ODV-online HowTo

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This document contains hands-on procedures for creating different kinds of graphics and products with the ODV-online data analysis and visualization tool.

If you are new to ODV-online see the ODV-online getting started document to familiarize yourself with the elements of the user interface and the crucial role of mouse positioning as well as left and right mouse clicking.

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Distributions along a section
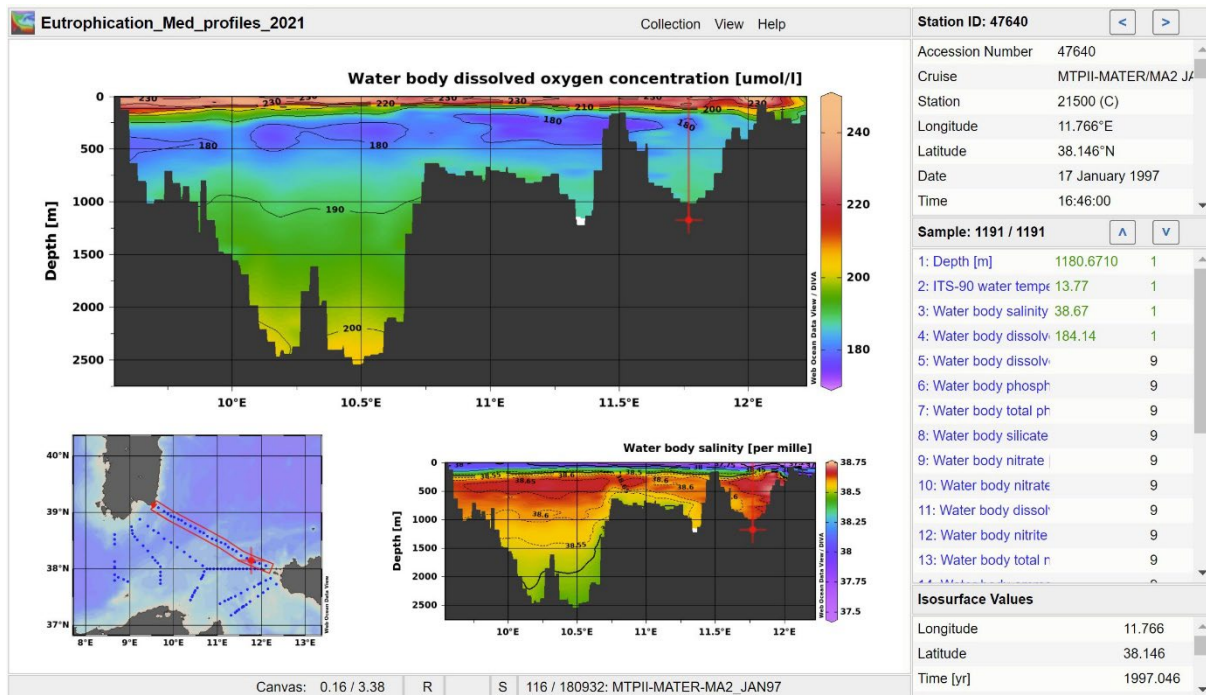
In this example we learn how to produce data distributions along a ship track (section), such as in the figure above. The section is nearly straight and quite simple in the present case, however, ODV-online also allows complicated tracks with many bends as well as curved tracks.

The figure shows dissolved oxygen and salinity versus depth along a section from southeast Sardinia to the western tip of Sicily. The data are from one particular cruise that took place in January 1997, thus representing winter conditions. The oxygen distribution shows high concentrations at the surface, an oxygen minimum zone at around 300 m depth, and increasing concentrations towards the bottom. The oxygen minimum zone is closely matched by a layer of high-salinity Levantine Intermediate water.

In this example we are using an eutrophication dataset from the EMODnet Chemistry project (https://www.emodnet-chemistry.eu/).

Open the dataset

In your webbrowser visit https://emodnet-chemistry.webodv.awi.de/, choose *eutrophication > Mediterranean > Eutrophication_Med_profiles_2021*. On the next page click DATA EXPLORATION.

Choose *View > Load View* and select *public > AllStationsMap*.

Select cruise MTPII-MATER/MA2 JAN97

Right-click into the map and choose *Station Filter > Customize*; visit the *Name / Range* page. In the *Cruise label* field enter MTPII-MATER/MA2 JAN97 or choose this entry from the list, then click *Apply*.

Zoom into the region between south Sardinia and western Sicily by right-clicking into the map, then choose *Zoom*. Drag the edges or corners of the zoom rectangle to the desired region and finally click the *Apply* button in the status bar.

