GO-SHIP, CCHDO, and GOMO
Practical Adoption of Standards

Steve Diggs
Technical Director / CCHDO
GOMO Review
2022-06-26 (2nd Draft for Review)
CCHDO: CLIVAR & Carbon Hydrographic Data Office
Officially: Data Office for GO-SHIP, CLIVAR, WOCE, pre-WOCE
Location: Scripps Institution of Oceanography / UCSD
Data: >2500 Cruises / >107,000 profiles
Purpose: Data Assembly and Dissemination Center

Type of Data Managed: Sustained hydrographic observations of trans-oceanic reference quality hydrographic, ocean carbon, and tracer measurements.

Contacts:
  • Technical Dir.: Steve Diggs
  • Scientific Adv.: Sarah Purkey
  • Director: Karen Stocks
  • Emeritus Adv.: Jim Swift
The Global Ocean Ship-based Hydrographic Investigations Program (GO-SHIP) coordinates a network of measurements that provide approximately decadal resolution of the changes in inventories of heat, freshwater, carbon, oxygen, nutrients and transient tracers, covering the ocean basins from coast to coast and full depth (top to bottom), with global measurements of the highest required accuracy to detect these changes.

GO-SHIP CTD data are inputs to the OWC algorithms that are used to estimate the time-varying correction of conductivity measurements from Argo floats.
Many opportunities to make things better

We chose to work on our data format
Strategy

- **Leverage existing infrastructure**
- **Deliver functionality to scientists in their existing workflows**
- **Focus on compatibility with existing tools and systems**
- **Minimal maintenance**
Text/csv formats are limited - move to CF

- How do we fit more data/metadata into our files?
  - Formal file metadata should be in the file (hashes, dates, etc)
  - Not by adding ad-hoc scientific metadata to structures that weren’t meant for it
- Emphasize machine readability
  - Better website APIs to find changing data, automatic updating models = faster science
- Less steps to data munging in future
  - Instead of csv -> netCDF, netCDF + netCDF
- CCHDO isn’t funded to develop file formats, we process and serve data
- CCHDO isn’t scoped to name new parameters
  - Better to adopt vocabularies from CF, NERC, etc.
- Data by profile is desirable and becomes possible
  - Per cruise is a WOCE-era thing, per profile opens up the data to a wider community
CF files are offered as an additional file type

Dataset
Files in the Dataset have been checked for format consistency, and merged into a single, integrated, downloadable file.

Download Entire Dataset  Submit Data For This Cruise  How to Cite Dataset

bottle
- **CF netCDF:** 325020210420_bottle.nc (Updated 2021-06-11, 753.8 kB)
- **exchange:** 325020210420_hy1.csv (Updated 2021-06-11, 1.6 MB)
- **WHP netCDF:** 325020210420_nc_hyd.zip (Updated 2021-06-11, 643.8 kB)

ctd
- **CF netCDF:** 325020210420_ctd.nc (Updated 2021-06-11, 6.5 MB)
- **exchange:** 325020210420_ct1.zip (Updated 2021-06-11, 2.2 MB)
- **WHP netCDF:** 325020210420_nc_ctd.zip (Updated 2021-06-11, 2.6 MB)

documentation
- **pdf:** 325020210420_do.pdf (Updated 2021-08-16, 41.9 MB)
- **text:** 325020210420_do.txt (Updated 2021-08-16, 230.8 kB)

summary
- **WOCE:** 325020210420su.txt (Updated 2021-10-12, 12.7 kB)
CCHDO data in CF-netcdf is makes **data-by-profile** available in almost 40 different formats through ERDDAP
Connecting repositories (2019)

CCHDO Bottle CTD Data

<table>
<thead>
<tr>
<th>Exopcode</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>33RO20180423</td>
<td>2018-04-23</td>
<td>2018-06-06</td>
</tr>
<tr>
<td>320620180309</td>
<td>2018-03-09</td>
<td>2018-05-14</td>
</tr>
<tr>
<td>740H20180228</td>
<td>2018-02-28</td>
<td>2018-04-10</td>
</tr>
<tr>
<td>320620170820</td>
<td>2017-08-20</td>
<td>2017-09-30</td>
</tr>
<tr>
<td>320620170703</td>
<td>2017-07-03</td>
<td>2017-08-17</td>
</tr>
<tr>
<td>33RO20161119</td>
<td>2016-11-19</td>
<td>2017-02-03</td>
</tr>
<tr>
<td>096U20160426</td>
<td>2016-04-26</td>
<td>2016-06-22</td>
</tr>
<tr>
<td>33RR20160321</td>
<td>2016-03-21</td>
<td>2016-04-28</td>
</tr>
<tr>
<td>096U20160314</td>
<td>2016-03-14</td>
<td>2016-04-13</td>
</tr>
<tr>
<td>33RR20160208</td>
<td>2016-02-08</td>
<td>2016-03-06</td>
</tr>
</tbody>
</table>

Showing 1 to 10 of 947 entries

BCO-DMO CTD Data

<table>
<thead>
<tr>
<th>Dataset Id</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>3358</td>
<td>2019-05-20</td>
<td>2019-05-23</td>
</tr>
<tr>
<td>781546</td>
<td>2019-05-20</td>
<td>2019-05-23</td>
</tr>
<tr>
<td>774859</td>
<td>2019-05-20</td>
<td>2019-05-23</td>
</tr>
<tr>
<td>774958</td>
<td>2018-05-07</td>
<td>2018-05-29</td>
</tr>
<tr>
<td>765868</td>
<td>2017-12-16</td>
<td>2017-12-22</td>
</tr>
<tr>
<td>757722</td>
<td>2017-10-14</td>
<td>2017-10-27</td>
</tr>
<tr>
<td>753679</td>
<td>2017-03-30</td>
<td>2017-04-04</td>
</tr>
<tr>
<td>753624</td>
<td>2016-09-07</td>
<td>2016-09-09</td>
</tr>
</tbody>
</table>

Showing 1 to 10 of 73 entries

https://lmerchant.github.io/dist/
Argovis

A Next Generation Platform for co-located Oceanic and Atmospheric Data to Accelerate Climate Science Workflows: **now also integrating Argo and GO-SHIP data**

In collaboration with S. Purkey, S. Diggs, A. Barna, L. Merchant at SIO


Argovis supports:

**Who?** Climate scientists, students, people curious about the climate system

**What?** Research, education, outreach

**How?** By making it easy for anyone to visualize and access co-located datasets using a browser or not (Argo, GO-SHIP, weather events, gridded products)

URL: argovis.colorado.edu
Contact: argovis@colorado.edu
Twitter: ArgovisWebApp, @ArgovisCU

This work supported through the National Science Foundation Award #1928305 and #2026954.