An Update on the OOI Data Explorations/Data Labs
AGU Town Hall
December, 2020

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datalab.marine.rutgers.edu
Grateful... to the National Science Foundation

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Updates

1. What are Data Labs?
2. Highlights of our 2020 Reach Survey Evaluation Report
4. Update - Virtual REU
5. Summary – Join our community!
OOI Data Labs Project-
https://datalab.marine.rutgers.edu

Key Goals
• Build a Community of Practice (CoP) of undergraduate educators, interested in using OOI data with their students through
  • Sustained professional development opportunities
  • Facilitating sharing of ideas and teaching practice
• Make OOI data more accessible to educators and students
OOI Data Labs
A Summary of our project milestones

Comprehensive Database
Fall 2018

Development Workshops
Spring 2019

Implementation Workshops
Summer 2019

Webinar Series
Fall 2019-2020

Open Source OOI Data Lab Manual
Winter 2020

Fellowship Program
Winter 2020

REU Program
Summer 2020

Cohort 1 Data Lab Manual Pilot
Fall 2020

590 scientists
2 undergraduates built a database of professors from around the country teaching Oceanography 101 like courses.

56 professors
Attended 4 week long workshops:
- Princeton, NJ.
- New Brunswick, NJ.
- Monterey, CA.
- Bellingham, WA.

60 professors
Attended Earth Science Teachers Rendezvous Nashville, TN July 2019

19 professors
8 webinars featuring data labs developed by workshop participants.

11 professors
Design workshop to develop an online lab manual for oceanography courses.

10 fellows
6 professors are collecting data and feedback from students on the efficacy of the Data Labs.
4 are creating new Python notebooks with OOI data.

9 professors
Mentored students in a virtual REU using OOI data in an online REU program.

20 professors
Are piloting the OOI Data Lab Manual created by 11 professors from the community.
Reach Survey Evaluation

Conducted by Dr. Ellen Altermatt, SERC at Carleton College

The purpose was to:

1. better understand current *perceptions of and practices in using large, real-world oceanographic datasets* in undergraduate classrooms,

2. assess *levels of involvement* in past and current OOI Ocean Data Labs initiatives,

3. examine the *impact of participation* in these initiatives on faculty teaching and perceptions of community belongingness, and

4. assess planned *levels of future involvement* and to understand how current resources might better meet community needs.
Survey Facts

- Sent to updated database of 590 professors
- Completed by 145 individuals (22.8% response rate).
- Analysis focused on n=133
  - 130 who indicated that they had taught an undergraduate-level oceanography course (or a related course with substantial oceanographic content) in the past two years.
  - An additional 3 respondents indicated that, although they had not recently taught this type of course, they planned to do so in the next two years.
A Vibrant Community of Practice

- Data Exploration pilot testers (27)
- Data Lab developers (56)
- 2020 Data Lab Fellows (11)
- Data Lab project team leaders

**60 Implementation workshop attendees (not pictured on map)**

[Map with markers representing locations across the USA]

[Link: https://datalab.marine.rutgers.edu/community-map/]
### Project Involvement

70% of n=133 involved in one or more Data Lab initiatives

<table>
<thead>
<tr>
<th>Activity</th>
<th>n (% of 133 respondents)</th>
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</thead>
<tbody>
<tr>
<td>Visited the OOI Ocean Data Labs Project website</td>
<td>81 (60.9%)</td>
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<tr>
<td>Joined the OOI Ocean Data Labs Project mailing list</td>
<td>49 (36.8%)</td>
</tr>
<tr>
<td>Introduced a colleague to the OOI Ocean Data Labs Project</td>
<td>28 (21.1%)</td>
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<tr>
<td>Attended a 2016-2017 OOI Teaching with Data Workshop</td>
<td>15 (11.3%)</td>
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<tr>
<td>Attended a 2018 OOI Early Career Scientist Data Workshop</td>
<td>7 (5.3%)</td>
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<tr>
<td>Attended a 2019 or 2020 OOI Ocean Data Labs Development Workshop (4.5 days)</td>
<td>30 (22.6%)</td>
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<tr>
<td>Attended a 2019 or 2020 OOI Ocean Data Labs Mini-Workshop (at the Earth Educators Rendezvous or the Ocean Sciences Meeting)</td>
<td>17 (12.8%)</td>
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<tr>
<td>Attended a 2019 or 2020 OOI Ocean Data Labs Webinar</td>
<td>14 (10.5%)</td>
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<tr>
<td>Attended the 2G2O OOI Ocean Data Labs Notebook Workshop</td>
<td>6 (4.5%)</td>
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<tr>
<td>Participated as an OOI Ocean Data Labs Project Fellow</td>
<td>5 (3.8%)</td>
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<tr>
<td>Used an OOI Data Exploration/Lab activity that I created in one or more of my courses</td>
<td>26 (19.5%)</td>
</tr>
<tr>
<td>Use an OOI Data Exploration/Lab activity that someone else created in one or more of my courses</td>
<td>32 (24.1%)</td>
</tr>
<tr>
<td>None of the above</td>
<td>39 (29.3%)</td>
</tr>
<tr>
<td>Other</td>
<td>5 (3.8%)</td>
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</tbody>
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How did you hear about the OOI Data Labs project?

