CCHDO & IQuOD

S. Diggs, A. Barna

IQuOD-4, Tokyo, Japan

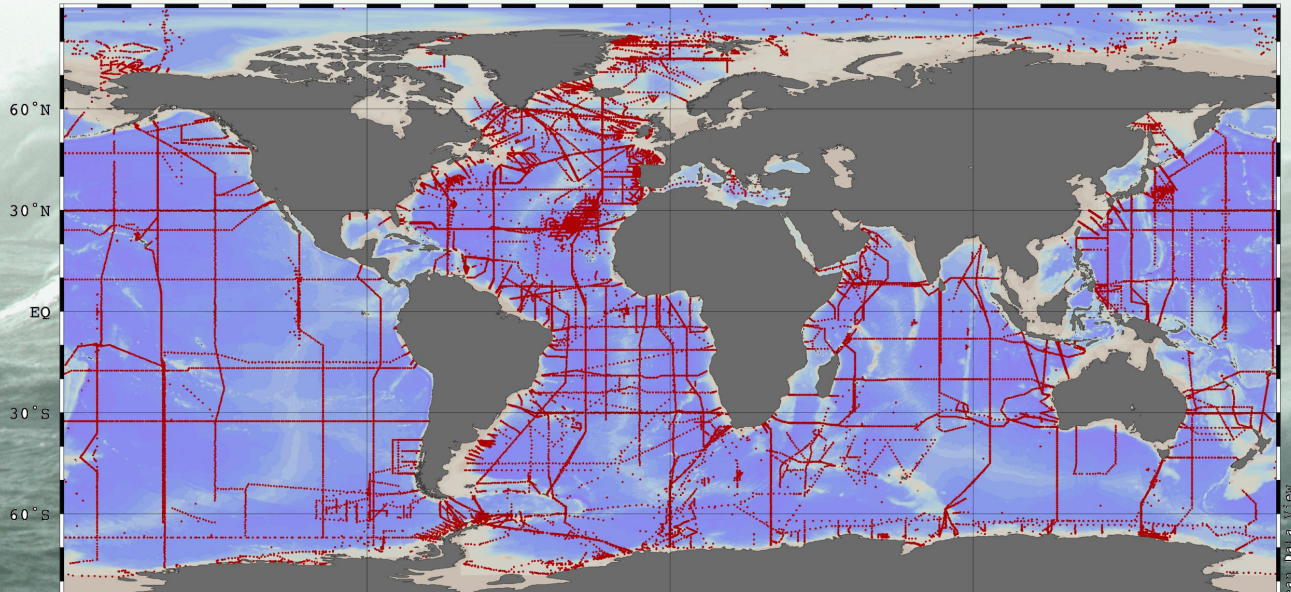
2016.10.04

CCHDO: CLIVAR & Carbon Hydrographic Data Office
(est. 1996 as WHPO)
Officially: Data Office for GO-SHIP
Location: Scripps Institution of Oceanography / UCSD
Holdings: >1350 Cruises / > 81K profiles
Purpose: Data Assembly and Dissemination Center

Contacts:

- Director : Jim Swift (jswift@ucsd.edu)
- Manager: Steve Diggs (sdiggs@ucsd.edu)

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

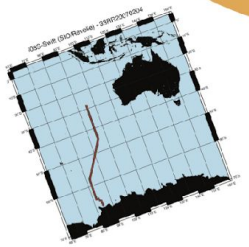


DATA FLOW

discover

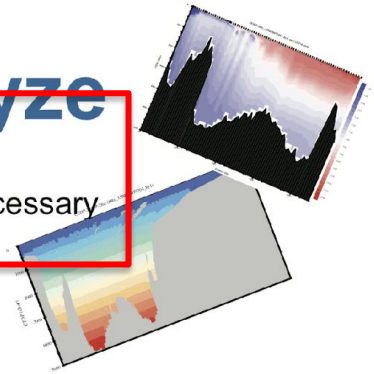
CCHDO staff actively seeks out new data through its contacts, national data centers, ship operators and individual scientists

Data and documentation are submitted or transferred to the CCHDO in a variety of input formats



analyze

All files are checked for basic consistency and corrected, if necessary



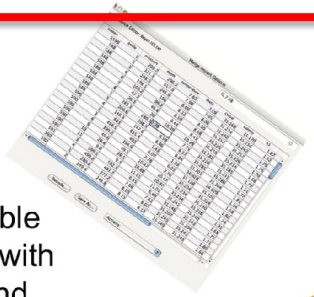
Data and metadata are translated into ASCII-CSV format and COARDS/EPIC compatible netCDF for easy use by MATLAB, ODV, JOA, and IDL users

