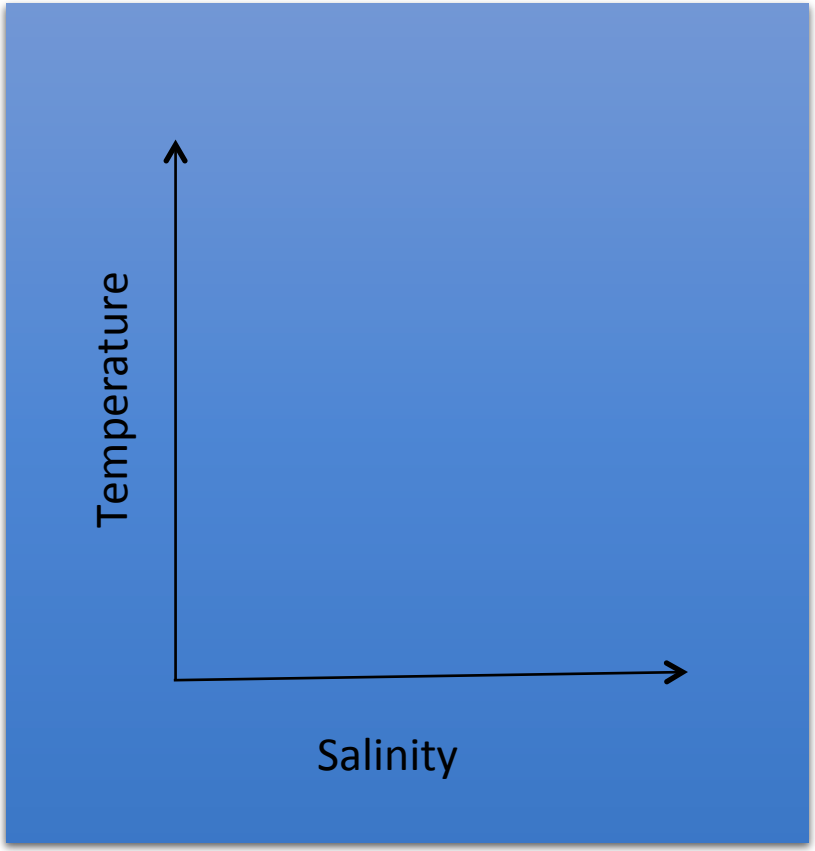
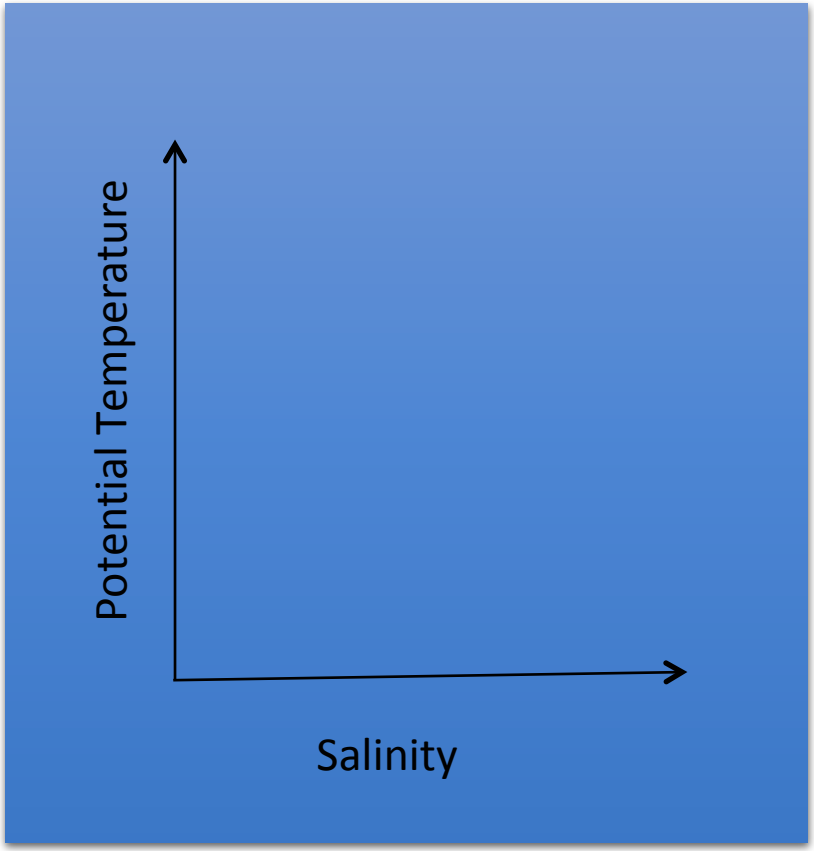
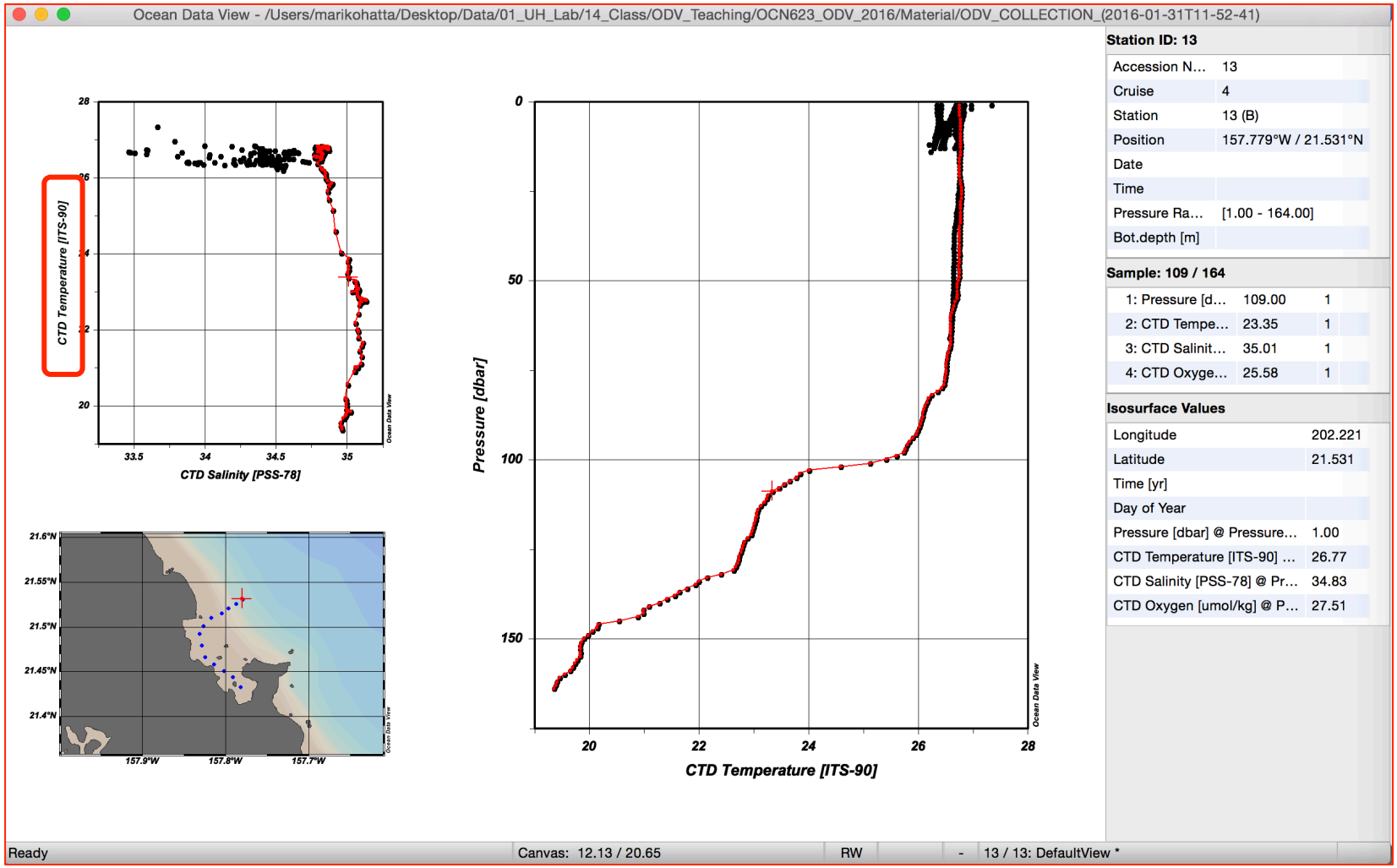
Exercise 3.
Make a T-S diagram





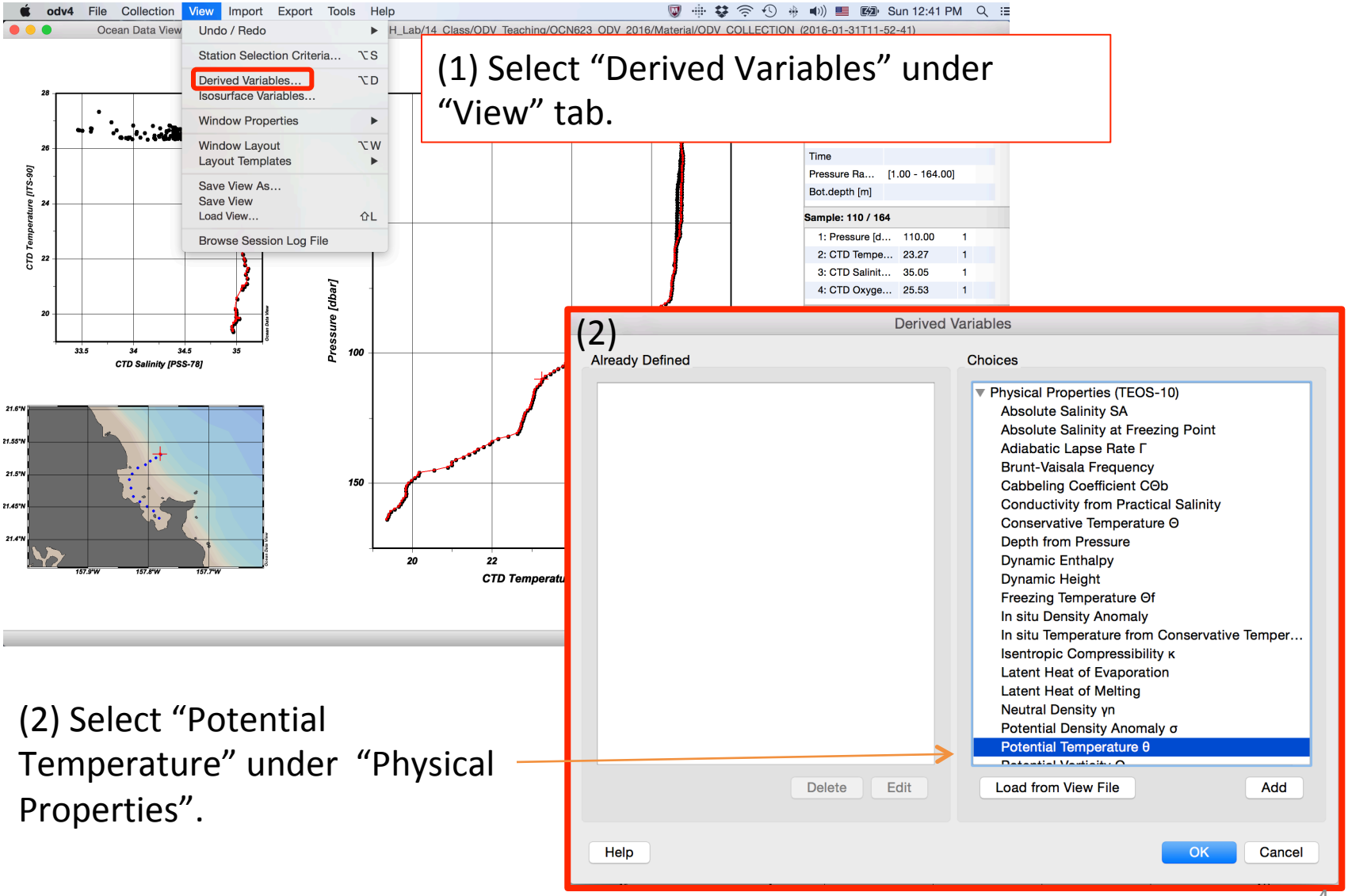
1. Change the y-axis from Pressure to CTD Temperature



Right click, then select “Properties”, then select “Data” tab. Select “y-axis” (now selected “2:CTD Temperature [ITS-90] ”.

2. Let's make a potential temperature-salinity diagram. In order to calculate "potential Temperature" using ODV "Derived Variables" function!

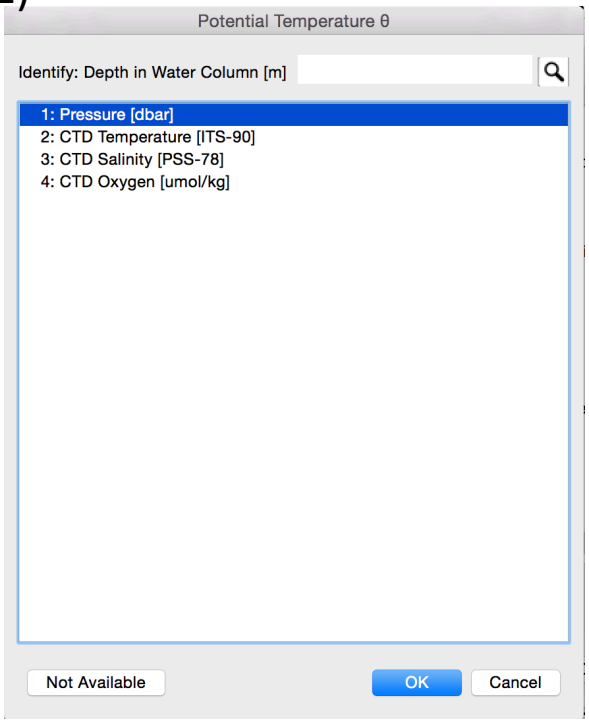
(1)



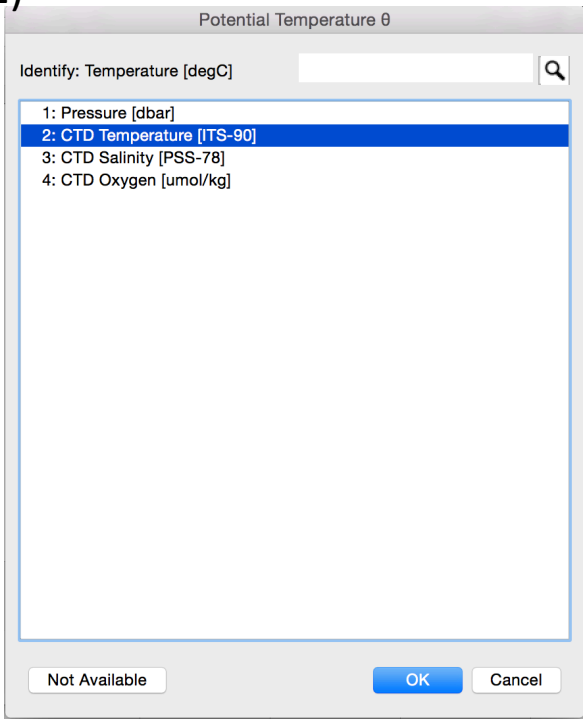
(2) Select "Potential Temperature" under "Physical Properties".

3. Identify each parameter from the list. At first, you have to identify “Depth in Water Column (m)”, here is “1. Pressure”. Next, identify “Temperature”, so select “CTD Temperature”, and finally identify “Practical Salinity”, and select “CTD salinity”. Then enter “reference pressure”, so type “0”.