Define the section

Right-click into the map and choose *Manage Section > Define Section*, note that the cursor changed to cross-hair. Move the cursor to the north-western end of the northern section and left-click the mouse. Follow the track towards south-east and left-click again, repeat this 3 or 4 times until you reach the south-east end of the section and finally click the *Apply* button in the status bar.

On the *Section Properties* dialog choose *Longitude* as *Section Coordinate* and 20 km as *Mean Width*. Then click Apply. Note the section band appearing in the map.

Establish the window layout

Choose *View > Layout Templates > 2 SECTION Windows*. Right-click into the upper data window, choose *Z-Variable* and select *4: Water body dissolved oxygen…* Then right-click into the lower data window, choose *Z-Variable* and select *3: Water body salinity*.

Refine the data display

Establish DIVA gridding by right-clicking into the upper data window and choosing *Properties.* Visit the *Display Style* page and in the combo-box under *Gridded field* choose *DIVA gridding*. Uncheck the *Automatic scale lengths* box, and for X and Y scale-lengths set 40 and 20, respectively. Uncheck the *Draw marks* box. Visit the *Contours* page. Set the *Start*, *Increment* and *End* values to 180, 10 and 270 and press the << button. Visit the *Color Mapping* page and press the *Auto Adjust* button. Press Apply.

Adjust the lower data window as described above.

Save the current layout as named view by choosing *View > Save View As* and specifying a descriptive name, e.g., *MTPII-MATER-MA2_JAN97*. Obtain a high-resolution image of the entire canvas by right-clicking on the canvas (white background area) and choosing *Save Canvas As*.

Distributions on constant depth surface
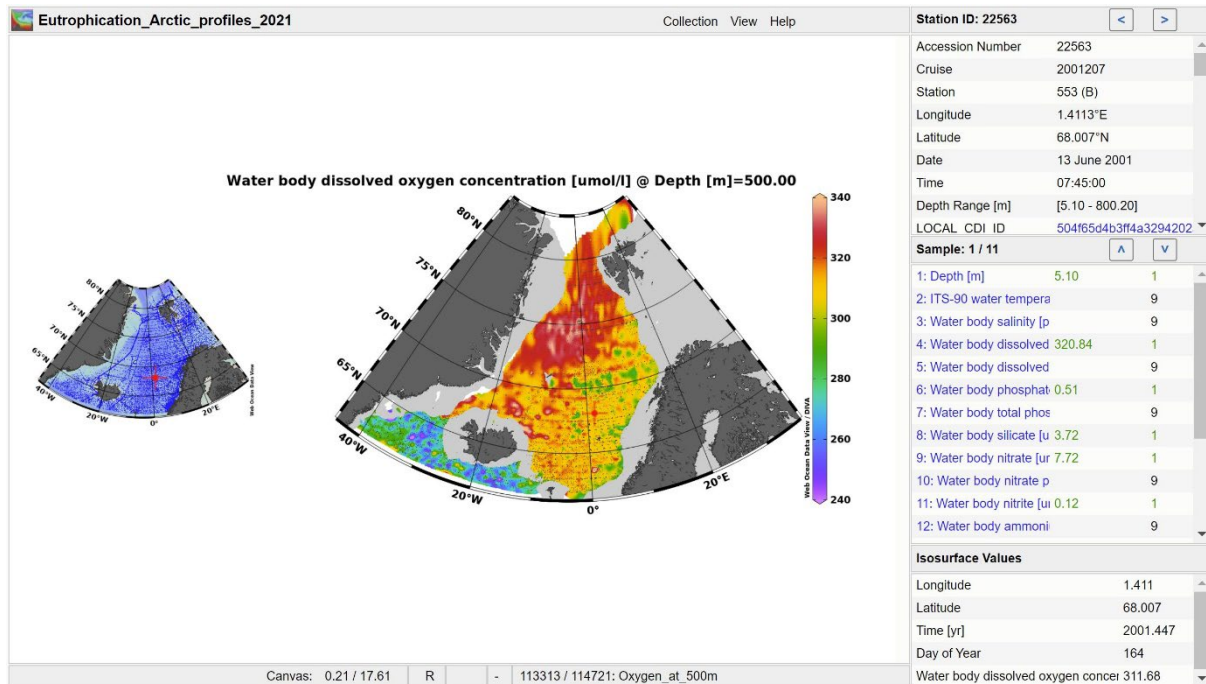
In this example we learn how to produce data distributions on constant depth surfaces, such as in the figure above. Obtaining distributions on constant density surfaces (isopycnals) is very similar, but instead of depth a derived density variable is used to define the surface. You also learn how to use special map projections, such as oblique orthographic.

