Basic Data analysis with ODV

- Save the OSD file in Documents\ODV\DATA with the filename osd_wod.gz.
- Similarly save the CTD and PFL files this folder.

- Please copy all the data provided, to the folder **User\Documents\ODV\Data** for ease of handling/importing during this training session

Options:

- To view the full screen map, select View > Layout Templates > Full Screen Map.
- To save the current view, select View > Save View As and name the view station_map.
- To save the distribution map as an image, right-click on the map and select Save Map As then specify the file name and select the file type.

Other Options:

- Change Projection
- Zoom to desired
- Add graphic objects
- Explore menu options

Keep in mind:

- Save views and plots frequently, whenever needed
- Undo options are limited

Task:

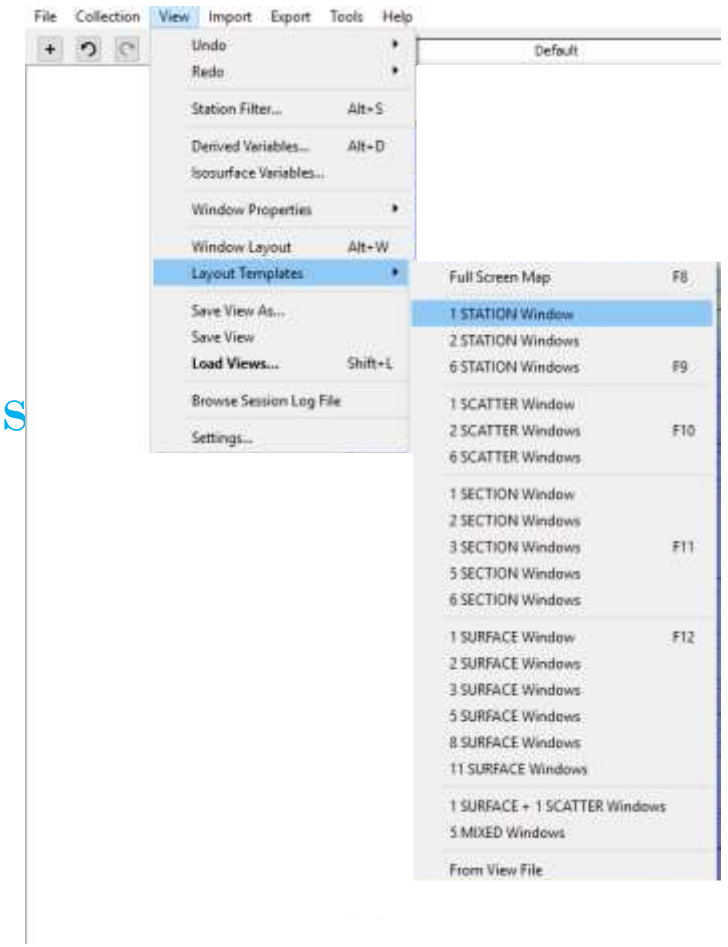
- Import the other WOD datasets (CTD, PFL) into the existing collection.

Basic plotting using ODV

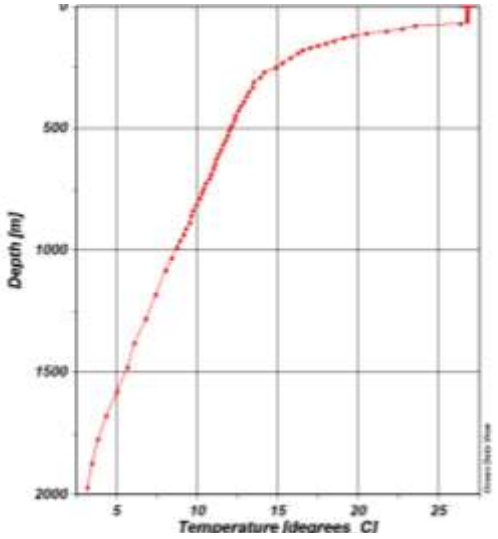
Part 1:
Station plot

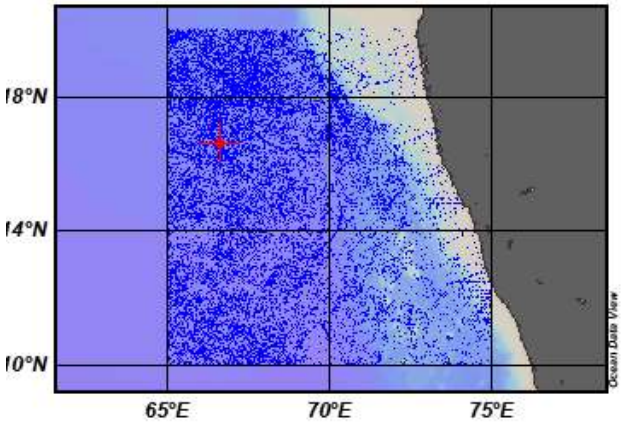
1. Draw a station plot:

- Open the OSD collection previously created.
- Select View > Layout Templates to show a list of predefined window layout templates.
- Select 1 STATION Window.



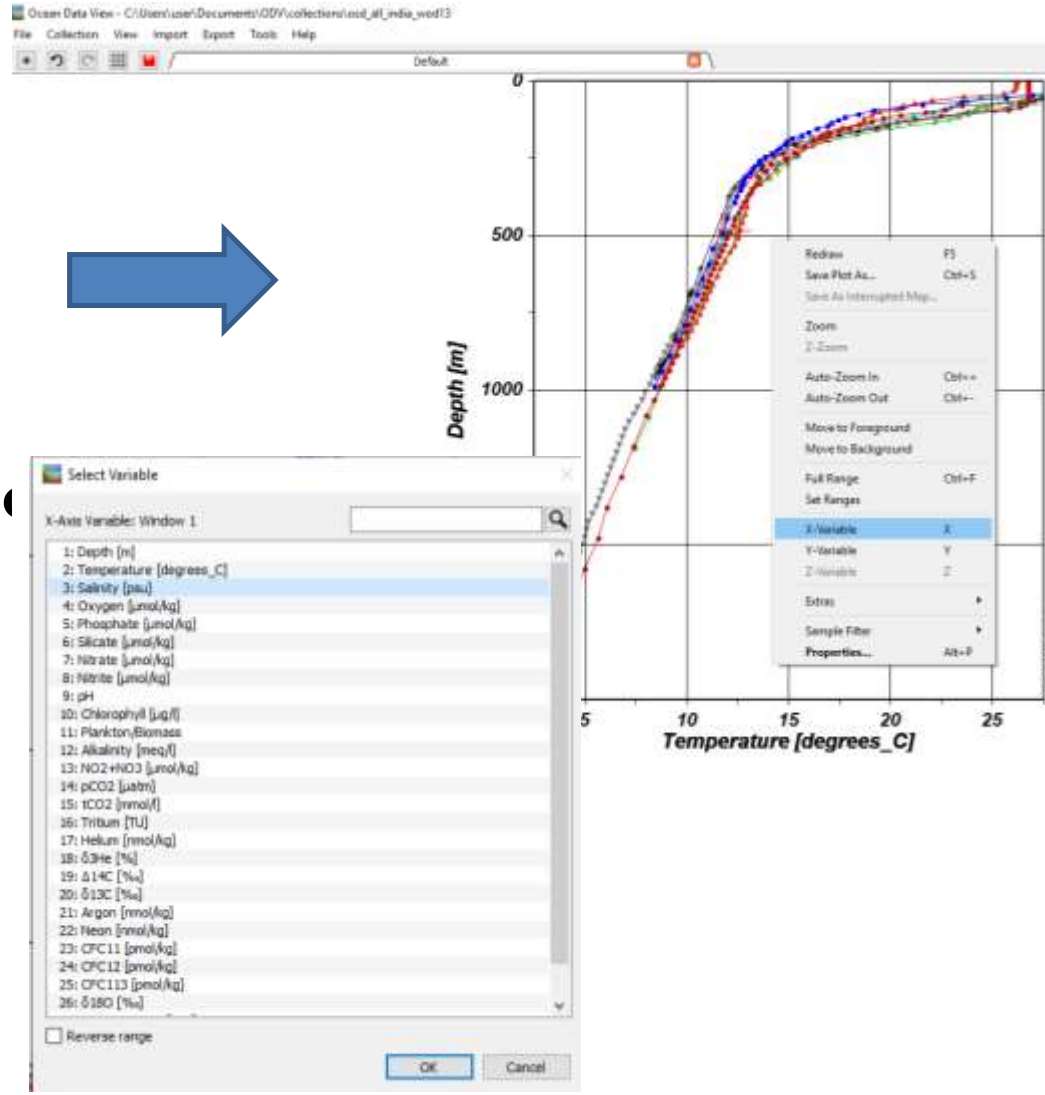
- Press Enter to plot the default station indicated by the small red cross on the map.
- Select other stations on the map to plot their profiles, temporarily, on the graph.
- Double-click on any station to make it appear permanently on the plot.



