

**Exercise #1: Exploring GEOTRACES datasets.** So you want to be an oceanographer? It's time to dive into the largest trace metal data product on the oceans made thus far. This problem set will get you exploring the data and using ocean data view.

Download the Intermediate Data Product 2021, from BODC. The data description is here:

<https://www.bodc.ac.uk/geotraces/data/dp/>

and the data is available here:

[https://www.bodc.ac.uk/data/published\\_data\\_library/catalogue/10.5285/cf2d9ba9-d51d-3b7c-e053-8486abc0f5fd/](https://www.bodc.ac.uk/data/published_data_library/catalogue/10.5285/cf2d9ba9-d51d-3b7c-e053-8486abc0f5fd/)

The process is: Download—>GEOTRACES\_IDP2021\_v1\_seawater\_odv\_zip—>seawater—>odv—>open the ODV file. Also download Ocean Data View (ODV Application, latest version for Mac or PC) as well from the link on the GEOTRACES page (<http://odv.awi.de/>). You may need to register for ODV.

**Familiarize yourself with the data** - Open the folder of the excel file, scroll around, how big is this file?

How many PhDs are in here (rhetorical question)? Examine the pdf:

Parameter\_Naming\_Conventions.pdf. Note that D is dissolved, and Pump refers to McLane pumps. Also look over the Parameter list pdf too.

Helpful hints:

If when you download ODV and are using a monitor or cannot see the plots, do the following.

Go to “view” on the top panel → view layout templates → select “ 5 mixed windows”

If the canvas size is still hard to read or the font is too large or small do the following:

Change window layout: Go to odv → preferences → canvas size → fit to screen

Change font size: Go to odv → preferences → font size

**Create Sections** – First you have to select the data: right click on the map and choose “Manage section” and “define section”. Define a section over the GP16 line (EPZT) which is the large E-W line from Peru past Tahiti at about ~10-15 south in the Pacific, do so by tracing the line and clicking with your cursor. Make sure you get all the points within your section either by tracing it accurately or increasing the mean width value. Note that you can select section distance or Lat or Long.

**Deliverables:** Image of the defined GP16 section (either save as image or take a screen shot)

Right-clicking any plot allows you to edit the figure. If you need more plots go to view → layout templates and select the ones you need. I recommend the 5 MIXED. Right-click on a plot and click “properties”. Change the scope to “Section”, X-axis to “drvd:Section Distance (km)” (note this is at the end of the parameters list), Y-axis to “Depth ([m]”, and Z-axis to CTDOxy (oxygen). Go back and click the reverse range box on the Y-axis now. In properties (right click and select properties) again try changing the display style from original data to gridded field. Note there are weighted average and DIVA settings here. Also explore the color mapping tab. Repeat this section for the second from the top plot to make a section of temperature for the same defined section. Save your section by right clicking on the map and clicking manage section, save as. Create a new section on another line (click on a datapoint to see the cruise name in the upper right corner), once saved you can switch between them relatively quickly by loading sections.

**Deliverables:** Section plot with O<sub>2</sub> (gridded) and with different color bar values; section plot with temperature. Any plot showing a new section was created.

**Create Scatter plots** - Right-click on one of the plots and select “Properties”, then the data tab then select the “scatter” option. Select DEPTH for Y-axis and a parameter (Cd\_D\_CONC\_Bottle) for the X-axis. Click around the plot, what is happening? Make a similar plot for the upper right with a different X-parameter.

**Deliverables: Two section plots (one with Cd and one with another x parameter). Description of what happens when you click around.**

**Create Station plots** – Right click on one of the plots and select Scatter under the Data Tab. Select X-axis Nitrate\_D\_Conc\_bottle, Y-axis Phosphate\_D\_conc\_Bottle, and Z-axis Depth. Make a similar plot for the with different X and Y parameters. Note that you can also select a section in these profile plots for defined sections, try it. To define a section, go to the global map with your defined section. Right click and “manage pick list” and then “add current station”. You can make a scatter of only these data by right-clicking in another plot and changing “scope” to “section”.

**Deliverables:** Scatter plot with Nitrate, phosphate and depth and scatter plot with different x and y parameters. Section profile for a defined section.

**Plotting selected stations** – Change your vertical scatter plot of Cd vs depth to a station plot in “scope”. Then double click on individual stations in the station map until some appear in the new profile plot. Note that you can edit the pick list by right clicking on the station map: Manage Pick List/Edit pick list. Why does data not always show up when you double-click?

**Sciencing:** Add one profile from each basin (N Atlantic, South Atlantic, South Pacific etc) on your pick list if possible, and profiles of dissolved Cadmium and Dissolved Zinc in the two profile plots. Plot dissolved Cadmium and Zinc versus phosphate in the two scatter plots (lower right and center). Then plot sections of Cd and Zn in the two sections plots. How can you account for differences in concentration and profiles? Include a list of your picks in your assignment. To do so, click on “manage pick list” and “edit pick list”. Include this table in the homework document.

Change phosphate to silica in the scatter plots, what happened? Print your plots. Return Si to Phosphate, then replace Cd with Co\_D. How does it differ? Print this out too. Pick two other parameters of your choice and plot them in the three types of plots as well (profile, section, and scatter), and describe what you’re seeing and print that page as well.

**Deliverables:** Profiles of dCd and dZn and section plots of dCd and dZn. Explanation to questions asked. Table of your picks. Six plots (profile, section, scatter) for two parameters of your choice. Description.

**Because you should know about other ODV functions:** play with Alt-W and Ctrl-R to modify the windows and resize the plots, respectively. Save your view (give it a non-default name). And play with View/Layout Templates for other layout setups. Also, add some contours to your section in the

Properties menu. How to load your own data into ODV: modify the columns of a prior ODV excel spreadsheet (copy first A-R columns titles for example, use as a template, note lat/long units are a bit unusual, and those columns need to be filled) and save as a text file, drag onto the ODV icon (easiest) or use import function in ODV.