CTD Data Documentation, Meteor Cruise No. 32 Leg 5

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2 Introduction

Leg 5 of the 32nd cruise of RV METEOR in the Indian Ocean started at July the 14th 1995 in Mahé on the Seychelles and ended at August 15th 1995 in Muscat/Oman. The main goal of the activities during this leg was the investigation of the pelagical systems of the western Arabian Sea during the SW monsoon and to study mesoscale variability of the hydrographical parameters. Lateral variability in the mixed layer and their forcing functions (solar insulation, air temperature and wind stress) were monitored by CTD-Profiles and shipborne sensors. The hydrographic measurements were carried out to estimate the relevant depths for biological and chemical probing and for characterisation of the physical properties (depth of the mixed layer, oxygen minimum and vertical distribution of temperature, salinity). Special emphasis was taken on the upper 500m of the water column for characterisation of the distribution of relevant physical, chemical and biological properties within the epipelagic zone in selected areas (central Arabian Sea, open ocean upwelling due to the Findlater Jet and in the region of coastal upwelling of the Arabian Peninsula).
On a transect from the equator north towards 16°N, 65°E and further on towards the coast of Oman (18°35'N, 57°10'E) and back again to the interna tional reference station at 16°N 62°E, eleven drift stations were carried out. A drifting sediment trap was deployed and extensive sampling of the water column took place for planktological, microbiological and chemical investigations.
The water column was probed by a Neil Brown CTD with a fluorometer and oxygen sensor and water sampler with 12x12 l Niskin bottles on the first 10 stations and a 24 bottle water

sampler with 10 l Niskin bottles during the rest of the cruise. From the Niskin bottles water samples were taken for calibration of fluorescence-, oxygen- and salinity measurements.

3 Instrument specification

Gear: CTD, Neil Brown, Mark III
Resolution: Temperature 0.5mK,
Pressure 0.1dbar,
Conductivity 1mS
Accurancy: Temperature , 0.3 mK,
Pressure , 6.5dbar,
Conductivity , 5 mS

4 Data Processing

The CTD raw data files were processed with a C-programme collection, named AFRAID, developed for use in oceanography. The processing before calibration (MATLAB routines) of the CTD sensor data included different steps: The first step is removing of spikes in pressure, salinity and temperature etc. The used filter window was 8 point wide on each side of a value/cycle and removed values above a defined standard deviation. We used a standard deviation of 1.75 for the pressure and 1.0 for temperature, salinity and oxygen data. Spikes in the Chl_a fluorescence were not removed because they are a relative measure for the size of the plankton cells in the water column. In the same step we carried out the pressure offset correction and cut out all cycles measured on air. In the second step we calculated the downward velocity of the CTD dependent on the sensor frequency (32 Hz) and the time constant (0.05ms) and skipped all cycles with a downward velocity less than 0.5 m/s. Next step included the monotonisation of the data. The median filter has a window width of two times 5 points. Finally we calculated depth, potential temperature and density values and made an interpolation of constant depth intervals.

5. Calibration of Salinity

The reference data from discrete bottle samples were measured with an AUTOSAL bench salinometer. The salinity values were fitted with a polynom of the 3rd degree and it's coefficients are:

A3= 4.7555958e-002
A2= -5.0831754e+000
A1= 1.8205900e+002
A0= -2.1491143e+003

The result has got the official quality flag good values , given by the principal investigator. The data are not very good, this would be closed to the WOCE standard, because of known data transmission problems from the instrument to the data logger, caused by the winch wire.

6 Calibration of Chl. a Flourescence

The fluorescense data have been calibrated with Chlorophyll_a data, measured on the bottle samples and determined with a TURNER bench fluorometer (see JGOFS protocols). If available, every profile was calibrated with the adjected Turner Chlorophyll values. A polynom of the 2nd degree was used for data fitting. The flourescence values have got the quality flag very good, given by principal investigator.