WHITETHORN CRUISE 83/8

Leg 5

8 JUNE - 22 June 1983

C.D.R. Evans

Introduction

The leg was divided into two parts: the period from 9-13 June was taken up recovering the Huntec boomer fish lost by the Marine Geophysics Unit in the Swallow Hole area: the remainder of the leg, 13-22 June, was spent sampling on the Dogger Sheet. 35 vibrocore, 56 sediment core and 113 shipek grab sites were occupied during the second half of the leg.

Personnel

9-13 June

C Evans - party chief
J Day - Marine Geophysics Unit observer
J Pheasant - technician
P Wiggins - technician
H Robertson - surveyor
HMB Submersible Group personnel
2 pilots
1 technician
1 supervisor

13-22 June

C Evans - party chief
H Robertson - surveyor
P Balson - day geologist
C Graham - laboratory
J Pheasant - technician
P Wiggins - technician
D Long - night geologist
G Tulloch - night laboratory
B Tait - geochemist

SUBMERSIBLE OPERATION 9-13 JUNE

The Marine Geophysics Unit in the Gorsethorn (a sister ship of Whitethorn) lost its Huntec deep tow boomer and a side-scan sonar fish in early June when the vessel passed too close ahead of an anchored trawler. The site was some ninety miles east of Blyth and had been marked by the trawler with a buoy. A recovery operation was mounted, using Whitethorn to carry a one-man tethered submersible (an OCEL 'Mantis'). The Whitethorn was fitted out for the operation at Blyth: a winch was welded onto the hatch cover, the control portakabin was placed in front of the vibrocorer winch and the Mantis was positioned in the vibrocorer's position. The whole operation including testing took twelve hours to mobilise once the equipment was at quayside.

Log

Thursday 9 June

The lorry started to unload the HMB equipment at 0800 hrs and in five hours all was aboard and welded down. The equipment was tested in the dock and by 1830 hrs the vessel was ready to sail. D Cameron brought on the Helle pinger receiver used on the Gorsethorn to the ship. Whitethorn left Blyth 2010 hrs and set off for the buoy position on Swallow Hole.

Friday 10 June

At 0550 hrs the vessel was abeam of the buoy and the pinger receiver dropped overboard; the returns were weak so the vessel ran over the site again in a slightly different direction. The receiver being in the water some 30 m below sea level and had no directional indicator. At 0710 it was decided to anchor the vessel, using a 2-anchor spread, where the signal seemed strongest. The submersible was launched at 0830 hrs and its very limited radius of operation (about 200') from the mother ship became immediately obvious. The direction of the signal coming from the pinger on to boomer fish was identified by the submersible by rotating the whole vessel and noting the direction of strongest signal. The submersible could not get close enough to the signal so the anchors were lifted and relaid some 200 m from the original position. This was done twice using the directional indications from the submersible as a guide. The search range of the submersible was increased by heaving up and down the anchor spread. By the evening the signal being picked up in the submersible was very strong and the operation was suspended at 2115 with the feeling that the fish was very near by.

Saturday 11 June

Whitethorn anchored up by 0630 hrs in marginal weather conditions. A fault with a thruster on the submarine delayed operations and it was finally launched at 1215 hrs. The signal from the pinger emanated from the north-west so the anchors were lifted and the vessel allowed to drift with the submersible near sea bed. The location with a strong signal was fixed and a four-anchor spread laid. On dipping the submersible the sound source was still to the north-west and the heading did not change appreciably on moving to the full extent of the anchor

spread. The anchors were lifted and the vessel moved a mile to the north-west of the buoyed site; the submersible recorded a signal to the south-east. Moving to the west of the intersecting bearings produced a cocked hat solution for the location of the pinger, a position nearly 0.7 n miles north-west of the buoyed site. 2300 hrs operations suspended for the day.