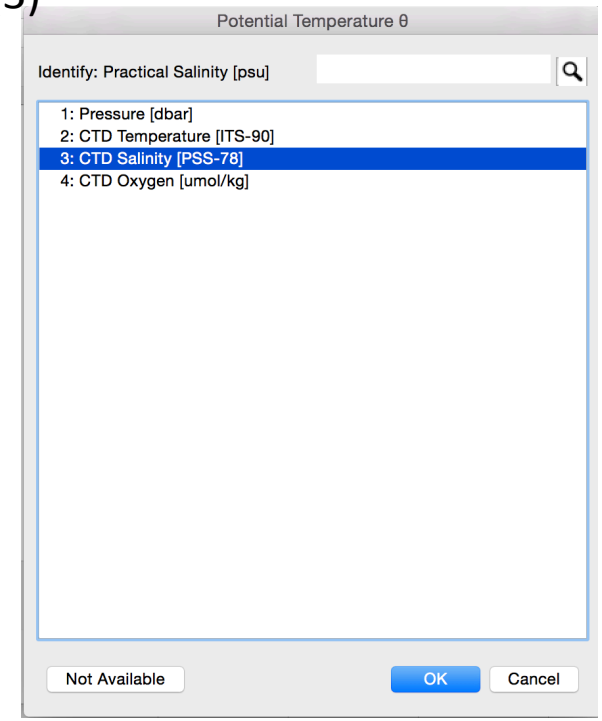
(1)



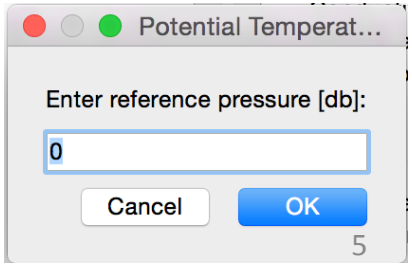
(2)



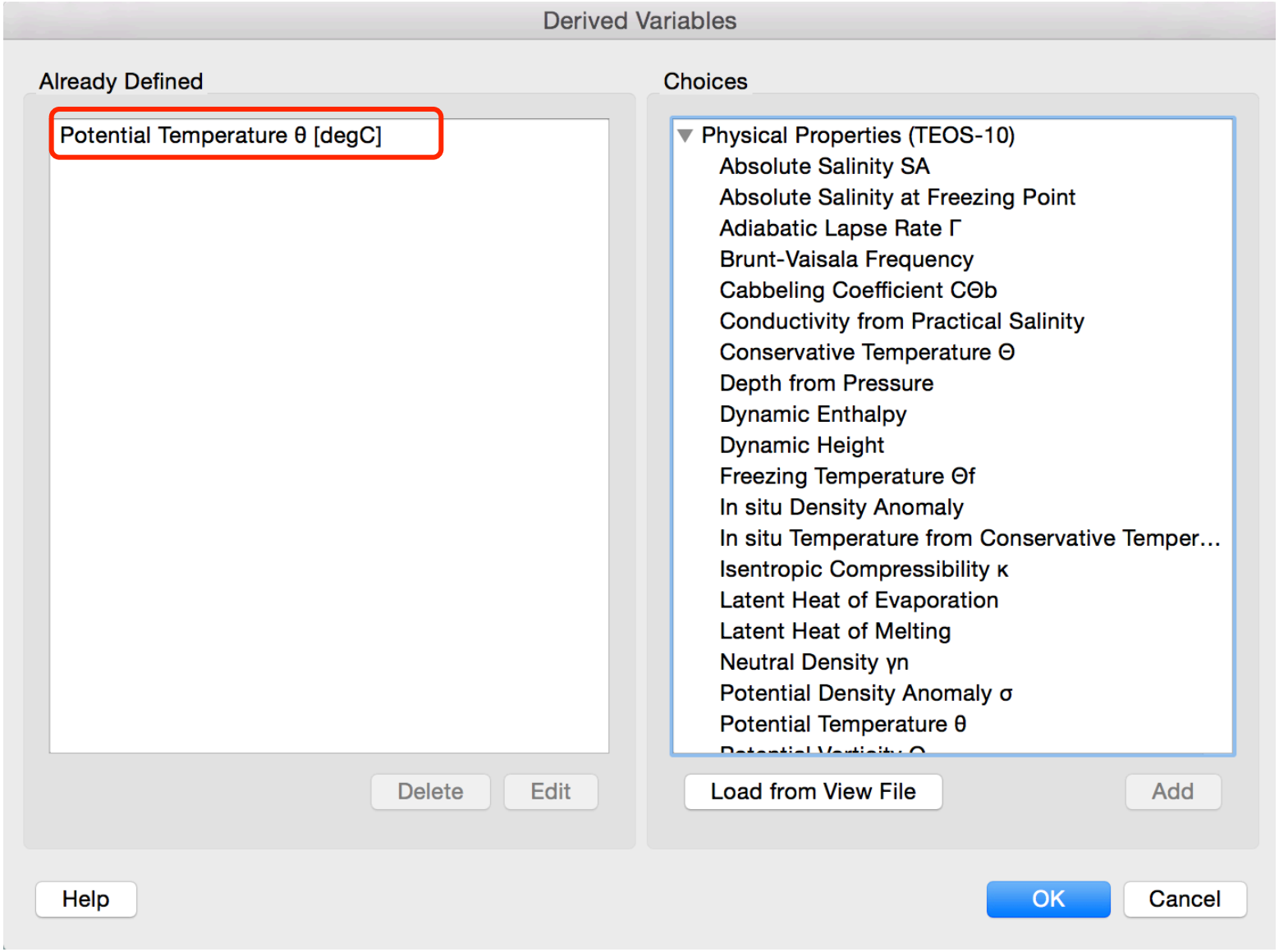
(3)



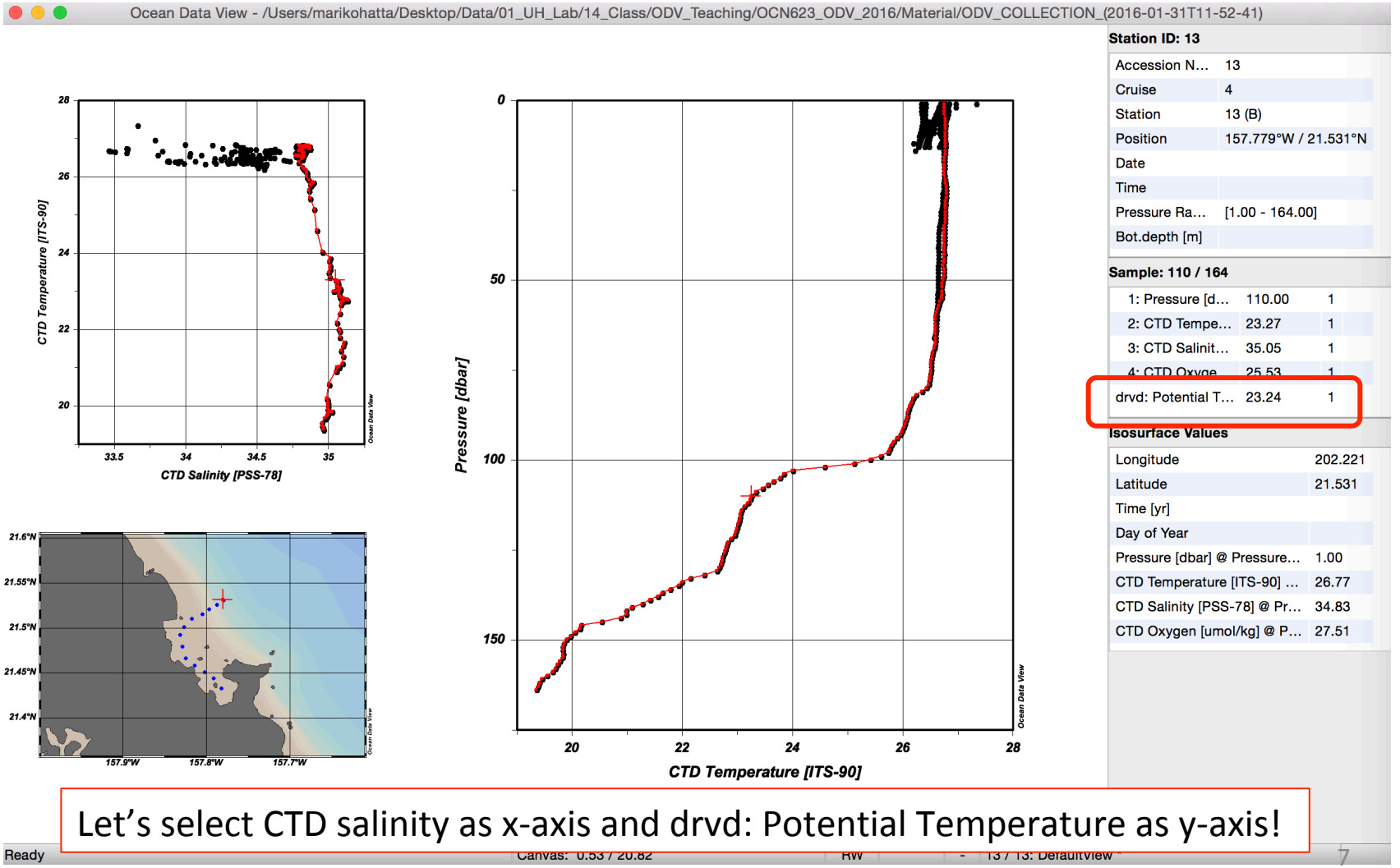
(4)



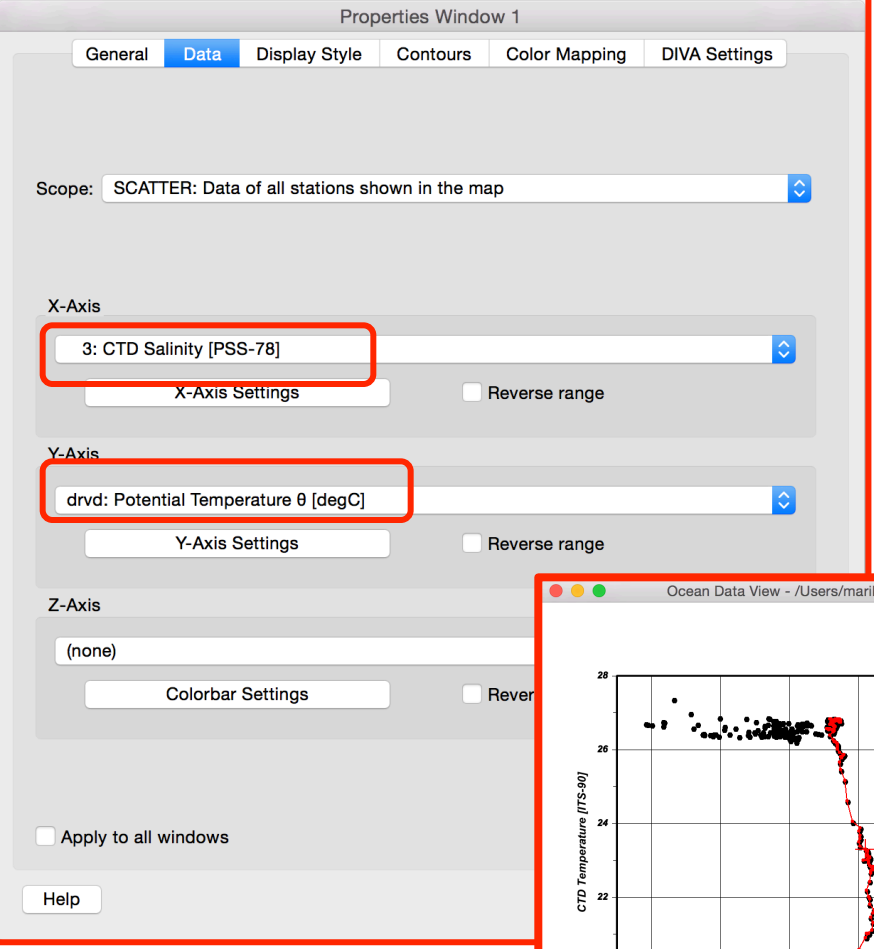
4. You calculated “Potential Temperature”!

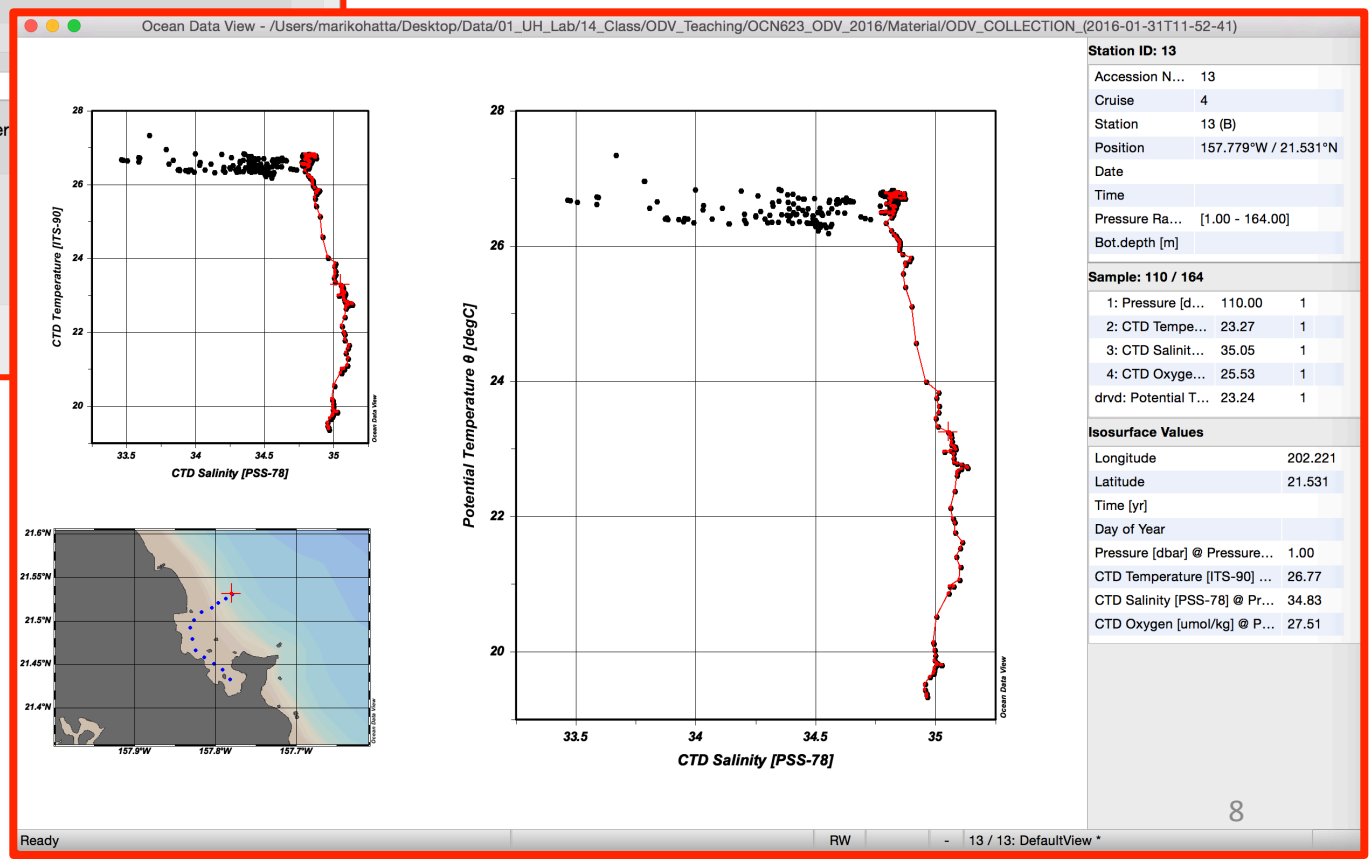


Now, “drvd: Potential Temperature” are appeared in the variables window!



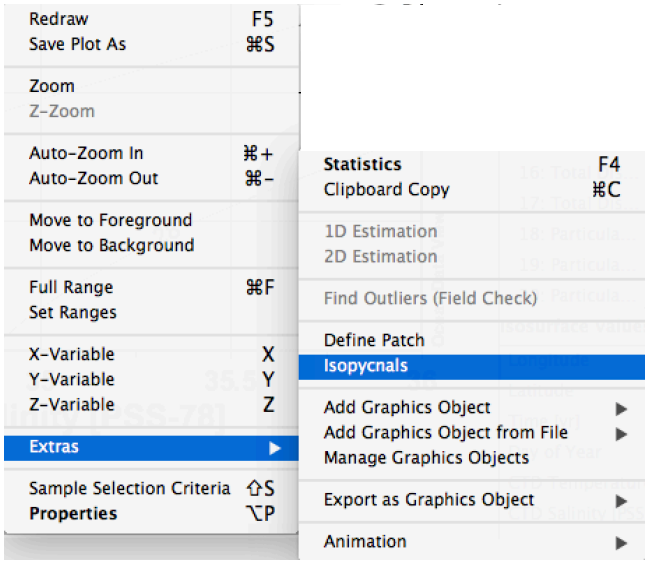
5. Right click over the Window, then select Properties. Then Select “Data” tab. And Select X-axis as “3: CTD salinity” and Y-axis as “drvd: Potential Temperature.