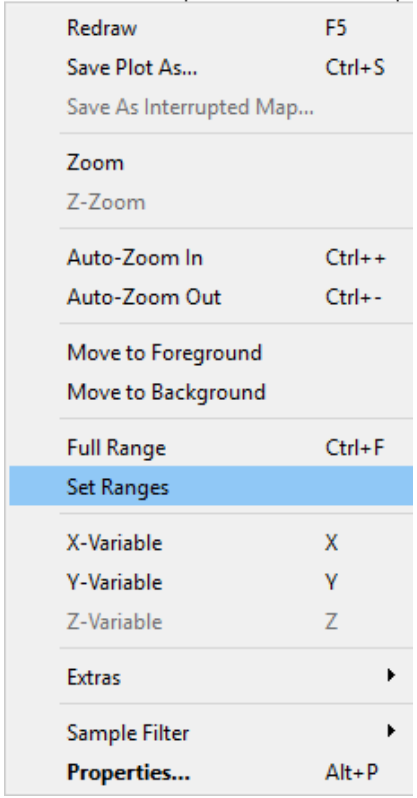


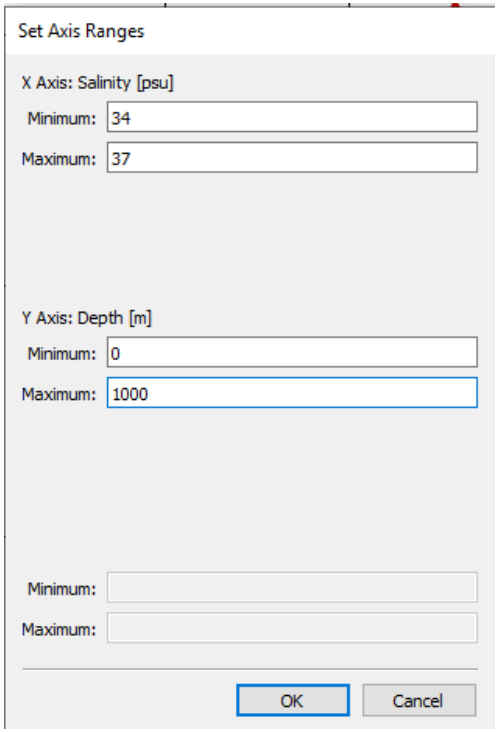
2. Adjust the variable in a station plot:

- To change the x or y variables in the station plot, right click on the station plot and choose X-Variable or Y-Variable
- For example, select X-Variable and choose Salinity to display the salinity profile.



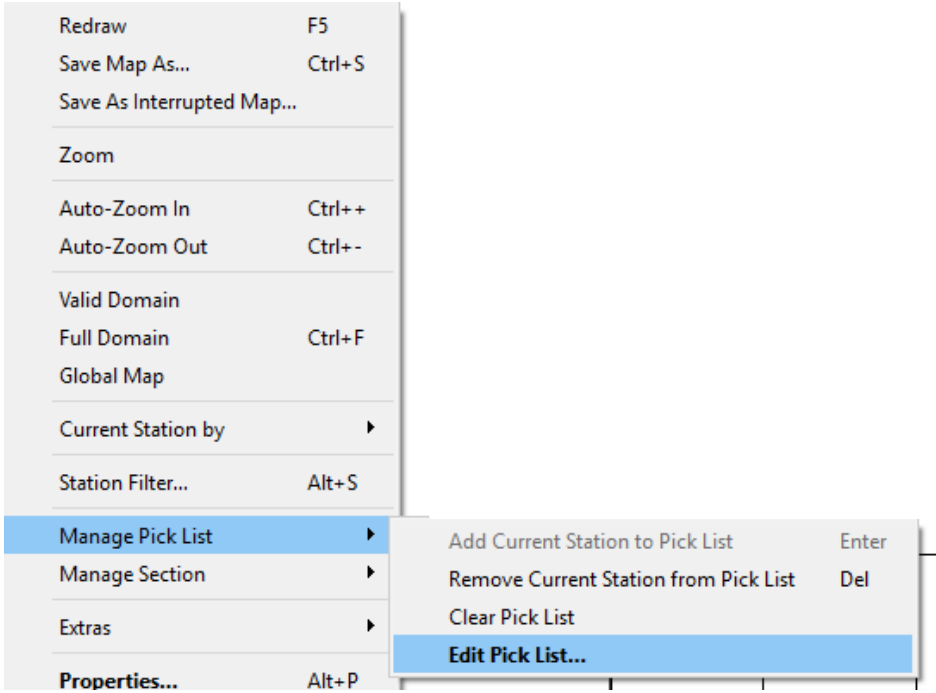
- Right click on the plot and choose Set Ranges then set the range for the X and Y variables.
- For example, set the depth range to 0 - 1000m or the salinity range to 34 to 37 psu.
- Right click and select Full Range to set the full range of the values.

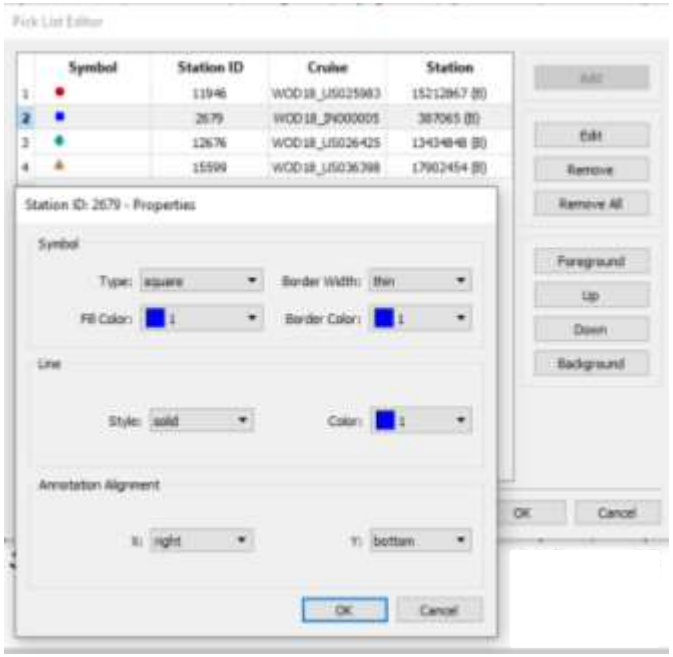




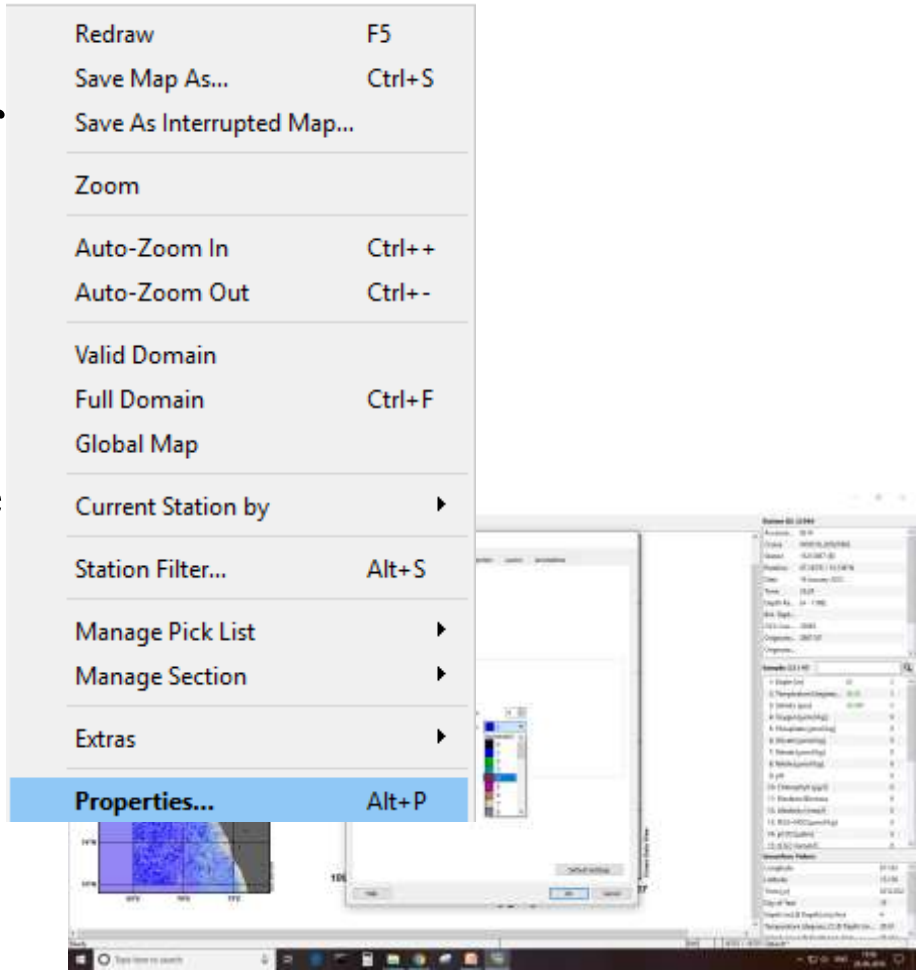
3. Edit station plot properties :

- To change the figure properties, select the station on the map then right click the map window and choose Manage Pick List > Edit Pick List to change the symbol type and colour and the line.





- To change the symbols of the stations on the map, right click on the map and select Properties > Display Style and change the colour and size of the symbol.



- Under Annotations you can add annotations about the cruise and station labels to the stations on the map window.

Other Options:

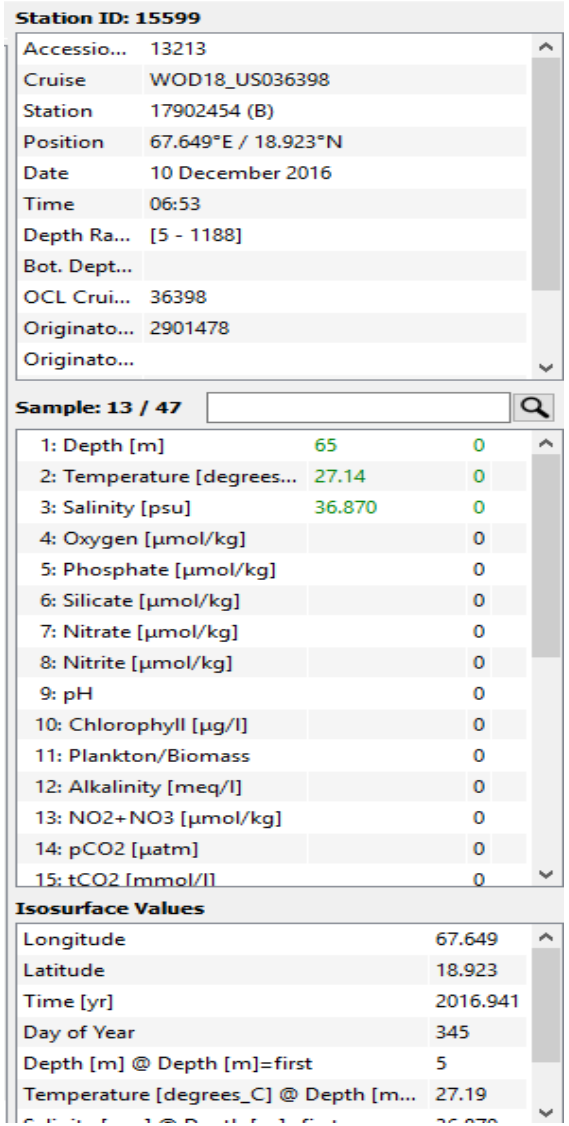
- Add graphic objects to station plot
    - Text (Annotation)
    - Symbol
    - Polygon

