

Prince Madog cruise 20/02
7, 8 August 2002
POL Coastal Observatory cruise 1
REPORT

1. Objectives

1. To deploy at 53° 32' N 3° 21.8' W, half a mile west of the Mersey Bar Light Vessel:
 - a) A sea bed frame for a 600 kHz ADCP to measure the mean current profile and pressures. A pressure recorder and a transmissometer / conductivity / temperature logger are also fitted to the frame.
 - b) A sea bed frame for a 600 kHz ADCP to measure fast sample current profiles and pressures in 10 minute bursts every hour.
 - c) A single point mooring marked by a toroid buoy with temperature and conductivity loggers at 2, 5 and 10 m below the surface.
2. To conduct a CTD survey of 34 stations every 5 miles covering the eastern Irish Sea between the North Wales coast and Blackpool and the Lancashire coast and the Great Orme, to determine the effects of the rivers Dee, Mersey and Ribble on Liverpool Bay.

2. Scientific personnel

M.J. Howarth
J.D Humphery
M.J. Smithson
J.P. Pugh
M. Burke
A. Hammerstein (School of Ocean Sciences)

3. Narrative (times in GMT)

The mooring, sea-bed frames and instrumentation were loaded onto RV Prince Madog on the afternoon of 6 August, the toroid being floated round at high water. The instruments were fitted onto the frames on the afterdeck, just leaving installation of the pyros until immediately prior to deployment.

RV Prince Madog left Menai Bridge at 07.45 on 7 August. Recording of surface sampling was switched on at 08.24, near Puffin Island, section 6. The mooring site, 53° 32' N 3° 21.8' W, was reached at 11.30, when a CTD profile was recorded to calibrate the recording transmissometer. The mooring was deployed at 12.10. The ADCP frames were deployed between the toroid and the Mersey Bar Light, the mean ADCP at 12.48 and the fast sample ADCP at 13.25, section 4 and Table 1. The acoustic releases were checked when the ship passed the site during the CTD survey, at 19.45 on 6 August.

The CTD survey, section 5 and Table 2, was then carried out until 13.00 on 8 August, when recording of surface sampling was also switched off. RV Prince Madog docked at

Menai Bridge at 14.45. Winds, between 8 and 12 m s⁻¹, had blown from the north-west during the afternoon and evening of 7 August, dying away by mid-morning on 8 August.

The sea surface temperature was between 15.1 and 19.3°C and the surface salinity between 30.3 and 34.0. Most CTD sites were stratified, although there was a tendency towards the edges of the survey area for the water column to become well mixed. The maximum surface to bed temperature difference was 2.9°C and the maximum salinity difference was 1.7. The water temperature generally exceeded the air temperature, by up to 3.5°C. (Note all these values are uncalibrated.)

The ship's ADCP, its transducers are at 3 m depth, was recorded for most of the cruise but there were doubts about the display.

All objectives were accomplished.

4. Moorings (times in GMT)

The set up of the instruments was as follows:

a) Mean 600 kHz ADCP, 2391

Mode 1: 100 pings every 10 minutes (velocity standard deviation 0.007 m s⁻¹).

35 x 1 m bins (2.66 – 37.66 m above the bed).

Earth co-ordinates - speeds, correlation, echo intensity, % good.

Sound velocity calculated from temperature, depth and salinity of 32.

Fitted with a pressure sensor.

Delayed start 07.00 on 7 August 2002.

Aanderaa pressure recorder BPR 445: 10 minute sampling, started 14.20 on 6 August.

25 cm Sea-Tech Transmissometer, ST637, recording in Aanderaa logger (RCM 11817) fitted with temperature and conductivity sensors: 10 minute sampling, started at 14.10 on 6 August.

The frame, D1, was fitted with two Benthos releases, 1B, 7A, and a spooler for recovery of the ballast weight.

b) Fast sample 600 kHz ADCP, 2390, with 512 MBytes of memory.

Mode 12: 8 subpings per second for 10 minutes every hour (velocity standard deviation 0.025 m s⁻¹).

30 x 1 m bins (2.66 – 32.66 m above the bed).

Beam coordinates – along beam speeds, echo intensity.

Fixed speed of sound 1500 m s⁻¹.

Fitted with a pressure sensor.

Delayed start 07.00 on 7 August 2002.