disseminate

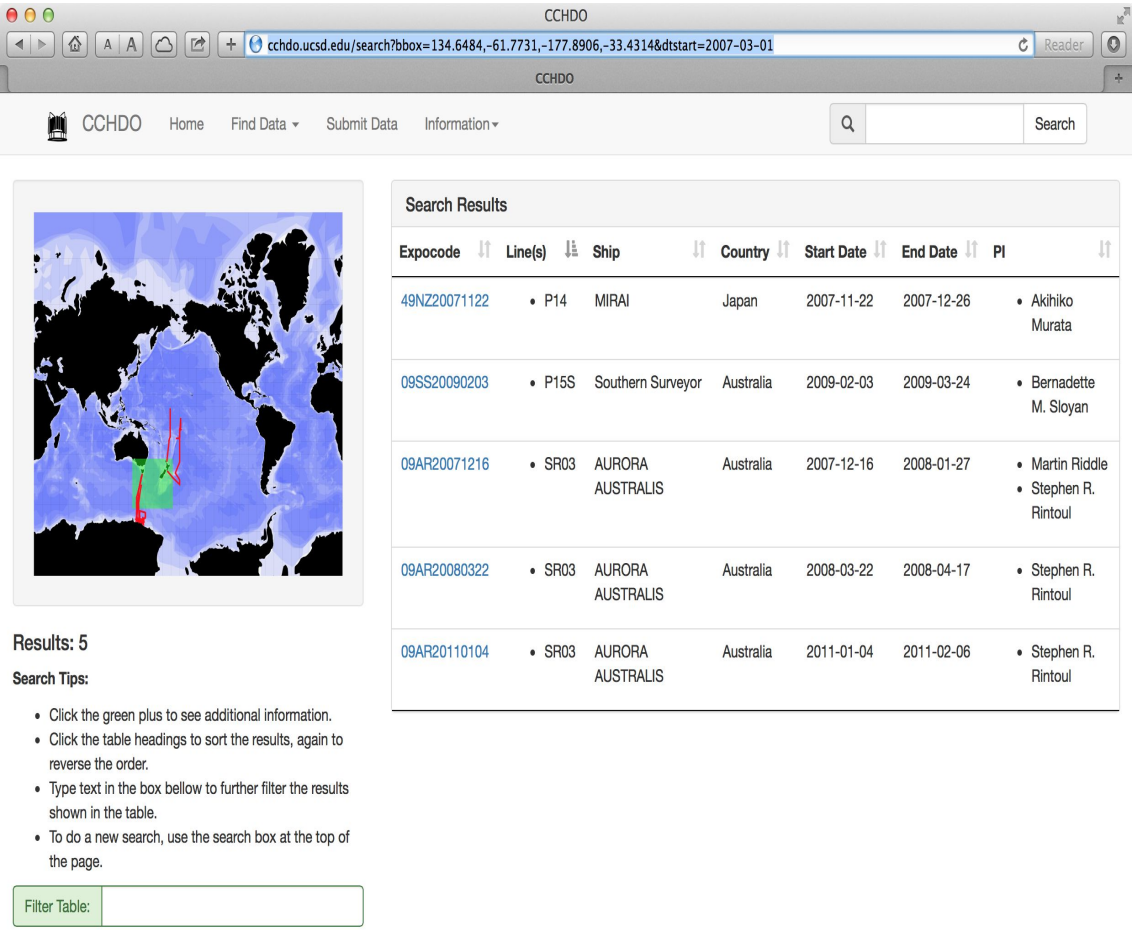
update

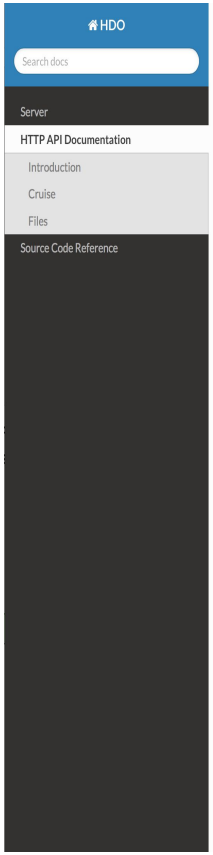
Files are provided on a usable website to the public along with extensive documentation and relevant metadata

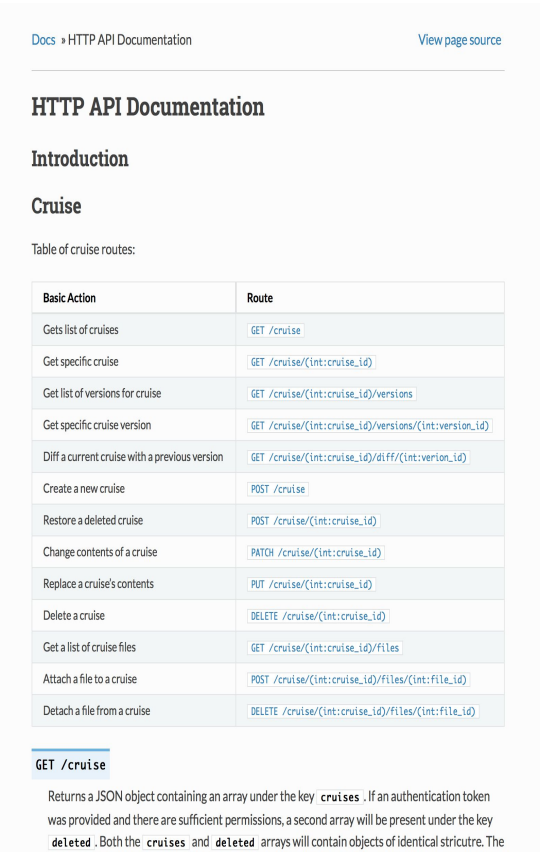
New data and updates to existing files come from ATLAS groups, the research community and data experts



The CCHDO API (v2.0 coming soon)



