Ocean Data View (ODV) is a freely available software that can be used to visualize physical, chemical, and biological data in the ocean. Data can be plotted by depth and across distance, latitude, longitude, or time. Data can be plotted discretely as individual points or intercalated to allow broad trends to be seen more easily. We will work through plotting a few examples from existing datasets to illustrate how this software could be used to analyze data. We will work with Geotraces data since this is an extensive dataset that has been collected across the globe.

Looking at data in ODV:

1. Double click on the Geotraces ODV file that you downloaded.

2. You will see a map with a dot representing each location where seawater is collected.

3. Go to the "View" dropdown menu. Under "Template Layouts" and select "1 SECTION Window".

4. Right click on map and under "Manage Section", select "Define Section". A red cursor will appear that will allow you to click along a row of dots to define the area of the ocean you would like to plot. Double click when you reach the end of the transect you wish to define.

5. Now, right click on the section plot and select "Properties". Under this series of tabs you can select what variables you would like to plot and how to plot the data. Work with these options to start making plots of the chemical data available from geotraces.

Exercises:

A. Plot dissolved iron along different cruise trajectories. What sources of iron to the ocean can you identify? How do other essential nutrients such as nitrogen and phosphorus compare to iron distributions?

B. Locate a region of the ocean with a subsurface oxygen minimum zone. Two places to look are off the coast of Peru or Namibia. Plot dissolved oxygen concentrations until you observe a low oxygen region just below the surface. Now try plotting other nutrients (nitrite, nitrate). What do you observe about these profiles? Is it the same in other areas of the ocean where you don't observe the oxygen minimum zone?

C. Plot dissolved inorganic carbon (DIC) and total alkalinity (TALK) for a region of the ocean of interest. How do these variables change with depth and from coastal to open ocean regions? The pH of seawater is directly related to DIC, alkalinity, and temperature. If there is an internet connection use the following website to calculate pH using the data plotted in ODV.

   https://biocycle.atmos.colostate.edu/shiny/carbonate/

   Where is pH the lowest and the highest?