The frame, D4, was fitted with two Benthos releases, 2B, 3A, and a spooler for recovery of the ballast weight.

c) Mooring. Three Aanderaa current meters without fins to log temperature and conductivity, fitted with 200 bar pressure sensors: 10 minute samples.

		Start time	Sensor depth (m)
Top	RCM8 10526	15.40 6 August	2
Middle	RCM7 9631	16.20 6 August	5
Bottom	RCM7 9959	15.40 6 August	10

The single point mooring was composed of ½" long link chain, marked by a 1.8 m diameter toroid and anchored by ½ tonne clump of scrap chain.

Table 1. Mooring positions and times

	N	W	Depth	Time	Date
Mooring	53° 31.966'	3° 22.187'	26	12.10	07/08/02
Mean ADCP	53° 31.971'	3° 22.038'	25	12.48	07/08/02
Fast sample ADCP	53° 31.931'	3° 21.902'	24	13.25	07/08/02

5. CTD

The Sea-Bird 911 CTD recorded temperature, conductivity, transmittance and fluorescence at 24 Hz. Since the frame was fitted with an altimeter measurements were taken to within 2 m above the bed. One water bottle was fired near the bed, to obtain reversing thermometer readings and a water sample (on most profiles) for salinity determination back at the School of Ocean Sciences. Copies of the Sea-Bird binary files were taken off for processing at BODC / POL.

Table 2. Nominal CTD positions

Site	Latitude	Longitude
	N	W
1	53° 32'	3° 21.8'
2	53° 37'	3° 13.4'
3	53° 42'	3° 13.4'
4	53° 47'	3° 13.4'
5	53° 52'	3° 21.8'
6	53° 47'	3° 21.8'
7	53° 42'	3° 21.8'
8	53° 37'	3° 21.8'
9	53° 32'	3° 21.8'
10	53° 27'	3° 13.4'
11	53° 27'	3° 21.8'
12	53° 27'	3° 30.2'
13	53° 32'	3° 30.2'
14	53° 37'	3° 30.2'
15	53° 42'	3° 30.2'

16	53° 47'	3° 30.2'
17	53° 47'	3° 38.6'
18	53° 42'	3° 38.6'
19	53° 37'	3° 38.6'
20	53° 32'	3° 38.6'
21	53° 27'	3° 38.6'
22	53° 23'	3° 38.6'
23	53° 23'	3° 47.0'
24	53° 27'	3° 47.0'
25	53° 32'	3° 47.0'
26	53° 37'	3° 47.0'
27	53° 42'	3° 47.0'
28	53° 47'	3° 47.0'
29	53° 47'	3° 55.4'
30	53° 42'	3° 55.4'
31	53° 37'	3° 55.4'
32	53° 32'	3° 55.4'
33	53° 27'	3° 55.4'
34	53° 22'	3° 55.4'

6. Surface sampling

The intake for the surface sampling system is located underneath RV Prince Madog, at about 3 m below sea level. The parameters recorded every minute by the WS Oceans system are:

Date, Solar Radiation ($W\ m^{-2}$), PAR ($\mu\text{mols} / m^2s$), Air Temperature ($^{\circ}C$), Relative Humidity, Relative Wind Speed ($m\ s^{-1}$), Relative Wind Direction ($^{\circ}$) – zero indicates wind on the bow, Transmissance, Hull Temperature ($^{\circ}C$), Barometric Pressure (mbar), Fluorescence, Turbidity, Salinity, Minimum Air Temp ($^{\circ}C$), Maximum Air Temp ($^{\circ}C$), Wind Gust ($m\ s^{-1}$), GPS Time, Latitude, Longitude, Barometric Pressure Minimum (mbar), Barometric Pressure Maximum (mbar), Conductivity sensor water temperature ($^{\circ}C$).

Data were recorded from 08:24 on 07/08/02, at $53^{\circ} 16.370' N$ $004^{\circ} 04.672' W$, until 13:17:00 on 08/08/02, at $53^{\circ} 21.018' N$ $003^{\circ} 59.542' W$. No data were recorded between 19.51 and 20.38 inclusive on 7 August. Copies of the data were taken off the ship as comma separated variable ASCII files.

Acknowledgements

The assistance of the Captain, Steve Duckworth, officers, bosun, Phil Jones, and crew contributed greatly to the success of the cruise.