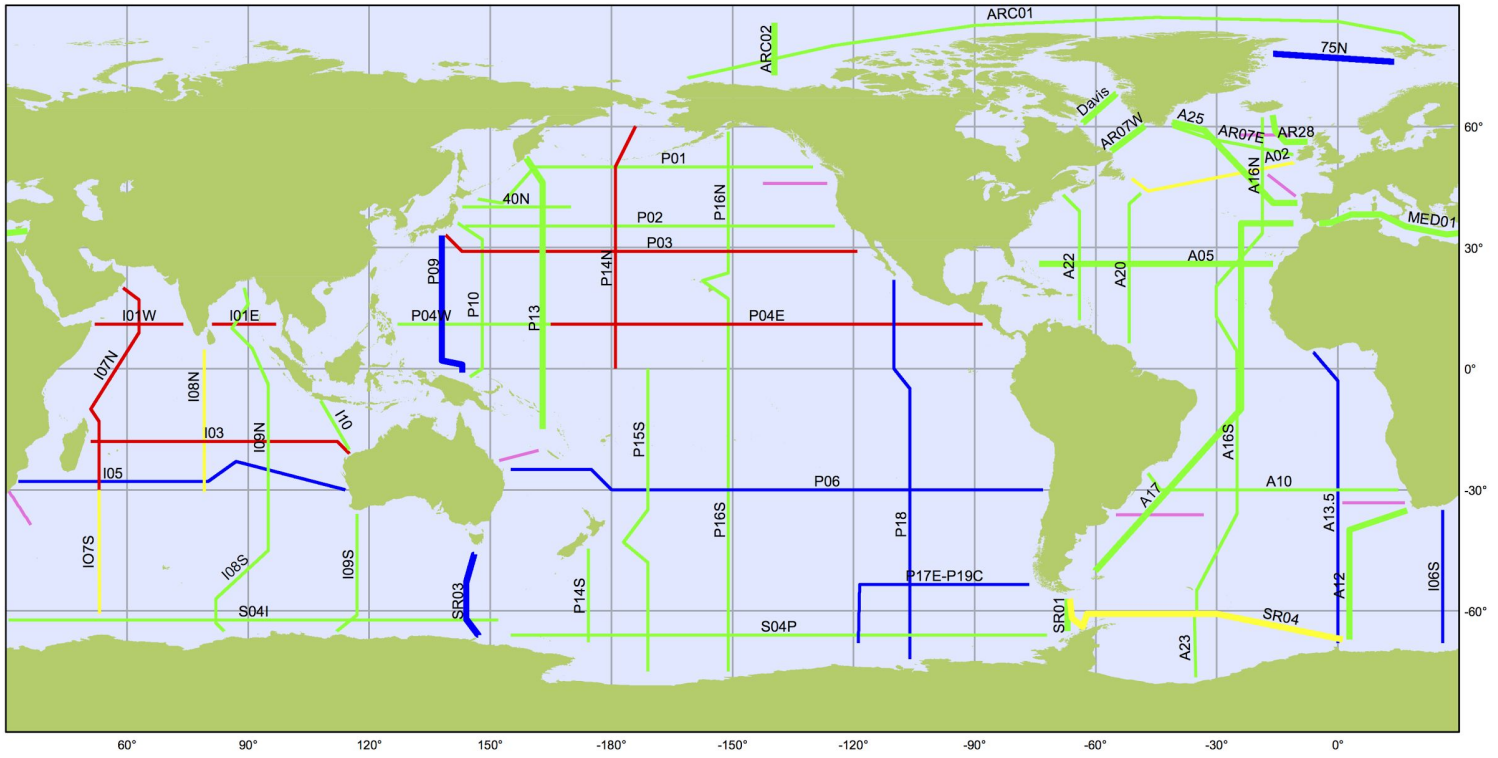




http://cchdo.ucsd.edu/search?bbox=-80.6836,34.5970,-61.3477,46.3166&dtstart=2010-04-01

curl --get -H "X-Authentication-Token: **XXXXXX691432**" --data-urlencode 'filters=[{"path":"data_type", "op":"eq", "value":"ctd"}, {"path":"data_format", "op":"eq", "value":"whp_netcdf"}]' http://cchdo.ucsd.edu/api/v1/query/file

CCHDO is the GO-SHIP Data Office



GO-SHIP **Status of 2012-2023 Survey (61 Lines)** **May 2016**

Bold lines: High Frequency (reduced requirements) Thin lines: Decadal GO-SHIP (full requirements)

completed at sea funded planned not planned yet associated & completed

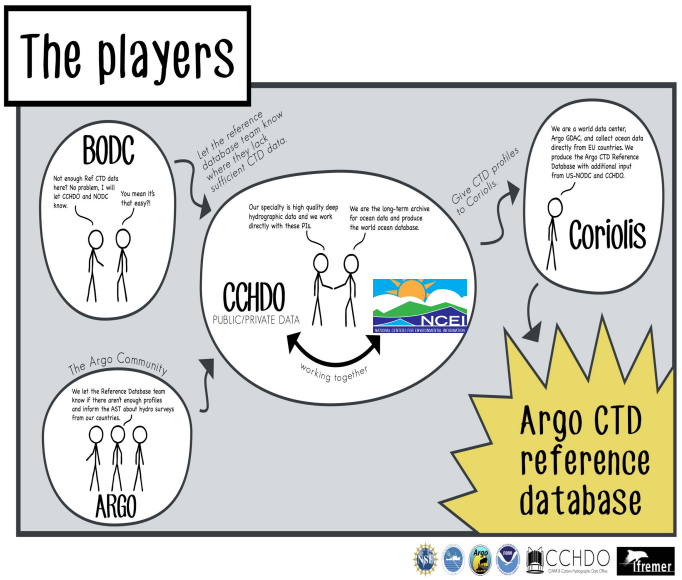
Percentage of so far completed, funded or planned lines in the current survey: 87%

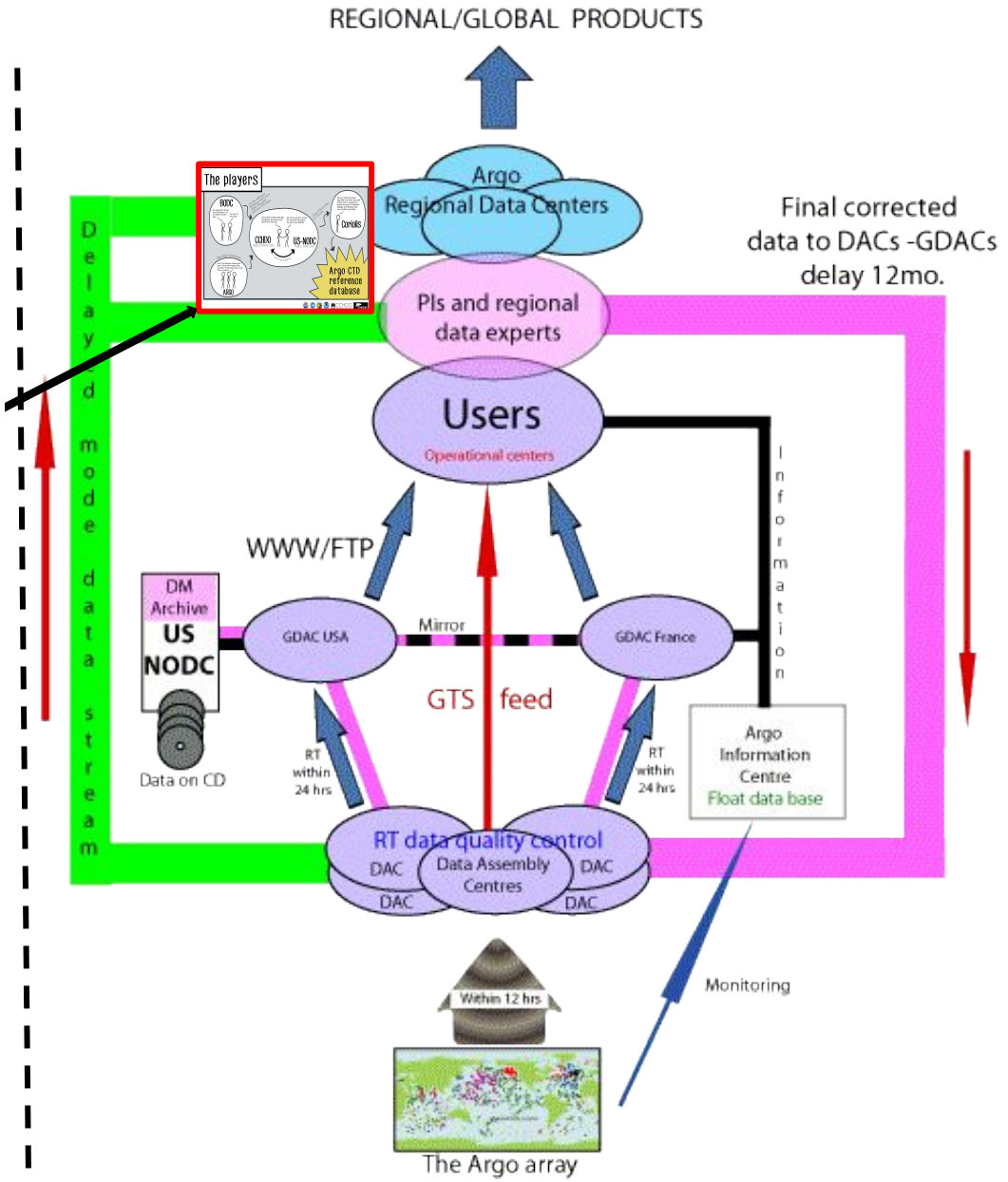
Generated by www.jcommops.org, 26-May-16

CCHDO is involved in….