Task:

- Make station plot with oxygen on X-axis (oxygen profile with depth)

4. Station metadata and data

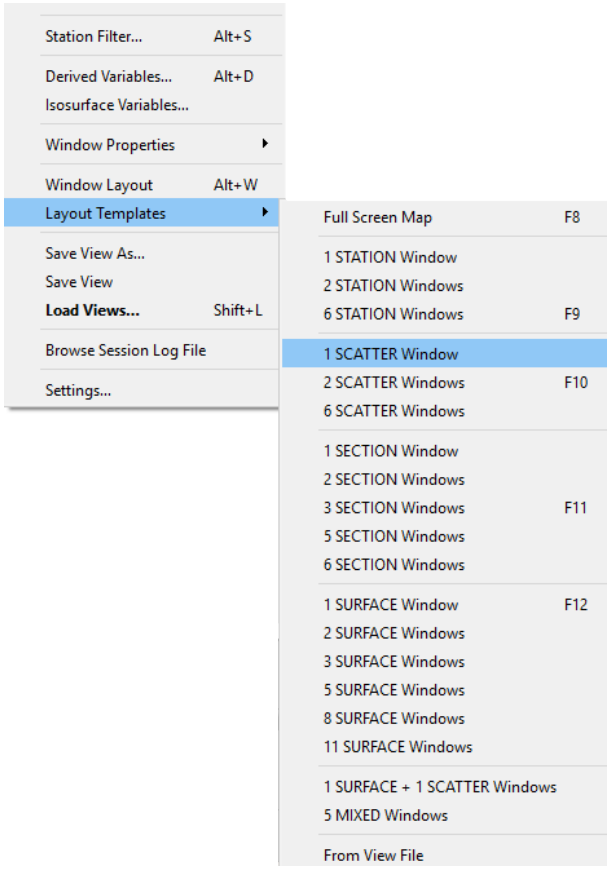
- The top panel (Station ID) contains the metadata about the cruise.
- The metadata includes the Accession No, cruise, station, position, data and time.
- The second panel (Sample) lists the depth and values of each variable measured at the station.



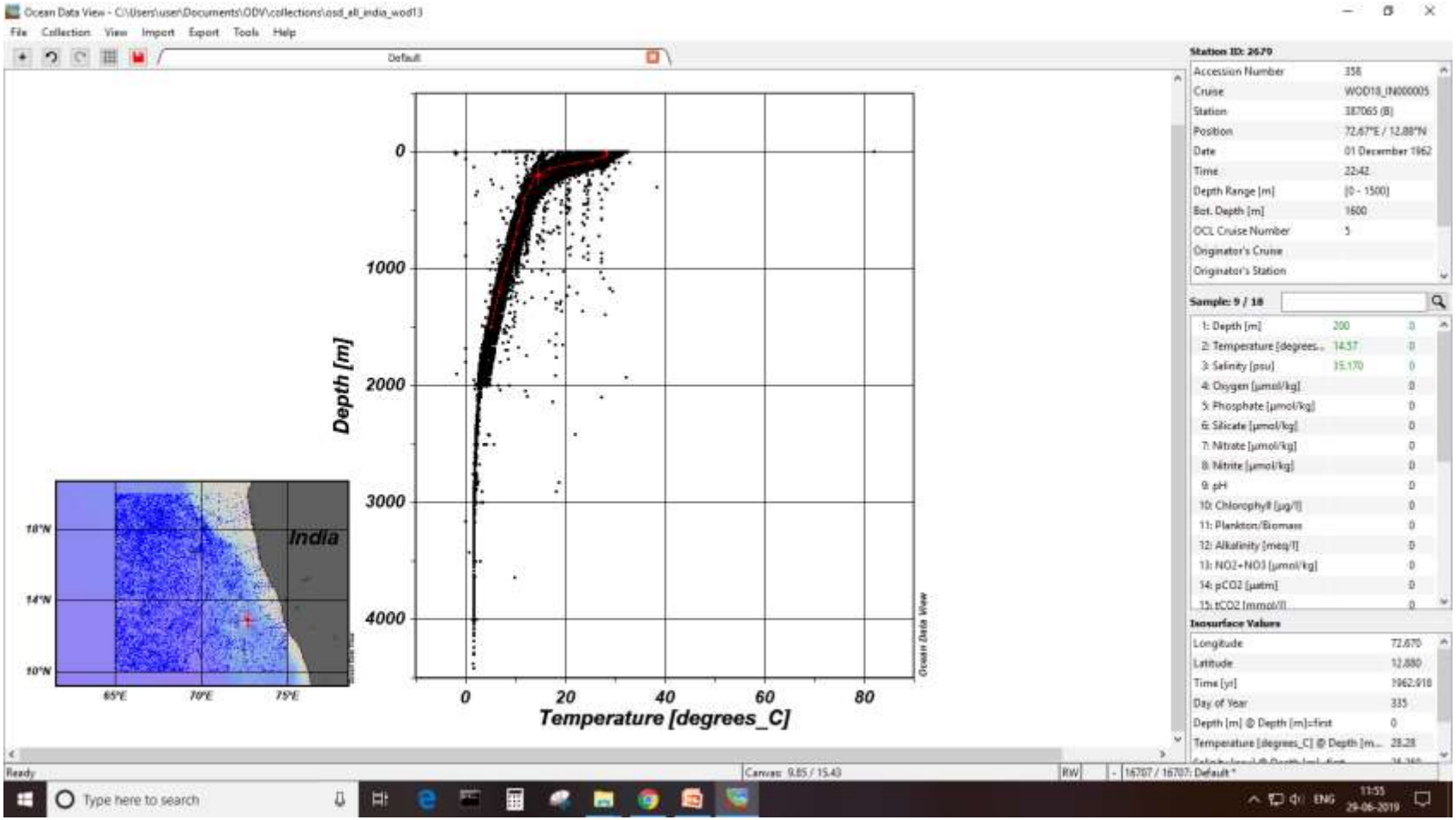
Part 2:
Scatter plot

1. Draw a scatter plot:

- Select View > Layout Templates to show a list of predefined window layout templates.
- Select 1 SCATTER Window.

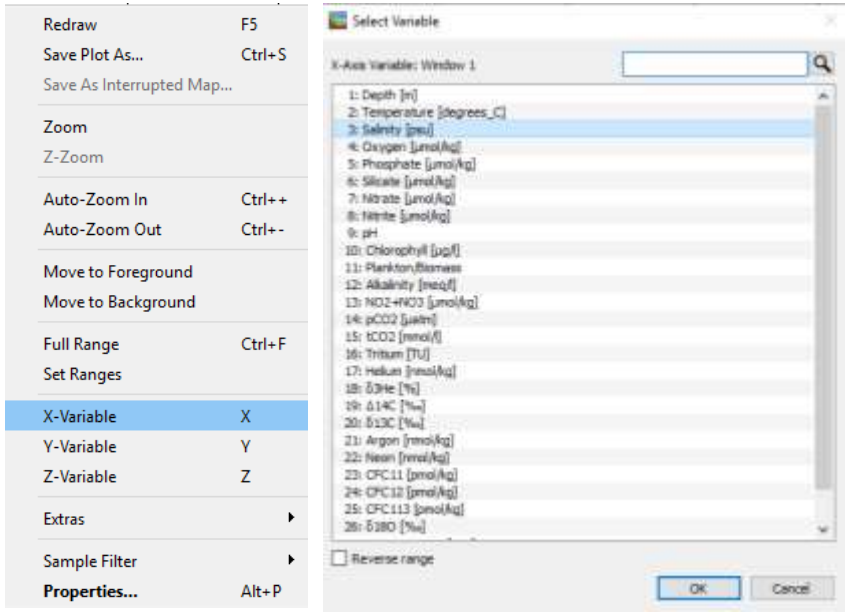


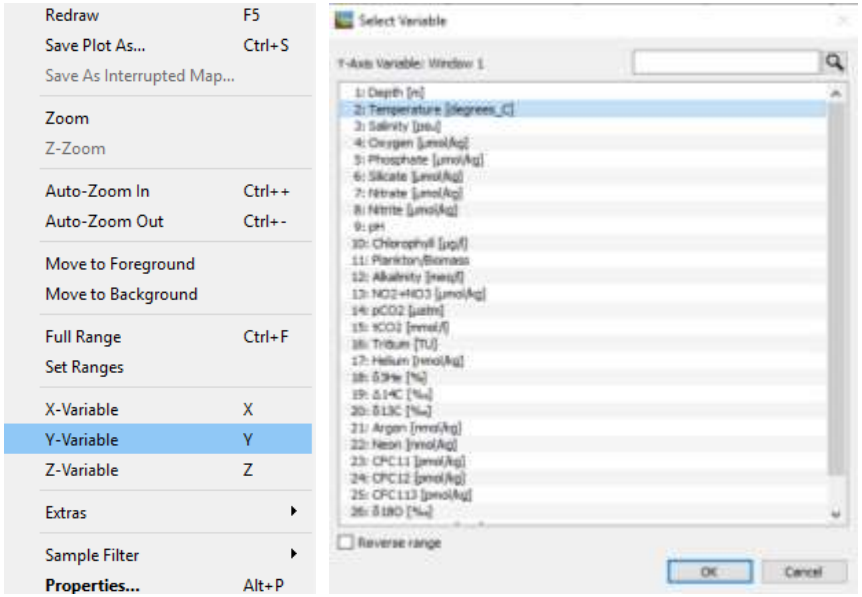
Scatter plot:



