregon
  - earthquakes, creep, slow slip?
- We have the sensors
- We need to instrument nodes PN1B, C, and D

Poster #2615 this afternoon
A-0-A calibrations of seafloor pressure to 1 mm of water

Wilcock et al., 2016
Sensor network \(\Rightarrow \text{???} \Rightarrow\) Hypotheses

Challenges:
- No calibration
- No biological ground truth

Opportunities:
- Trends and patterns contain information too!

\(\text{???} = \text{Data-driven methods}\)

[OD53A-02 / Friday 2:15 PM ]

Wu-Jung Lee | wjlee@apl.washington.edu
Applied Physics Lab, University of Washington
Temporal and Spatial Dynamics of Physical and Biological Properties along the Endurance Array of the California Current Ecosystem

Fernanda Henderikx Freitas, Gonzalo S. Saldias, Miguel Goni, Kipp Shearman, and Angelique White
Oregon State University

- Similar magnitudes of chl blooms in WA and OR despite weaker winds in WA
- River plumes and re-suspension patterns control suspended particle distributions
- CDOM contamination of satellite retrievals of chl appear to be significant, particularly along the WA line
Using Aquatic Eddy Covariance to measure benthic oxygen consumption seasonally at Oregon shelf and inshore stations

Eddy Covariance Data, Dec. 6-7, 2017
Avg. Inshore O₂ Flux = -31.4 mmol m⁻²d⁻¹

Cruise Schedule:
Dec. 4-7, 2017 ✓
Jan. 28-31, 2018 ✓
Feb. 27-Mar. 2
May 12-15
Jul. 2-5
Aug. 1-3
Oct. 3-9
How do small-scale changes in upwelling alter animal behavior?

Mei Sato, University of British Columbia (m.sato@oceans.ubc.ca)
The southernmost long-term open ocean mooring yields the first multi-year air-sea flux results south of 50°S.

- Extreme turbulent heat loss events occur year-round, and are driven primarily by cold, dry northeastward winds.
- Winter 2015 had more intense heat loss events, deeper mixed layers, and greater Subantarctic Mode Water formation than 2016.

Deep convection in the Irminger Sea observed with a dense mooring array

M. Femke de Jong\(^1\) (femke.de.jong@nioz.nl), Marilena Oltmanns\(^2\), Johannes Karstensen\(^2\), Laura de Steur\(^1,3\)

\(^1\)Royal Netherlands Institute for Sea Research, \(^2\)GEOMAR Helmholtz Centre for Ocean Research Kiel, \(^3\)Norwegian Polar Institute
OOI Irminger Sea Array is located in a critical region for carbon uptake and export (the biological pump)

Hilary I. Palevsky and David P. Nicholson, Woods Hole Oceanographic Institution
hpalevsky@whoi.edu

A new OCE-CHEM award will leverage existing OOI Irminger Sea assets to quantify full annual cycle of biological pump

Configure gliders to calibrate oxygen sensor in air

Irminger Sea field deployment in 2018 and 2019
Analysis of Pioneer Array Glider Observations

Robert E. Todd, Woods Hole Oceanographic Institution, rtodd@whoi.edu

• Full quality control of temperature and salinity data completed for 38 Pioneer Array glider missions through early 2017 (2625 glider-days of measurements).
• Processing and quality control of velocity measurements (depth averaged and DVL) is underway.
• Mean temperature, salinity, and density transects from the eastern boundary (EB) line show notably saltier Cold Pool waters and warmer waters over the upper slope compared to prior climatologies.

[Gawarkiewicz et al., 2018, Oceanography]
New Processes of Cross-shelf Water Exchange Revealed by OOI Pioneer Array

Weifeng (Gordon) Zhang, Woods Hole Oceanographic Institution, wzhang@whoi.edu
Collaborators: Glen Gawarkiewicz, Robert Todd, Jacob Partida

Pioneer Array glider data

1) Onshore intrusion of the ring water

Satellite Sea Surface Temperature

(i) revealed the subsurface structure of the onshore and offshore intrusions
(ii) provided the density distribution for dynamical analysis of the mechanisms
(iii) helped quantifying the cross-shelf transport
(iv) provided the educational opportunity for an undergraduate student

Publications: Zhang and Gawarkiewicz, GRL, 2015; Gawarkiewicz, et al, Oceanography, 2018;
Zhang and Partida, JGR, in review
• OOI Glider data shows extremely warm water offshore of continental shelf (15°C) in January 2017.