- CLIVAR
- **Argo** (refDB, outreach, CTD-QC project)
- OceanSITES (HOT / BATS, Timeseries)
- ICSU-CODATA / **DTARG** (data at risk)
- EarthCube (NSF) / **SeaView Project**
- Research Data Alliance (TAB / **DatRes-IG**)
- SOOS / DMSC
- **Jim Swift's "Clean Data Project"**

The Argo Data System

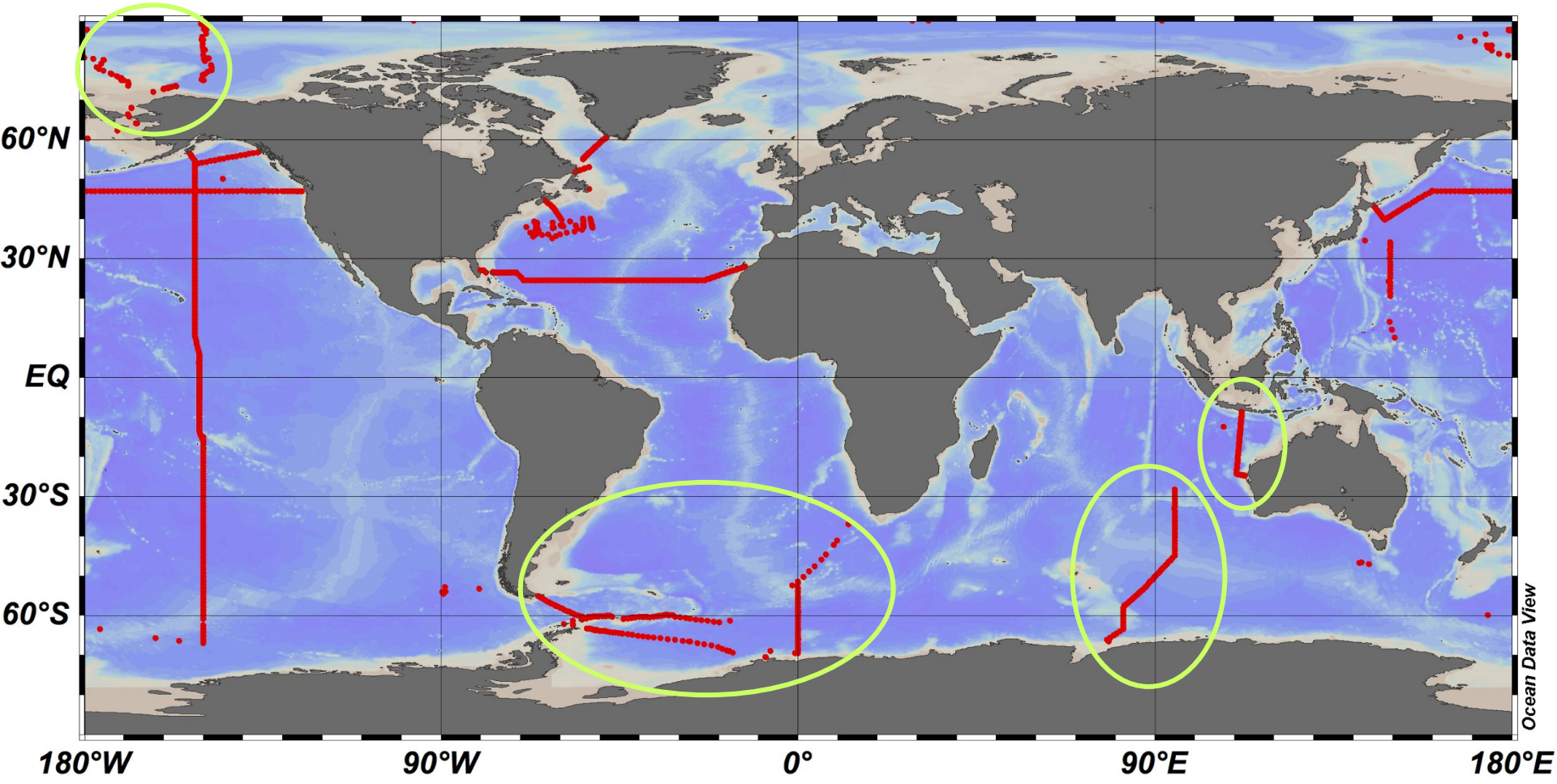


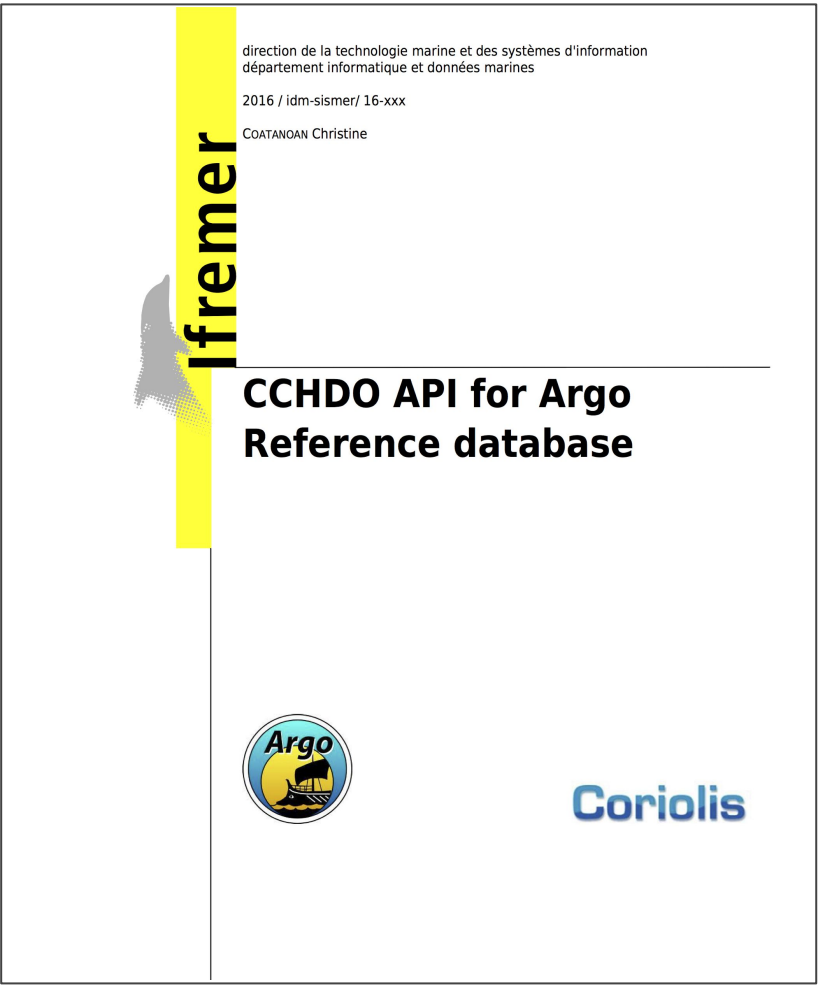


CCHDO
CLIVAR & Carbon Hydrographic Data Office

28 cruises with **1827** profiles added

Since November 2015 (ADMT-16 / Bermuda)





