

# Java OceanAtlas 3.1 Feature List

## Introduction

Java OceanAtlas (JOA) is a software application for viewing and manipulating oceanographic profile data. JOA was designed primarily for oceanographic sections but is useful for looking at data also in the latitude-longitude domain. JOA can directly open EPIC data files from pointer files created by *epicselect* or the EPIC Web data browser ([epic.pmel.noaa.gov/epic/ewb/](http://epic.pmel.noaa.gov/epic/ewb/)).

## Platforms

JOA should run on the following Java-enabled platforms:

Windows 95\*, 98, ME, NT\*, 2000\*, XP  
Mac OS 9\*, X\*  
Solaris\*  
Linux  
Other UNIX OSes with at least JDK 1.1 support

Note: JOA has not been tested on a wide variety of UNIX platforms or extensively on all flavors of Windows. JOA has been used extensively with the operating systems marked with an asterisk (\*).

## Input/Output

Table 1 lists the current input and output file formats supported by JOA.

Format	Read	Write
EPIC netCDF (bottle and CTD)	X	X
WOCE netCDF (bottle and CTD)	X	
WOCE "Exchange" Bottle	X	
WOCE "Exchange" CTD	X	
Zip files (all formats)	X	
EPIC Pointer	X	X
NODC SD2	X	
TSV	X	X
JOA Binary	X	X
Power OceanAtlas	X	
GIF (plots only)		X
Postscript (via printer drivers)		X
PDF (Mac OS X only)		X

Table 1. File formats supported by JOA.

## NdEdit Data Browsing

### NdEdit Features

- Read EPIC pointer files generated by *epicselect* and EPIC web data browser
- Up to six views of stations locations in space and time: latitude/longitude, latitude/depth, latitude/time, longitude/depth, longitude/time, and depth/time
- Optional bathymetry display in latitude/longitude view
- Zooming to specific regions of interest in location and time
- Interactive filters for latitude, longitude, depth, and time allow narrowing data collection to region/time of interest
- Tools for selecting stations in regions or in user-defined sections
- Open selected stations directly into JOA

## Data Management

### Section Manager

- Reverse stations
- Merge casts at same section
- Sort stations by latitude, longitude, date, station number

### Station Filter

- Include/exclude individual stations/sections
- Include/exclude stations by geographic location using zoomable map
- Exclude stations by absence of measured parameter

### Observation Filter

- Up to 4 selection criteria that can be grouped with and/or logic
- Can test range of parameter or quality codes values
- Results apply to all open property, profile, and contour plots
- Highlight results with contrasting symbols/color or show only observations that meet filter criteria
- Settings savable to settings files

### Data Quality

- Filter plots by quality codes
- Highlight outliers by quality code or value (contrasting symbol and/or color)
- Display observation quality codes
- Display bottle quality codes in Data Window

### **File Properties**

- Edit station metadata: section name, station number, cast number, station location, station date, station maximum depth, station ship code, file comments, map color

### **Parameter Properties**

- Edit parameter name, parameter units, parameter y-axis orientation

### **WOCE Data Import**

- Post process WOCE exchange files:
  - Translate WOCE quality codes to IGOSS
  - Convert temperatures from ITS90 to IPTS68
  - Convert from mass to volume units
  - Replace value with missing if quality code criteria met
  - Set all bottle parameters missing if bad bottle quality code
  - Set gas parameters missing when bottle quality is questionable and bottle oxygen is bad

### **CTD Decimation**

- No decimation
- Decimate to constant interval
- Decimate to JOA interpolation levels
- Decimate to custom, user-defined intervals
- Save/Load custom decimation schemes

## **Data Visualization**

### **Data Window**

- Current observation: optional display of units and color by quality codes
- Current station metadata
- Section cross section: offset by sequence, distance, latitude, longitude; color symbol by bottle quality code; reverse station plot order

### **Features of All JOA Plots**

- Optional color legend
- Resizable
- Zoomable (zoom to new window or replace current plot)
- Browsable
- All plots linked by common data "cursor"
- Full control of axes ranges, increments, minor tics
- User-settable background, foreground, grid colors
- Savable as GIF, Postscript, and PDF (Mac OS X only)
- Printable
- User-settable plot name (default names are generated automatically)