• Data collected by commercial fishermen show 10°C water extending across continental shelf (5°C warm anomaly)
Atmospheric and offshore forcing of temperature variability at the shelf break

Ke Chen (kchen@whoi.edu), Woods Hole Oceanographic Institution
Collaborators: Glen Gawarkiewicz, Al Plueddemann

1. Large contrast in temperature variability, only 30 km apart
2. Significant impact from Gulf Stream warm core ring activity
3. Advective flux dominates the heat balance

Reference:
Chen et al., Atmospheric and Offshore Forcing of Temperature Variability at the Shelf break: Observations from the OOI Pioneer Array, Oceanography, in press.
Pioneer Array – A Versatile and Indispensable Tool for Ocean Science Education and Research in a Land-Locked Undergraduate Teaching University

Robert D. Vaillancourt, Associate Professor of Ocean Sciences and Coastal Studies
Millersville University, Millersville, PA  (robert.vaillancourt@millersville.edu)

**Education**
- Time & Space Scales
- Eulerian vs. Lagrangian
- Water masses & fronts
- Seasonal changes
- Vertical density stratification
- Real vs. idealized data
- Databases, data mining
- Hypothesis testing

**Research**

The Seasonal Changes of the Ocean’s Properties Near the New England Shelf Break Front Using the Pioneer Coastal Array

**ABSTRACT**

The Pioneer Coastal Array (PCA) is a network of autonomous sensors deployed on the continental shelf of the northeastern United States. The PCA provides continuous, high-resolution measurements of oceanic properties such as temperature, salinity, and currents. This study focuses on the seasonal variations of these properties near the New England Shelf Break Front (NFSBF), a dynamic interface that separates cold, nutrient-rich waters from warm, nutrient-poor waters. The seasonal changes in the properties near the NFSBF are crucial for understanding the ecological and biogeochemical processes in the region.

**METHODS**

Data from the PCA sensors were analyzed to identify seasonal patterns in the oceanic properties. Time series analysis was used to detect trends and seasonal cycles. The effects of the NFSBF on the properties were quantified using statistical methods. The data were also used to validate models of the oceanic processes in the region.

**RESULTS**

The results show significant seasonal variations in temperature, salinity, and currents near the NFSBF. The data also reveal the influence of the NFSBF on the properties, with distinct patterns observed in the different seasons. The models were able to capture the observed patterns, indicating the importance of the seasonal changes in understanding the oceanic processes.

**CONCLUSIONS**

The seasonal changes in the oceanic properties near the NFSBF are critical for understanding the regional ecosystems and biogeochemical cycles. The data from the PCA provide valuable insights into these processes, and further studies are needed to fully understand the complex dynamics in the region.
What done so far and plan to do more...

- Participated in Rutgers University OOI workshop for educators. (see talk by Sage Lichtenwalner)
- Beta tested some tools (widgits) for integrating static data into oceanography and geology classes.
- Developed plan, new lab, instrument and got IRB approval to test salinity widgets in Fall Introductory Oceanography classes at UWT & UWS. (see our poster)

Questions asked:

- Are there improvement differences in demonstration of knowledge between students using the old salinity lab versus the new salinity OOI widget lab (3 sections each UWS)?
- Are there improvement differences in demonstration of knowledge between students using the new salinity OOI widget lab in a large class (UWS) versus a small class (UWT)?
- Qualitatively, what did students think of the lab?
- Are there any demographic patterns observed with these data?

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1 Thursday Feb 15 2018 - 4:00 PM – 06:00 PM, Poster Hall
ED44C-2483: Integrating Ocean Observatories Initiative Data into Undergraduate Introductory Oceanography Courses
Julie E Masura, Mikelle Nuwer, Cheryl Lee Greengrove, Deborah S Kelley from University of Washington

2 Thursday Feb 15 2018 - 9:30 AM – 9:45 AM, Room: D139-D140
ED41A-07: Engaging Introductory Undergraduate Students with Online Data Explorations
Charles Sage Lichtenwalner, Janice D McDonnell, Kristin I Hunter-Thomson from Rutgers University, Catherine Halversen from University of California Berkeley
Thank you!