AMONG THE SPECIFIC ISSUES RAISED

- Format inconsistencies
- Parameter names
- QC code
- ExpoCode / Ship Name or Code
- Data Anomalies

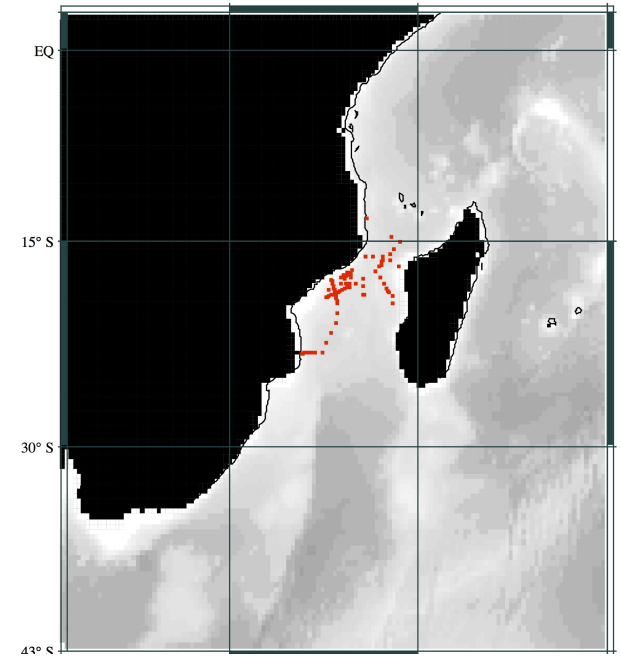
Dear Christine,

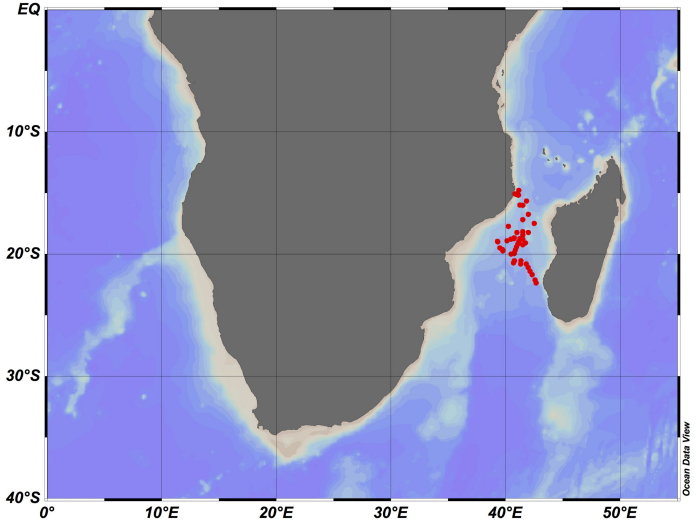
Thank you!

Much Love,
CCHDO

“League of Emeritus Oceanographers”

J. Swift, B. Owens, B. King and H. Freeland





I have carried out a basic examination of the data in CTD data file ctd_10857_nc_ctd.zip, which you sent to me for this purpose.

The file opened without problem. The cruise data are from December 2008. The stations are located between Madagascar and the African continent. There are no geographically-coincident CCHDO data, but WOCE/CLIVAR line I04W lies not to distant to the south.

The data consist of combined down and up CTD casts, with a maximum pressure of 1000 db. There are down versus up cast differences, probably arising from the usual causes, such as entrained water, and possibly not-fully-corrected temperature/conductivity lag time differences. It is recommended that a special file be made with only the down cast data. The data are not excessively noisy and in general seem to be OK, though perhaps not processed (for noise, spike, etc.) to the degree expected for GO-SHIP data.

There were no bottle data with the CTD data, so it is not possible to estimate the goodness of fit for the salinity and oxygen data.

There are no data from deep or abyssal waters to check the reasonableness of the CTD temperature, salinity, and oxygen data compared to presumed smaller temporal variability in those layers. Comparisons of the 2008 data with the 2003 Japanese I04W simply show differences, but not alarming ones.