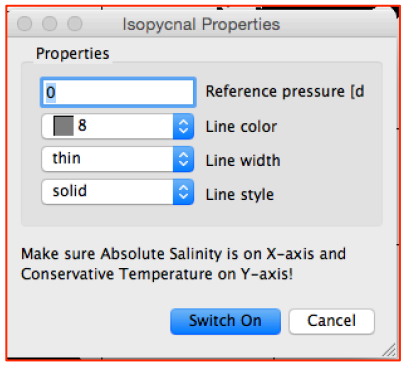


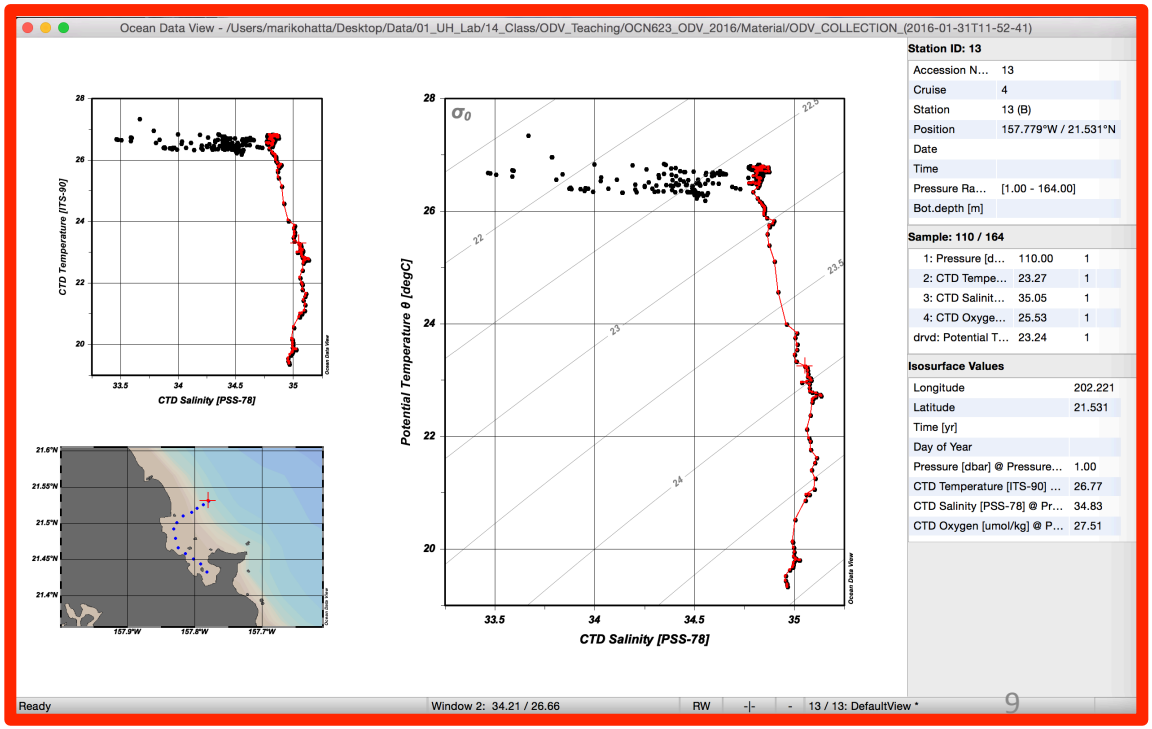


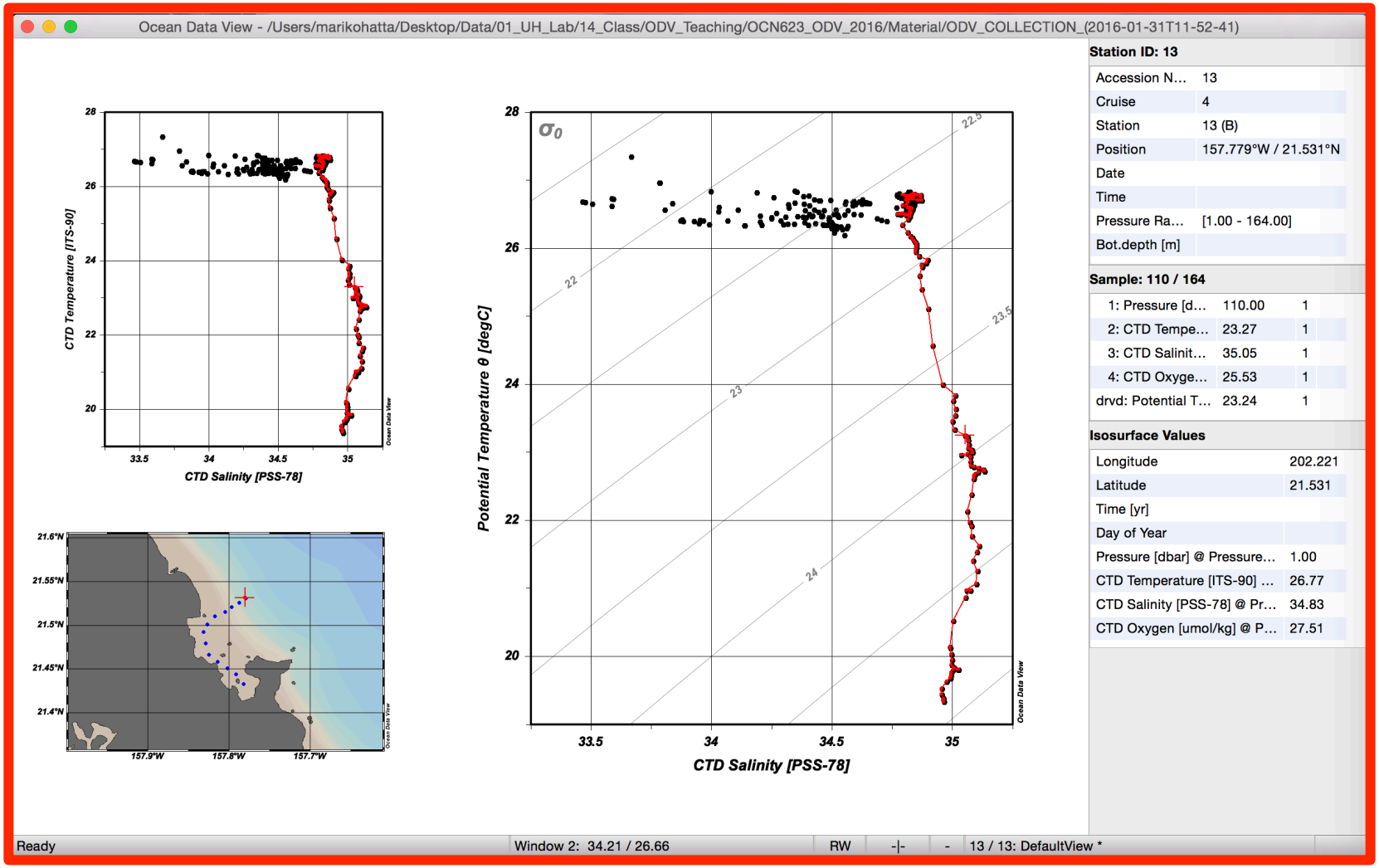
6. Draw the Isopycnals.

Right click over the Window, then select “Extras”. Then Select “Isopycnals”. Select “Switch On”.



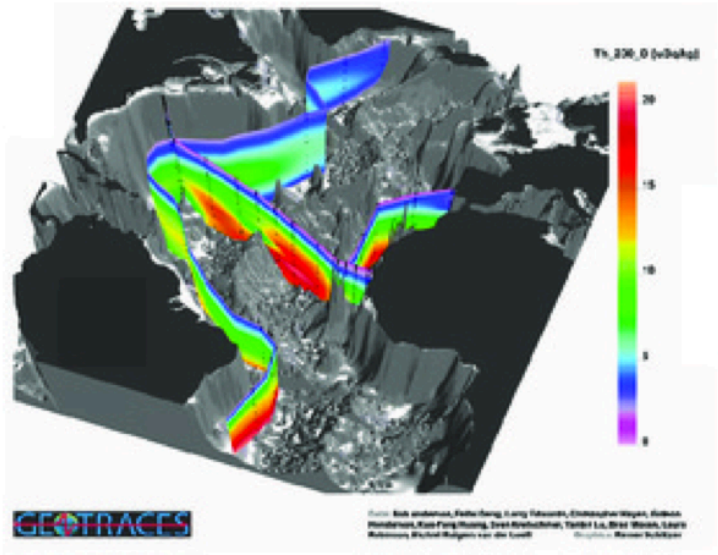





Ocean Data View - /Users/marikohatta/Desktop/Data/01_UH_Lab/14_Class/ODV_Teaching/OCN623_ODV_2016/Material/ODV_COLLECTION_(2016-01-31T11-52-41)
CTD Temperature [ITS-90]
CTD Salinity [PSS-78]
Potential Temperature θ [degC]
σ0
Station ID: 13
Accession N... 13
Cruise 4
Station 13 (B)
Position 157.779°W / 21.531°N
Date
Time
Pressure Ra... [1.00 - 164.00]
Bot.depth [m]
Sample: 110 / 164
1: Pressure [d... 110.00 1
2: CTD Tempe... 23.27 1
3: CTD Salinit... 35.05 1
4: CTD Oxyge... 25.53 1
drvd: Potential T... 23.24 1
Isosurface Values
Longitude 202.221
Latitude 21.531
Time [yr]
Day of Year
Pressure [dbar] @ Pressure... 1.00
CTD Temperature [ITS-90] ... 26.77
CTD Salinity [PSS-78] @ Pr... 34.83
CTD Oxygen [umol/kg] @ P... 27.51
Ready
Window 2: 34.21 / 26.66
RW
13 / 13: DefaultView *

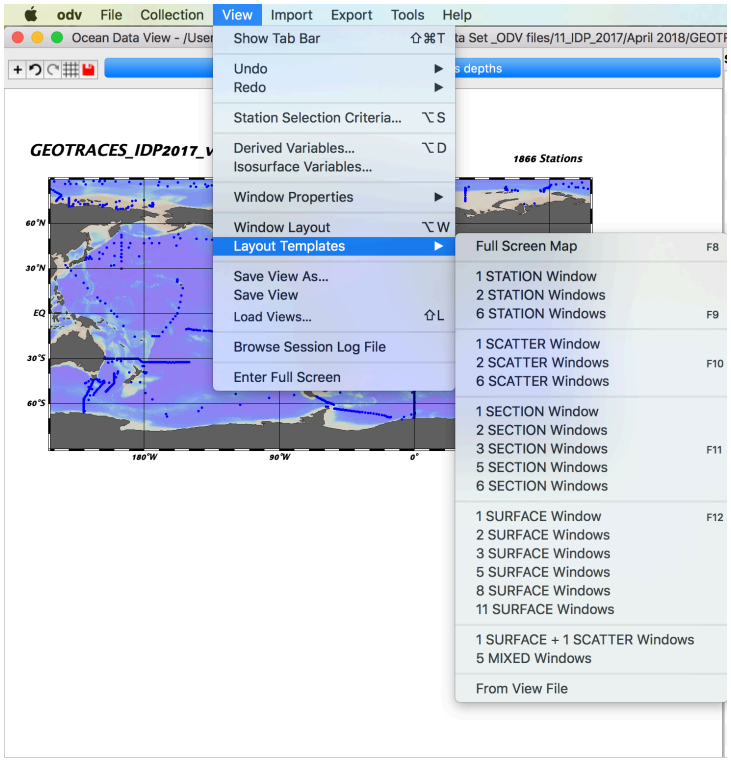
What can you do with ODV?

3D scene generated by Ocean Data View and Ocean 3D showing distribution of dissolved ^{230}Th in the North Atlantic



Distribution de ^{230}Th dissous dans l'Atlantique Nord : scène tridimensionnelle générée par le logiciel Ocean Data View et Ocean 3D

"**ODV lets the users maintain and analyse very large datasets on inexpensive and portable hardware.** Various types of graphics output can be produced easily, including high-quality station maps, general property-property plots of one or more stations, scatter plots of selected stations, section plots along arbitrary cruise tracks and property distributions on general isosurfaces."

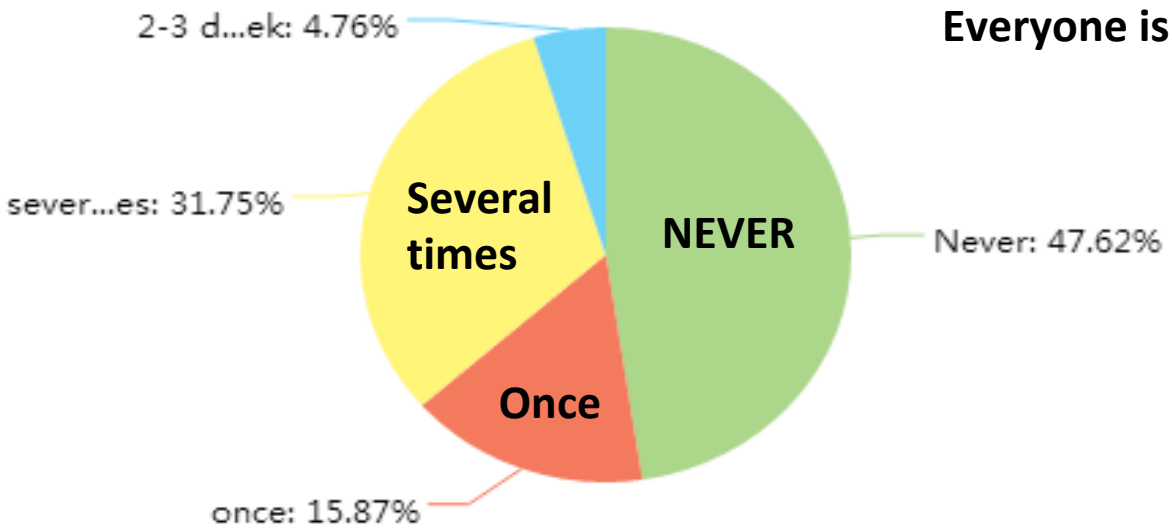


Full Screen Map F8
1 STATION Window
2 STATION Windows
6 STATION Windows F9
1 SCATTER Window
2 SCATTER Windows F10
6 SCATTER Windows
1 SECTION Window
2 SECTION Windows
3 SECTION Windows F11
5 SECTION Windows
6 SECTION Windows
1 SURFACE Window F12
2 SURFACE Windows
3 SURFACE Windows
5 SURFACE Windows
8 SURFACE Windows
11 SURFACE Windows
1 SURFACE + 1 SCATTER Windows
5 MIXED Windows
From View File

Various data format

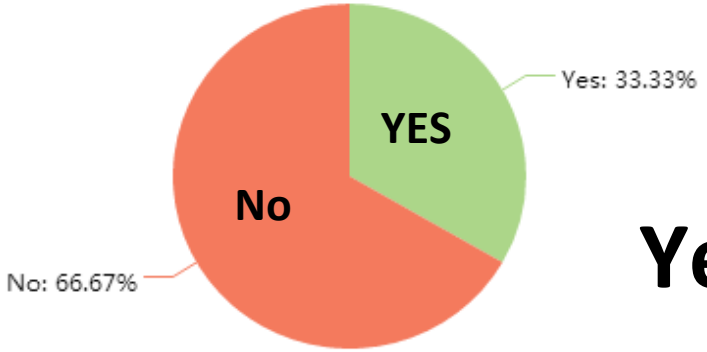
- The ODV data format allows dense storage and very fast data access. Large data collections with millions of stations can easily be maintained and explored on inexpensive desktop and notebook computers. Data from Argo, GTSPP, CCHDO, World Ocean Database, World Ocean Atlas, World Ocean Circulation Experiment (WOCE), SeaDataNet, and Medar/Medatlas can be directly imported into ODV. Ready-to-use versions of the WOCE data, the gridded World Ocean Atlas 2009, 2005 and 2001 as well as many other important geoscience datasets are available for download.
- ODV also supports the netCDF format and lets you explore and visualize CF, COARDS, GDT and CDC compliant netCDFdata sets. This works with netCDF files on your local machine as well as with remote netCDF files served by an OPeNDAP server. Climate data in netCDF format are available here.

Have you ever used ODV software before?



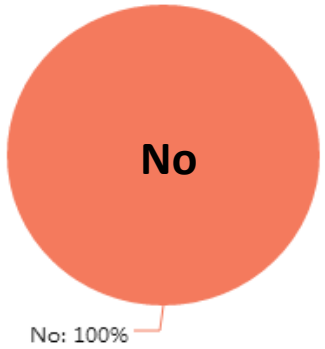
Everyone is pretty good by now!

Have you ever created own data spreadsheet for ODV and import into ODV?



Yes!

Have you ever imported netCDF format data file into ODV?



ADCP data during HOT cruise
http://currents.soest.hawaii.edu/hot/

Back to currents

Station Aloha Shipboard ADCP data

The **Hawaii Ocean Timeseries** project involves cruises to **ALOHA Station** nearly every month, starting in October 1988. Most of these cruises have been on ships equipped with acoustic Doppler current profilers, the observations from which are presented here. Continuous time series of currents at ALOHA are available elsewhere from the **WHOTS mooring**.

Funding from the National Science Foundation via grants OCE-0752606 and OCE-0926766 is gratefully acknowledged.

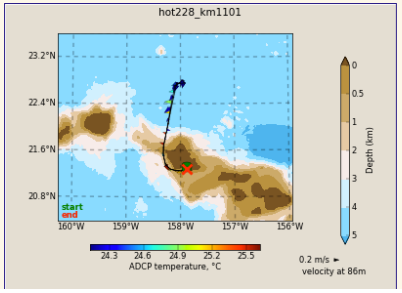
For each cruise we provide a set of links to data plots (left column), to the data location in the **NODC JASADCP** (center, if present), and to **netcdf files** with the ADCP data and predicted barotropic tides (right column).

