Calibration and data processing of Seabird SBE49-076 used on the deployment cruise: CLIVEC 7

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NAME: Seabird SBE49 FastCAT
S/N: 4942127-0076

1) Introduction and Summary

The Seabird SBE49 is a CTD (Conductivity, Temperature, Pressure) sensor designed for low power consumption and high sampling rate. All calculations are done using firmware, and data is output in engineering units. Its resolution for salinity (oceanic water) is 0.4 ppm, and for temperature is 0.0001°C. Resolution for pressure is 0.002% of full range, or 0.012 m in this case. The SBE49 has an internal pump to draw the water through the conductivity and temperature probes, and a Druck pressure sensor.

2) Calibration/Maintenance

2.1) Manufacturer calibrations/coefficients

The instrument was last calibrated on Feb 16, 2012 at the Seabird Electronics facility. Its temperature drift was found to be -0.00020°C/year and salinity drift was 0.001 PSU/year.

2.2) Self calibration methods and results

The SBE49 does not require field calibrations.

3) Deployment

3.1) Measurement methods

Profiles were made at each station, except when bottom depth was greater than 150 meters, due to limitations in the battery housing. The sequence was one downcast from approximately 3 meters after soaking at 10 meters to degas, then an upcast with periodic time series at depths where bottles were being fired. These have not been separated in the files submitted to SeaBass. Only the ends of the files, when the rosette was out of the water, have been eliminated.

3.2) Package design

The SBE49 was mounted to the ship's CTD rosette on an auxiliary ring. Other instruments used were: a Wetlabs acs, a Wetlabs bb-9, a Wetlabs DH4 data handler, a Satlantic OCR 7-wavelength irradiance sensor. It was powered through the DH4 by a Li-ion 12VDC battery pack, and the archived data were uploaded after each cast.

4) Data processing

4.1) Data analysis

The instrument was configured to output at 8 Hz, which was matched (without binning) to the acs data (~4 Hz) by a nearest neighbor routine. After eliminating outliers from the acs, the combined data were binned to 1 Hz to match the bb-9 data. Further processing included calculation of Sigma-T using the equation of Fofonoff and Millard (1983).

4.2) Quality control

Processed data were reviewed by eye for any evidence of electronic spikes.

5) References

SBE49 user's manual. Retrieved from
http://seabird.com/pdf_documents/manuals/49_014.pdf

Fofonoff, N.P., and R.C. Millard, 1983. Algorithms for computations of fundamental properties of seawater. *Unesco Technical Papers in Marine Science No. 44,* 53 pp.