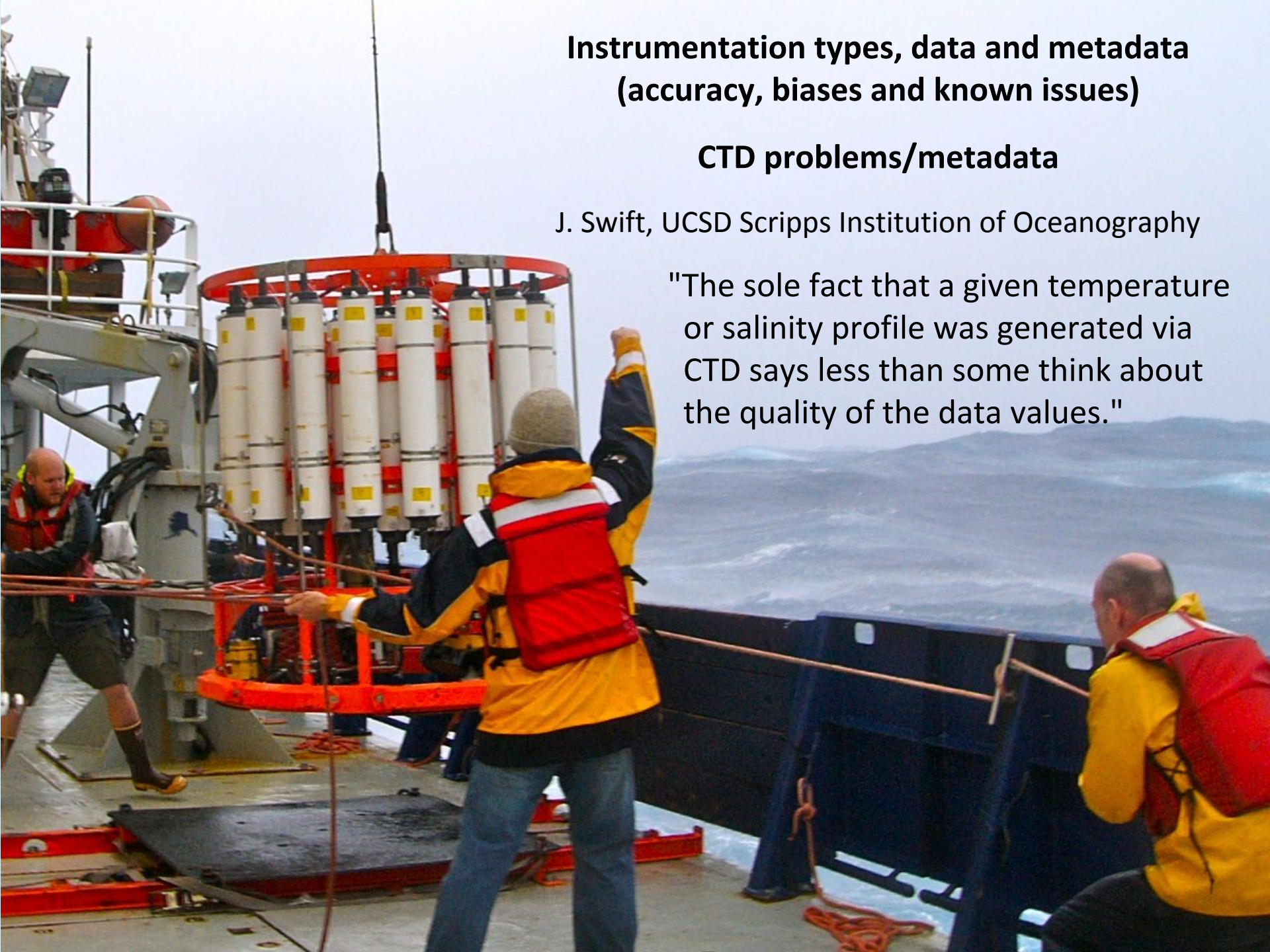
There was an apparent eddy crossed at station 1239 (and neighboring stations).

Jim Swift
Research Oceanographer, SIO

Quite by accident the CCHDO (WHPO) pioneered Crowd Sourced QC for Ocean Profiles.

It works for small, known crowds

A man and his tools



Instrumentation types, data and metadata (accuracy, biases and known issues)

CTD problems/metadata

J. Swift, UCSD Scripps Institution of Oceanography

"The sole fact that a given temperature or salinity profile was generated via CTD says less than some think about the quality of the data values."

There are many thousands of CTD profiles available from the oceans.

CTD data provide the P, T, and often S for most bottle data in the past 40 years.

Early CTD data

Data quality problems may have been widespread in the early years of using CTDs. Some early CTD data were lost (perhaps intentionally discarded after problems were realized?) due to lack of attention to calibration and correction, the need for which was in some cases understood belatedly. It is not clear if some early CTD data now in archives suffered similar problems, unknown to the data originators, and hence "should have been lost".

CTD Data Inherent Quality

For high-quality data, it is important that CTD was calibrated before the cruise.

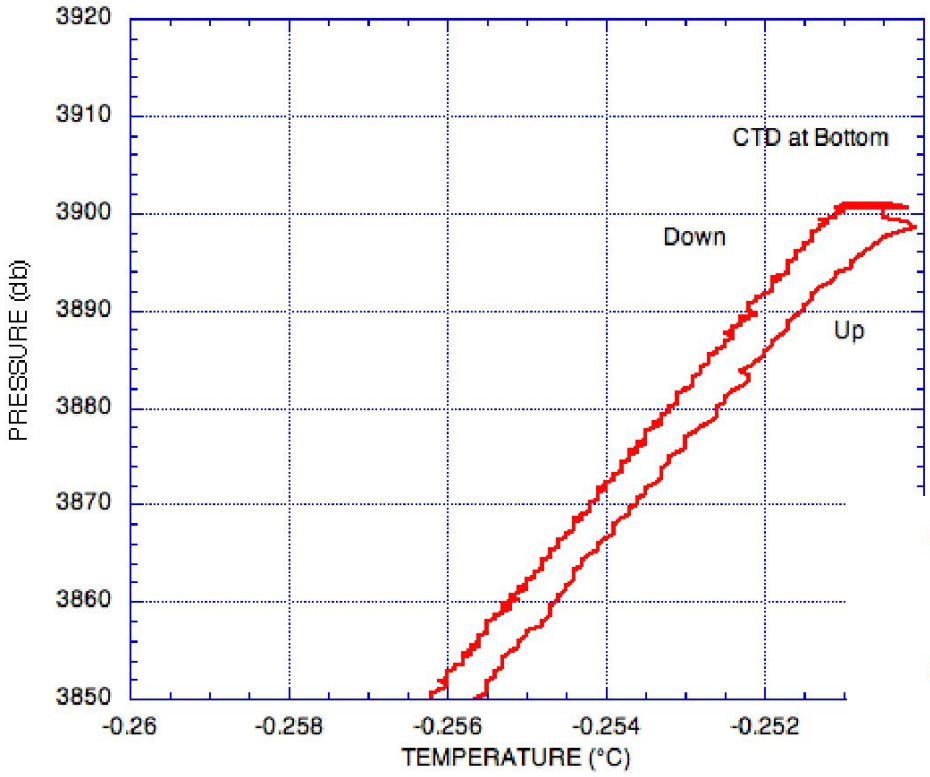
Sensors used by most non-deep-sea groups are rarely freshly calibrated.

When were the PTC sensors last calibrated?

