

Underway navigation and surface hydrography data series for cruise Mitra MT0499 (21 to 27 April 1999)

Data Originator:

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Content of data series:

Parameter	Unit	Parameter code	Comments
Latitude	deg. N	A	none
Longitude	deg. E	B	none
Sea temperature	deg. C	C	none
Salinity	PSU	F	none
pH	pH units	f	none
Attenuance (10 cm PL)	per m	H	as for CTD series
Attenuance (25 cm PL)	per m	I	as for CTD series
Dissolved oxygen	$\mu\text{mol l}^{-1}$	Q	none
Oxygen saturation	percent	R	none
Chlorophyll a	$\mu\text{g l}^{-1}$	G	calibrated from fluorescence

Sampling strategy, instruments and data processing by originator:

The surface underway data series was acquired during eight successive surveys by towing a SeaBird Electronics (SBE) 911 Plus CTD system at a depth of ca. 3.5 m below sea surface. The SBE 911 Plus system was identical to the one used for the CTD vertical profiles (see MT0499 CTD data series documentation) with the exception of the PAR sensors which were removed from the towed system. The eight surveys were conducted along 4 lines (SL1, NL1, NL2, NL3) separated by 4 nautical miles and running parallel to the line formed by the mooring sites A, U, T and X. The line SL1 was 2 nautical miles south of the mooring line while the lines NL1, NL2 and NL3 were 2, 6 and 10 nautical miles north of the mooring line respectively. Start and end time of each of the eight surveys were as follows:

SL1 on 21/04/1999 from 01:00 to 06:35
NL1 on 21/04/1999 from 20:05 to 23:48
NL2 on 22/04/1999 from 16:18 to 17:47
NL2a on 23/04/1999 from 18:39 to 23:16
NL1a on 24/04/1999 from 00:05 to 02:38
NL3 on 25/04/1999 from 18:34 to 00:21
SL1a on 26/04/1999 from 11:49 to 17:57
NL2b from 26/04/1999 23:44 to 27/04/1999 05:47

The data were logged on a PC running Seabird data acquisition software version Seasave Win32 v.1.10 and manufacturer's calibration coefficients were applied to the raw data.

Data were supplied to BODC as individual ASCII files for each survey with a 10 second sampling interval.

BODC post-cruise processing and screening

Reformatting:

The data were converted to a binary format and merged into one single file for the whole cruise (the Binary Merge File) with a time channel spanning from 21 April 1999 01:00:00 (JD111) to 27 April 1999 05:48:00 and a sampling frequency reduced to 30 seconds.

The pressure channel was not transferred to the binary merge file. Observation of the pressure records

showed that variations in depth were relatively small ranging from 1.9 to 4.0 metres over the eight surveys.

The following modifications were applied to the data:

- dissolved oxygen was converted from mg l^{-1} to $\mu\text{mol l}^{-1}$ by multiplying the values by 31.25 (=1000/31.998).
- transmissometer reading for the two transmissometers were converted from % transmission to attenuation using the algorithm:

$$\text{attenuance (m}^{-1}\text{)} = -1/\text{PL} * \log_e (\% \text{ transmission}/100)$$

where PL is the transmissometer pathlength in metres (0.10 and 0.25 m).

Screening:

Reformatted data were screened graphically on a high-speed graphics workstation using custom in-house graphics editors. If present, spikes and suspicious data were manually flagged. No data values were edited or deleted; flagging was achieved by modification of the associated quality control flag ('S' for suspicious and 'N' for null).

Calibration:

- Fluorescence: the calibration equation applied was the same as that determined for the fluorometer when used in profiling mode (see Mitra MT0499 CTD documentation).

$$\text{Chl} = 1.21 \times \text{CTD_FL} + 1.72, \quad R^2=0.730, \quad n=49$$

where Chl is the *in situ* chlorophyll concentration ($\mu\text{g l}^{-1}$) and CTD_FL is the factory-calibrated fluorometer output in $\mu\text{g l}^{-1}$.

- Data from the other channels had already been calibrated by the data originator and no further calibration/correction was applied.

Comments on data quality

Attenuance: the two transmissometers used on the CTD unit give attenuation values significantly different from each other. The two outputs are highly correlated ($R^2=0.988$) and the relationship shows no deviation from linearity in the lower or higher range of attenuation values. It is found that over the full range of attenuation values (ca. 1-2 to 11-12 per metre) attenuation derived from the short pathlength transmissometer output is consistently higher than that derived from the medium pathlength transmissometer output (average offset: 1.01 ± 0.12 per metre). Comparisons, carried out by the SPM Group in Bangor, with calibrated attenuation data from the transmissometer moored close to the surface layer on POLRIG#A, suggested that the medium pathlength transmissometer was closer to the correct value.

As was noted in the CTD profiles documentation for this cruise, the oxygen concentrations measured by the oxygen probe were generally very high, giving rise to oxygen saturation levels of up to 180% on 25-26 April 1999. Although these may appear exceptionally high, the data originators confirmed that they were plausible for the area studied at times of high phytoplanktonic production (pers. comm. and Zindler et al. 2001).

Reference:

Zindler JS, Baretta JW, Heins C, Hoogervorst RDN, Suijlen JM (2001), Non-turbulent dynamics and water column biology and physics. Report RIKZ/OS/2001.112X