LIST VIEW

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
2008	2009	2010	2011						

2011

hot228	km1101	2011/01/08 to 2011/01/10	Honolulu, HI to Honolulu, HI
hot229	km1102a	2011/01/27 to 2011/01/31	Honolulu, HI to Honolulu, HI
hot230	km1108	2011/02/27 to 2011/03/03	Honolulu, HI to Honolulu, HI
hot231	km1113	2011/04/10 to 2011/04/14	Honolulu, HI to Honolulu, HI
hot232	kok1107	2011/05/08 to 2011/05/12	Honolulu, HI to Honolulu, HI



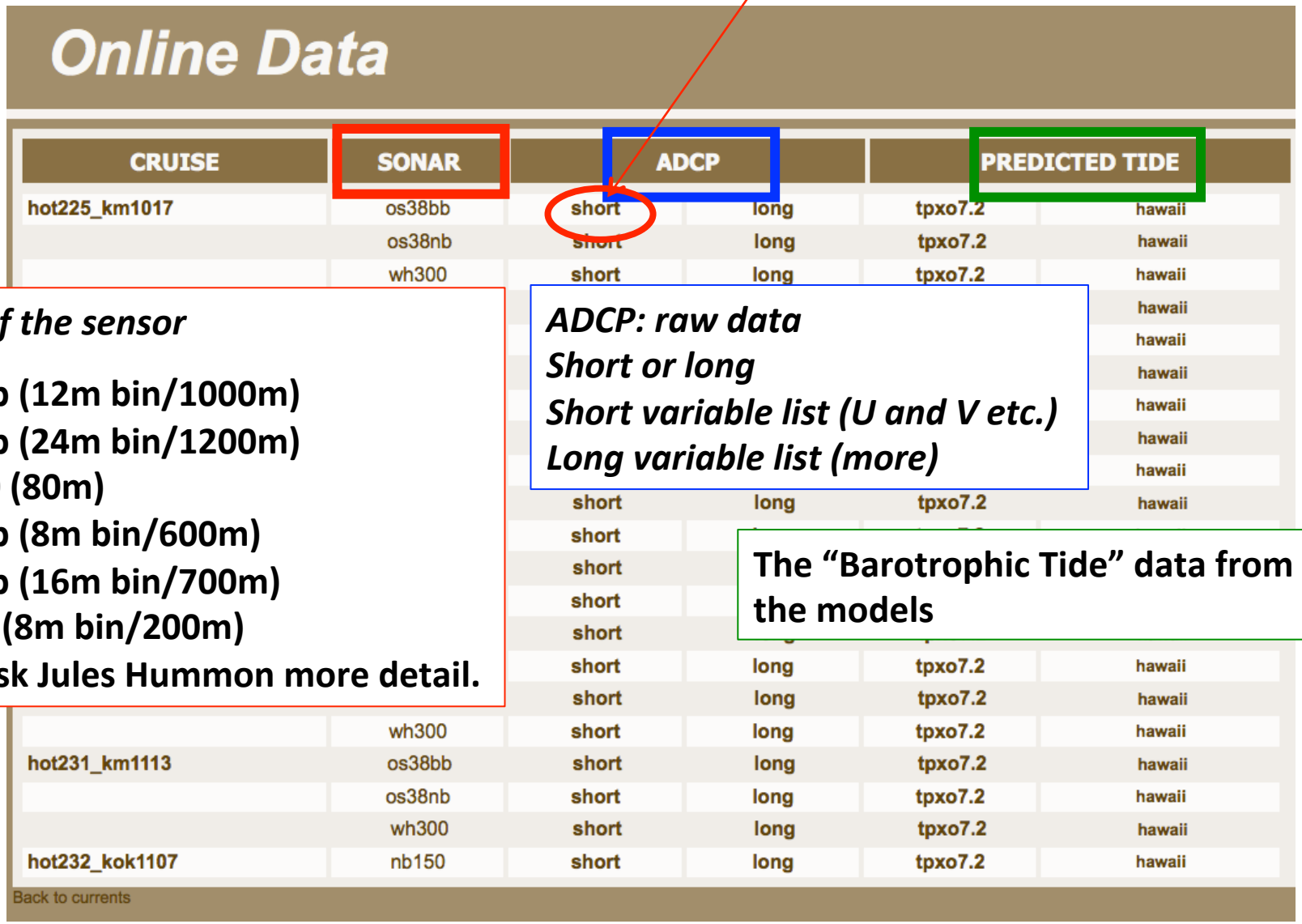
hot228_km1101
2011/01/08 to 2011/01/10
Honolulu, HI to Honolulu, HI

os38bb	JASADCP	netCDF
os38nb	JASADCP	netCDF
wh300	JASADCP	netCDF

top

Hot Cruise Data

Download this!



Online Data

CRUISE	SONAR	ADCP		PREDICTED TIDE	
hot225_km1017	os38bb	short	long	tpxo7.2	hawaii
	os38nb	short	long	tpxo7.2	hawaii
	wh300	short	long	tpxo7.2	hawaii
					hawaii
					hawaii
					hawaii
					hawaii
					hawaii
					hawaii
		short	long	tpxo7.2	hawaii
		short			
		short			
		short			
		short			
		short	long	tpxo7.2	hawaii
		short	long	tpxo7.2	hawaii
	wh300	short	long	tpxo7.2	hawaii
hot231_km1113	os38bb	short	long	tpxo7.2	hawaii
	os38nb	short	long	tpxo7.2	hawaii
	wh300	short	long	tpxo7.2	hawaii
hot232_kok1107	nb150	short	long	tpxo7.2	hawaii

Back to currents

Type of the sensor

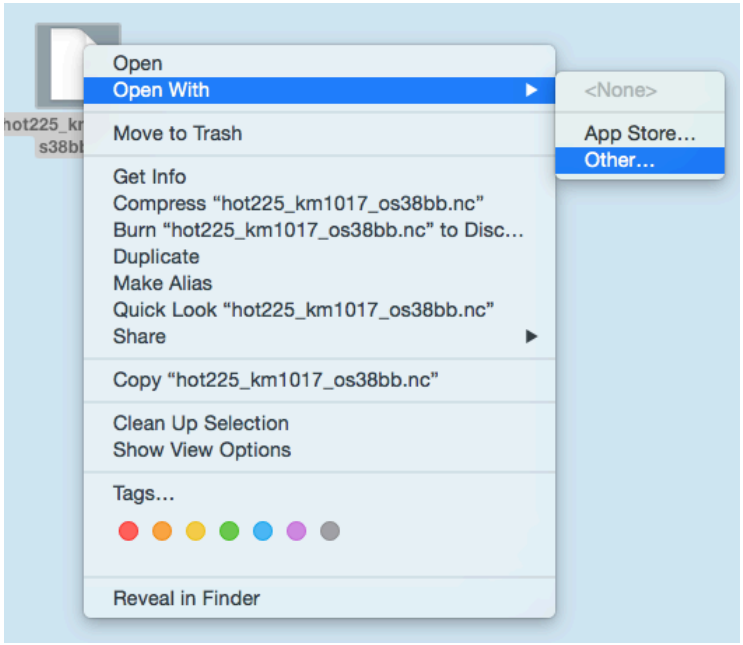
os38bb (12m bin/1000m)
os38nb (24m bin/1200m)
wh300 (80m)
os75bb (8m bin/600m)
os75nb (16m bin/700m)
nb150 (8m bin/200m)
etc.. Ask Jules Hummon more detail.

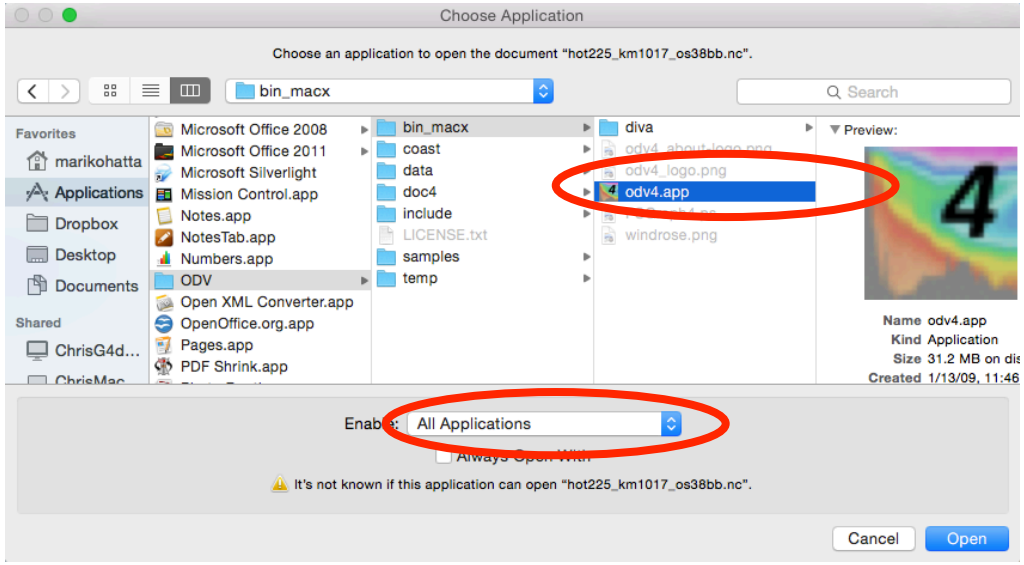
ADCP: raw data
Short or long
Short variable list (U and V etc.)
Long variable list (more)

The "Barotrophic Tide" data from the models

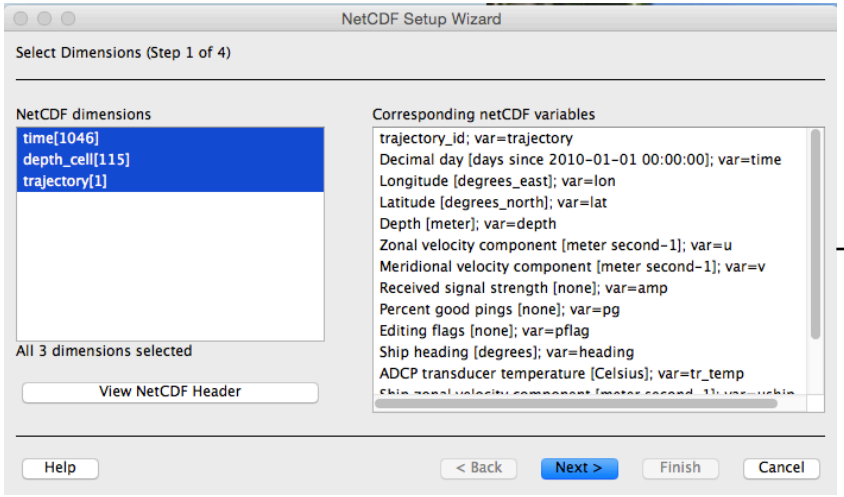
How to open ADCP data (netCDF)

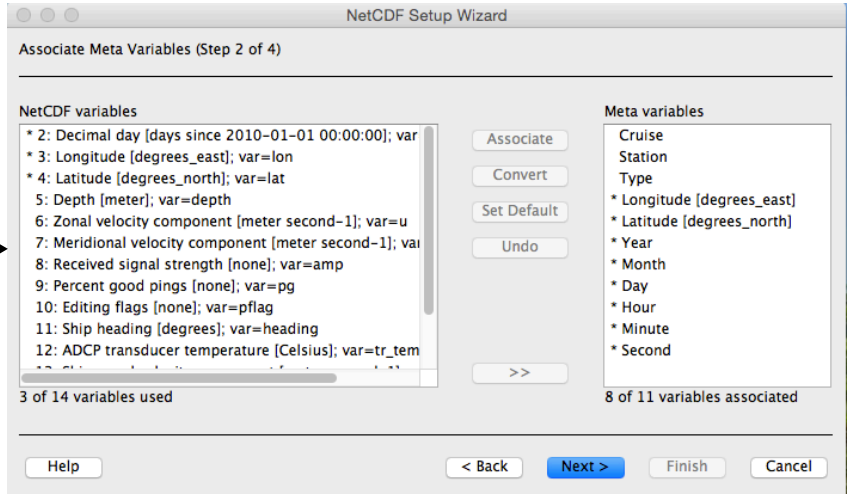
1. After download netCDF file, open XXX.nc file with “Other”. In menu “Choose Application”, enable “All Application” and go to ODV, bin_macx, odv4.app, then open odv4.app



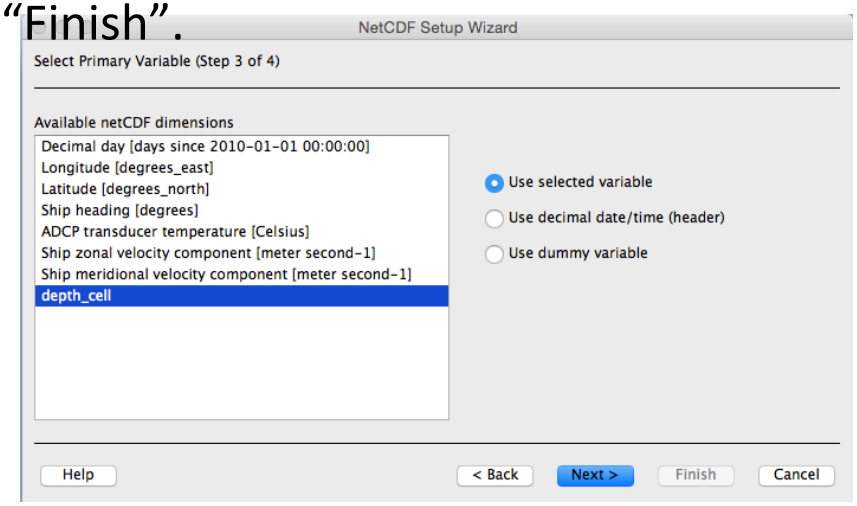


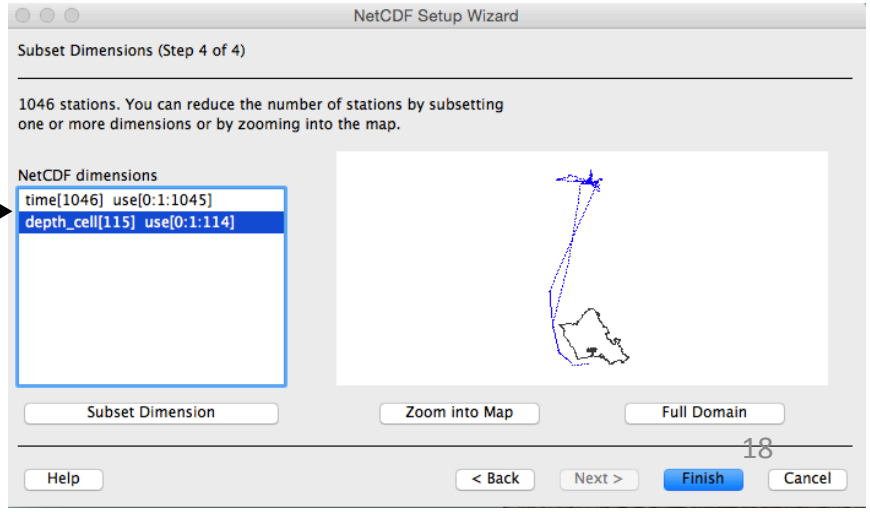
2. Should get “NetCDF Setup Wizard”. Select (highlight) both dimensions shown (at least, “Time” and “depth_cell”). A bunch of corresponding variables should appear to the right, then click “Next”. Should get “Associate Meta Variables” screen; likely you will do nothing but select “Next”.



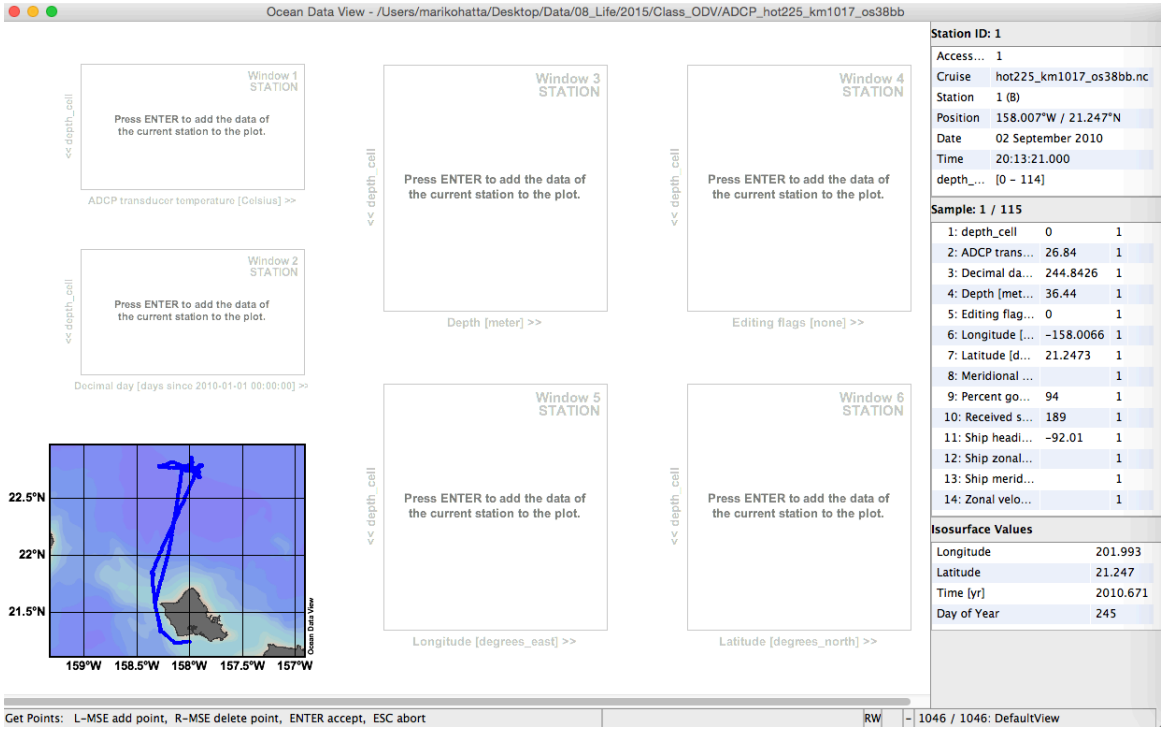


3. Should get “Select Primary Dimension” screen: select “depth_cell” by clicking on it, then click “Next”. Then you should get “Subset Dimensions” screen. Then “Finish”.