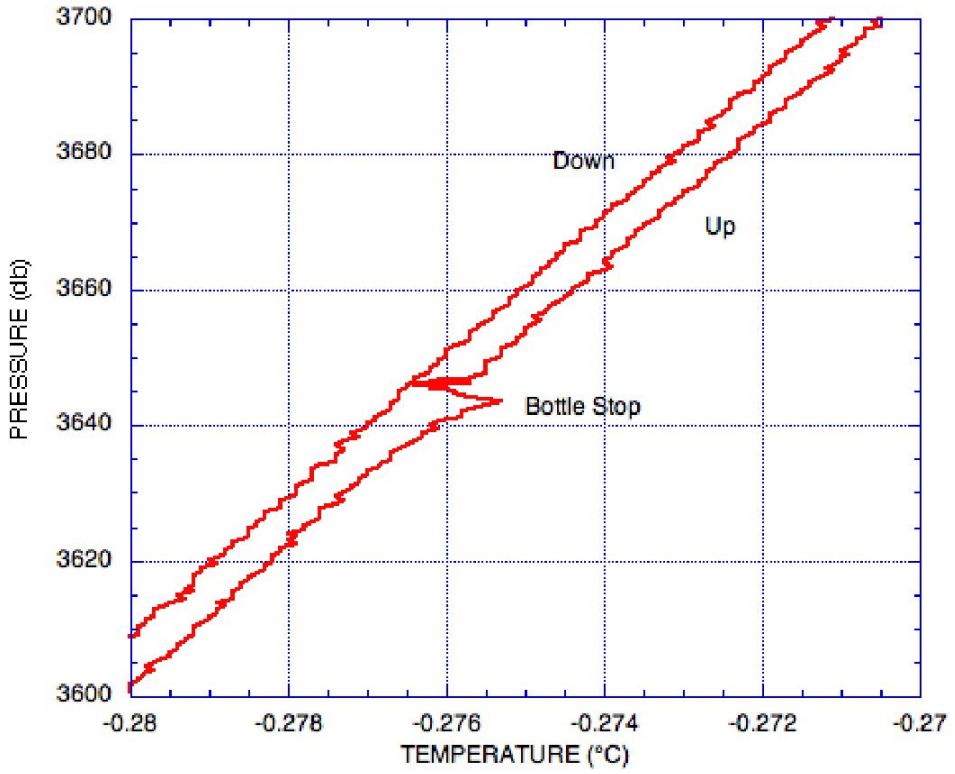
SeaBird claims:

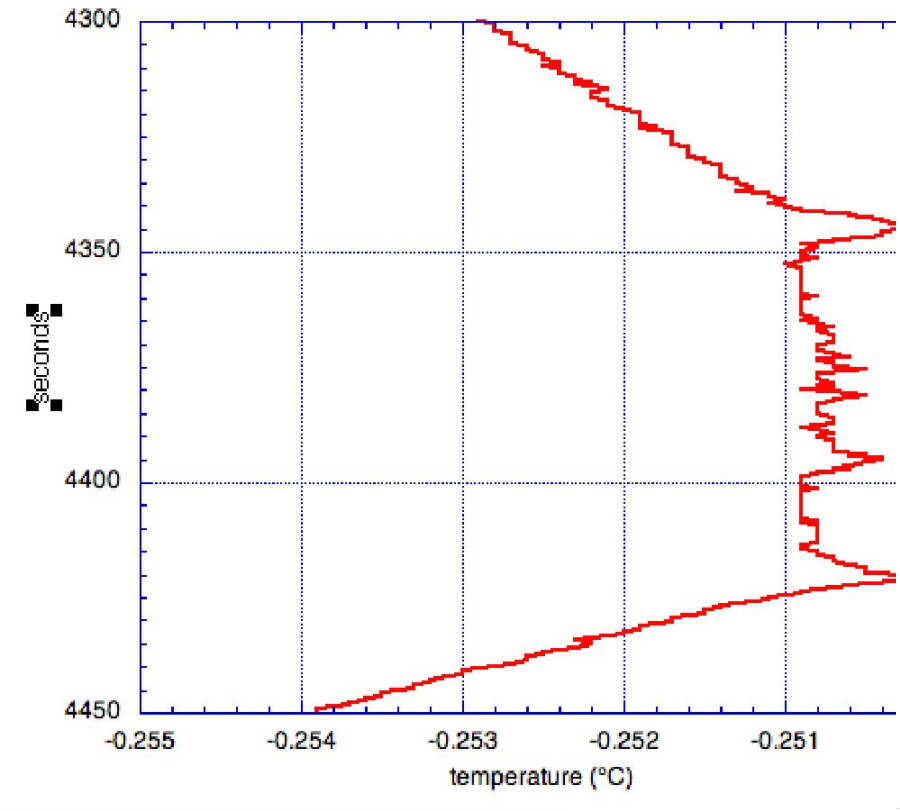
P:	Digiquartz 10,000 psi:	Typical stability 0.02% of full scale per year (≈1.2 dbar/year)
T:	SBE3plus	< 0.001 °C / 6 months (this may be a bit overstated)
refT:	SBE35RT Reference	Temperature 0.001 °C / year
"S":	SBE4C Conductivity	0.003 mS/cm /month (≈ 0.003/month in salinity)

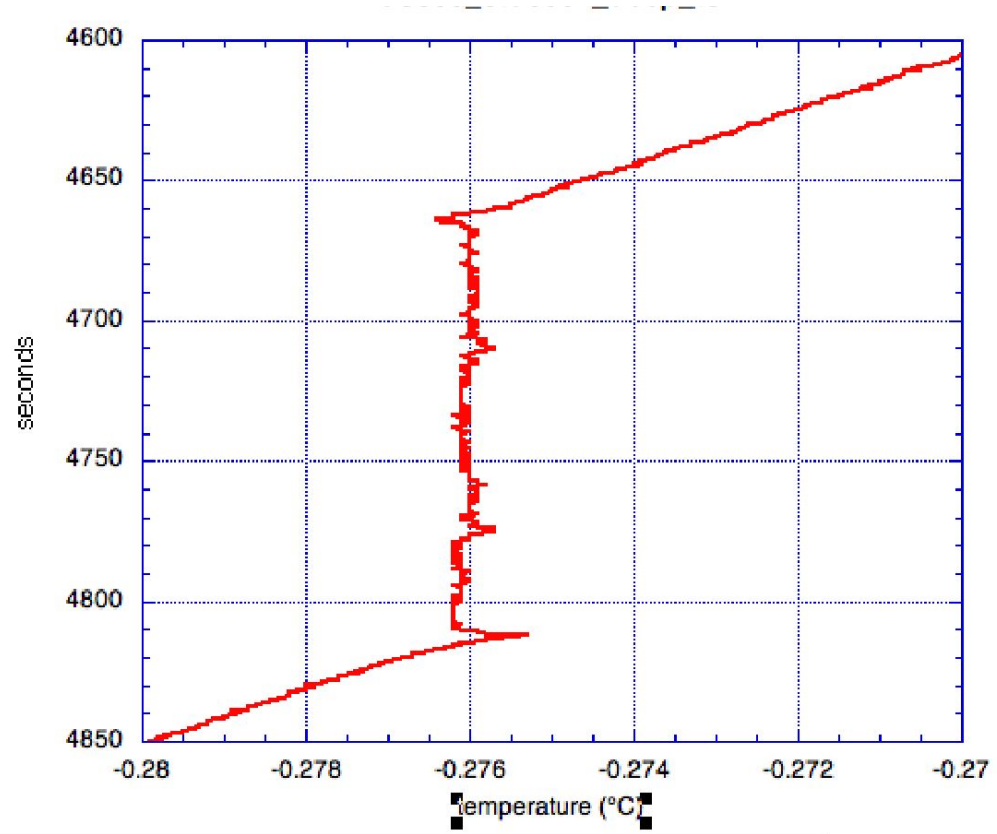
(Very few groups take into account the pressure effect on the T/C sensors. It's much lower than it used to be, but can cause 0.001 or more (in either T or S) at 5000 decibars for sensors used in recent years.)