Sunday 12 June

At 0612 hrs commenced anchoring on the western side of the search triangle. The submersible's finder gave an intercept for the two signal bearings some 90 m east of the ship's position. Anchors lifted and relaid: again some distance from the mother vessel so anchors lifted and relaid. Submersible deployed at 1225 hrs. At 1430 hrs the submersible, at the limits of its range, found the boomer fish but because of the strong tidal currents and its position the submersible was not able to return to a position below the vessel to pick up a lifting line. The operation was suspended until the tide turned with the submersible haning onto guide ropes on the fish. An attempt to pull the fish back failed when a guide rope broke. At 1800 the submersible wrapped its emergency lifting strop onto the fish's lifting yoke. Once completed the submersible and fish were lifted together with only slight damage to the submersible due to the weight hanging underneath it. The pair reached surface at 1947 hrs and the weight of the fish was transferred onto the gravity coring winch. The lifting strop was then disconnected and fish and submersible brought inboard separately. The fish appeared undamaged except for score marks on the basal tail fin where it had been pulled around by trawl wires and a fractured perspex sheet underneath. The ship picked up the marker buoy and returned to Blyth.

Comments

The OCEL 'Mantis' was a one-man vessel less than 3 m long attached to the surface by a combined hoist, communication and power line. It fitted snugly onto the Whitethorn's deck and was easy to handle with the A-frame. The submersible had a range of about 60 m away from the vessel, beyond this range it could not pull its umbilical cable. The pinger location device on the submersible gave a crude bearing but was not very accurate when the signal was close and very loud.

There was no way other than by taking bearings to deduce the range of the pinger from the receiver and there was a feeling that temporal variations in the water column led to changes in the strength of the received signal which could lead to misunderstanding the range of the signal purely from signal strength.

If such an operation is mounted in future then the search should commence with some widely spaced 'dip' dives to establish the position of the emitting pinger. The position should be refined until a series of two-anchor moorings can be placed over the site. For the present exercise the buoy position was 55° 11.06' N 00° 34.10' E, the fish was located at 55°11.69'N 0°33.58'E.

SAMPLING PROGRAMME 13-22 JUNE

The vessel arrived in Blyth at 0700 hrs on 13 June; the submersible and its paraphernalia were removed and vibrocorer put on by 1500 hrs. At 1800 hrs the vessel sailed for the western half of the Dogger Sheet.

The ship arrived on station at 0630 hrs on 14 June after a rough passage to be greeted by a gale S-SE 6-8 which promised to veer to the west. Operations were suspended until 2115 when shipek grab sampling was started.

Eleven sites were collected during the night shift but by 0630 hrs on 15 June the weather had deteriorated with a forecast of W-NW 6-8 locally 9 for the Dogger area. Operations were suspended until 2300 when the night shift were called out to start on the shipek grab sites.

16 June opened with the night shift having completed seven sites. Vibrocoring commenced at 0800 hrs and the day shift finished at 2300 having completed six sites. Starting the vibrocoring produced a few problems. The Rolls Royce generator developed a few rough spots; the outer power pack for the A-frame was not at all happy and the penetrometer on the vibrocorer gave trouble on the inboard end when a transformer blew.

17 June started with eleven sites completed by the night shift. Vibrocoring started at 0800 hrs and finished at 2200 hrs with six sites occupied.

On 18 June the shift collected 13 sites during the night and vibrocating from 0800 to 2300 hrs occupied seven sites. The weather was warm, sunny and calm.

On 19 June ten sites were occupied during the night and eight vibrocore sites during the day. The Rolls Royce generator had sounded rough for a few days and nearly 40 mins of down time accumulated when the fuel system was cleaned to remove dirt thought to be causing the irregular running.

On 20 June the night shift occupied 12 sites and four vibrocore sites were completed during the day from 0800 hrs to 2230 hrs. The port bow anchor motor seized up on lifting at the first site. The weather was force 5 with a moderate swell. Attempts to repair the winch were unsuccessful and a retrieval of the anchor cable using the bow windlass was attempted. This was found to be impossible because of the wind so the wire from the stern anchor was attached to the bow wire; the bow cable was cut and the two wires brought to the stern. The bow cable was then pulled up on the windlass. This problem resulted in 7.1 hrs down time.

On 21 June the night shift collected at thirteen sites. The vessel vibrocored four sites from 0800 until 1430; three additional shipek sites were collected by 1600 hrs when the vessel headed for Blyth.

