

INSTITUTE OF GEOLOGICAL SCIENCES
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WHITETHORN CRUISE REPORT

CRUISE NO. 81 WH 08

29th April - 13th May, 1981

LEG 3

by

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1. INTRODUCTION

Leg 3 of cruise 81WH08 continued the sampling of the Bosie's Bank sheet (58°-59°N; 2°W-0°) 1:250 000 mapping area. The primary objective was completion of the Bosie's Bank SE 1:100 000 sheet, followed by infill sampling on Bosie's Bank SW.

A total of 112 sites were occupied, 44 with the vibrocorer. Details of the work programme are given in the survey log (Appendix I).

2. PERSONNEL

R Owens	MGLU (Edin)	Senior Geologist
D Gregory	Pal Dept (Leeds)	Surveyor
D Tappin	MGLU (Leeds)	Day Geologist
G Tulloch	MGLU (Edin)	Day Lab
N Campbell	MGLU (Edin)	Deck Operations
W Lonie	MGLU (Edin)	Main Technician
N Fannin	MGLU (Edin)	Night Lab/Geologist
R Sutherland	HCU (Edin)	Night Lab
M Dawkins	A & C (London)	Geochemist

3. EQUIPMENT

a) "Whitethorn"

- (i) 4 x 16t diesel-hydraulic anchoring winches
- (ii) 4 x Bruce anchors
- (iii) "A" frame and 30t winch
- (iv) Atlas-Deso echosounder

b) IGS

- (i) Vibrocorer (6m) c/w retraction and penetration-indication system
- (ii) Gravity corers, Lebus winch and braided nylon line
- (iii) Shipek grabs and Lebus grabbing winch
- (iv) Core-cutting system.

4. PERFORMANCE

a) "Whitethorn"

i) Anchoring - this was generally slower than last year, even after allowance is made for greater water depths in this years work area. It was impossible to establish whether this was due to a deterioration in performance of either the ship's anchor winches or in the ship's officers.

ii) "A" frame and winch - comment made to the ship's engineers following attention to valves in the hydraulic system. However, performance was still slow and, on occasions, the winch seemed almost unable to lift the vibrocorer.

iii) General - the inability of the bow-thruster to hold the ship's head to the seas caused excessive rolling ($>45^{\circ}$) during gravity coring operations in marginal conditions. If the bow-thruster is not up-rated, conditions that result in suspension of vibrocoring are almost certain to be unsafe for gravity coring to continue as a stand-by operation.

b) IGS

i) Vibrocorer - no problems or break-downs occurred during this leg. Performance of all associated systems was also excellent.

ii) Gravity corer - two corers were lost during this leg, one when operating in marginal conditions (corer stuck in bottom while ship had way on when attempting to keep on station). The other was lost when an excessive snatch load was imposed on the work by the combination of launching and a heavy roll. The use of the 4" barrel gave longer and less disturbed core than the 2½" barrel.

iii) Shipek grabs - with the exception of an occasional malfunction of the cable metering device, no problems were encountered with this

system.

iv) Decca Navigator - the model 350T track plotter failed at 2140 hours on 4.5.81. Via a radio-telephone conversation with the Decca engineer in Aberdeen, we were able to establish that the internal power-supply circuit had failed. Arrangements were made to rendezvous with a pilot cutter off Aberdeen in order to obtain a replacement. Whilst lying off Aberdeen Decca advised that there were no 220V DC track plotters available and that a 12V DC model was all that could be supplied. When on board the Decca engineer, jury-rigged a 12V DC power supply from the ship's radio. Arrangements were made for proper replacement at the next port-call.

5. RESULTS

a) Operational

The total number of sites occupied was 112, 44 with the vibrocorer.

The average number of vibrocorer stations per working day was 5.

The areal distribution of the sites occupied is shown in Figure 1. A type analysis of the samples taken is detailed below.

1:100 000 Sheet	Total Stations	Shipek Grabs	Gravity Corer	Vibrocorer
58-02	56	56	33	23
58-01	56	56	34	21

Despite the generally poor weather (see survey log) the main objects of the leg were attained, viz. sampling Bosie's Bank SE and completion of cover on Bosie's Bank SW.

b) Technical

i) Core cutting - the equipment proved entirely satisfactory, despite

being rigged on an "experimental" basis.