There are also more subtle CTD errors related to the limitations of the instrument. These temperature records are from bottle stops in adiabatically uniform deep water.



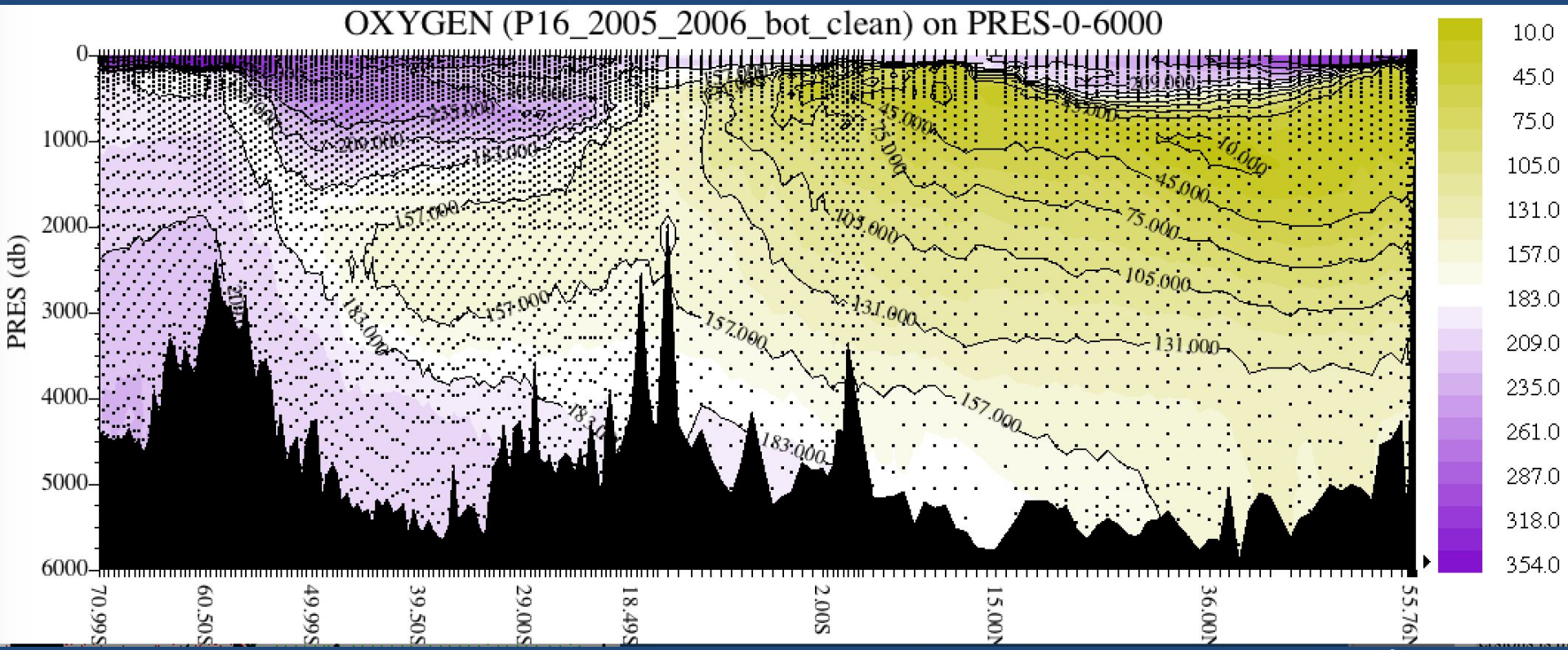




This is an instrumental artifact which is not yet understood.

CCHDO Clean Data Project

an ongoing hobby project by Jim Swift (SIO), aimed at educational users, but with some utility to researchers



Cleaning Steps (page 1):

- Remove bad (WOCE quality code 4) and uncertain (WOCE quality code 3) data and replace with WOCE missing values (usually -999).
- Remove "bad" (usually leaking; WOCE quality code 4) bottles - delete entire row of data.
- Remove bottles (delete entire row of data) for which there are no bottle salinity, oxygen, and nutrient data (all three must be missing). (This eliminates the extra bottles closed for larger volume samples.)
- Eliminate data columns not on the master list of data columns to be in all cleaned files.
- Add data columns, filled with WOCE blanks (usually -999), for any parameters missing from the master list of data columns.
- Sort all data columns into the column order on the master list of data columns.
- Repair header data into specified names and format if/as needed.
- Repair minor errors (e.g., extra commas) generated by use of spreadsheet to sort data.

J.Swift 03OCT2016

Possible Synergies (some already in progress)

- IQuOD should exploit the newly enhanced Argo RefDB CTD-QC project
- Use our extended community (crowd-sourcing, uncertainties, etc.)
- Use our communication channels and long-standing relationships for all IQuOD tasks (SOOS does this)
- Our mission is **Fully Funded**

The Missions (almost) the same

The **CCHDO's** primary mission is to ***deliver the highest possible quality global CTD and hydrographic data to users.*** These data are a product of decades of observations related to the physical characteristics of ocean waters carried out during WOCE, CLIVAR and numerous other oceanographic research programs.

IQuOD: “The primary focus of IQuOD is to ***produce and freely distribute the highest quality and complete single ocean profile repository*** along with (intelligent) metadata and assigned uncertainties for use in ocean climate research applications. ”

IQuOD

www.iquod.org

Co-Chairs

Catia Domingues, Matt Palmer (both from CLIVAR GSOP)

Steering committee

Tim Boyer, Rebecca Cowley, Ann Thresher, Simon Good,
Susan Wijffels, Gustavo Goni, Janet Sprintall, Alison Macdonald,
Toru Suzuki, Steve Diggs, Viktor Gouretski, Charles Sun

(including representation from US CLIVAR, CCHDO, Argo, SOT, SOOP, GTSPP, WOD, GODAR, Etc)

Task Team 1
GDAC
(Tim Boyer)

Task Team 2
Uncertainty { Formats }
(Bec Cowley, John Gould)

Task Team 3
Intelligent metadata
(Shoichi Kizu, Toru Suzuki)

Task Team 4
Auto QC
(Mat Palmer
Simon Good)

Task Team 5
Duplicates/Expert QC
(Ann Thresher,
Ed King)

Questions?