2. Plot a Temperature-salinity scatter

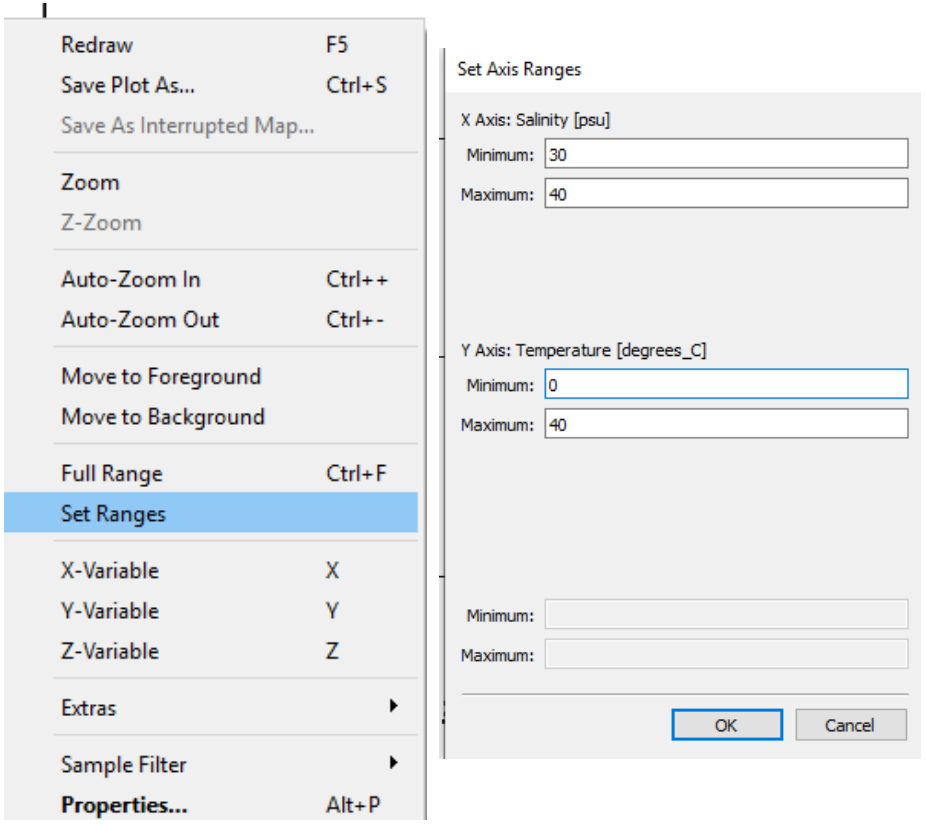
- Right click on the scatter diagram
- Change the X-Variable to Salinity
- Then change the Y-variable to Temperature





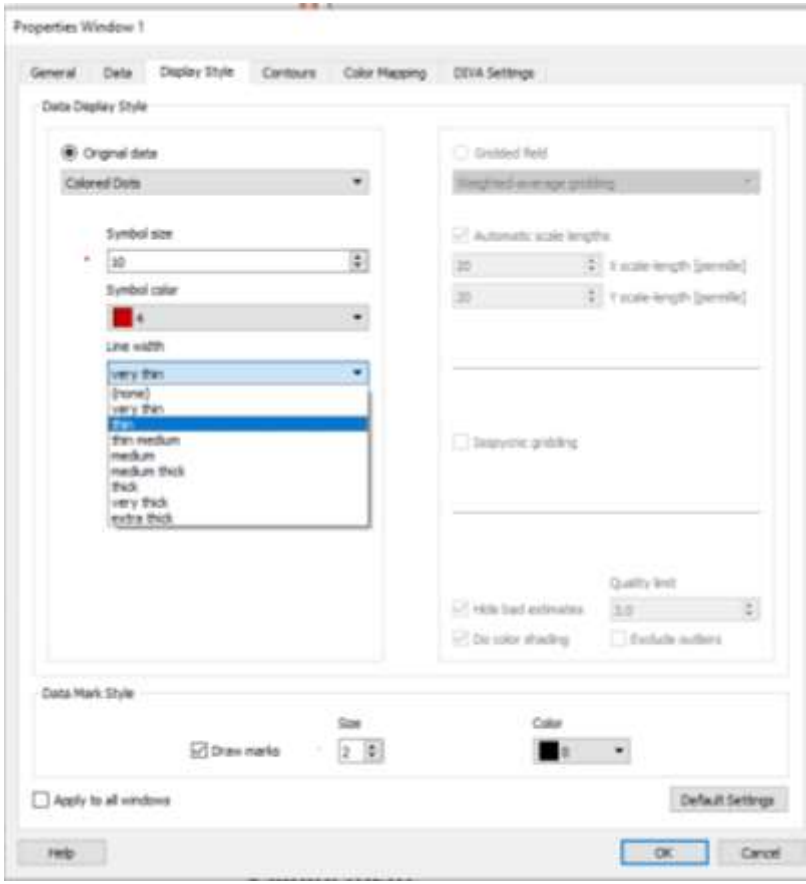
3. Set axis limits

- Right click on the scatter diagram > Set ranges
- Set temperature range to 0-35 and salinity range to 30-40 to ignore the outliers/ bad data



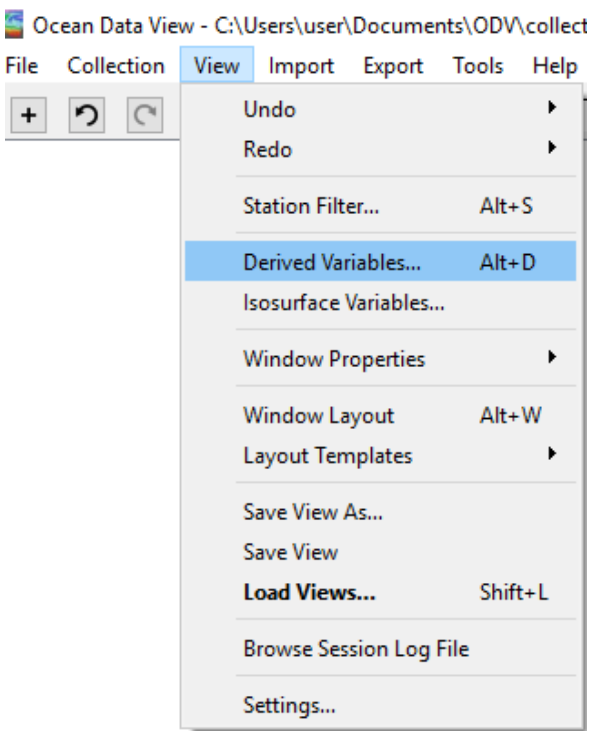
4. Change display properties

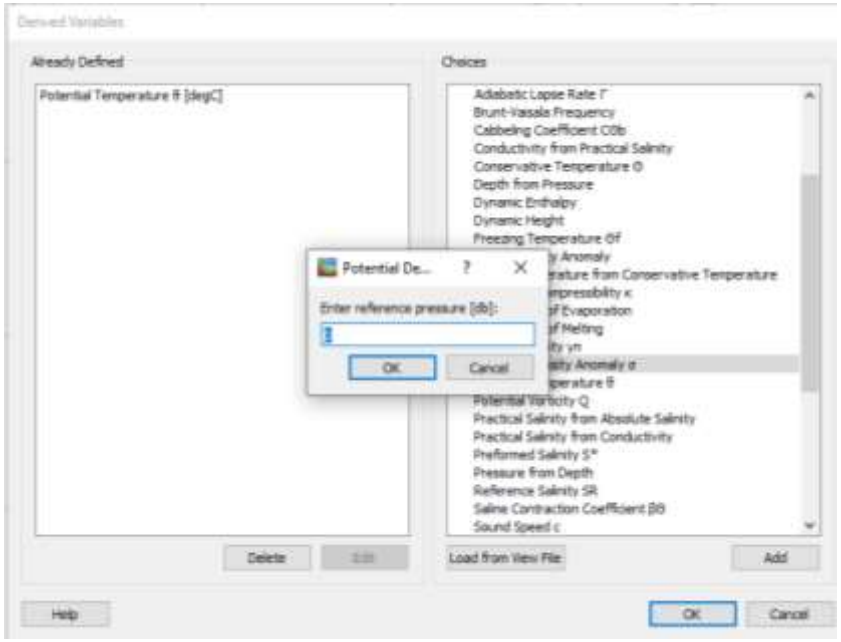
- Right click on the scatter diagram > Properties > Display Style
- Change the Symbol size, Symbol color, and Line width



5. Derived variables

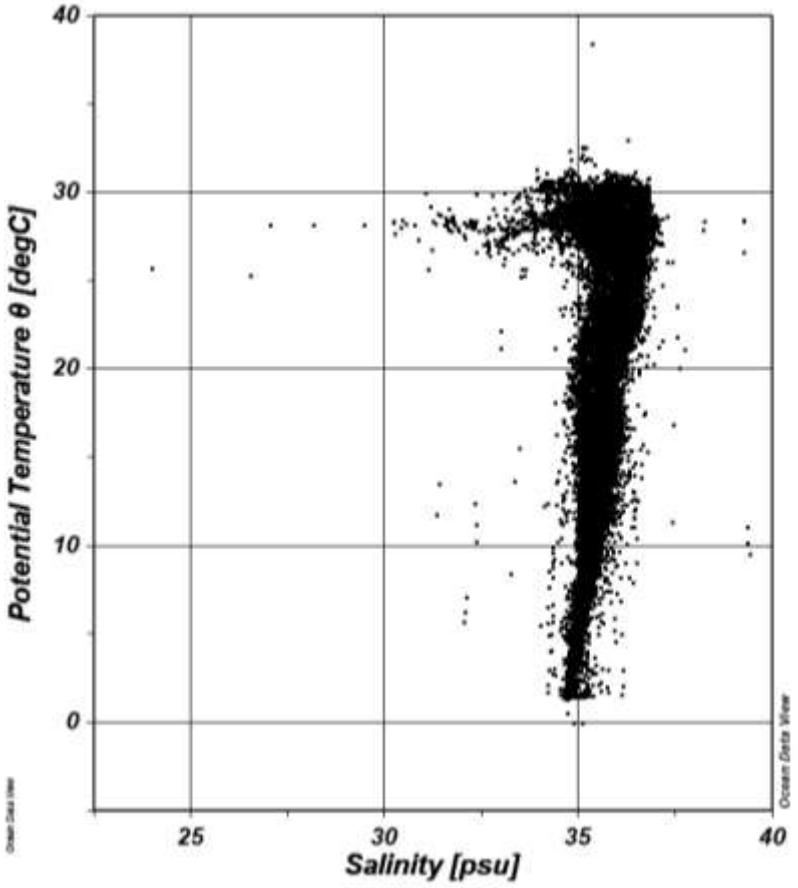
- Go to Top Menu > View > Derived variables
- Select Potential temperature and set reference pressure as 0 db. Then click Add > OK
- Similarly select and set potential density anomaly





