

Near-bed Interfacial Sampler data series for cruise Mitra MT0499

Principal Investigator

Dr. Ken Jones, Dunstaffnage Marine Laboratory (DML), Oban, UK.

Collaborators

Ivan Ezzi and Martyn Harvey - DML.

Content of data series:

Parameter	Unit	Parameter code	Number of samples	Comments
Sampling height above seabed	m	AHSFZZ01	97	none
Dissolved ammonium	$\mu\text{mol l}^{-1}$	AMONAAD1	97	none
Dissolved nitrate+nitrite	$\mu\text{mol l}^{-1}$	NTRZAAD1	97	none
Dissolved silicate	$\mu\text{mol l}^{-1}$	SLCAAAD1	97	none
Dissolved phosphate	$\mu\text{mol l}^{-1}$	PHOSAAD1	96	none
Chlorophyll a	$\mu\text{g l}^{-1}$	CPHLHPP1	93	none
Chl. a standard deviation	$\mu\text{g l}^{-1}$	SDCLHPP1	62	none
Particulate Organic Carbon	$\mu\text{mol l}^{-1}$	CORGCAP1	77	none
Particulate total Nitrogen	$\mu\text{mol l}^{-1}$	NTOTCNP1	77	none
Oxygen uptake	$\mu\text{mol l}^{-1} \text{d}^{-1}$	RESPLDPX	40	none

Originators' protocol

An Interfacial Sampling device (Bale & Barrett 1995) was used to obtain water samples from close to the seabed (Fig. 1). This instrument collects 10 water samples (approximately 4 litres each) at 20 cm height intervals up to 2 metres above the sea bed, thus providing high resolution sampling in the benthic boundary layer.

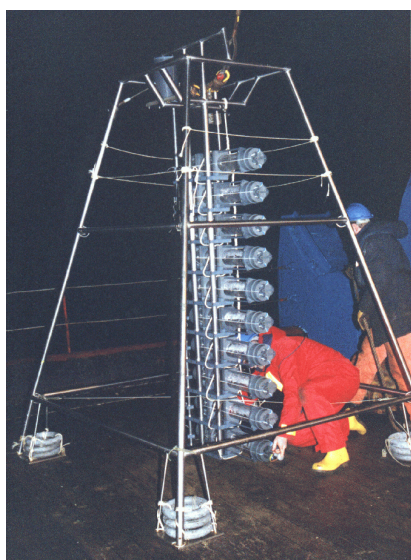


Fig. 1. Preparation of the bottom water Interfacial Sampler prior to deployment by the DML group.

The sampler was deployed four times at six hourly intervals during two 25-hour cycles (at spring and neap tides). During a third 25-hour cycle, the sampler was deployed three times at eight hourly intervals. Samples were taken for measurements of oxygen consumption, chlorophyll concentration, nutrient concentrations, particulate organic carbon and nitrogen concentrations and suspended particulate matter concentration.

For oxygen uptake measurements, samples were transferred into calibrated oxygen bottles, some of which were fixed immediately and some incubated for 24 hours prior to fixing. Incubations were carried out in a tank with a close fitting lid to exclude light. Water was continuously re-circulated through the tank, initially from the ship's seawater supply. This however led to unacceptable variations in the incubation temperature, so for subsequent incubations the water was re-circulated via a cooling unit which maintained the water temperature at 9-9.5°C, corresponding to ambient conditions. The fixed samples were Winkler titrated to measure their dissolved oxygen concentration, and hence the oxygen consumption rate of the water column at each depth interval could be calculated.

Subsamples for dissolved inorganic nutrient analysis, chlorophyll and particulate organic carbon and nitrogen were processed as detailed below, immediately frozen at -80°C and subsequently stored at -20°C prior to analysis.

For chlorophyll analysis, 100-ml samples were filtered onto 25-mm GF/F filters and extracted into 8-ml of 90% acetone. Chlorophyll concentration was then determined by isocratic HPLC analysis of the acetone extract. The value was taken as the mean of triplicate analyses.

Samples for particulate organic carbon and nitrogen measurements were filtered onto 25-mm GF/F filters pre-combusted for 4 hours at 450°C. The filters were then acid fumed and analysed on a C/N analyser. POC and PON measurements were corrected for filter blanks.

Water samples for dissolved inorganic nutrient analysis were filtered through GF/F filters and stored in sealed polypropylene tubes until further analysis. Dissolved nutrients were determined using flow injection analysis.

BODC processing

- Hourly oxygen uptake rates were converted to daily rates by multiplying the original values by 24.
- Sampling height above seabed was converted from cm to m.
- Bottle sampling depth was attributed by subtraction of sampling height based on the instrument set up to water depth as measured by the ship's echosounder and extracted from the cruise report.
- Standard errors associated with nutrient concentration measurements were not loaded in the database. These were generally small averaging $0.04 \pm 0.04 \mu\text{M}$ (mean CV of 4%) for ammonia, $0.07 \pm 0.09 \mu\text{M}$ (mean CV of 2%) for silicate and 0.30 ± 0.35 (mean CV of 2%) for nitrate+nitrite. Phosphate concentrations were generally below the detection limit of the method with typically low standard errors.

Comments on data quality

None to report.

References

Bale AJ, Barrett CD (1995) A bottom-landing water sampling system for the benthic boundary layer. Neth. J. Sea Res. 34 (4): 259-266.