Prince Madog cruise 31/02
13,14 November 2002
POL Coastal Observatory cruise 3
REPORT

1. Objectives

1. At 53° 32´N 03° 21.8´W, half a mile west of Mersey Bar Light Vessel –

To recover
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, and a SeaBird MicroCat are also fitted to the frame.

b) A single point mooring marked by a toroid buoy with temperature and conductivity loggers (Aanderaa current meters without the vane) at 2, 5 and 10 m below the surface.

To deploy
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, and a SeaBird MicroCat are also fitted to the frame.

b) A CEFAS directional waverider (single point mooring).

c) A CEFAS SmartBuoy (single point mooring) with Aanderaa temperature conductivity logger at 10m below surface.

2. To conduct a CTD survey of 34 stations every 5 miles covering the eastern part of the Irish Sea between the North Wales coast and Blackpool and the Great Orme, to determine the effects of the rivers Dee, Mersey and Ribble on Liverpool Bay.

2. Scientific personnel

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3. Narrative (times in GMT)

All the equipment for the cruise were loaded onto RV Price Madog on the afternoon of 12 November. The SmartBuoy and the frame were built up on the afterdeck

RV Prince Madog left Menai Bridge at 08:30 on the 13 November. Recording of surface sampling was switched on before reaching Puffin Island. The ship's ADCP was not working. The mooring site, 53° 32´N 03° 21.8´W, was reached at 11:42. The toroid was visible and the two acoustics (both on the same frame) responded.

At 11:59 a CTD profile was carried out (CTD1/Station1 – Position 53° 32.202´N 03° 22.366´W) to calibrate the recording transmissometer (later to be attached to the frame). At 12:23 the ADCP release was fired (first release), however, it did not appear at the surface. The second release was fired at 12:23, again nothing appeared at the surface. The Prince Madog echo sounder picked up an object 2-3 metres from the bottom when passing close to deployment position of the ADCP.

After no sign of the ADCP sweeping was commenced, with a loop of wire hanging off the stern of the ship. After the third attempt the ADCP was hooked and came to the surface under its own buoyancy at 13:28. It was on deck by 13:37 followed within 5 minutes by the weights.

At 13:54 the deployment of the ADCP was started. At 14:05 it was released over the side of the ship at position 53° 31.967´N 03° 21.763´W. Water depth 23.6m.

At 14:42 the deployment of the CEFAS SmartBuoy (No. 12) was initiated. Anchor over the side at 14:45 at position 53° 31.912´N 03° 22.035´W, Aanderaa in water at 14:47. Buoy finally released at 14:51 at position 53° 31.929´N 03° 22.033´W. Water depth of 25.4m. **Note: The Smart Buoy cannot be deployed within 5 minutes either side of the hour and half hour intervals due to sampling within these times; The SmartBuoy takes a sample on the hour and half hour and could take in air instead of water – at the final stage just before deployment the DI water bag should be removed.**

At 14:56 the recovery of the toroid was initiated, position 53° 31.992´N 03° 22.976´W. Depth of water 24.7m. The toroid was on deck at 15:00 followed by all three Aanderaa loggers by 15:02.

At 15:44 the deployment of the CEFAS Directional Wave Rider (DWR) was initiated, position 53° 31.890´N 03° 21.896´W. Depth of water 25.7m.

After deployment of the SmartBuoy and DWR there was confirmation that both telemetry parts of these moorings were sending data back successfully.

The moorings deployments and recoveries have been tabulated in Table 1. and Table 2 respectively.

CTD2/Site1 was carried out near to the SmartBuoy (Position 53° 31.945´N 03° 21.864´W) with extra samples taken for SmartBuoy calibration.

The CTD survey then began with CTD3/Station11, CTD4/Site10, CTD5-14/Site2-9,12-13 (See Table 3. for full details of CTD survey). During CTD15, at Site14 the CTD broke (01:25 14 November). After a few attempts to restart it, A Hammerstein was woken. After inspecting the error messages a new fuse was tried with no effect. It was then decided to return to Menai Bridge to make repairs.
At 07:00 the ship arrived back at Menai Bridge. About 11:00 the SOS technician said that a capacitor had blown in the CTD unit and that it was a part that had to be ordered (2-3 days). The cruise was then terminated.

All the mooring objectives were accomplished and 13 out of 34 CTD sites visited.

4. Moorings (times in GMT)

4.1 The setup of the <u>recovered</u> instruments were as follows:

a) Mean 600 kHz ADCP
Mode 1: 100 pings every 10 minutes (velocity standard deviation 0.007 ms^{-1}).
35 x 1m bins (2.65-36.65 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.
Meter type: BB
Meter No.: 2391
Started at: 18:40:00 25/09/02
Stopped at: 16:10:00 13/11/02

Aanderaa pressure recorder BPR 444: 10 minute sampling:
Started at: 14:50:00 24/09/02
Stopped at: 15:50:41 21/11/02

25cm Sea-Tech Transmissometer, ST557, recording in Aanderaa logger (RCM11818) fitted with temperature and conductivity sensors: 10 minute sampling:
Meter type: AS
Meter No.: 11818
Started at: 15:30:00 24/09/02
Stopped at: 15:51:20 21/11/02

SeaBird MicroCat temperature, conductivity recorder, fitted with a pressure sensor (37IM29828-2506-ID03): 10 minute sampling:
Meter type: MC
Meter No.: 2506
Started at: 12:00:00 25/09/02

Stopped at: 14:50:00 21/11/02

The frame, D6, was fitted with two Benthos releases, 5A, 8A, and a spooler for recovery of the ballast weight.

Note: Whole frame and equipment covered in a fury green growth.

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

Note: Each meter was covered in fury green growth, the top meter also having a covering of black/green slime.