### **Property-Property Plots**

- Up to 7 x-axes: each axis can have unique symbol, symbol size, connect observation line color
- Change order of x-axes
- Symbols colored by third parameter (can be turned off)
- Optional X,Y grid
- Isopycnal contour overlay for T-S plots
- User-settable reference pressure for isopycnals
- Plot current station only (optional)

### **Profile Plots**

- Lines colored by third parameter
- Offset by sequence or distance
- Optional y-axis grid
- User-settable plot symbols/symbol sizes
- User-settable amplitude, trace offset, line width

### **Contour Plots**

- Offset by sequence, distance, latitude, longitude
- Autoscale creation of parameter colorbars
- Solid fill contours, contour lines, combination of solid filled and contour lines, skip every nth contour
- Observation or interpolation level overlay
- Residual contour plots with user-defined mean cast
- Contour plots of parameter referenced to user-defined level
- Control of missing value handling
- Interpolate up or down cast
- User settable horizontal and vertical browsing panels

### **Map Plots**

- User-defined projection: Mercator, Miller, orthographic, stereographic (with polar aspects), Lambert equal area, Mollweide
- User-defined map region or select from predefined regions
- Optional coastline display
- User-settable station symbol and size
- Connect station symbols with line option
- User-defined latitude/lon graticule
- Optional graticule labels
- Retain cartographic aspect or allow map to fill window
- Isolines from built in bathymetry
- Filled bathymetry from etopo, Sandwell-Smith, and IBCAU
- Color station symbols by parameter interpolated onto isosurface or at surface or bottom

### **Map Plots (continued)**

- User-settable background, coastline, graticule, graticule labels color
- Map settings savable to files and as default map
- Map tools for creating custom sections

### **Station Value Plots**

- Line plots of mixed layer and integration between surfaces.
- Color coded to show where integration outcrops or runs into bottom.

## **Calculations**

### **Built-in Calculations**

- $\theta$ ,  $\sigma_0$ ,  $\sigma_1$ ,  $\sigma_2$ ,  $\sigma_3$ ,  $\sigma_4$ ,  $\sigma_n$ , specific volume anomaly, spiciness, sound velocity, O<sub>2</sub> % saturation, AOU, NO, PO, Brunt-Vaisala frequency, squared Brunt-Vaisala frequency, squared Brunt-Vaisala frequency/g, thermal expansion ( $\alpha$ ),  $\alpha * dT/dz$ , saline contraction ( $\beta$ ),  $\beta * dS/dz$ , acoustic travel time, net heat content, geopotential anomaly, and potential energy anomaly
- Calculations automatically applied to data added to current data window

### **Custom Parameters**

- Arithmetic operations (+, -, /, x) on parameters and user-defined constants
- Derivative and integrals operators
- Multistep calculations

### **Parameter Transformations**

- natural log, log, x, square root, sin, cos, reciprocal,  $e^x$ ,  $10^x$ , convert pressure to depth, convert depth to pressure

### **Station Calculations**

- Mixed-layer depth based upon parameter of choice and choice of difference method, surface method, or slope method
- User-settable tolerance
- Integration of any parameter between any two values of another parameter (options include: use shallowest/deepest observation if surface outcrops or hits bottom if needed, compute weighted mean, interpolation of missing values and interpolation direction: top down, bottom up, or up/down)

## **Supporting Resources Management**

### **Color Palettes**

- Create/Edit 16 x 16 color palettes
- Blend colors from start to end color
- Save/restore palettes

### **Colorbars**

- Create/edit colorbars up to 128 value/color pairs
- Color assignment from color palettes, blending from start to finish color through intermediate color, rainbow, inverse rainbow
- Assign values with autoshape tools (linear, asymptotes, and logistic) or assign user values to color
- Colors individually editable
- Histogram overlay to aid in colorbar creation (measured parameters only)
- Assign new colors without replacing existing values

### **Interpolation Surfaces**

- Create/edit interpolation surfaces of up to 128 levels
- Assign values with autoshape tools (linear, asymptotes, and logistic) or assign user values to levels

## **Miscellaneous Features**

- Windows menu for easy navigation between windows
- Export station calculations to file
- Export interpolated values for contour plot to file

## **Additional Resources**

The official JOA web site at PMEL is:

<http://www.epic.noaa.gov/epic/software/JavaJOA.htm>

The official JOA web site at Scripps is:

<http://odf.ucsd.edu/joa/jsindex.html>