The figure shows dissolved oxygen at a depth of 500 meters in the subpolar North Atlantic and the Nordic Seas. Clearly visible are high oxygen levels in the Greenland and Irminger Seas indicating intensive vertical ventilation. Oxygen concentrations are much lower in the region south of Iceland and in the Norwegian Sea due to the influence of the North Atlantic Current carrying oxygen deprived waters northward into the Greenland Sea and Arctic Ocean.

In this example we are using an eutrophication dataset from the EMODnet Chemistry project (https://www.emodnet-chemistry.eu/).

Open the dataset

In your webbrowser visit https://emodnet-chemistry.webodv.awi.de/, choose *eutrophication > Arctic > Eutrophication_Arctic_profiles_2021*. On the next page click DATA EXPLORATION.

Choose *View > Load View* and select *public > AllStationsMap*.

Define the oxygen @ 500 m isosurface variable

Right-click into the *Isosurface Values* list and choose *Sample Filter > Reject Outliers*. Again, right-click into the *Isosurface Values* list, this time choose *Isosurface Variables*. Delete all existing isosurface variables in the *Already Defined* list by selecting them and pressing the *Delete* button.

In the *New* group make the following choices:

      4: Water body dissolved oxygen concentration [umol/l] @ Depth [m] = 500

Then press *Add* and *Apply*.

Establish the window layout

Choose *View > Layout Templates > 1 SURFACE Window*. Right-click into the data window and choose *Zoom*. Drag the edges or corners of the zoom rectangle to the region covered by data and finally click the *Apply* button in the status bar.

Refine the data display

Adjust the value range of the Z variable by right-clicking into the data window and either choosing *Set Ranges* (enter 240 and 340 as minimum and maximum) or *Z-Zoom* (drag the bottom and top edges of the zoom rectangle in the color bar, then press the *Apply* button in the status bar).

Establish DIVA gridding by right-clicking into the data window and choosing *Properties.* Visit the *Display Style* page and in the combo-box under *Gridded field* choose *DIVA gridding*. Ensure the *Automatic scale lengths* box is checked. Press Apply.

Change the map projection by right-clicking into the map (on the left). Choose *Properties* and visit the *Projection* page. Choose the *Orthographic (Oblique)* projection and click *Apply*.

Save the current layout as named view by choosing *View > Save View As* and specifying a descriptive name, e.g., *Oxygen_at_500m*. Obtain a high-resolution image of the entire canvas by right-clicking on the canvas (white background area) and choosing *Save Canvas As*.

Along-track distributions from profiling floats
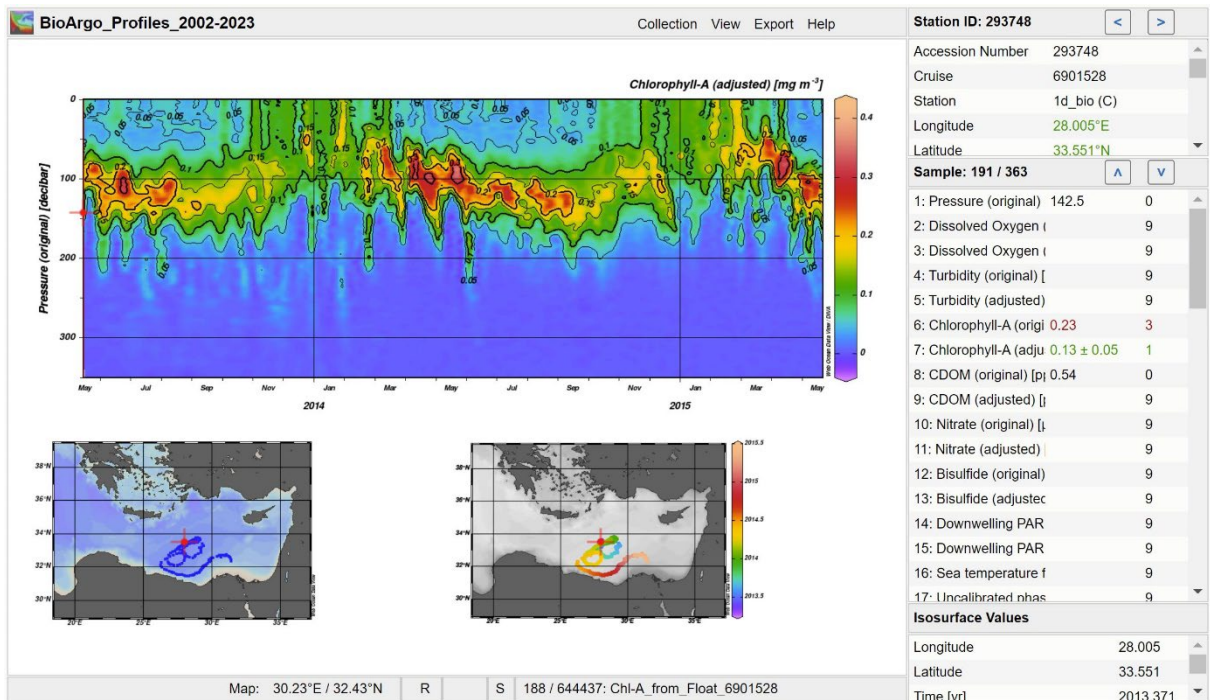
In this example we learn how to produce data distributions along the track of drifting profiling floats, such as in the figure above. The procedure can also be applied to create similar temporal evolution plots from sets of hydrographic stations repeated over time in a small geographical region.