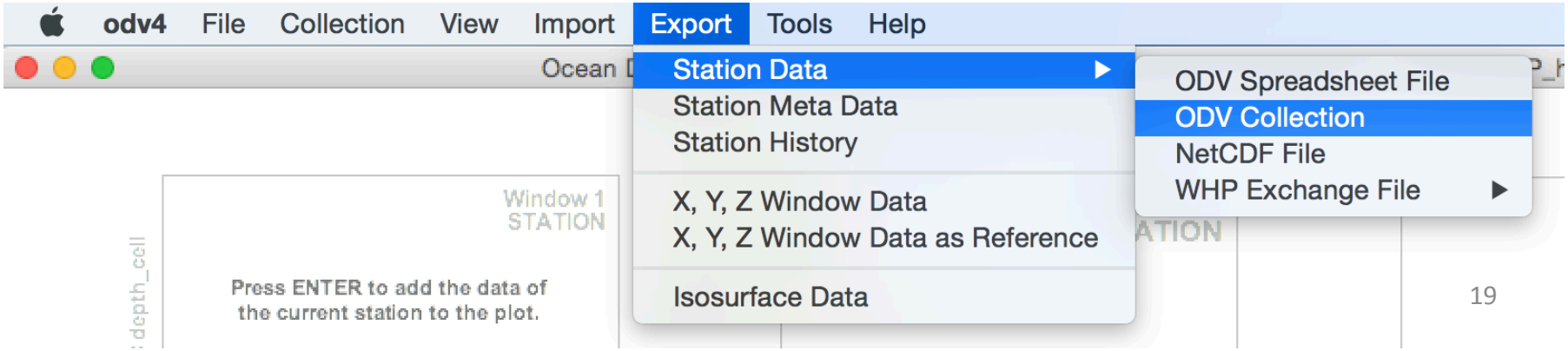




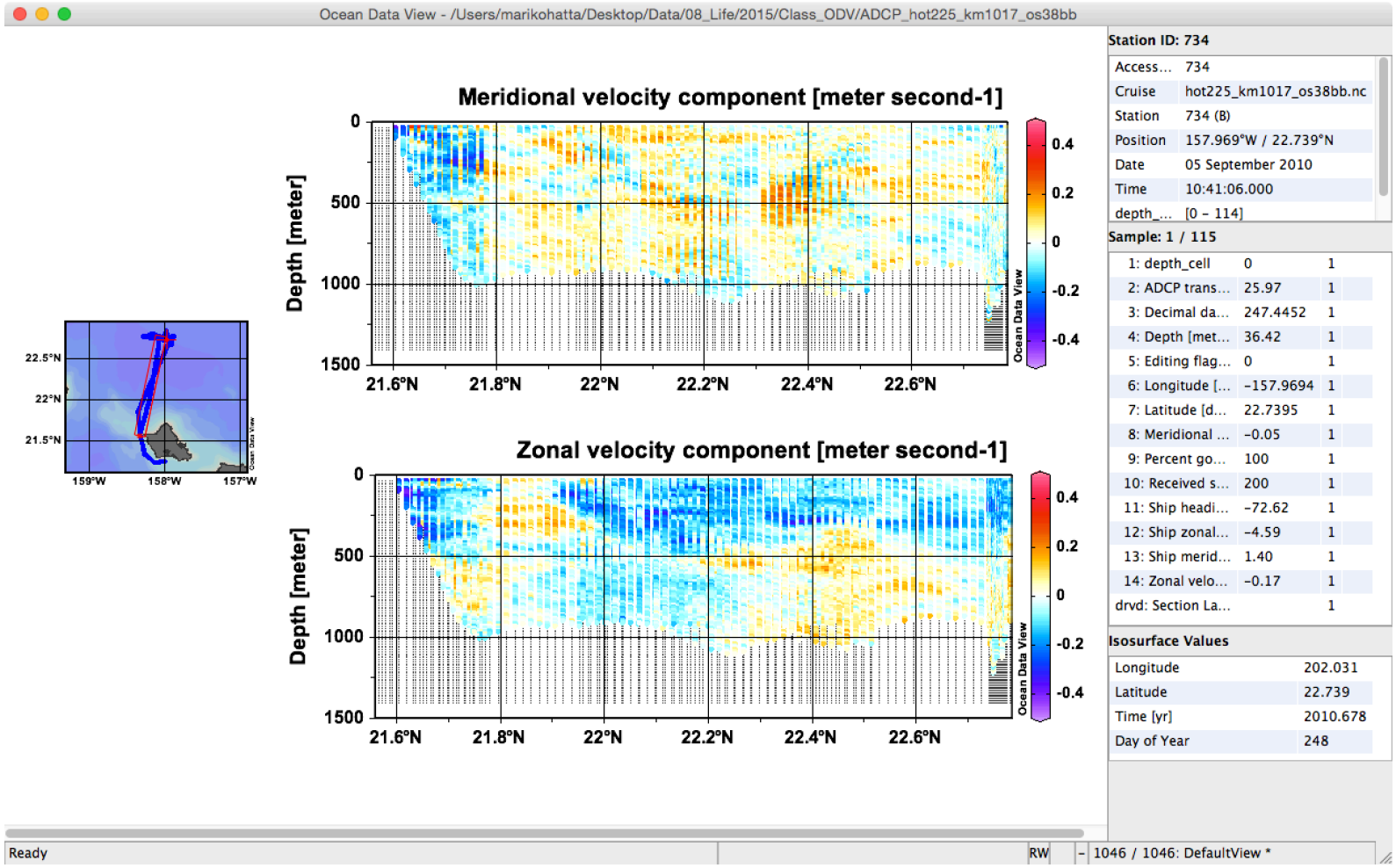
4. You should get the ODV file.



5. You should export the ODV collection. Since the ADCP data is huge, it is easy to crash ODV, so it is the safe thing to do!



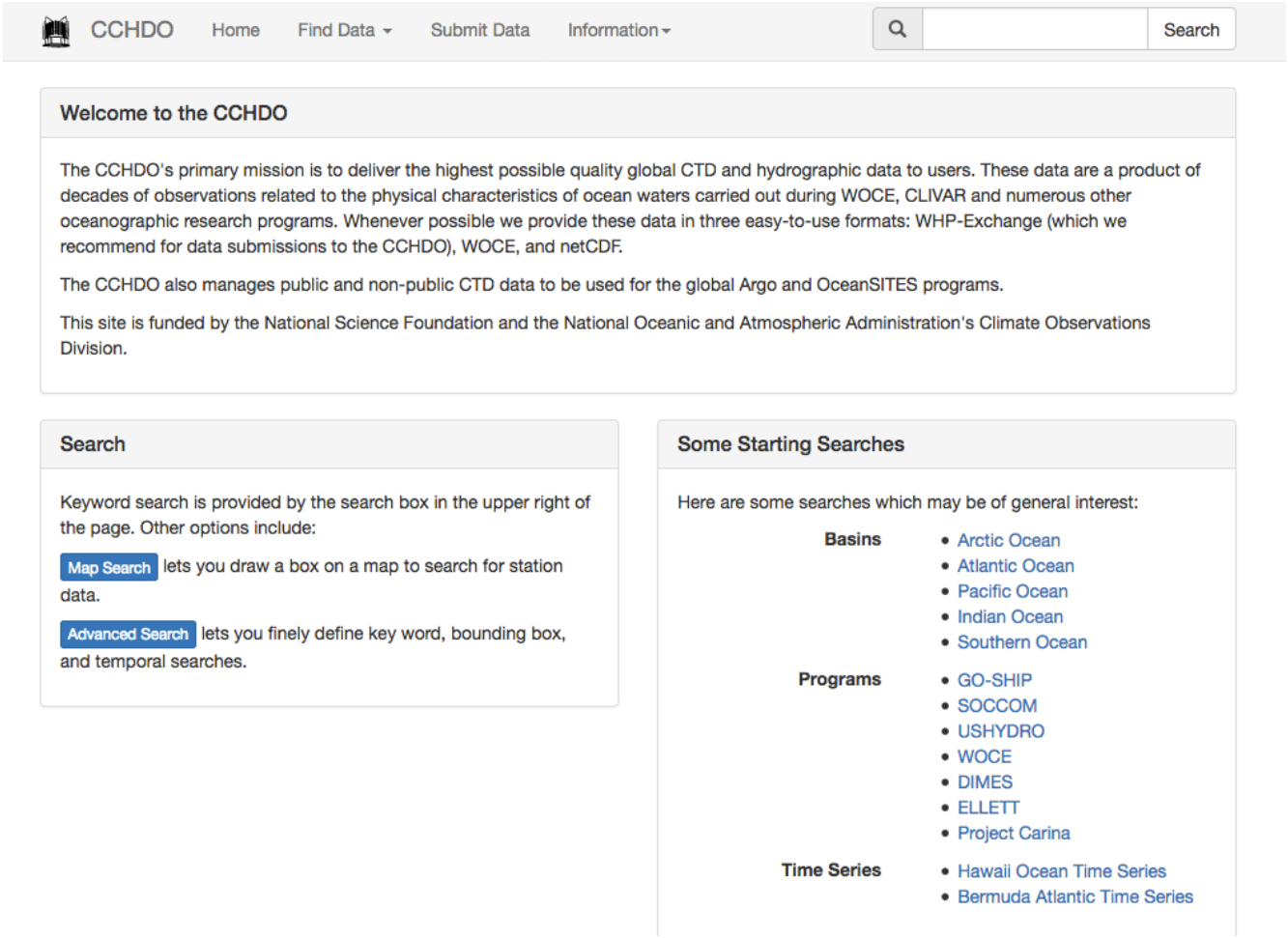
6. You can make the section data of ADCP components with “Section Window” mode.



7. Save “View”, then you do not have to make this again! Also you can save the canvas as your favorite format (.jpg/.png/etc..).

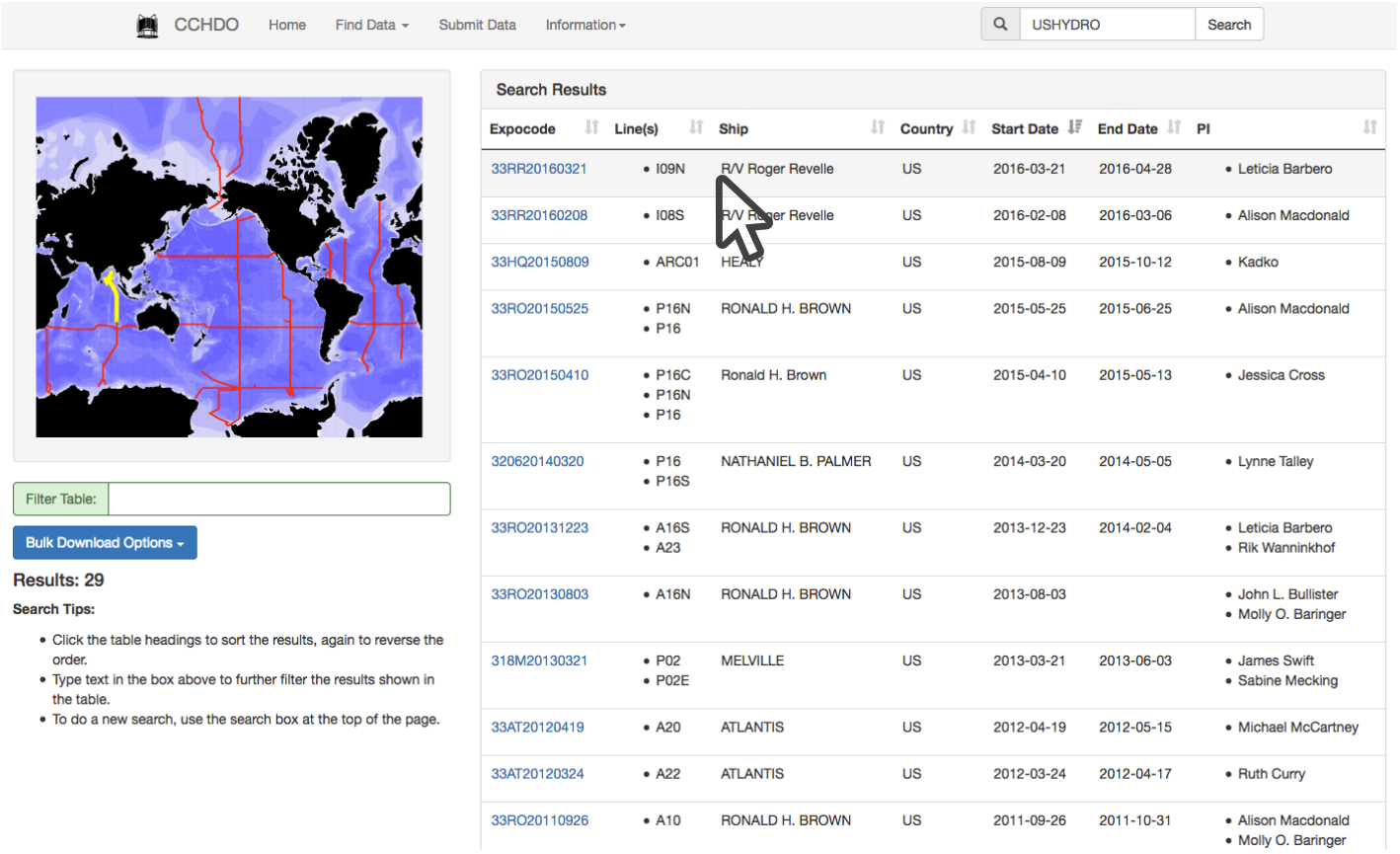
How to open US Hydro data set (WOCE bottle/ctd format) with ODV software

1. Go to CCHDO website and select US Hydro data page: https://cchdo.ucsd.edu/search?q=USHYDRO

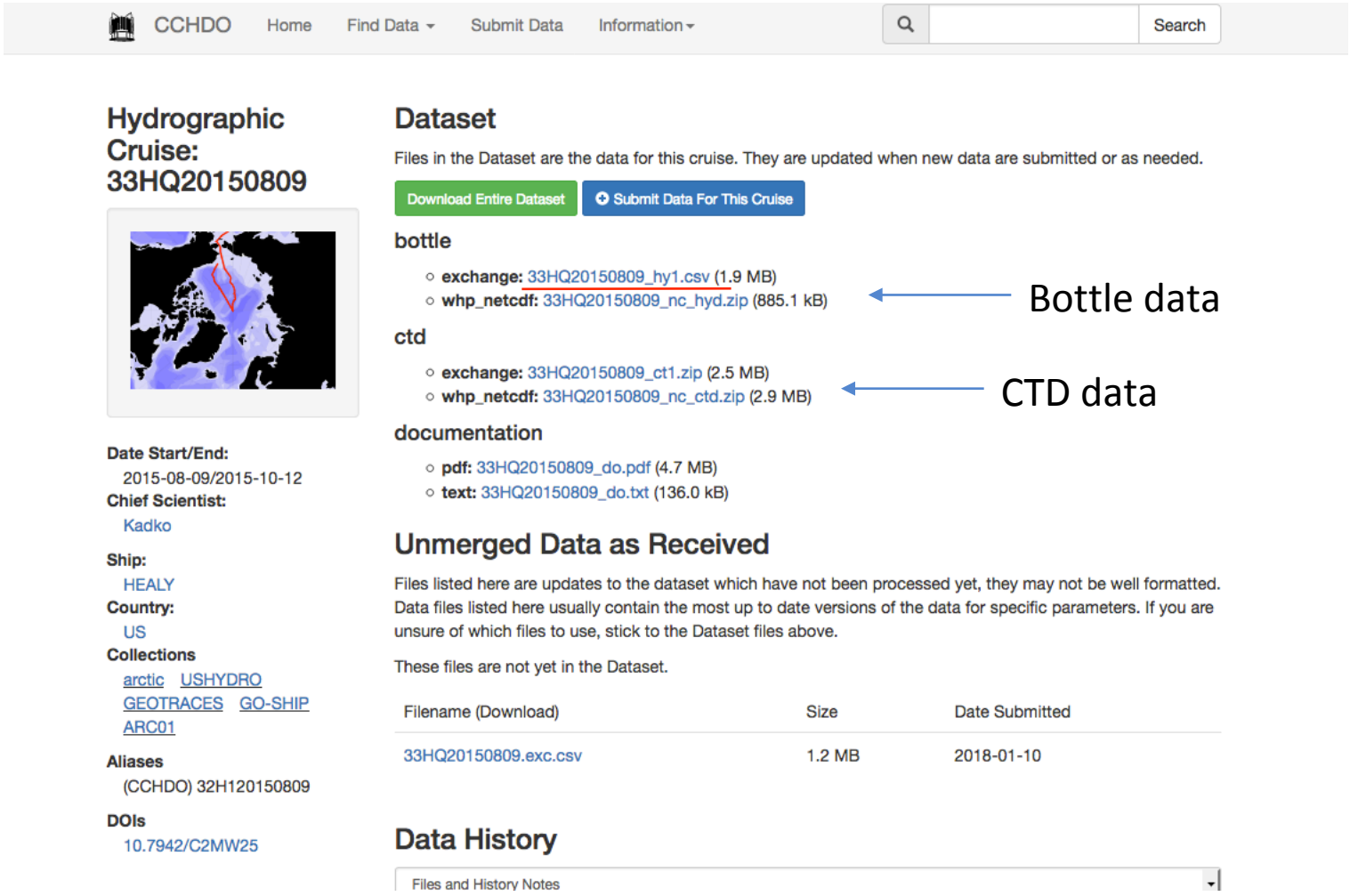


How to open US Hydro data set (WOCE bottle/ctd format) with ODV software

2. In case that you want to download one of the data from the list, you select the data that you want with your cursor. The cruise track will be highlighted on the map (as yellow).

