Parent

Whole Core Measurements Data Documentation

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Introduction

Most benthic data collected during OMEX were profiles along the length of cores. However, a small number of data sets were obtained using grabs, were properties of the sediment/water interface or were the result of integration of along-core data. These data are stored in the database CORETOT table and the aim of this document is to allow the protocol used to obtain any particular data value within this table to be determined with ease.

To help you find the information you require quickly, the document is subdivided into sections that describe groups of closely related parameters. These are listed below as a series of hot links. Each section starts with the definition of the parameter codes covered, followed by a list of who measured one or more of those parameters by cruise. Next, there is a protocol section describing the methods used by each principal investigator. Finally, there may be comments on data quality that have been noted by BODC or have come to our attention.

<TIP> If you want to find out a how a particular parameter was measured and know the parameter code then the fastest way to find the information you require is to use the *Acrobat* 'find' tool to search for the parameter code. Then use the 'find' tool again to search for the name of the principal investigator. This will take you straight to the protocol description you require.

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Sediment Erosion Resistance

Parameter Code Definitions

BSHVCRXX	Critical bottom shear velocity Flume observations on sediment sample cm/sec

Originator Code Definitions

Pelagia cruise PLG93

96	Dr. Laurenz Thomsen	GEOMAR, Kiel, Germany

Originator Protocols

Dr. Laurenz Thomsen

Sediment samples were collected using a multicorer (most stations) or by taking a sub-core from a sample collected using the NIOZ box corer. Both these instruments are designed to minimise disturbance of the sediment/water interface and return an intact sample of the bottom water overlying the sediment.

The sediment samples were returned to the laboratory and transferred into a recirculating flume. Water velocity in the flume was measured using a doppler velocity profiler (ADV, Sontec, USA). The beginning of grain movement was determined visually using a Wild dissecting microscope.

Plankton Accumulation Rates

Parameter Code Definitions

DACCCSXX Diatom accumulation rate
Optical microscope counts combined with stratigraphy
Valves per cm^2 per thousand years

SACCCSXX Silicoflagellate accumulation rate
Optical microscope counts combined with stratigraphy
Valves per cm^2 per thousand years

Originator Code Definitions

Pelagia cruise PLG93 and Charles Darwin cruise CD86

81	Dr. R. Bao Casal	Universidade da Coruna, Spain

Originator Protocols

Dr. Roberto Bao Casal

Samples were collected using the circular NIOZ box corer. The upper 1 cm of the surface sediment was collected. After standard acid cleaning (Schrader, 1973) an aliquot of each cleaned sample was mounted on 22 x 22 cm cover glasses with Hyrax (n=1.7). Counts were made at 1000x magnification with a Nikon Optiphot II phase contrast microscope following random transects. At least 300 valves were counted per sample following standard counting procedures (Schrader and Gersonde, 1978).

Sediment accumulation rates were determined on the box cores by NIOZ partners using stratigraphic techniques calibrated by AMS carbon dates. These data were used to express the valve counts in terms of number per unit area per unit time.

Sediment Grain Size

Parameter Code Definitions

MNGSPSXX Mean grain size
Sieving and particle sizer method
Micrometres

SDGSPSXX Standard deviation of the grain size distribution
Sieving and particle sizer method
Micrometres

SKGSPSXX Skewness of the grain size distribution
Sieving and particle sizer method
Dimensionless

SPRPWSXC Dry weight proportion of the coarse (63-1000 µm) size fraction
Wet sieving
Per cent

SPRPWSXF Dry weight proportion of the fine (<63 µm) size fraction
Wet sieving
Per cent

Originator Code Definitions

Charles Darwin cruise CD84

102	Dr. Paul Chatwin	University of Plymouth, UK

Originator Protocols

Dr. Paul Chatwin

The samples were collected using a Shipek grab. The samples were immediately stored in an ethanol-based solution and analysed back at the laboratory.

The samples were stirred in a solution of the dispersant Calgon (sodium hexametaphosphate) and placed in an ultrasonic bath for 5 minutes. The sediment was then wet sieved using a particle shaker into size classes >500, 250-500, 125-250, 63-125 and <63 µm. The samples were oven dried for 24 hours and weighed. The silt (<63 µm) fraction was estimated using five replicates taken from a homogenised suspension. The weights of these size classes were combined to give the coarse and fine size fractions by weight.

The grain size distribution within the silt fraction was determined using a Malvern Instruments 2200 particle sizer with a 100 mm focal length lens covering the size range from 1.9 to 188 μm. Fifteen sub-samples from each grab sample were analysed. The results from this instrument were combined with the coarse size class data determined by sieving to give the total sample size distribution parameters.

Mean grain size was computed as half the sum of the sizes (in phi units) of the 16th and 84th percentiles. The standard deviation was computed as one half of the difference of the sizes at these percentiles. The skewness was computed as the ratio of the mean grain size minus the median grain size over the grain size standard deviation.

The mean and standard deviation grain sizes were supplied to BODC in phi units. These were converted to microns using the formula:

$$\text{Microns} = 1000 * 2^{-\phi}$$

The skewness values have been left unmodified and therefore, although dimensionless, they pertain to the logarithmic Krumbein scale and not to the absolute Wentworth scale.

Sediment Oxygen Demand

Parameter Code Definitions

SODMISXX Sediment oxygen demand (water to sediment oxygen flux)
In-situ measurement of the change in overlying water oxygen concentration during over time
Millimoles/m^2/day

SODMODXX Sediment oxygen demand (water to sediment oxygen flux)
Measurement of the change in overlying water oxygen concentration during an on-deck incubation
Millimoles/m^2/day

Originator Code Definitions

Pelagia cruise PLG93 and Charles Darwin cruise CD86

95	Prof. Peter de Wilde	NIOZ, Texel, the Netherlands

Originator Protocols

Prof. Peter de Wilde

In-situ Measurements

The in-situ sediment oxygen demand measurements were made using the BOLAS free-fall lander (Tengberg et al., 1995 and Tahey et al., 1996). This comprised a tripod below a floatation rack containing glass buoyancy spheres, acoustic releases and two single-cup sediment traps. The tripod supported two independent 30 cm benthic chambers equipped with Idronaut oxygen probes, a stirrer and three pairs of 60 ml syringes for sampling water from the head space.

Dissolved oxygen analyses of syringe samples collected at different stages during the incubation by a variation of the Winkler technique (Pai et al., 1993) were used to calibrate the oxygen probes.

All BOLAS operations were programmable and hydraulically driven.

Sediment oxygen demand was computed from the initial linear decrease of the oxygen concentration in the overlying water.

Shipboard Incubations

Core samples were collected using either the 30 cm or 50 cm diameter NIOZ box corer. This was fitted with a top cover to prevent disturbance of the sediment/water interface and loss of overlying water. Leakage checks were done by comparing the silicate concentration of the overlying water with near bottom samples from a CTD rosette.

The sediment oxygen demand was measured by incubating intact box core samples in a 30 cm diameter polyester tube. This was sealed by a lid containing a stirrer and Yellow Spring oxygen probes and placed in a thermostatically controlled incubator at sea floor temperature. The decrease in oxygen concentration was measured continuously and the sediment oxygen demand was determined from the initial linear portion of the trace.

References

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