The figure shows chlorophyll-a data from a profiling float in the eastern Mediterranean over a two year period from 2013 until 2015. The track of the float is shown in the small plot on the lower right, colors indicating time. Evidently, the float is trapped in two eddies at the start of the observations (magenta/blue), before starting an eastward journey along the coast of Egypt (orange/red). The large plot at the top shows chlorophyll-a concentrations in the upper 380 m of the water column (Y axis) versus time (X-axis). Clearly visible are subsurface Chlorophyll maxima at around 100 m depth during most of the year, except for winter and spring times, when high chlorophyll concentrations reach up to the surface. Satellite sensors that can only "see" the upper ten meters of the water column are missing most of the chlorophyll signal.

In this example we are using a global collection of BGC-Argo data from drifting floats.

Login to EGI

In your webbrowser visit https://webodv-egi-ace.cloud.ba.infn.it/login and click on the *Login with EGI* button, taking you to the EGI login page. You have different options for login, either using your academic account (scroll through the list of supported institutions or use the search field to locate your institute quickly) or via your Google, ORCID, Facebook or other social media account. Please choose the login route that is most convenient for you.

Open the dataset

Once you are logged in, the tree of available datasets is shown in the bottom part of the page. Choose *Ocean > Biogeochemistry > Argo > BGC-Argo_Global_Profiles_2002-2023*. On the next page click DATA EXPLORATION.

Choose *View > Load View* and select *public > AllStationsMap*.

Select float PF_6901528

Right-click into the map and choose *Station Filter > Customize*; visit the *Name / Range* page. In the *Cruise label* field enter PF_6901528, then click *Apply*.

Zoom into the region of the drifting float by right-clicking into the map, then choose *Zoom*. Drag the edges or corners of the zoom rectangle to the desired region and finally click the *Apply* button in the status bar. Delete the two labels by moving the mouse over them, right-click and choose *Delete Object*.

Define derived variables

Choose *View > Derived Variables*. Under *Choices* open the *Metadata* group, click on *Latitude*, then *Longitude*. Now open the *Time* group, and click on *Time (station date/time)*. Click the *Apply* button.

Establish the window layout

Choose *View > Layout Templates > 2 SCATTER Windows*. Keep the station map untouched, but change the geometry of the two data windows one by one like in the figure above. Perform the following steps: right-click into the data window, choose *Layout > Move / Resize Window*, then drag the zoom rectangle to the desired location and size, and click the *Apply* button in the status bar. Make sure to leave margins on all sides of the data windows for color bar and axis annotations.

Select X, Y, Z variables

Right-click into the lower-right data window, choose *X-Variable* and select *Longitude* (near the end of the list). In the same way define the Y and Z variables as *Latitude* and *Time (station Date/time)*, respectively. In the upper data window put *Time (station Date/time)* on X, and *Water body Chlorophyll-A (adjusted)* (variable 7) on Z.

Refine the data display

- Small data window: Increase the dot size by right-clicking into the data window, choose *Properties* and visit the *Display Style* page. Under *Original Data* choose a larger *Symbol size*. Press *Apply*.
- Large data window: Zoom into the upper water column by right-clicking into the data window, choose *Zoom* and drag the lower edge to a depth of about 380 m. Also move the left and right edges closer to the first and last data. Then click the *Apply* button in the status bar.
- Large data window: Establish DIVA gridding with contour lines. Right-click into the data window, choose *Properties* and visit the *Display Style* page. In the combo-box under *Gridded field* choose *DIVA gridding* and ensure the *Automatic scale lengths* box is checked. Uncheck the *Draw marks* box to switch off marking the data locations. Now visit the *Contours* page and simply click the << *auto-create* button. Remove all contour lines from the *Already Defined* list except the 0.05, 0.1, 0.2, and 0.5 lines by selecting the others and pressing the >> button. Press *Apply*.

Save the current layout as named view by choosing *View > Save View As* and specifying a descriptive name, e.g., *Float_6901528_Chl-a_along_track*. Obtain a high-resolution image of the entire canvas by right-clicking on the canvas (white background area) and choosing *Save Canvas As*.