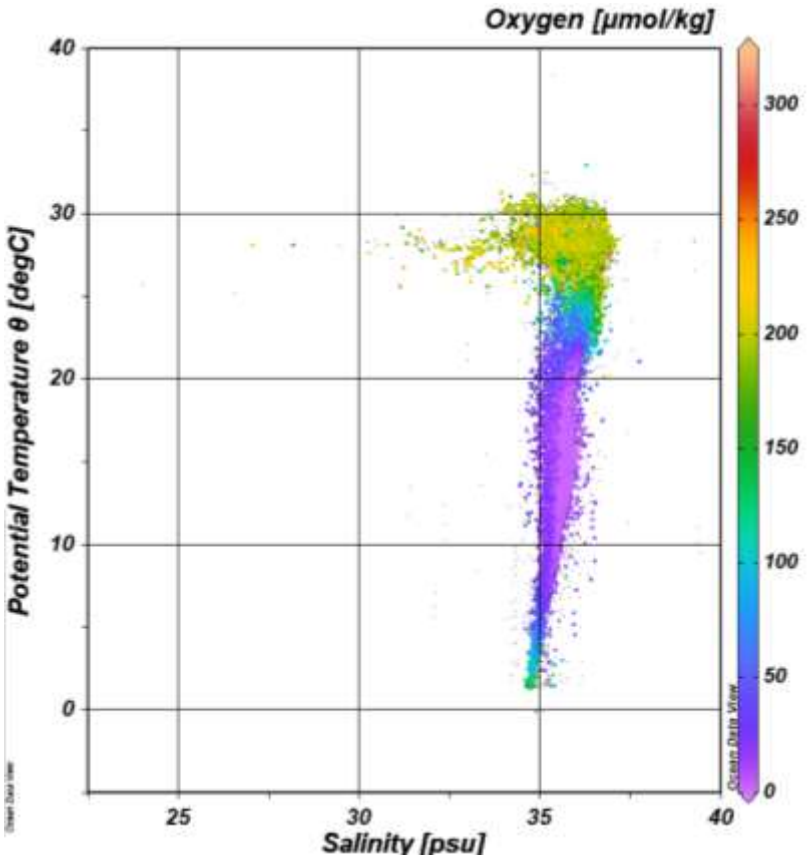
6. Plot Potential Temperature vs. salinity

- Right click on the scatter diagram
- Change the Y-Variable to drvd:potential temperature



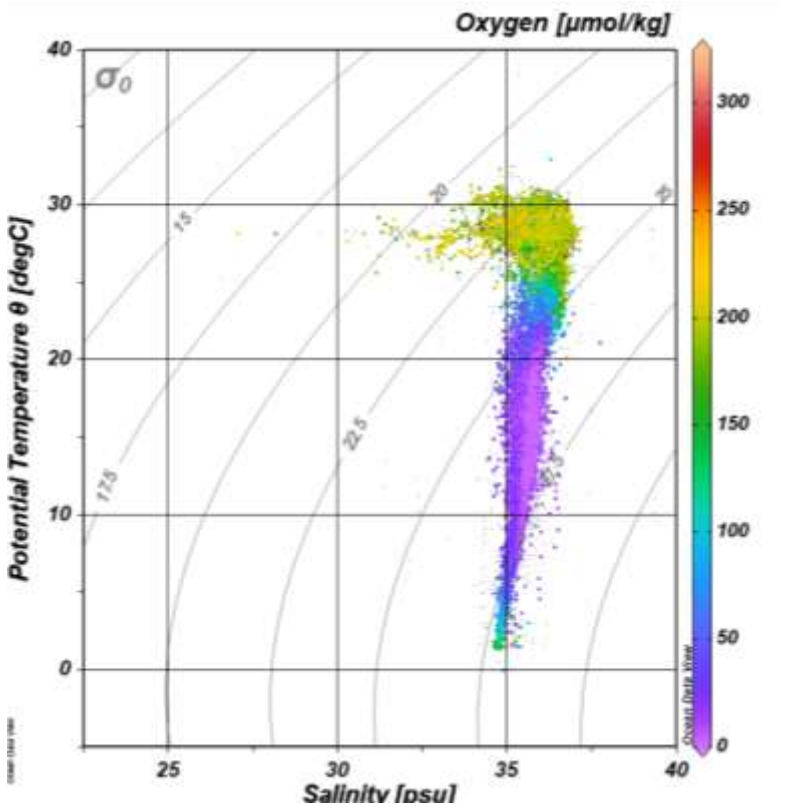
7. Overplot with another variable

- Right click on the scatter diagram
- Select Z-Variable as Oxygen



Other Options:

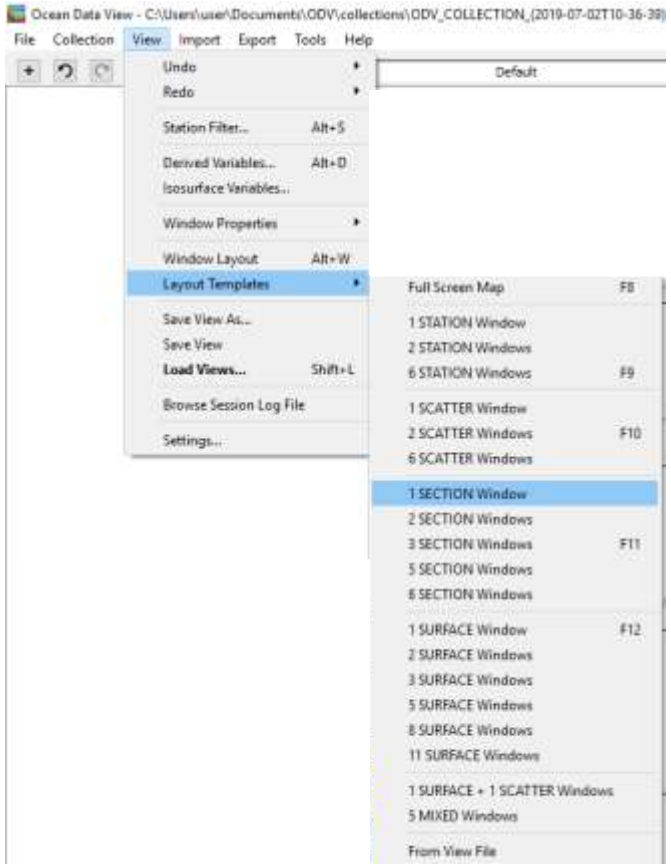
- Add isopycnals from Extras
- Save view from Menu > Save View As. Later Load this view from Menu > Load Views



Part 3:
Section plot

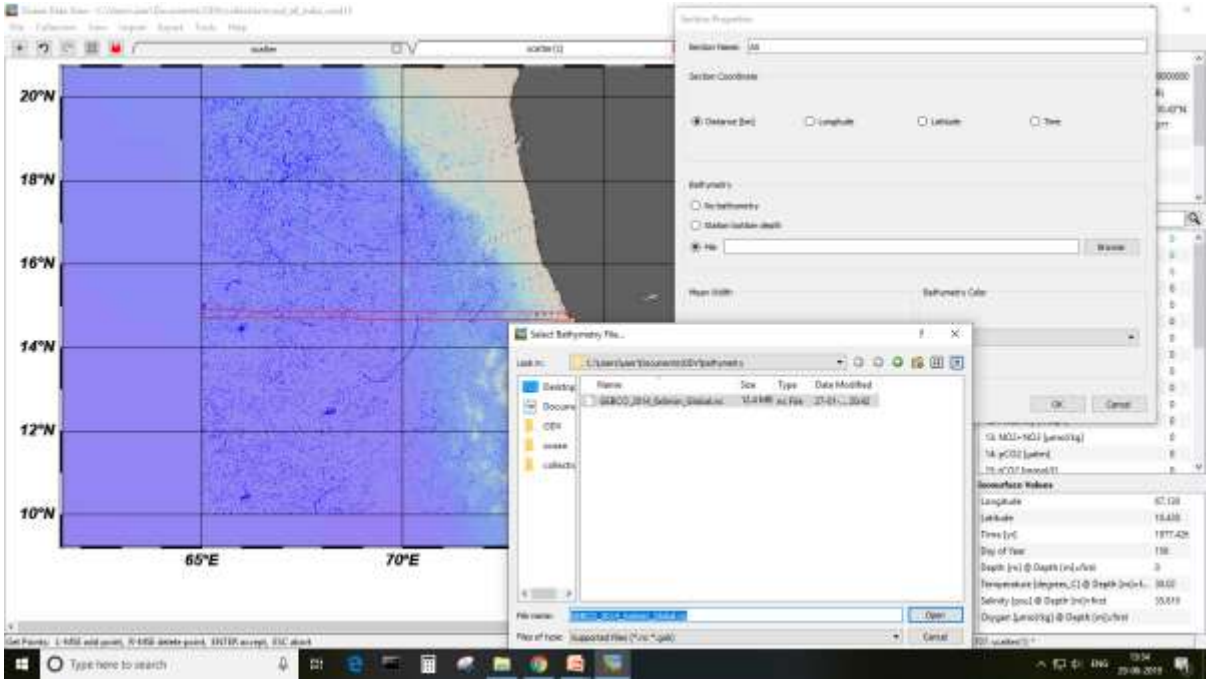
Section plot:

- Select View > Layout Templates to show a list of predefined window layout templates.
- Select 1 SECTION Window.