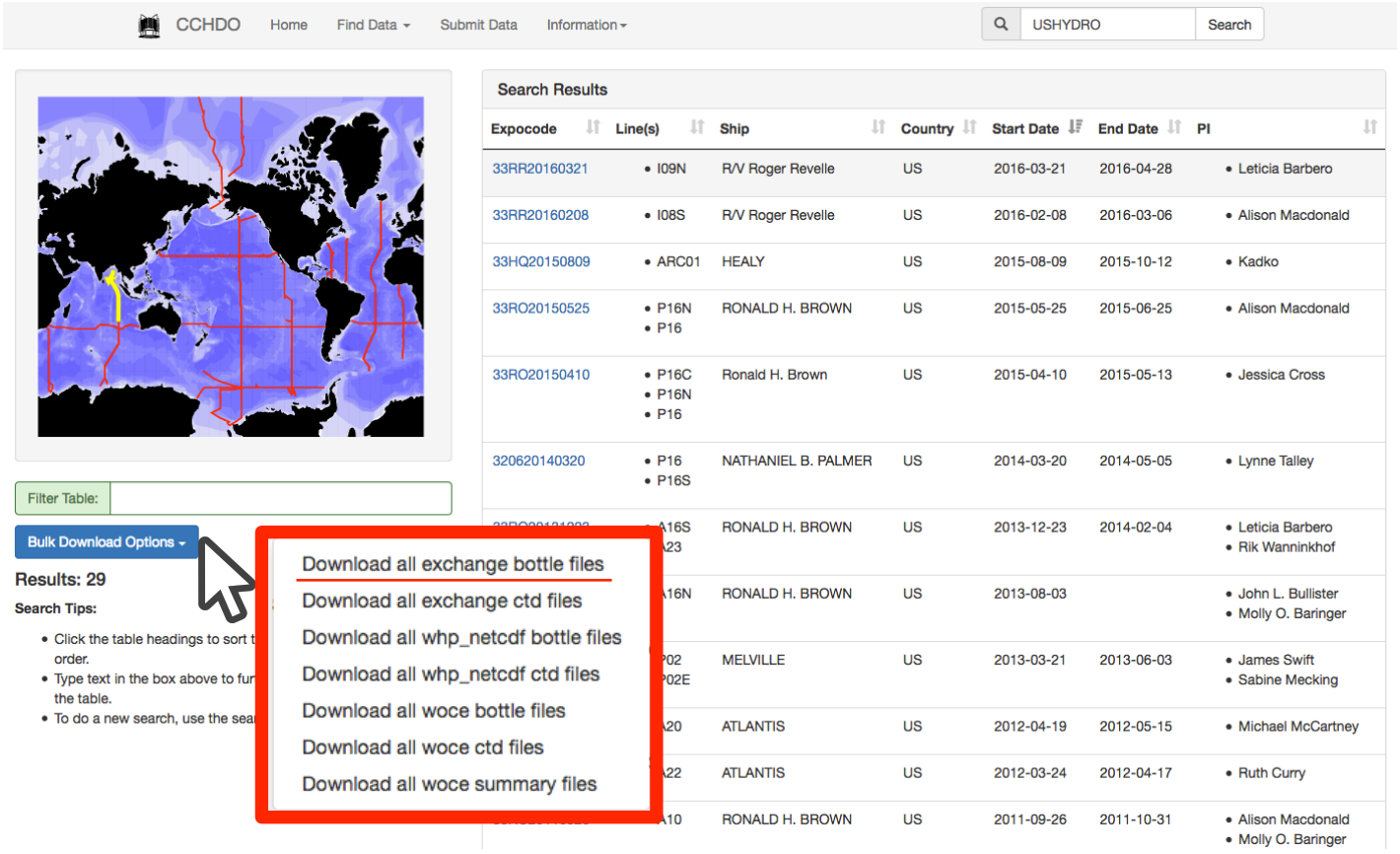


You can see the Data set Information. You select "**bottle exchange**" or "**ctd exchange**" for ODV formatted data file. File will download to your computer.

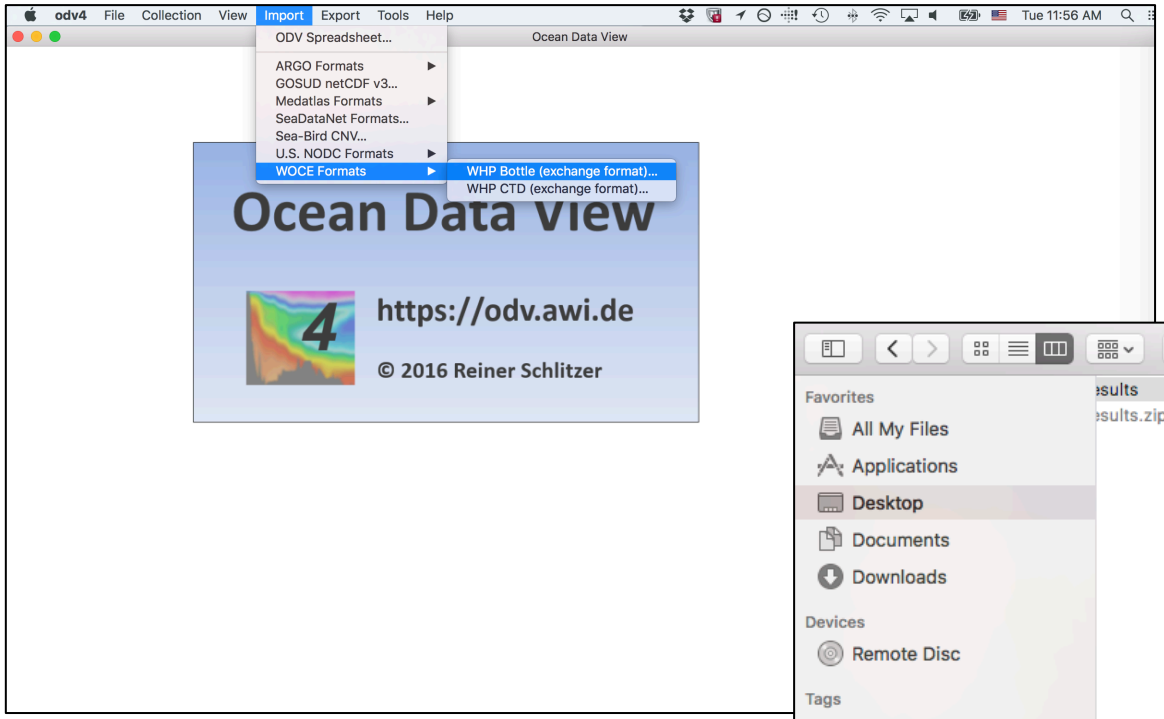


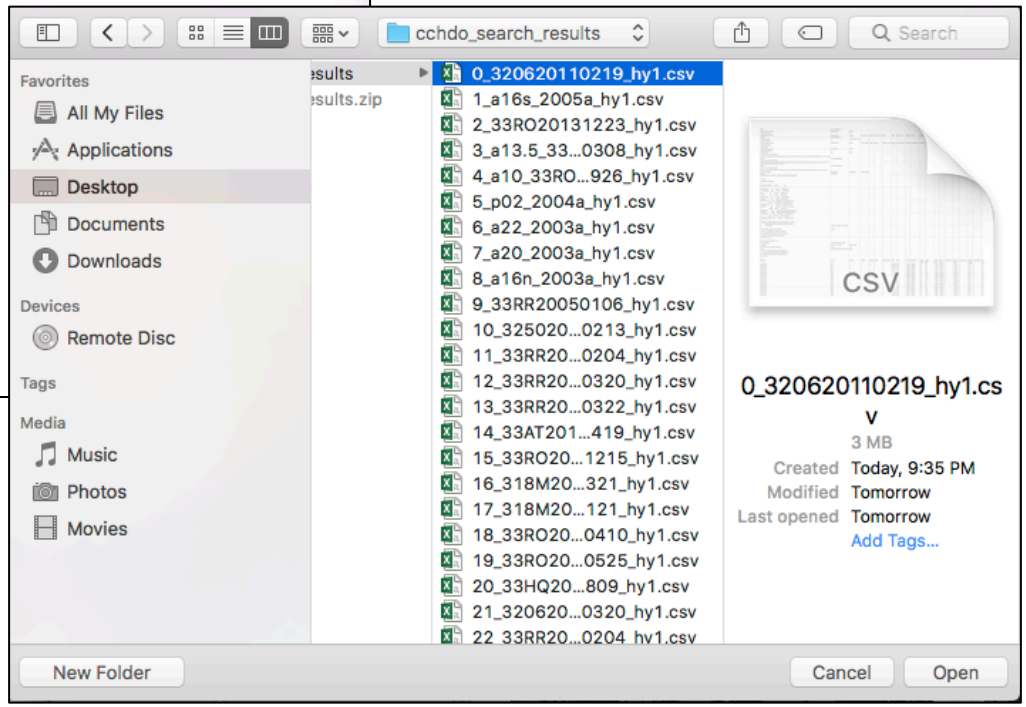
How to open US Hydro data set (WOCE bottle/ctd format) with ODV software

3. In case that you want to download all of the data in this list, you click "**Bulk Download Option**" and select "**Download all exchange bottle files**" or "**Download all exchange ctd files**".



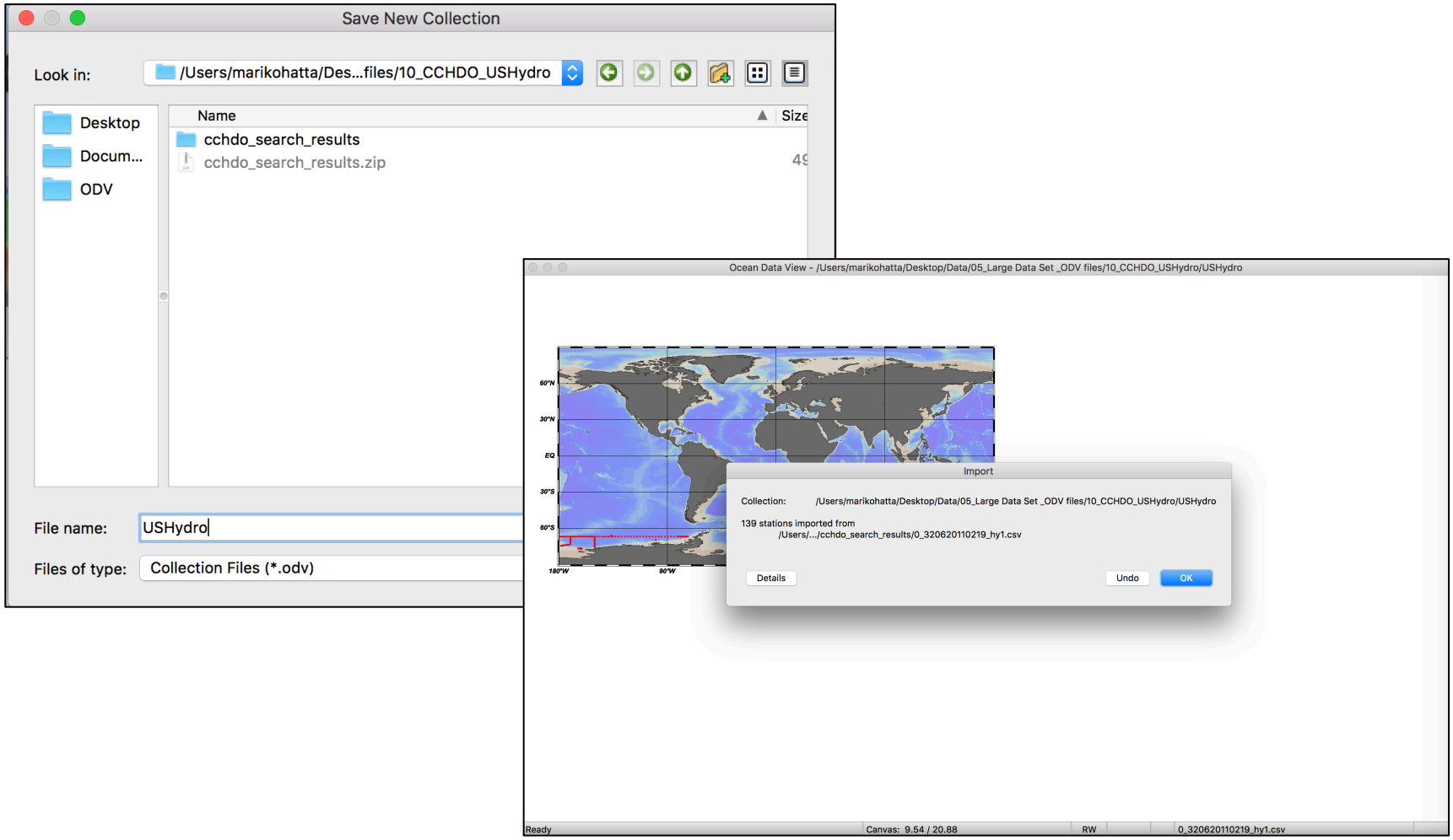
4. Open ODV and select “Import” – “WOCE Format” – “WHP Bottle (exchange format)” or “WHP CTD (exchange format)”.



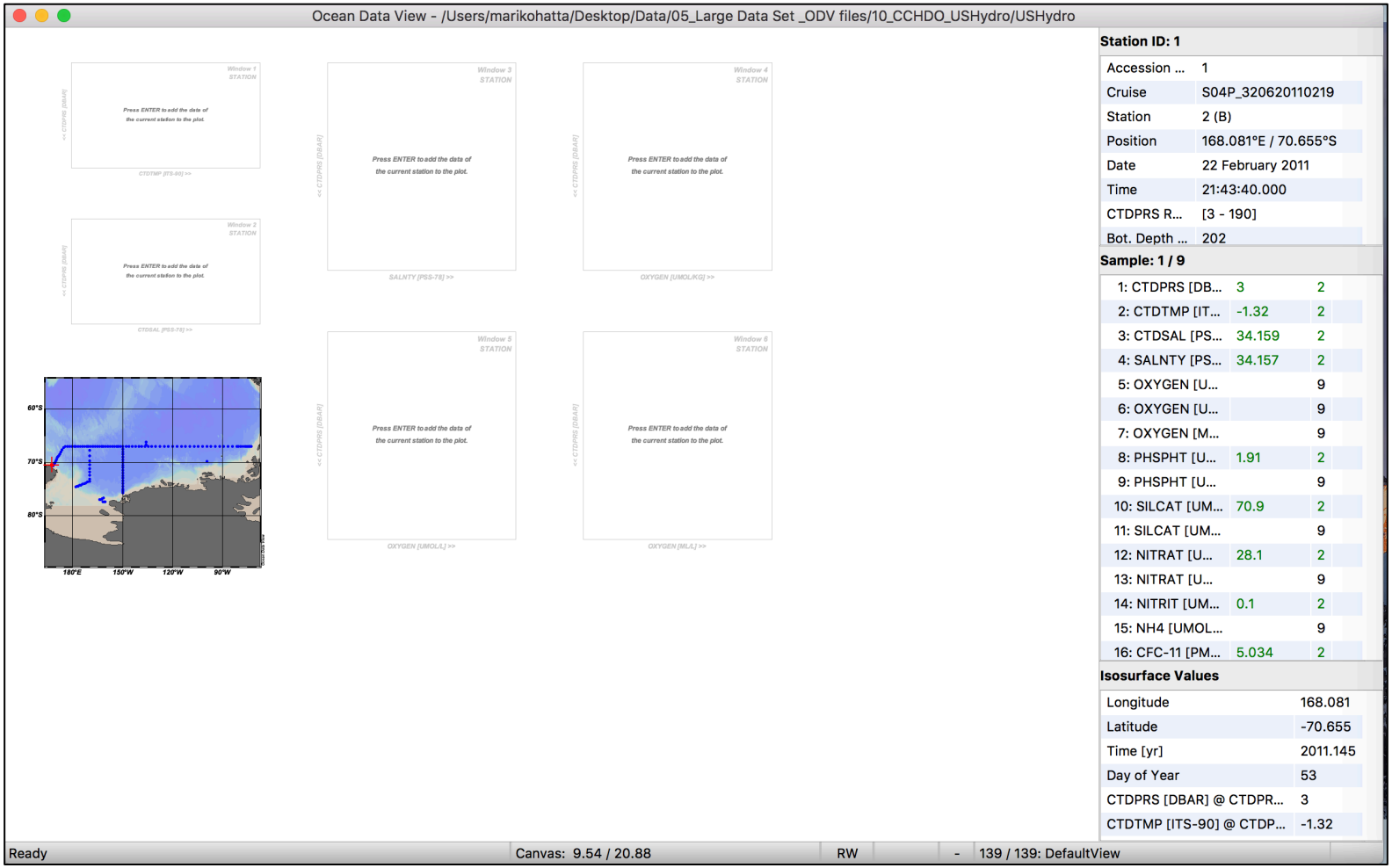


5. Select data file that you want to import. Note that you can select multiple files if you want.

6. Select the location that you want to say this ODV file, and save as your preferable file name.



Done!