22 June, the ship docked at Blyth at 0715 hrs.

Ship's Equipment

In general the ship's equipment worked well but there were three problem areas: the Rolls Royce generator, the outboard A-frame power pack and the port bow anchor winch. The Rolls Royce generator problem was caused by dirt in the fuel lines and was cleared after a few days of rough running. The outer A-frame power pack was worked on in Blyth at the start of the leg and was obviously not fully repaired when the ship sailed. Attempts to use it proved unsuccessful and inner back was used for all the leg. The problem on the port bow anchor winch occurred in the hydraulic motor. The seven hours down time caused by the problem resulted from the diagnosis of the problem and the subsequent difficulty in hauling in the anchor wire when the winch was not operational.

IGS Equipment

The sampling equipment used was a vibrocorer, gravity corer and shipek grab. But for a minor problem with a transformer in the inboard end of the penetrometer all worked well. A locator pinger was strapped to the leg of the vibrocorer to assist any future recovery operation of the corer.

The big advance was the use of the Racal-Decca Lat/Long converter, and the Apple Computer with a disc memory system. Both proved slightly troublesome: the touch sensitive switches on the convertor were sticky and a new panel was put on at the end of the leg. The computer worked well but refused to store data on disc when the computer was switched off. This system obviously has great advantages for the surveyor and crew and in terms of rapidly producing a skeleton map at the end of the leg. But beware, they only replace the quill pen: we do not put page three of the data sheet on the computer. This carries the full sample description and is the most important part of the data set.

Geology

This was the first cruise by the unit onto the sheet. Because of the time lost at the start of the leg sampling was restricted to the north western quadrant and the western half of the southwestern quadrant of the sheet. The area had been covered by seismic lines the previous month and the sample sites occupied had been chosen by D Cameron. The geology may be divisible into the sea bed sediments and the underlying older Quaternary sequences and there is usually a well marked divide between the two.

The surface sediment in the area consists of a well sorted fine to very fine grained olive grey sand which becomes slightly finer and more muddy to the north. In the south over the shallower parts of the Dogger Bank the colour is less olive, the grain coarser and gravelly areas have been recognised. The thickness of the upper unit is generally between 20-80 cm though locally it may exceed five metres and in the south be reduced to a thin lag gravel deposit. Near the base of the unit is a layer of large whole bivalves with a shell hash matrix. This layer appeared to be less well developed in the shallower (< 40 m) areas. The recent sediments displayed a slightly gravelly base in some areas.

The recent sediments passed down with a sharp, often bioturbated contact, into a sequence of sands and clays. In the north this consisted of fine well sorted rather featureless dark grey sand. This locally displayed slightly coarser shelly bands, and peat granules were also found. Penetration into this unit was rarely more than two metres. A few cores in this northern area were of a stiff faintly colour banded uniform clay.

Southwards onto the Dogger Bank the material beneath the recent sediment was predominantly a stiff dark grey brown clay, occasionally silty with rounded pebbles up to 2 cm across, granules of chalk and no definite internal structures. On occasions these clays passed down into sandier and/or less firm muds. The sands were similar to those recorded further north but chunks and granules of lignite were more frequent. A definite interlamination of mud and sand was observed in some cores often with intense bioturbation. Within some of these cores there were bands where the lamination appeared to be tilted and broken up, as in a breccia. There was some debate on the ship whether this was a function of the vibrocoring process, an intertidal scarp breccia or an effect caused by cryoturbation or ice push. These cores should be re-examined to try and resolve this dilemma.

Time Analysis

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		Date June	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Totals
Working Time		In Port	7.5	20.5	2.5	6.6	6.0	10.5									17	70.6
		On Passage	16.5	3.5	6.0		2.8	13.5	6.5							8.2	7	64.0
		Traversing			0.6	0.4	0.9		2.4	6.5	9.5	12.0	11.3	11.4	11.1	8.1		74.1
		Anchoring			1.5	4.8	4.7				6.9	5.4	5.3	5.6	2.7	2.1		39.0
		On Station			13.5	8.0	9.6		0.6	1.1	7.6	6.6	7.4	6.4	3.1	5.6		69.5
Down time		Weather							14.5	16.4								
	Ship	Power Supply												0.6				
	Ship	Anchoring													7.1			
		HMB Sub				4.2												
No. of Stations		Grab							4	7	13	18	17	20	16	18		113
		Sediment Corer									1	12	10	12	12			56
		Vibrocorer									6	6	7	8	4	4		35