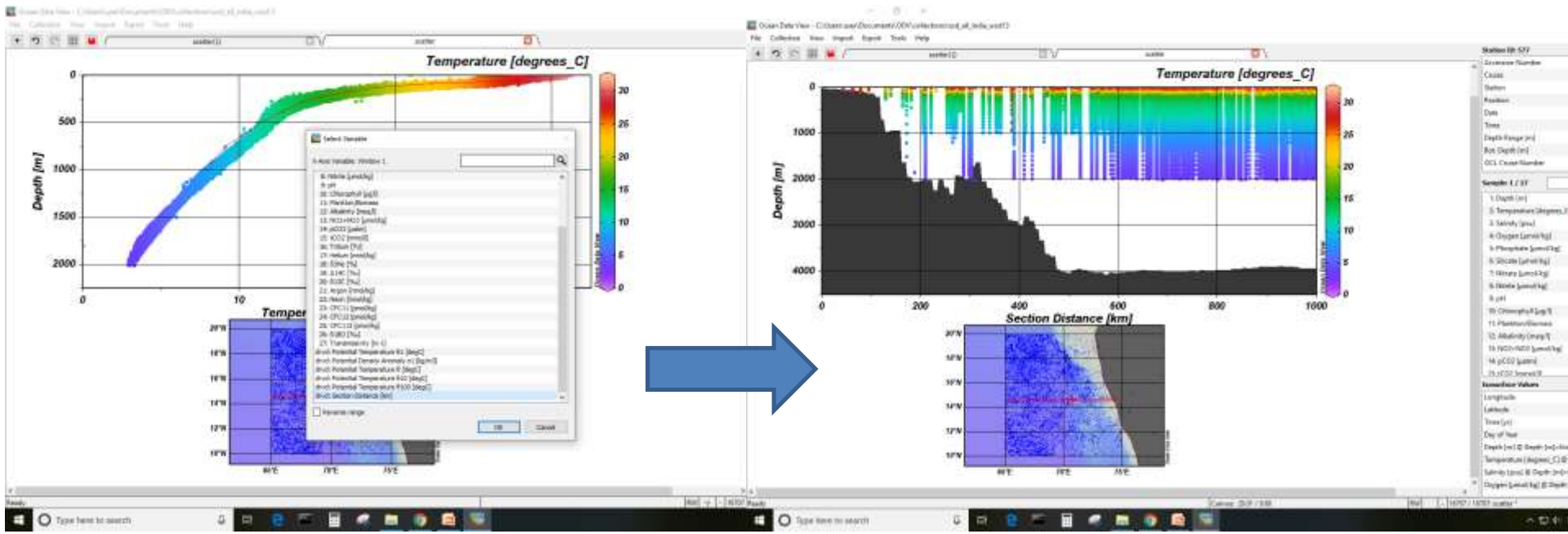
1. Define a geographic section:

- Right-click on the map, and select Manage Section > Define Section.
- Click on any point to start section. A red dot appears to mark the start point.
- Draw a line to the end point of the section and double click to end section.
- Provide Section name, choose bathymetry > File



2. Draw a Section Plot:

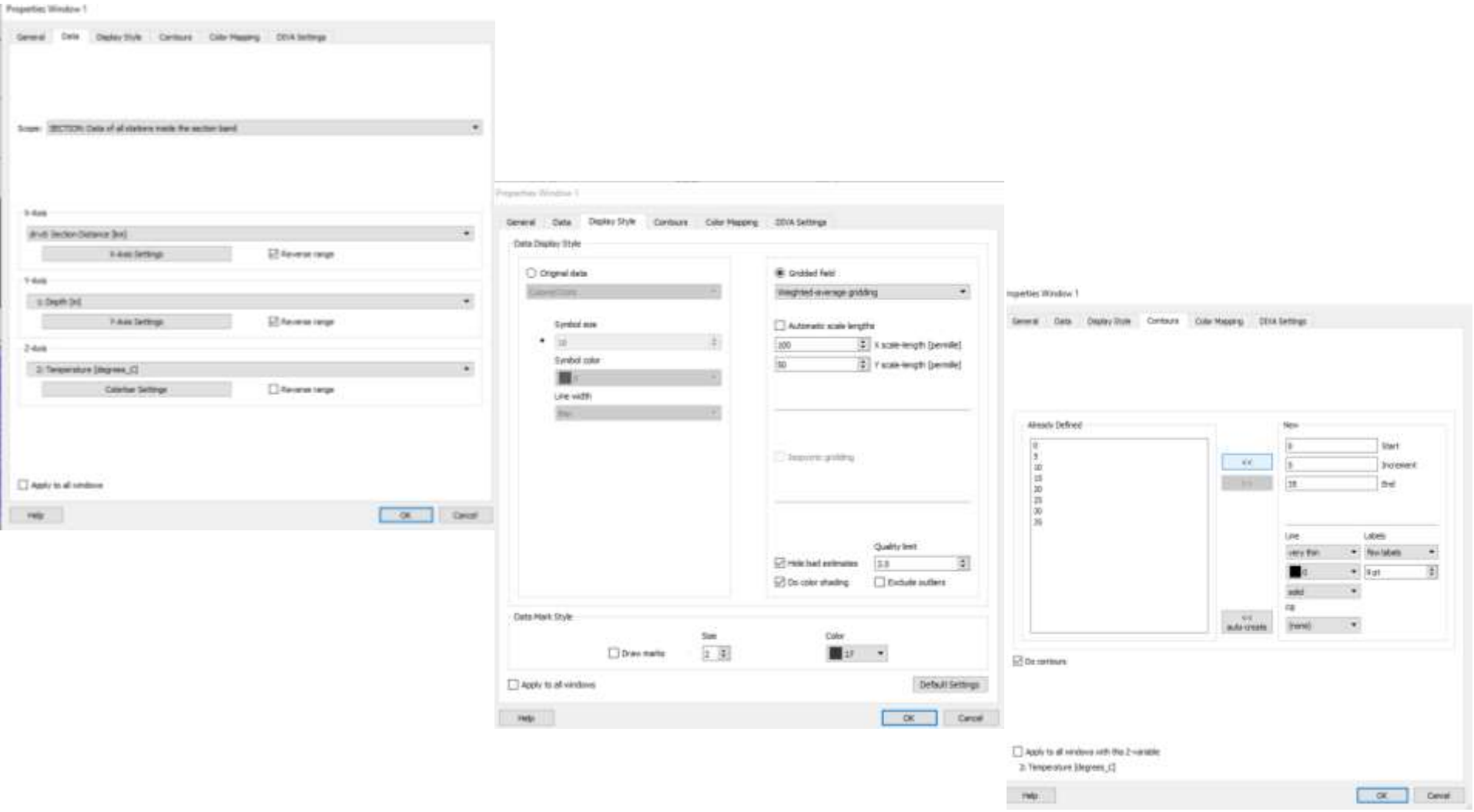
- Right click the section plot and select X-Variable > Section Distance. The section is displayed as coloured dots with the temperature scale bar on the right.
- Set range of X axis up to 4500 m to show the ocean floor.

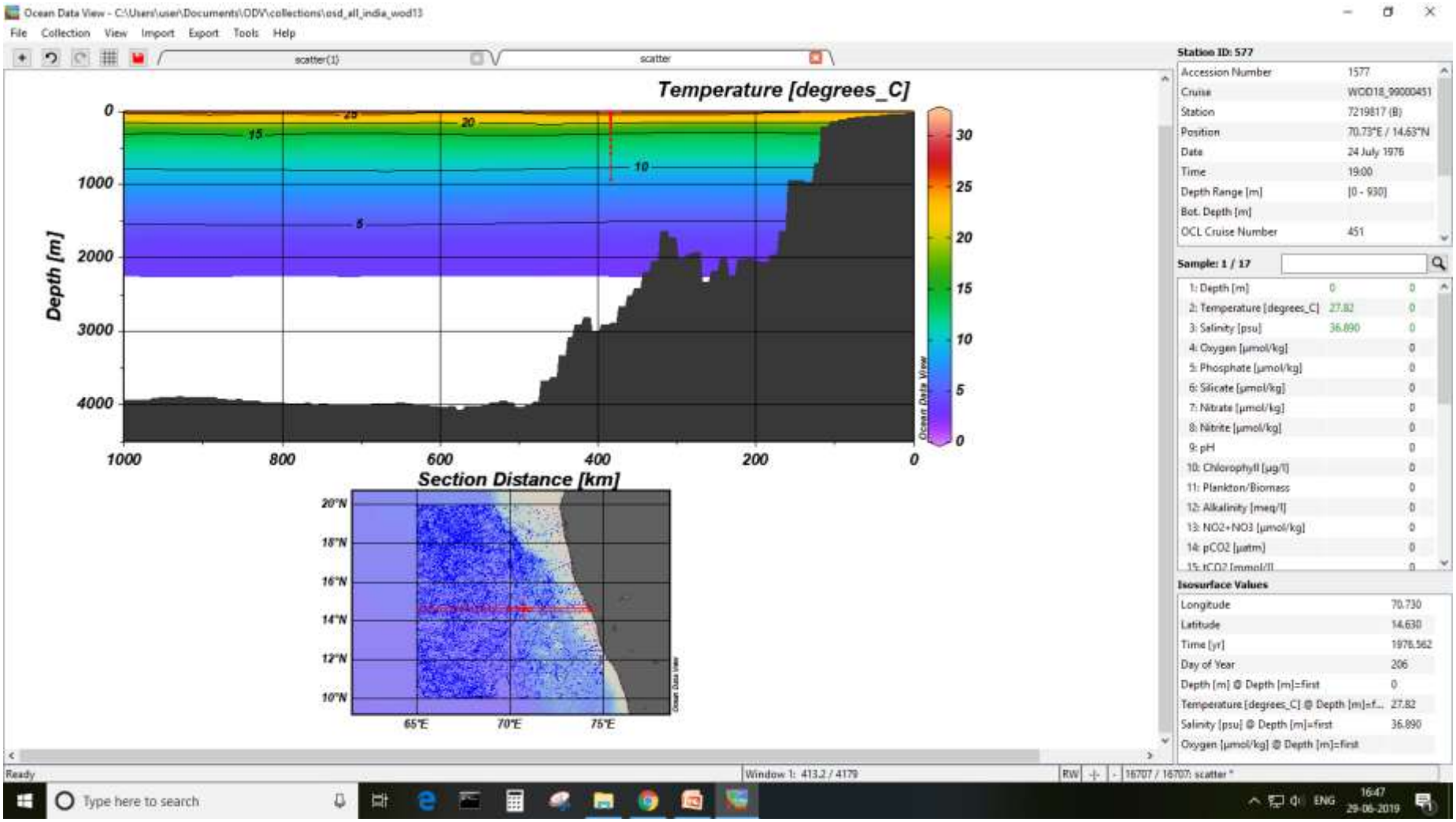


3. Data interpolation/Gridding:

- Right click the section plot and select Properties
- For Data, select Reverse Range X-Axis so the view is the same as the station map.
- In Display Style, use Weighted-average gridding, set X scale-length to 100 and Y scale-length to 50. Uncheck Draw Marks.
- Experiment with different length scales to get desired smoothness while preserving the data structure.
- In Contours, check Do Contours and click on the icon << to create contours for the z variable