Ocean Data View - /Users/marikohatta/Desktop/Data/05_Large Data Set _ODV files/10_CCHDO_USHydro/USHydro
Window 1 STATION
Press ENTER to add the data of the current station to the plot.
Window 2 STATION
Press ENTER to add the data of the current station to the plot.
Window 3 STATION
Press ENTER to add the data of the current station to the plot.
Window 4 STATION
Press ENTER to add the data of the current station to the plot.
Window 5 STATION
Press ENTER to add the data of the current station to the plot.
Window 6 STATION
Press ENTER to add the data of the current station to the plot.
60°S
70°S
80°S
180°E
150°W
120°W
90°W
Station ID: 1
Accession ... 1
Cruise S04P_320620110219
Station 2 (B)
Position 168.081°E / 70.655°S
Date 22 February 2011
Time 21:43:40.000
CTDPRS R... [3 - 190]
Bot. Depth ... 202
Sample: 1 / 9
1: CTDPRS [DB... 3 2
2: CTDTMP [IT... -1.32 2
3: CTDSAL [PS... 34.159 2
4: SALNTY [PS... 34.157 2
5: OXYGEN [U... 9
6: OXYGEN [U... 9
7: OXYGEN [M... 9
8: PHSPHT [U... 1.91 2
9: PHSPHT [U... 9
10: SILCAT [UM... 70.9 2
11: SILCAT [UM... 9
12: NITRAT [U... 28.1 2
13: NITRAT [U... 9
14: NITRIT [UM... 0.1 2
15: NH4 [UMOL... 9
16: CFC-11 [PM... 5.034 2
Isosurface Values
Longitude 168.081
Latitude -70.655
Time [yr] 2011.145
Day of Year 53
CTDPRS [DBAR] @ CTDPR... 3
CTDTMP [ITS-90] @ CTDP... -1.32
Ready
Canvas: 9.54 / 20.88
RW
139 / 139: DefaultView

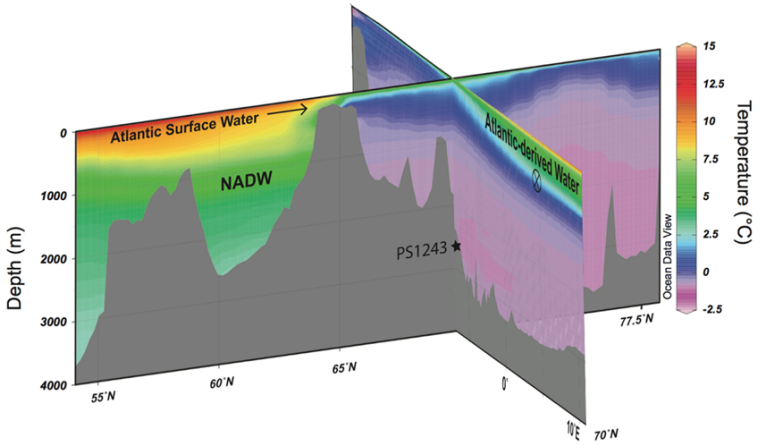
Questions:

- “I am interested in how to draw the 3D plot by ODV”

Answer: I do not think that I can do this using current ODV software.

Dr. Benoit Thibodeau said “It was done by plotting two sections on ODV and then using the 3D tool in illustrator.”

Reiner said “Concerning Ocean3D there are no news, still far from being ready for general distribution. The composed figure is cool.”



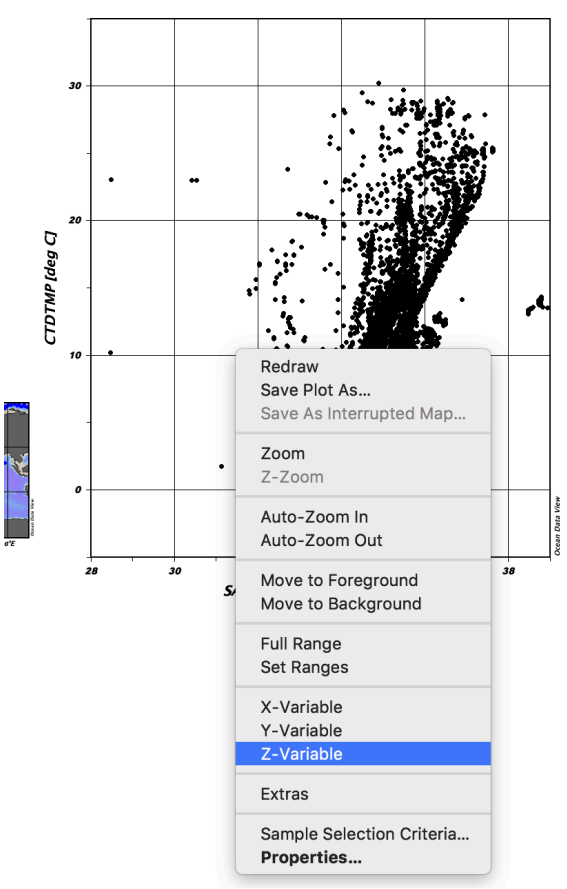
Thibodeau et al., EPSL 457, 2017

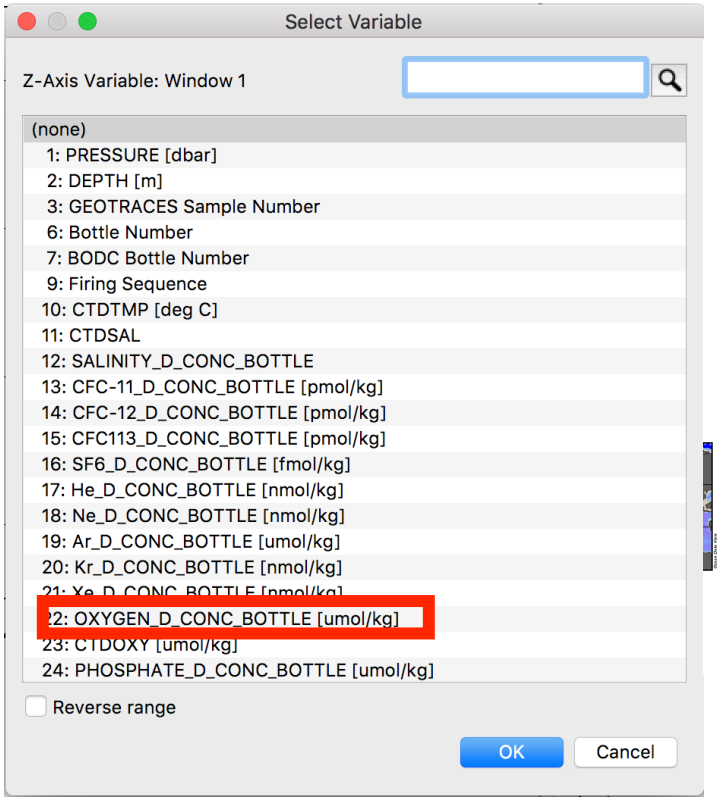
Dr. Benoit Thibodeau
Research Assistant Professor& Honorary Assistant Professor
Environmental Geochemistry & Oceanography Research Group
Department of Earth Sciences&Swire Institute for Marine Science
The University of Hong Kong

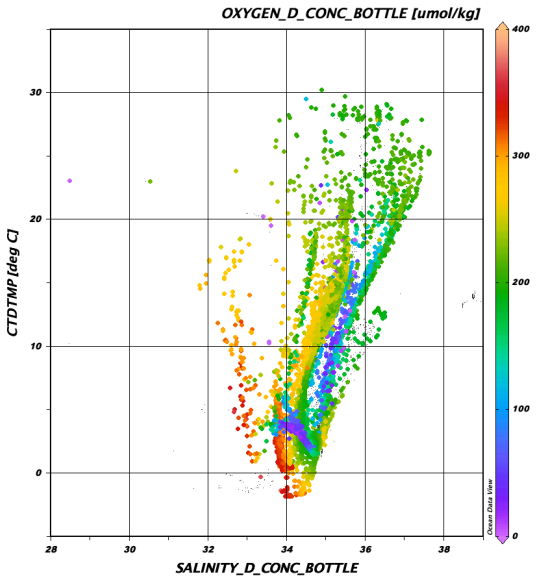
Questions:

- “How to plot two-dimension graph like T-S, X-Y axis with scale color bar?”

Answer: Need to select Z-axis with one parameter and change the color.





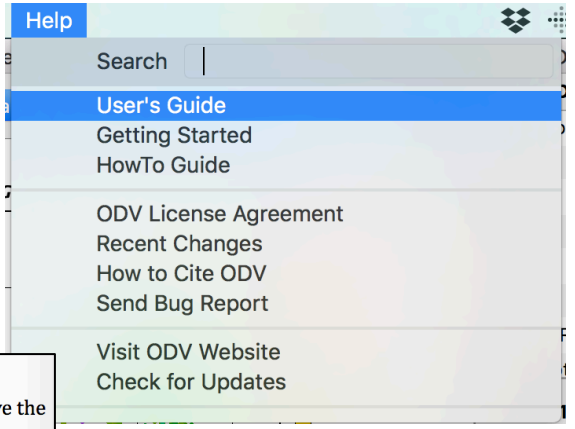


- “How to distinguish different water masses in a T-S diagram by color.”

Answer: Check “Help” – “User’s Guide”.

Read Section 6 “Derive variables”

– “6.5 Patches”



6.5 *Patches*

You can define water-mass patches by specifying polygons in the X/Y space of any data plot currently displayed on the screen. To do so, move the mouse over the data plot that you want to use for definition (e.g., theta/S plot) and click the right mouse button. From the popup menu choose *Extras* > *Define Patch* (note that the cursor changes to a cross-hair) and define the nodes of the patch-polygon by clicking the left mouse button at the node positions. You may delete points by moving the mouse close to the respective point and clicking the right button. Terminate definition of the polygon by pressing *Enter* or double-clicking the left mouse button. Note that the polygon is automatically closed by ODV. ODV then prompts you for a patch name (no extension) and writes the patch definition to a file in the collection directory.

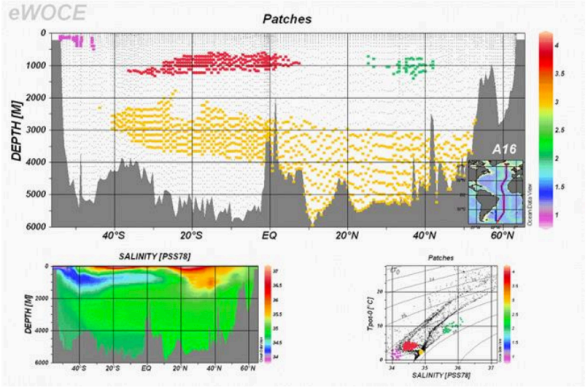
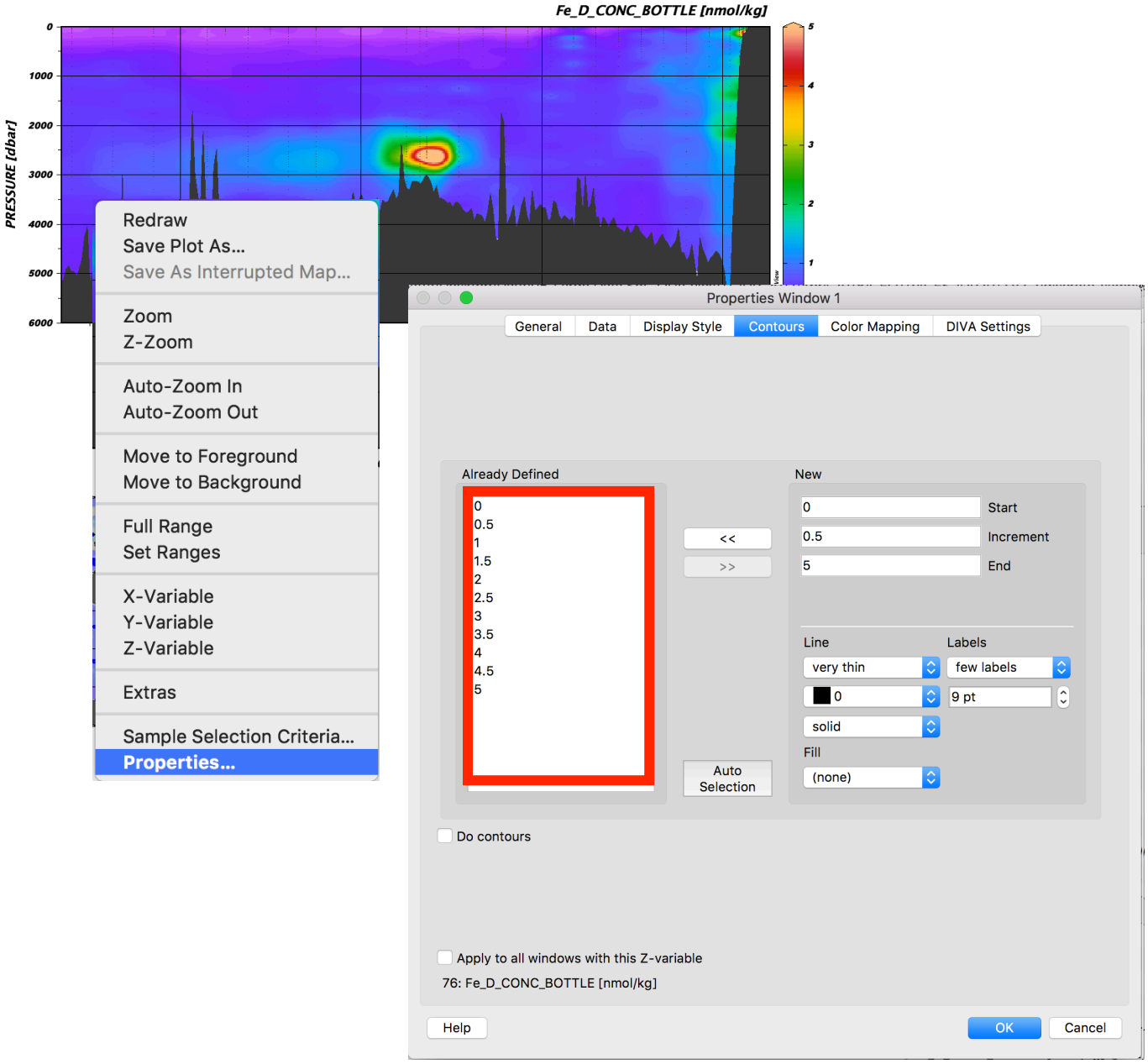


Figure 6–5: Using patches to identify the extent of water masses

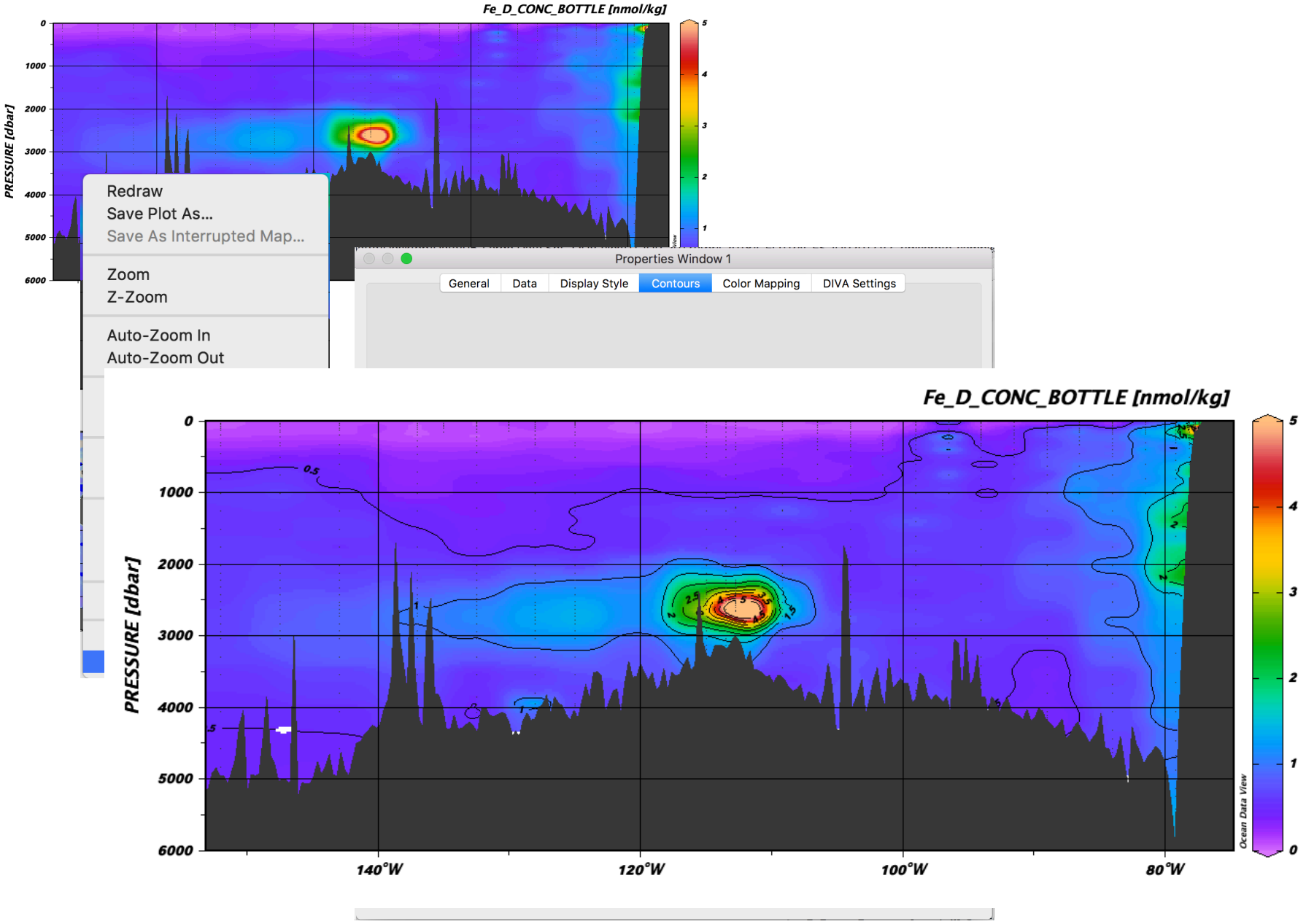
Once you have defined one or more water-mass patches for a collection, you can use them to compose and activate the derived variable *Patches*. Choose *View* > *Derived Variables* and select *Patches* from the *Choices* list. You can compose the Patches variable by selecting one or more of the available water-mass patches (defined previously as described above) into it. Press *OK* when you are done. To evaluate the Patches variable for a given sample, ODV determines whether the sample is inside one of the patch-polygons selected into the variable, and (if found) assigns the number of the respective patch as Patches value. If the sample is outside all the selected patches, its value is set to the missing data value.

Like all other variables (basic or derived) you can use the *Patches* variable on any axis of any data window. Use it, for instance, as Z-variable along sections or for isosurface variables in order to display the spatial extent of specific water masses (see Figure 6-5).

