OCN 623  How to use ODV

Currently 46,300 registered users, ~20 new users every day!!

Jan 21, 2016

What is ODV?

• “Ocean Data View (ODV) is a software package for the interactive exploration, analysis and visualization of oceanographic and other geo-referenced profile, time-series, trajectory or sequence data. ODV runs on Windows (8, 7, Vista, XP), Mac OS X, Linux, and UNIX (Solaris, Irix, AIX) systems.”

Free, Easy-to-use, visual, practical...etc..

Prof. Reiner Schlitzer
Alfred Wegener Institute
His Research Interests:
Modeling; Nutrient and Carbon Cycles; Information Systems;
Productivity and Particle Fluxes; Radionuclides
What can you do with ODV?

- property/property plots of selected stations
- scatter plots for sets of stations
- color sections along arbitrary cruise tracks
- color distributions on general isosurfaces
- geostrophic velocity sections
- temporal evolution plots of tracer fields
- differences of tracer fields between repeats
- Animations
- interrupted maps.

Example. property/property plots of selected stations
Example. scatter plots for sets of stations

Example. color sections along arbitrary cruise tracks
Example. color distributions on general isosurfaces

Example. interrupted maps
**Example.**

Temporal evolution plots of tracer fields
- Time-series data at BATS station

**Example.**

Animations

*Mean Sea Level Pressure [Pa]*
Example. animation 2

Data sets that are or soon will be able to be downloaded in ODV format (2017)

• CCHDO [http://cchdo.ucsd.edu/]
• GO-SHIP (2012-2023)
• WOCE
• GEOSECS
• HOTS & BATS
• The Rolling Deck to Repository (R2R) [http://www.rvdata.us/]
• The Biological and Chemical Oceanography Data Management Office (BCO-DMO) [http://www.bco-dmo.org/]

http://cchdo.ucsd.edu/search?dtstart=1800
Let’s get started


1. Download data and open it
2. Modify views
3. Create your own data file
4. Open new ODV & import your data file
5. Make T-S diagram and derived variable
6. How to save figures and views
“6 Scatter Windows” mode

This mode shows all of the station data in this odv file. (Scatter mode)
Red color in the scatter window shows the data at the station selected on the map (selected station is shown with red cross symbol).
“6 Scatter Windows” mode

The Red cross symbol in the scatter window shows the data at the depth. The selected parameter value is shown in “Variables box” together with the other parameters.

Quality Flag (QF)


**ODV flag:**

QF

- You use the flag to identify data quality, you can then isolate bad data from your figure!

- If you do not add QF column, ODV will automatically assign a flag “unknown (QF=1)”.

<table>
<thead>
<tr>
<th>Flag Description</th>
<th>ODV</th>
</tr>
</thead>
<tbody>
<tr>
<td>good quality</td>
<td>0</td>
</tr>
<tr>
<td>unknown quality</td>
<td>1</td>
</tr>
<tr>
<td>questionable quality</td>
<td>4</td>
</tr>
<tr>
<td>bad quality</td>
<td>8</td>
</tr>
</tbody>
</table>
“6 Scatter Windows” mode

“Metadata” show the information of the selected station on the map (e.g. Cruise name, Station #, Position (Long/Lat), sampling date etc.)

Right click ("control" + click if you are Mac user), and select “Window Layout”. 

“Isosurface values” show the calculated/selected values at the selected station. (see detail in the ODV manual)
“6 Scatter Windows” layout mode

This is “layout mode” of 6 scatter windows, and you can modify the layout of your windows (e.g. add new window, change the size, select different parameter etc.)

Window’s number
Window type

Metadata
Variables

Isosurface Values
“6 Scatter Windows” layout mode

Move your cursor on the scatter window that you want to modify, and then Right click (“control” + click if you are Mac user).

- Move / Resize
- Delete Window
- Create New Window
- Create Overlay Window
- Move to Foreground
- Move to Background
- Properties
  - X-Variable
  - Y-Variable
  - Z-Variable
- Layout Templates
- Accept
- Cancel

Change the size of windows
Add the new windows

After you change the layout, select “Accept”.

“6 Scatter Windows” mode

[Diagrams and images related to scatter windows and data analysis]
Let’s change the temperature plot to pH.

Move your cursor on the scatter window that you want to change the parameter, right click (“control” + click if you are Mac user), then select “Properties”.