Weighted-Average Gridding for Data Interpolation




Ocean Data View - C:\Users\user\Documents\ODV\collections\osd_all_india_wod13
File Collection View Import Export Tools Help
scatter(1)
scatter
Temperature [degrees_C]
Depth [m]
Section Distance [km]
Station ID: 577
Accession Number 1577
Cruise WOD18_99000451
Station 7219817 (B)
Position 70.73°E / 14.63°N
Date 24 July 1976
Time 19:00
Depth Range [m] [0 - 930]
Bot. Depth [m]
OCL Cruise Number 451
Sample: 1 / 17
1: Depth [m] 0 0
2: Temperature [degrees_C] 27.82 0
3: Salinity [psu] 36.890 0
4: Oxygen [µmol/kg] 0
5: Phosphate [µmol/kg] 0
6: Silicate [µmol/kg] 0
7: Nitrate [µmol/kg] 0
8: Nitrite [µmol/kg] 0
9: pH 0
10: Chlorophyll [µg/l] 0
11: Plankton/Biomass 0
12: Alkalinity [meq/l] 0
13: NO2+NO3 [µmol/kg] 0
14: pCO2 [µatm] 0
Isosurface Values
Longitude 70.730
Latitude 14.630
Time [yr] 1976.562
Day of Year 206
Depth [m] @ Depth [m]=first 0
Temperature [degrees_C] @ Depth [m]=f... 27.82
Salinity [psu] @ Depth [m]=first 36.890
Oxygen [µmol/kg] @ Depth [m]=first
Ready
Window 1: 413.2 / 417.9
16707 / 16707: scatter *
Type here to search
ENG
16:47
29-06-2019

- To save the settings for the section, right-click on the station map and select Manage Section > Save Section As. Accept the location and filename extension and enter the name AS_offshore_southwest. (for access later)
- To save the view of the data, select View > Save View As with the name India_southwest_section.

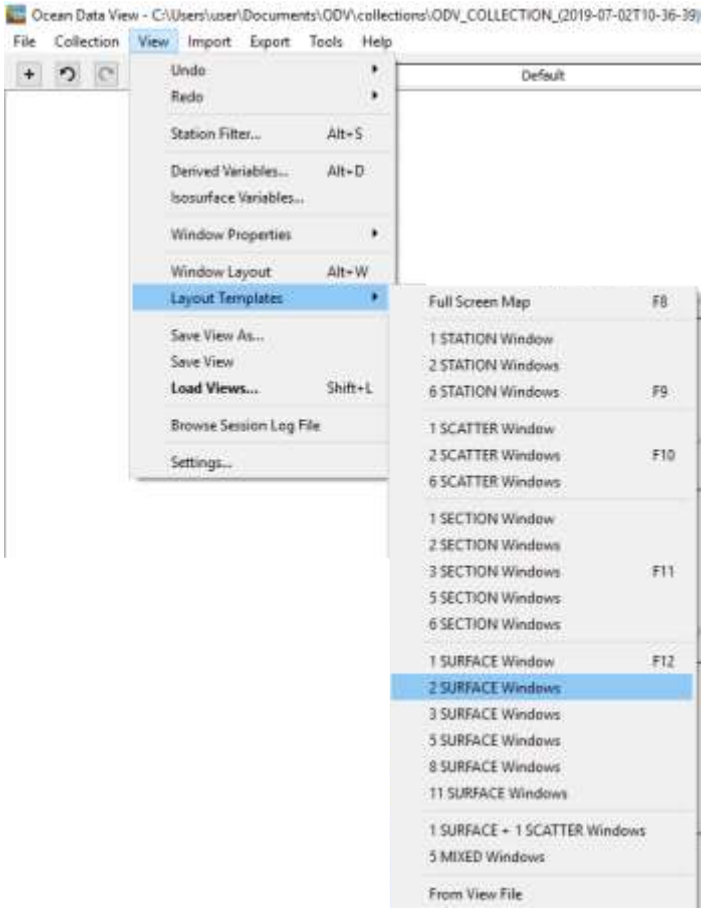
Task:

- Change the section variable to oxygen, and set ranges of the axis to view the continental shelf.

Part 3:
Surface plot

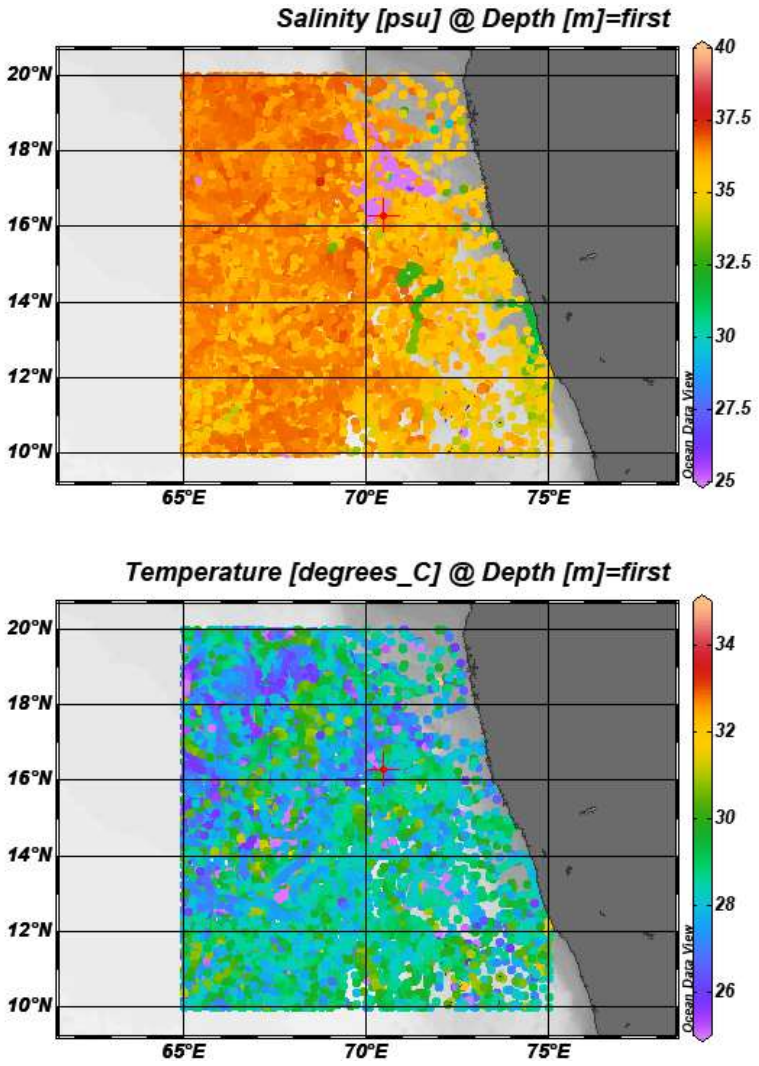
Surface plots:

- Select View > Layout Templates to show a list of predefined window layout templates.
- Select 2 SURFACE Window.

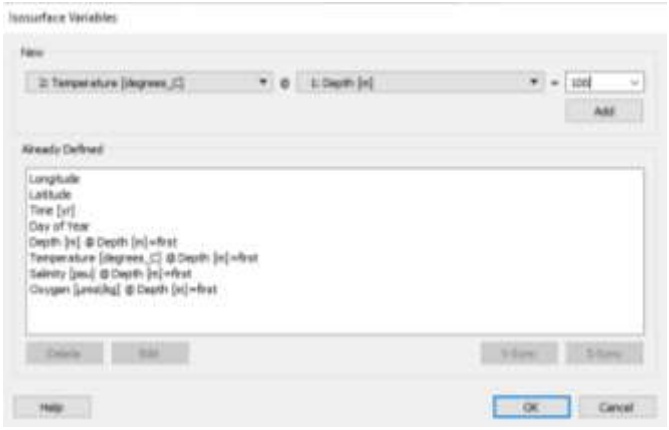


1. Draw Surface Plot:

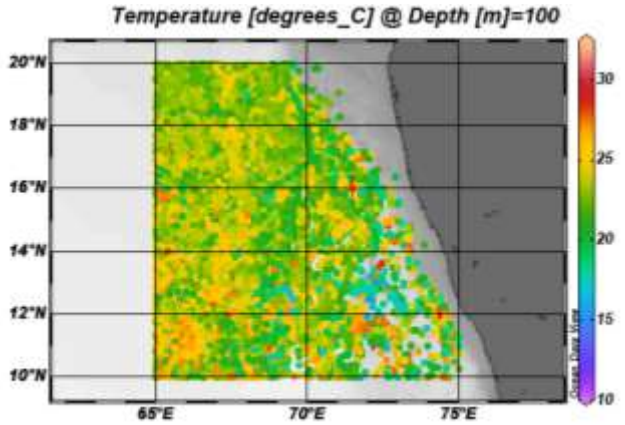
- Right click on one surface plot and select Z-Variable > Temperature.
- Right click on the other surface plot and select Z-Variable > Salinity.
- Set ranges of Z axis for temperature as 25 to 35 and salinity as 25 to 40.

