OCN 623  How to use ODV

Latest ODV4 Version: ODV 4.7.10 (Feb 07 2017)
http://odv.awi.de/

Currently >60,000 users, 10~20 new users every day!!

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, Mac OS X, Linux, and UNIX (Solaris, Irix, AIX) systems. ODV data and configuration files are platform-independent and can be exchanged between different systems.”

• Data from Argo, GTSP, CCHDO, World Ocean Database, World Ocean Atlas, World Ocean Circulation Experiment (WOCE), SeaDataNet, and Medar/Medatlas can be directly imported into ODV.

• ODV also supports the netCDF format and lets you explore and visualize CF, COARDS, GDT and CDC compliant netCDF datasets.

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

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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

eWOCE
Example. color distributions on general isosurfaces

Example. interrupted maps

World Ocean Atlas 2013

Oxygen [mL/L] @ Depth [m]=100
temporal evolution plots of tracer fields
- Time-series data at BATS station

Example.

Mean Sea Level Pressure [Pa]

Example.

animations
Example.

Data sets are able to be downloaded in ODV format
- CCHDO website (http://cchdo.ucsd.edu/)

Various programs:
• GO-SHIP
• SOCCOM
• USHYDRO
• WOCE
• DIMES
• ELLETT
• Project Carina
• Hawaii Ocean Time Series (HOTS)
• Bermuda Atlantic Time Series (BATS) ...etc

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

Find where you have put ODV data files on your computer.
“6 Scatter Windows” mode

In scatter mode, all data within the map are shown. Clicking on a particular station, will highlight that station’s data in red. If the station has multiple occupations, like HOT, then you can scroll between different occupations with the left and right arrows on your keyboard.
“6 Scatter Windows” mode

You can move up and down the red highlighted profile with up and down keys. And the data corresponding to the point will be shown in the variables window.

Quality Flag (QF)


**ODV flag:**

- Every parameter and each sample can have its own quality flag, good, unknown, questionable, or bad.

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

- ODV always assign quality flag = 1 i.e. unknown if you do not.
“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.)

“Isosurface values” show the calculated/selected values at the selected station. (see detail in the ODV manual)

Let’s change the layout of the canvas

Move your cursor in the white part (it should not be on the map or on any scatter window)

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

After you change the layout, select “Accept”.

“6 Scatter Windows” mode

Metadata
Variables
Isosurface Values
Let’s change the temperature plot to pH.

To make changes in any window, put your cursor and right click ("control" + click if you are Mac user) click in the window, 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]”).
Let’s change the temperature plot to pH.
Select “8:pH”, then select “OK”.

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

Now, we are going to modify the sample selection criteria used for the plot.
Let’s modify the sample selection criteria!

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 modify the sample selection criteria (Quality Flag)!

In Quality tab, select “Variable” that you want to modify 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.
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.

Different window types (shown in color) have different pop-up menus!

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

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Map  Scatter Windows  Background
Different window types (shown in color) have different pop-up menus!

How to save figures and views

All of the parameters in a canvas, window types, parameters shown, scaling, etc. are known as a view which can be saved. 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!

Phosphate Time Series
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

You must have all 6 meta parameters except type in the header and data must be in the columns or ODV won’t work.
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.

4. Save “header.xlsx” in Tab delimited format (.txt) is now “header.txt”.

ODV will only recognize files in the tab delimited format (.txt).
Exercise 2.

Let’s create your own ODV file & figures

1. Close the HOT ODV data file. Open up the ODV program you downloaded. Then, let’s create new collection. Select “File” tab, and select “New”. Then, 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!
Let’s make “2 scatter windows” using Layout Templates

“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. Let’s make a potential temperature-salinity diagram. In order to calculate “potential Temperature” using ODV “Derived Variables” function!

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) Select “Derived Variables” under “View” tab.
   (2) Select “Potential Temperature” under “Physical Properties”.
   (3) Identify “Depth in Water Column (m)”, “Temperature”, and “Practical Salinity”.
   (4) Enter reference pressure: 0
4. You calculated “Potential Temperature”!

Now, “drvd: Potential Temperature” are appeared in the variables window!

Let’s select CTD salinity as x-axis and drvd: Potential Temperature as y-axis!
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

Horizontal Profiles + T-S diagrams

Vertical Profiles + T-S diagram
ADCP data during the cruise

Grand et al., 2015

Concentrations with color as well as flow direction (ADCP data)

Measures et al., 2014
Temperature overlaid with Salinity

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

Reference

Grand et al., 2015
Questions?

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Goldschmidt meeting 2016


Sunday, 26 June 2016 (9-16h) - Yokohama, Japan
ADCP data during HOT cruise
http://currents.soest.hawaii.edu/hot/

Hot Cruise Data

Type of the sensor
- os38bb (12m bin/1000m)
- os38nb (24m bin/1200m)
- wh300 (80m)
- os75bb (8m bin/600m)
- os75nb (16m bin/700m)
- nb150 (8m bin/200m)
etc. Ask Jules Hummon more detail.

ADCP: raw data
- Short or long
- Short variable list (U and V etc.)
- Long variable list (more)

The “Barotrophic Tide” data from the models

Download this!
How to open ADCP data (netCDF)

1. After download netCDF file, open XXX.nc file with “Other”. In menu “Choose Application”, enable “All Application” and go to ODV, bin_macx, odv4.app, then open odv4.app

2. Should get “NetCDF Setup Wizard”. Select (highlight) both dimensions shown (at least, “Time” and “depth_cell”). A bunch of corresponding variables should appear to the right, then click “Next”. Should get “Associate Meta Variables” screen; likely you will do nothing but select “Next”.

3. Should get “Select Primary Dimension” screen: select “depth_cell” by clicking on it, then click “Next”. Then you should get “Subset Dimensions” screen. Then “Finish”.

4. You should get the ODV file.

5. You should export the ODV collection. Since the ADCP data is huge, it is easy to crash ODV, so it is the safe thing to do!

6. You can make the section data of ADCP components with “Section Window” mode.

7. Save “View”, then you do not have to make this again! Also you can save the canvas as your favorite format (.jpg/.png/etc..).
How to open US Hydro data set (WOCE bottle/ctd format) with ODV software

1. Go to CCHDO website and select US Hydro data page: https://cchdo.ucsd.edu/search?q=USHYDRO

2. In case that you want to download one of the data from the list, you select the data that you want with your cursor. The cruise track will be highlighted on the map (as yellow).
You can see the Data set Information. You select "bottle exchange" or "ctd exchange" for ODV formatted data file. File will download to your computer.

How to open US Hydro data set (WOCE bottle/ctd format)
with ODV software

3. In case that you want to download all of the data in this list, you click "Bulk Download Option" and select "Download all exchange bottle files" or "Download all exchange ctd files".
4. Open ODV and select “Import” – “WOCE Format” – “WHP Bottle (exchange format)” or “WHP CTD (exchange format)”.

5. Select data file that you want to import. Note that you can select multiple files if you want.

6. Select the location that you want to say this ODV file, and save as your preferable file name.
Done!

Before the class starts