Let’s change the temperature plot to pH.

Select “Data” tab, then select “X-axis” (now selected “2:CTD Temperature [ITS-90]”).
“6 Scatter Windows” mode

Now you will see the modified scatter window showing pH as a vertical profile.
“6 Scatter Windows” mode

Move your cursor in the scatter window that you want to change the selection criteria, right click (“control” + click if you are Mac user), then select “Sample Selection Criteria”.

How to change the parameter’s QF

In Quality tab, select “Variable” that you want to change the selection criteria.

Select Quality Flags that you want to show. You can select multiple qualities if you want. ODV default is all flags.

- 0: good quality
- 1: unknown quality
- 4: questionable quality
- 8: bad quality

Select only “0: good quality” here.
“6 Scatter Windows” mode

If the pH data in the scatter window disappeared, you are exactly following my instructions.

The pH values are not showing here because all of the flags in this data set were recorded as “unknown (=1)” by ODV.

Depending on what you want to modify, you have to select “Map” or “Scatter Window” or “background”.

Map  Scatter Windows  Background
“6 Scatter Windows” mode

How to save figures and views

How to save views:
Click “View” in the Menu Bar to select “Save View as” or “Save View”.

How to save figures:
Click “File” in the Menu Bar to select “Save Canvas as”.

Tip: The highest resolution of the canvas you can save is 499, which would be important for a publication. Also when you print the Canvas, it would take a long time to print. Save as the canvas, and then print it (faster!).
Let's change the view from the vertical profiles to "Phosphate Time Series" mode!

<table>
<thead>
<tr>
<th>Variable</th>
<th>Time Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIC</td>
<td></td>
</tr>
<tr>
<td>Oxygen</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td></td>
</tr>
<tr>
<td>Phosphate</td>
<td></td>
</tr>
<tr>
<td>Silicate</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
</tr>
</tbody>
</table>

Phosphate Time Series in Section Mode: All of the stations data
Exercise 1.
Now to create your own ODV readable text file

1. Open the “header.xlsx” file, and look at the first row. The essential parameters are:

- **Cruise (name)**
- **Station (numbers)**
- **Type (B or C)**
- **Latitude (North +, South -)**
- **Longitude (East +, West -)**
- **Pressure (or depth)**
- **QF**

Your parameters
2. Open “example1.xlsx” and then let’s arrange the windows to look at both Excel files together.
Select “Window”- then select “Arrange”, then click “vertical”.

3. Copy the parameter values from “example1.xlsx” to the correct parameter name in the “header.xlsx” Excel spreadsheet.
When you have finished, it should look like this.

![Excel Spreadsheet Image]

4. Save “header.xlsx” in Tab delimited format (.txt).
   Is now header.txt.
   ODV will only recognize files in the tab delimited format (.txt).

![Save As Image]
Exercise 2.
Let’s create your own ODV file & figures

1. Close the HOT ODV data file. Open up the ODV program you downloaded. Create New Collection. Find the place you want to save the new ODV collection.
2. Choose “Definition of collection variables”. Select “Use .txt, .odv, .var or other file as template” and select your file that you made (“header.txt”).

This step defines how ODV will read your data (i.e. metadata, variable name, QF etc.)

Now you made a new ODV file with your parameters in the header. Next, you have to import your data!
3. Click “Import”, and select “ODV spreadsheet” and select the txt file that you made.  
This step actually imports your data into ODV.

Now you can see your data on the screen!

Use a magnifying glass!
Zoom the map: Right click on “Map” window, and select “Full Domain”.

Kaneohe Bay data!
Select “2 scatter windows”

“2 scatter windows” mode
**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. Create “Derived Variables”

1. Select “Derived Variables” under “View” tab.

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”!

drvd: Potential Temperature
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”.
Draw Map & stations

Hatta et al., 2014 & Measures et al., 2014
Same section with different depths

Hatta et al., 2014

Vertical Profiles + T-S diagram

Hatta et al., 2014
Concentrations with color as well as flow direction (ADCP data)

Temperature overlaid with Salinity

Measures et al., 2014

Grand et al., 2015
Reference

ODV User’s Guide:
http://odv.awi.de/en/documentation/

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

Kaneohe data:
http://data.nodc.noaa.gov/cgi-bin/iso?id=gov.noaa.nodc:0099831

Questions?

Mariko Hatta
Office: MSB 509
mhatta@hawaii.edu