- ii) Photography - the transfer of the photographic equipment from the hydraulics workshop to the laboratory, with the attendant re-arrangement of the equipment and disposal of the photographic frame, was a considerable improvement on the previous arrangement and resulted in a more efficient cycle of operations within the laboratory itself.
 - iii) Core storage - although the system of palletising the boxed and cut core worked, it would have been more efficient if the core could have been retained in a container for transfer onshore at port calls.
- c) Geological
- i) Core logging - all core taken on this leg was cut, opened, photographed, geotechnically tested and geologically logged as routine during normal operations. This did result in a heavy work load, particularly when sampling areas of soft sediments where 6m cores were regularly obtained. Nevertheless, at no time did any significant back-log of un-opened core accumulate.
 - ii) In Bosie's Bank SE the sediments cored were dominantly muddy, with fine sandy laminae stained black with iron sulphides. Drop-stones were occasionally present.

Towards the western margin of the area a unit with rhythmic alternations of reddish-brown and green clayey horizons was well developed. This is similar to a unit mapped in the west of the Halibut Bank area as "lagoonal". These sediments were traceable through the southern half of Bosie's Bank SW.

In the shallower waters of the SW corner till-like sediments, generally

reddish-brown, were cored. Most were normally consolidated, implying a glaciomarine origin. Occasional horizons of overconsolidated sediment could represent "true" tills, or the results of dessication.

6. CONCLUSIONS

- a) The complete absence of "down" time due to IGS equipment failure of malfunction is evidence that we now have both efficient and reliable equipment and an organised system of preventative maintenance.
- b) The success of the core-cutting exercise should result in this becoming a routine part of our operations, with consequent improvements in speed of map production and savings in onshore geological time.