		Start time	Stop time	Sensor depth(m)
Top	RCM7 11820	15:30 24/09/02	15:10:30 21/11/02	2
Middle	RCM7 9959	17:39 25/09/02	Battery ran out after recovery, but before attempted switch off time.	5
Bottom	RCM7 11814	14:50 24/09/02	15:40:29 21/11/02	10

Table 1. Recovered mooring positions and times.

	Latitude (N)	Longitude (W)	Water Depth (m)	Deployment Time Date	Water Depth (m)	Recovery Time Date
Mooring	53° 31.994′	3° 22.011′	21	18:40 25/09/02	25	14:50 13/11/02
Mean ADCP	53° 31.997′	3° 21.792′	21	19:07 25/09/02	24	12:43 13/11/02

4.2 The setup of the <u>deployed</u> instruments were as follows

a) Mean 600 kHz ADCP
Mode 1: 100 pings every 10 minutes (velocity standard deviation 0.007 ms^{-1}).
35 x 1m bins (2.65-36.65 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. Battery case No. 0254
Meter type: BB
Meter No: 2390
Started at: 19:10:00 12/11/02

Aanderaa pressure recorder. 10 minute sampling.
Meter type: WR
Meter No: 445
Started at: 16:10:00 12/11/02

First scan at: 16:10:48 12/11/02

25cm Sea-Tech Transmissometer, ST637, recording in Aanderaa logger fitted with temperature and conductivity sensors: 10 minute sampling:
Meter type: AS
Meter No: 11817
Started at: 16:40:00 12/11/02

SeaBird MicroCat temperature, conductivity recorder, fitted with a pressure sensor (37IM29828-2081 – ID02): 10 minute sampling – delayed start:
Meter type: MC
Meter No.: 2081
Started at: 12:00:00 13/11/02

The frame, D6, was fitted with two Benthos releases, 2B(61166), 3A(40266), and a spooler for recovery of the ballast weight.

b) SmartBuoy
Buoy No.12 – Telemetry setup prior to cruise.
Aanderaa current meter (RCM 8 No. 10526), without fin to log temperature and conductivity. 10 minute samples. 10m below surface.
Started at: 16:30:00 12/11/02

c) DWR
Telemetry setup prior to cruise.

Table 2. Deployed mooring positions and times.

	Latitude (N)	Longitude (W)	Water depth (m)	Deployment Time/Date
Mean ADCP	53° 31.967′	3° 21.763′	24	14:05 13/11/02
SmartBuoy	53° 31.929′	3° 22.033′	26	14:51 13/11/02
DWR	53° 31.890′	3° 21.885′	26	15:47 13/11/02

5. CTD

The Sea-Bird 911 CTD recorded temperature, conductivity, transmittance and fluorescence at 24Hz. Since the frame was fitted with an altimeter measurements were taken to within 2m above of the bed. One water bottle was fired near the bed, to obtain reversing thermometer readings and a water sample for salinity determination back at the School of Ocean Sciences. Additional water bottles were used, both near surface and

near the bed for calibration of the SmartBuoy Sites 5-11 (see Table 3 for further details). Copies of the Sea-Bird binary files were taken off for processing at BODC/POL.

Table3. Nominal CTD positions

Site	Latitude(N)	Longitude(W)	Visited	Extra samples taken for SmartBuoy calibration
1	53° 31′	3° 21.8′	Yes (3 times)	Yes(twice)
2	53° 37′	3° 13.4′	Yes	No
3	53° 42′	3° 13.4′	Yes	No
4	53° 47′	3° 13.4′	Yes	No
5	53° 52′	3° 21.8′	Yes	Yes
6	53° 47′	3° 21.8′	Yes	Yes
7	53° 42′	3° 21.8′	Yes	Yes
8	53° 37′	3° 21.8′	Yes	Yes
9	53° 32′	3° 21.8′	Yes	Yes
10	53° 27′	3° 13.4′	Yes	No
11	53° 27′	3° 21.8′	Yes	Yes
12	53° 27′	3° 30.2′	Yes	No
13	53° 32′	3° 30.2′	Yes	No
14	53° 37′	3° 30.2′	No	-
15	53° 42′	3° 30.2′	No	-
16	53° 47′	3° 30.2′	No	-
17	53° 47′	3° 38.6′	No	-
18	53° 42′	3° 38.6′	No	-
19	53° 37′	3° 38.6′	No	-
20	53° 32′	3° 38.6′	No	-
21	53° 27′	3° 38.6′	No	-
22	53° 23′	3° 38.6′	No	-
23	53° 23′	3° 47.0′	No	-
24	53° 27′	3° 47.0′	No	-
25	53° 32′	3° 47.0′	No	-
26	53° 37′	3° 47.0′	No	-
27	53° 42′	3° 47.0′	No	-
28	53° 47′	3° 47.0′	No	-
29	53° 47′	3° 55.4′	No	-
30	53° 42′	3° 55.4′	No	-
31	53° 37′	3° 55.4′	No	-
32	53° 32′	3° 55.4′	No	-
33	53° 27′	3° 55.4′	No	-
34	53° 22′	3° 55.4′	No	-

6. Surface sampling

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

system are: Date, Solar Radiation,PAR, Air Temperature, Relative Humidity, Relative Wind Speed, Relative Wind Direction – zero indicated wind on the bow, Transmittance, Hull Temperature, Barometric Pressure, Fluorescence, Turbidity, Salinity, Minimum Air Temperature, Maximum Air Temperature, Wind Gust, GPS Time, Latitude, Longitude, Barometric Pressure Minimum, Barometric Pressure Maximum, Conductivity sensor water temperature.

Data were recorded during the cruise. Copies of the data were taken off the ship as comma separated variables ASII files.

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