- How to add contour lines?



- How to add contour lines?



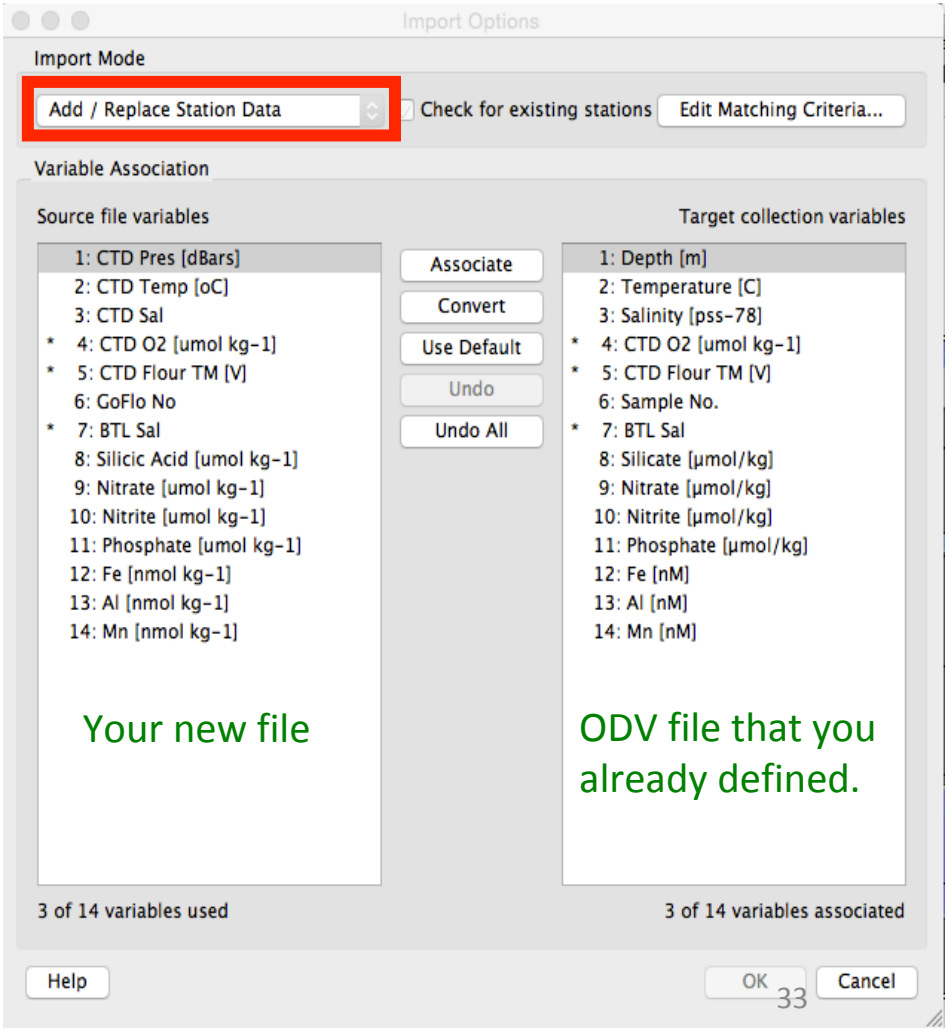
- “How to revise the data?”

Answer: Click “Import”, and select your file that you made. Select “Import Mode” type as you wish. You can select “Matching criteria” if you like.

This step imports your data into ODV. Now you can see which your data in the spreadsheet on the screen as “Source file variables” and your ODV data as “Target collection variables”.

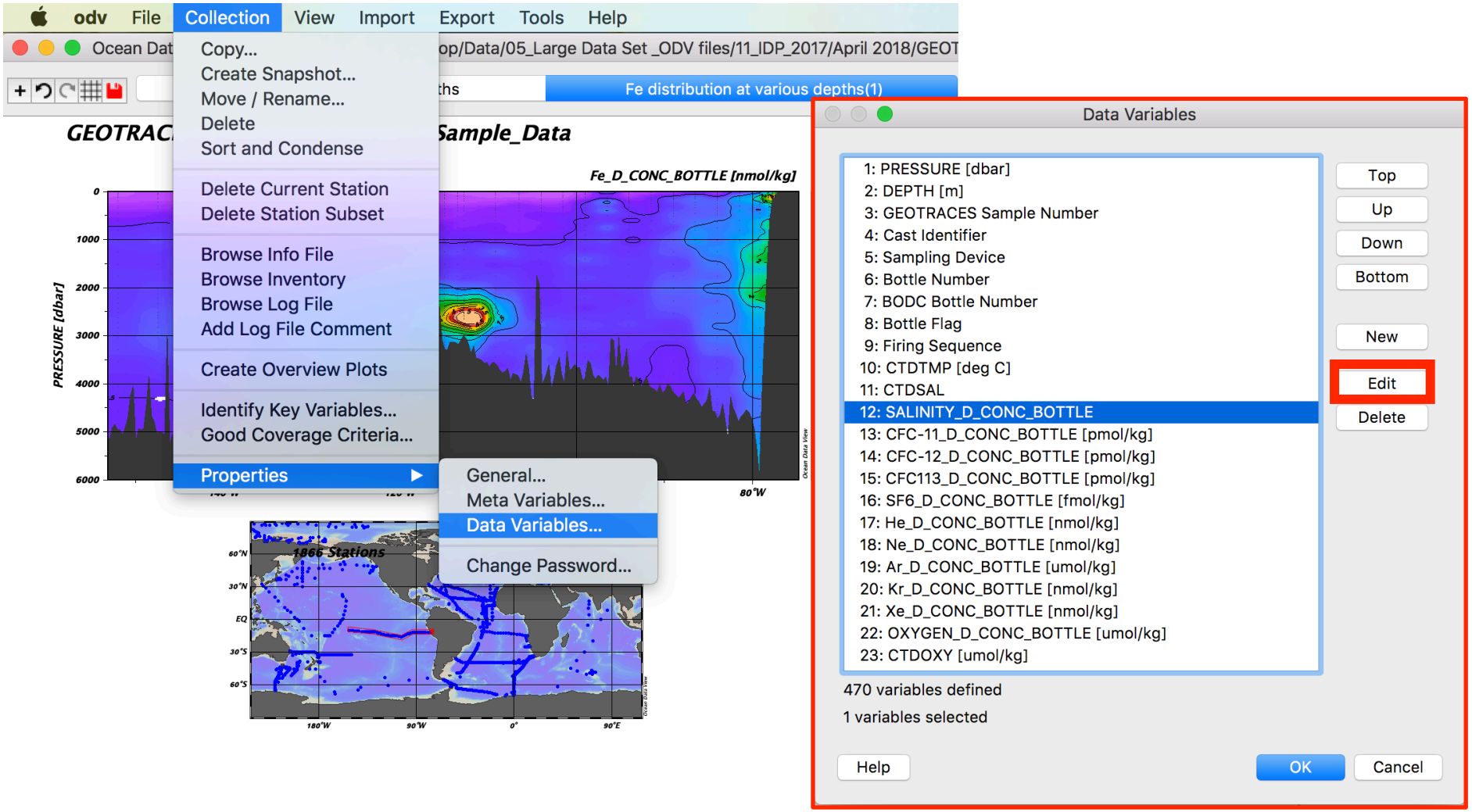
Tip: If you want to import additional data into an existing file, you need to associate the new variables with the existing file “Target collection variables”.

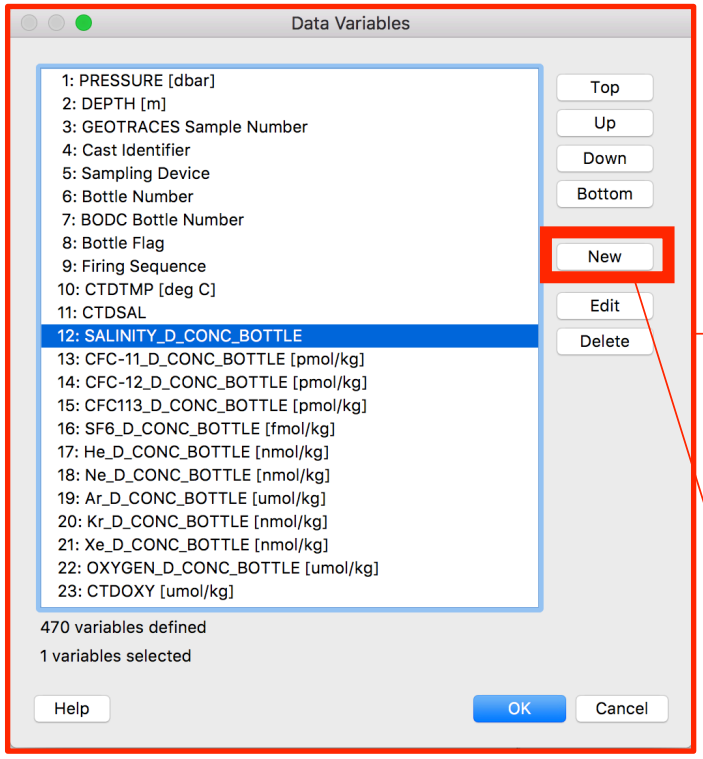
- *When you use the same parameter names, it should be automatically associated.*
- *When you have the data name “Source file” is different from the original “Target collection variables”, you need to select the parameter name and associate with “Target collection” manually.*

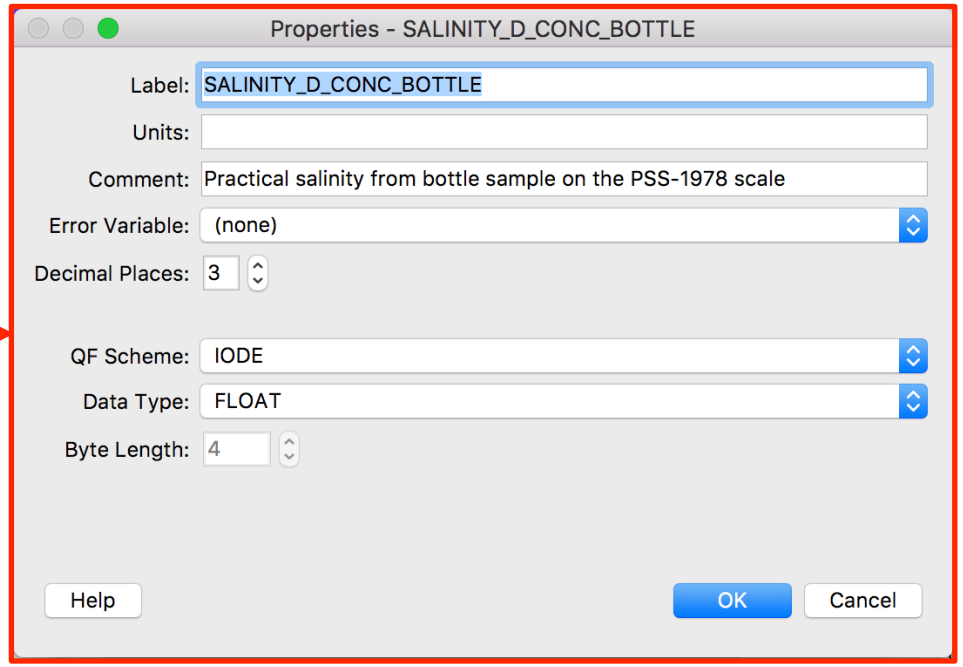


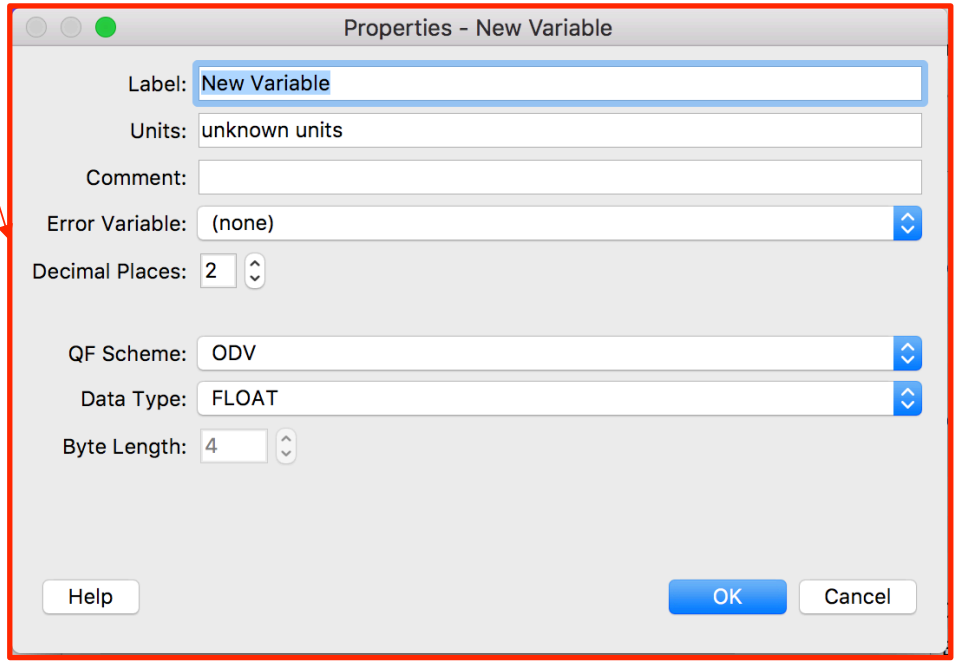
- “How to revise label directly instead of importing another spreadsheet?”

Answer: If you want to change the existing *variable name, need to select “Collection” – “Properties” – “Data Variables”. Then, select the parameter you want to change the name.*









If you want to add the new variables, click “New” and add the information.

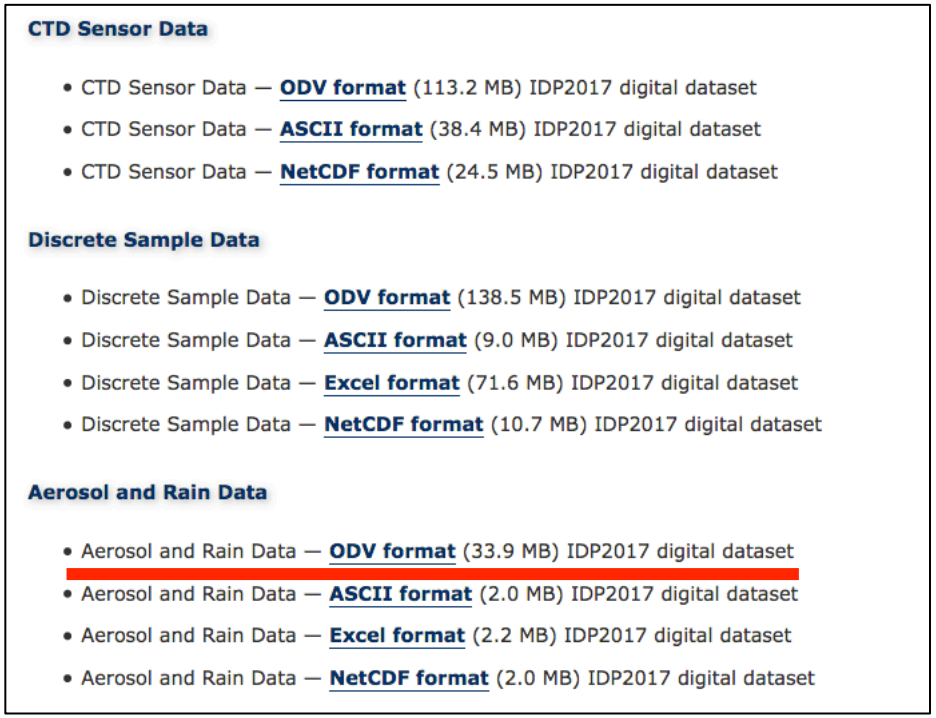
Tip: Careful for the “Decimal Places” When you want to add 3 decimal numbers (i.e. 0.003) but select here as “2 decimal places” your data will be all “0”.
“QF Scheme” is also important.

“I want to learn some drawing skills about atmospheric field using ODV."

Answer: Software can be used for atmospheric filed data.
Download “**Discrete Aerosol and Rain Data** ODV format(33.9 MB) IDP2017 digital dataset” and look at the data how it is.

https://www.bodc.ac.uk/geotraces/data/idp2017/

Click



CTD Sensor Data

- CTD Sensor Data — **ODV format** (113.2 MB) IDP2017 digital dataset
- CTD Sensor Data — **ASCII format** (38.4 MB) IDP2017 digital dataset
- CTD Sensor Data — **NetCDF format** (24.5 MB) IDP2017 digital dataset

Discrete Sample Data

- Discrete Sample Data — **ODV format** (138.5 MB) IDP2017 digital dataset
- Discrete Sample Data — **ASCII format** (9.0 MB) IDP2017 digital dataset
- Discrete Sample Data — **Excel format** (71.6 MB) IDP2017 digital dataset
- Discrete Sample Data — **NetCDF format** (10.7 MB) IDP2017 digital dataset

Aerosol and Rain Data

- Aerosol and Rain Data — **ODV format** (33.9 MB) IDP2017 digital dataset
- Aerosol and Rain Data — **ASCII format** (2.0 MB) IDP2017 digital dataset
- Aerosol and Rain Data — **Excel format** (2.2 MB) IDP2017 digital dataset
- Aerosol and Rain Data — **NetCDF format** (2.0 MB) IDP2017 digital dataset

Note: The citation to use for IDP2017 is that given in the download agreement (since the IDP2017 paper is not published yet), that is:

Thank you very much!