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Description of the dcc file format

Summary

The dcc file format is commonly used at Woods Hole Oceanographic Institution for Conductivity-Temperature-Depth (CTD) data that have received a higher level of data processing than normally provided through standard practices. Each dcc file contains pressure-averaged data for one CTD station following the World Ocean Circulation Experiment (WOCE) format and quality specifications for CTD data. CTD temperatures, pressures, and conductivities have been scaled with pre-cruise calibrations from the sensor manufacturer. All CTD salinity, and if available dissolved oxygen, data have been post-calibrated using bottle salinity measurements.

Final dcc file variable definitions

Pres Binned pressure (dB)
T90(1) Calibrated primary temperature (°C)
T90(2) Calibrated secondary temperature (°C)
Sal(1) Calibrated primary salinity (psu)
Sal(2) Calibrated secondary salinity (psu)
OxCur Oxygen Current (V)
OXYG Dissolved Oxygen (ml/l)
Trans Beam Transmission (%)
Flur Fluorescence (mg/m3)
Turbidity Turbidity (NTU)
Altimeter Bottom-finding altimeter reading (m)
nscans Number of CTD scans used in pressure bin-averaging
wocecode WOCE quality word for each variable

WOCE quality word definitions:
1 = Not calibrated with water samples
2 = Acceptable measurement
3 = Questionable measurement
4 = Bad measurement
9 = not sampled

SeaBird processing

As per manufacturer recommendations, CTD data are processed using SeaBird data processing software. The raw CTD data are converted from HEX to ASCII, lag corrected, edited for large spikes, smoothed according to sensor, and pressure averaged for final data quality control and analysis.

Post-processing conductivity calibrations

Basic fitting procedure:
CTD salinity data are further calibrated by utilizing water sample salinity measurements. WHOI post-processing fitting procedures are modeled after methods used in Millard and Yang, 1993. CTD conductivity and water sample salinity differences are characterized as a function of pressure and time. A fit is created by grouping together data from CTD stations. The group is fit for a slope and bias adjustment using only water sample data that was within a defined physical range of CTD values. The slope term is a polynomial function of the station number based upon chronological station collection order. A linear pressure term (modified beta) was applied to conductivity slopes using a least-squares minimization of CTD and bottle conductivity differences.

The function minimized was:

$$BC - m * CC - b - \beta * CP$$

BC - *bottle conductivity [mS/cm]*
CC - *pre-cruise calibrated CTD conductivity [mS/cm]*
CP - *CTD pressure [dbar]*
m - *conductivity slope*
b - *conductivity bias [mS/cm]*
β - *linear pressure term [mS/cm/dbar]*

The final conductivity, FC [mS/cm] is:

$$FC = m * CC + b + \beta * CP$$

For more information pertaining to the dcc file format, please contact the distributors of the relevant dataset.