<table>
<thead>
<tr>
<th>Response</th>
<th>n (% of 93 respondents)</th>
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<tbody>
<tr>
<td>Internet search</td>
<td>15 (16.1%)</td>
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<tr>
<td>Colleague referral</td>
<td>34 (6.6%)</td>
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<tr>
<td>Email Communication</td>
<td>44 (47.3%)</td>
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<tr>
<td>Other online communication (e.g. blog post)</td>
<td>9 (9.7%)</td>
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<tr>
<td>Printed communication (e.g. journal article)</td>
<td>3 (3.2%)</td>
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<tr>
<td>Professional conference</td>
<td>21 (22.6%)</td>
</tr>
<tr>
<td>Other</td>
<td>7 (7.5%)</td>
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</table>
Impact of Participation in OOI Data Labs
1=strongly disagree; 5= strongly agree

“I never used OOI data previously to attending the workshop and I did not know about the research arrays from the Ocean Observatories Initiative. I now introduce my students on these physical tools used to study the ocean remotely.”

Increased the extent to which I feel a part of a community of educators interested in using OOI data in their teaching

Increased the extent to which I feel of a community of educators interested in changing how they teach to improve student outcomes
Figure 4. Mean ratings for the degree to which participants’ involvement with the OOI Data Labs Project has influenced their teaching. (1- strongly disagree 5- strongly agree)

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<th>1</th>
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<tbody>
<tr>
<td>increased the frequency with which I engage students with large, real-world oceanographic data</td>
<td>4.12 (n = 76)</td>
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<td>increased my level of confidence in effectively engaging students with large, real-world oceanographic data</td>
<td>4.12 (n = 74)</td>
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<td>increased my technical abilities in accessing large datasets for teaching</td>
<td>3.89 (n = 72)</td>
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<tr>
<td>positively impacted the way I think about how students learn</td>
<td>4.12 (n = 73)</td>
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<tr>
<td>positively impacted the types of pedagogies I use in my teaching</td>
<td>4.15 (n = 72)</td>
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<tr>
<td>positively impacted the ways in which I assess students' learning</td>
<td>3.72 (n = 72)</td>
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OOI Data Labs in a Pandemic

• “I will increase the use of real data sets into lab environments. The involvement is depending on how labs are taught. The more labs are taught in a distance learning environment, the more I am relying on real data sets. Using real time data sets has multiple objectives: a) help students learn to analyze data, b) help students to deal with data messiness, c) help students to visualize data using software.”

• “I am grateful that these resources are available, especially as I try to convert my class to a hybrid model with less access to field trips and collecting our own data (and potentially being fully remote). I look forward to working to incorporate these data and activities into my Biological Oceanography course in Fall 2020.”

• “Thank goodness for Data labs! They have really been a remote learning life jacket!”
OOI Data Lab Manual

• Community-generated from the idea to the authorship
OOI Data Lab Manual

Lab Chapters

- Lab 1 – Introduction to the Ocean Observatories Initiative (OOI) – The collection of oceanographic data
- Lab 2 – Building Data Skills – The display of oceanographic data
- Lab 3 – Geology – Plate Tectonics and the Seafloor
- Lab 4 – Geology – Sea Floor Changes in a Volcanically Active Setting
- Lab 5 – Ocean Chemistry – Investigating Density and Stratification in the Ocean
- Lab 6 – Ocean Physics – Waves Generated by Large Storms
- Lab 7 – Primary Production – Identify factors that control Primary Production in the western temperate Atlantic Ocean
- Lab 8 – Anoxic Events – Solve the mystery of the dying crabs
OOI Data Lab Manual

- Fully fleshed out lessons
- Interactive quizzes
- Instructors guide

LAB 1 – THE COLLECTION OF OCEANOGRAPHIC DATA

The ocean has vast resources for humans. It supplies food, medicines, jobs in fisheries, the transportation of goods, tourism and recreation. All of these industries are more efficient if they can predict ocean processes. For example, it doesn’t make sense to go fishing in an area if your target fish are not there. Ship routes may need to be changed when there is bad weather and poor sea

Quick Check on Platforms

Drag and drop the platform name that is best suited to collect each type of data

Use a _________ to take a “snapshot” of the color of surface water over a large ocean area.
Use a _________ to retrieve samples of water or rocks.
Use a _________ to continually sample temperature at many depths along a transect.
Use a _________ to collect wind speed and direction at a particular point for a long time.
Use a _________ to monitor a volcano for earthquakes and send large quantities of data to shore.
Use a _________ to transmit data in real time to scientists.

- glider
- ship
- mooring
- telemetered array
- cabled array
- satellite

Lab 1.3 – How do you know where you are on the Earth?
Virtual REU

8 student posters at AGU 2020

13 mentors from Data Lab community

Building a CoP: Moving to the Center of the Community

Of the 116 we worked intensively with in workshops:

• 19 delivered OOI DL webinars, presenting the DL they had developed during workshop
• 11 became DL Fellows
• 11 are designing and building the DL Notebook
• 9 became peer presenters at mini workshops
• 10 presented on OOI at Ocean Sciences Meeting in San Diego, CA
• 13 volunteered to be an OOI Virtual REU mentor
• 20 are participating as Lab Manual testers
• The community is growing!
Summary

• Building a promising CoP
• Positive results of Reach Survey
• Active Blog and mailing list
• Webinar series Fall 2020, Spring 2021
• Video on Teaching with Data
• DL Online Manual for Oceanography 101
• Cohort I testing (Fall 2020) Cohort II (Spring 2021)