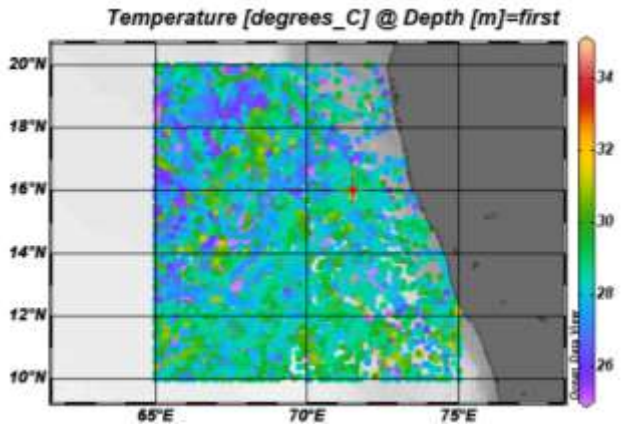


2. Isosurface variables:



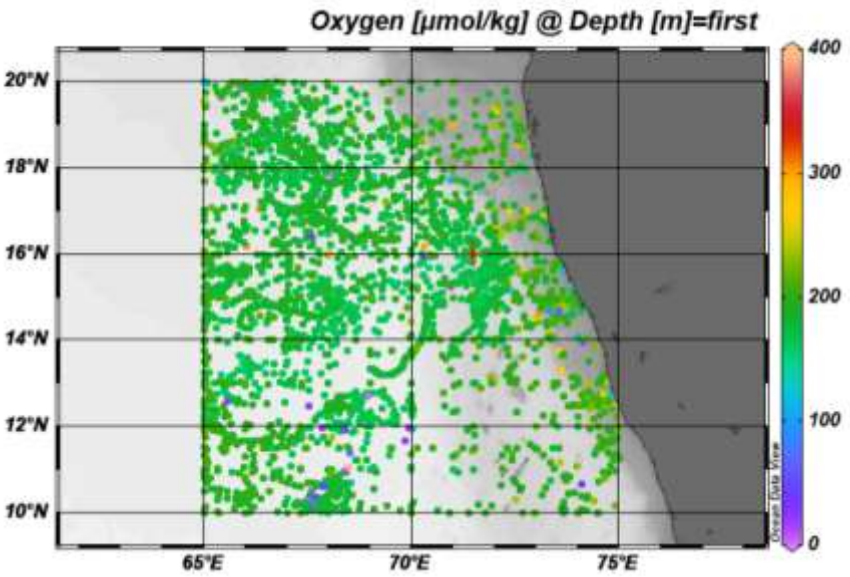
- Select View > Isosurface varaible
- Under New, select Temperature @ Depth = enter 100 m. Click Add, Ok
- Right click the salinity surface plot, select Z-variable and select Temperature at depth=100
- Set ranges as same limits for both the plots, for easier comparison.

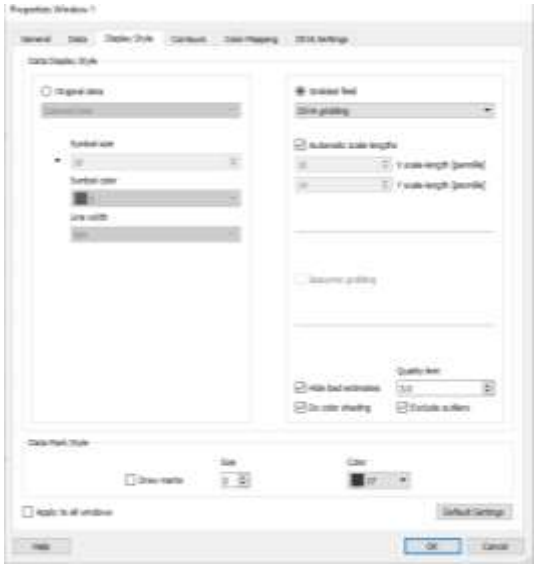


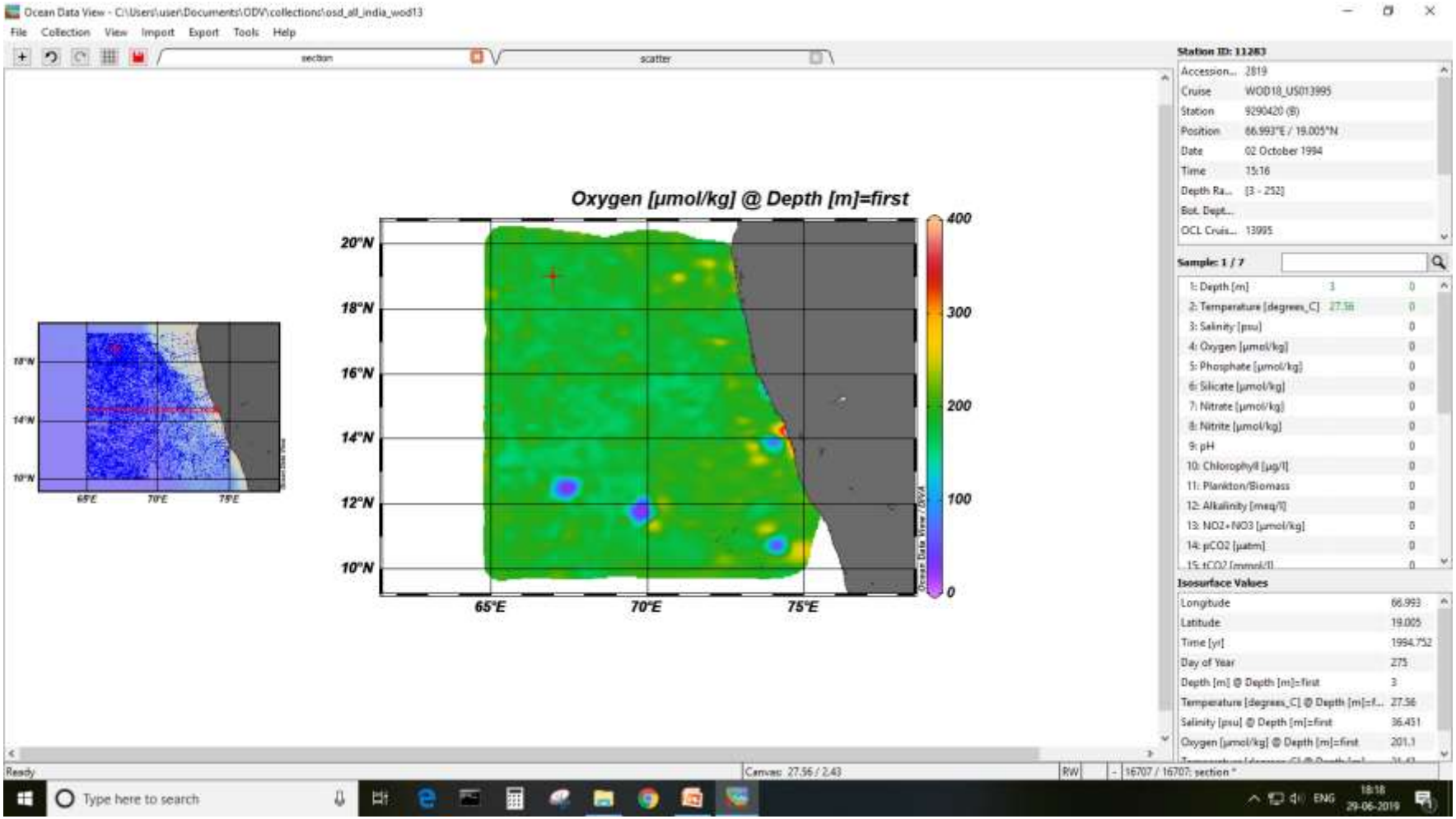


3. Data interpolation

- Again go to View > Layout Templates, select 1 SURFACE Window.
- Right click on the figure and select Z-variable as Oxygen. Set Ranges as per data variability.
- Again, click properties by right clicking, go to Display Style, select DIVA gridding.
- Uncheck Draw Marks. Check Hide Bad Estimates, Do color shading and Exclude outliers.






Ocean Data View - C:\Users\user\Documents\ODV\collections\osd_all_india_wod13
File Collection View Import Export Tools Help
section
scatter
Oxygen [µmol/kg] @ Depth [m]=first
20°N
18°N
16°N
14°N
12°N
10°N
65°E
70°E
75°E
400
300
200
100
0
Station ID: 11283
Accession... 2819
Cruise WOD18_US013995
Station 9290420 (B)
Position 66.993°E / 19.005°N
Date 02 October 1994
Time 15:16
Depth Ra... [3 - 252]
Bot. Dept...
OCL Cruis... 13995
Sample: 1 / 7
1: Depth [m] 3 0
2: Temperature [degrees_C] 27.56 0
3: Salinity [psu] 0
4: Oxygen [µmol/kg] 0
5: Phosphate [µmol/kg] 0
6: Silicate [µmol/kg] 0
7: Nitrate [µmol/kg] 0
8: Nitrite [µmol/kg] 0
9: pH 0
10: Chlorophyll [µg/l] 0
11: Plankton/Biomass 0
12: Alkalinity [meq/l] 0
13: NO2+NO3 [µmol/kg] 0
14: pCO2 [µatm] 0
Isosurface Values
Longitude 66.993
Latitude 19.005
Time [yr] 1994.752
Day of Year 275
Depth [m] @ Depth [m]=first 3
Temperature [degrees_C] @ Depth [m]=f... 27.56
Salinity [psu] @ Depth [m]=first 36.451
Oxygen [µmol/kg] @ Depth [m]=first 201.1
Ready
Canvas: 27.56 / 2.43
RW
16707 / 16707: section
Type here to search
ENG
18:18
29-06-2019

- To save the view of the data, select View > Save View As with the name india_surface_oxygen.
- To save the figure select Save Plot As by right clicking, and save into desired format (.png, .jpg, .ps, .tif etc)

Task:

- Add another isosurface variable 'oxygen at depth=200 m' to see the Arabian Sea oxygen minimum zone.