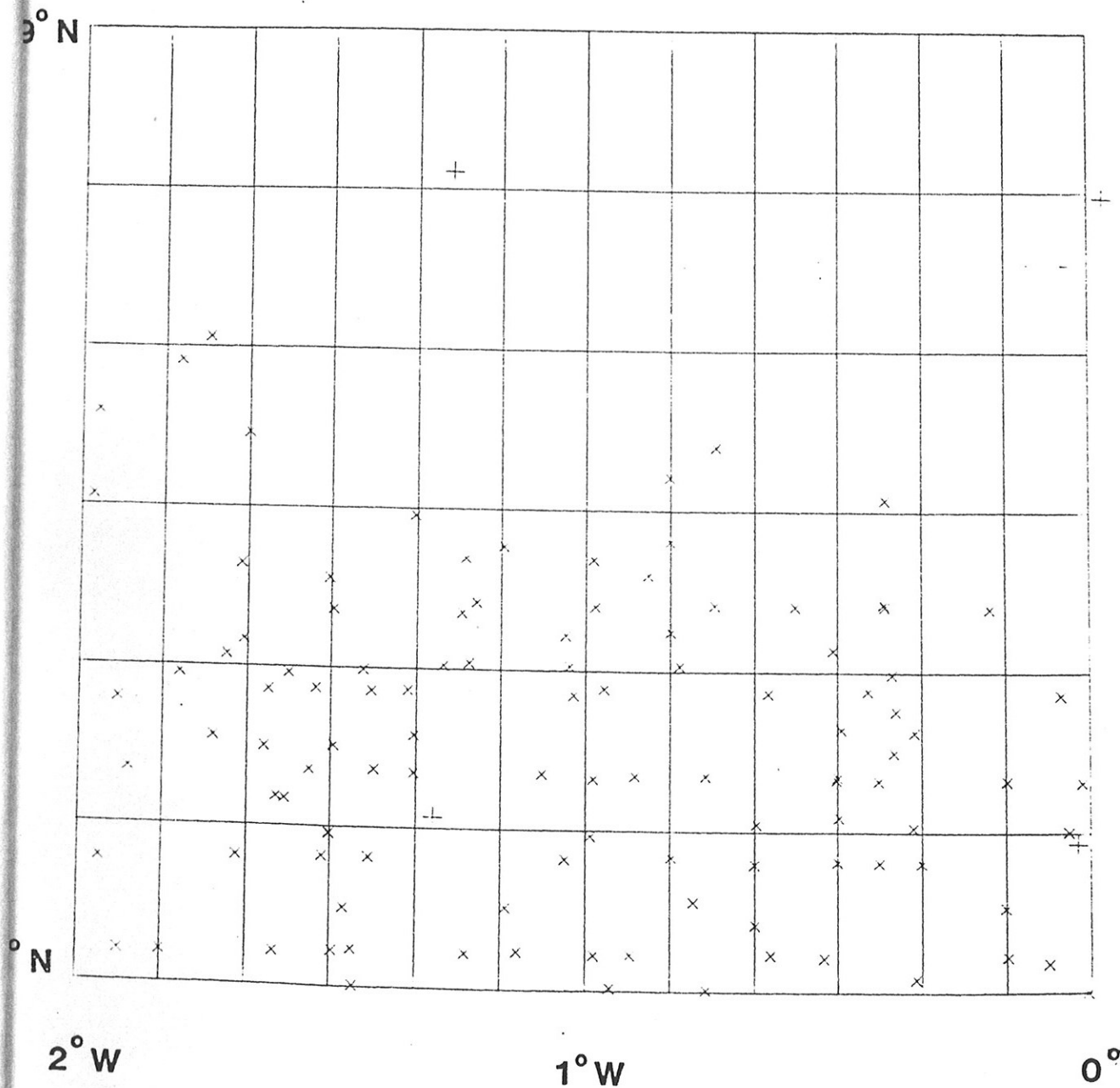
7. RECOMMENDATIONS

- a) A post-cruise meeting at the end of the season should be held to review the years problems and experiences. This meeting should involve all technical staff and senior geologists.
- b) The need for two technicians on routine sampling legs should be carefully examined. The present arrangement is not an efficient use of our technical staff time.
- c) The concentrated activity in the laboratory highlights the inefficient use of technical space. During most of the leg very little use was made of the main workshop container and almost no use of the hydraulics workshop. Rationalisation and redistribution of working space is needed.

- d) The problems associated with the use of Aberdeen docks indicate that this port should be avoided, where possible.
- e) Track plotting would be significantly improved if we specified the Decca track plotter model 350 TS which has the advantage of a lane ratio range from $\frac{1}{4}$ to 4, as against $\frac{1}{2}$ to 2 in the case of the model 350T presently used.
- f) Despite all comments and recommendations from last season, the standards of catering, stewarding and hygiene on this leg of "Whitethorn" was little improved on those of previous years.
- g) The use of 4" barrels as standard on the gravity corer would eliminate the need to carry two different sizes of liner tube. It also makes economic use of offcuts from liner used in vibrocoring.

BOSIES BANK SHEET

Scale 1:750,000



x sample station occupied during leg 3

APPENDIX I

SURVEY LOG

8. SURVEY LOG

Wed 29 April

1030 R Owens, N Campbell, R Sutherland aboard in Aberdeen
 1500 G Tulloch aboard with M Dawkins
 2000 N Fannin, D Gregory, D Tappin aboard.

Thurs 30 April

1500 Moved to bunkering wharf
 1830 Sailed from Aberdeen to anchor outside harbour. Forecast
 for work area NW 7-9, occ 10

Fri 1 May

0015 Forecast NW 7-9, occ 10
 0625 Forecast a/a
 0900 Sailed on course to Bosies Bank SE to test weather
 1045 Altered course to head inshore for shelter. Winds force 7,
 sea heavy.
 1750 Forecast Viking/Forties N 6-8, occ 9.

Sat 2 May

0015 Forecast Viking/Forties N 6-8
 0625 " " " N 6-8 dec 4-5
 0830 Sailed on course to Bosies Bank SE to test weather
 1730 Arrived at 58°N 00°; hove to testing seas
 1925 Commenced anchoring at 58-01/232

Sun 3 May

0025 Finished vibrocoreing (58-01/233), sailed for 1st gravity
 coring site
 0110 Commenced gravity coring
 0710 Finished gravity coring
 0750 Commenced anchoring at 58-01/242

Sun 3 May (cont'd)

- 1130 Ship moved on anchors at 58-01/243. Recovered VE with bend barrel; lifted anchors and commenced re-laying.
- 2115 Finished vibrocoring, headed for first night site
- 2155 Commenced gravity coring

Mon 4 May

- 0635 Gravity corer lost in deteriorating weather conditions. Suspend operations.
- 1710 Commence anchoring at 58-01/254
- 2140 Track plotter fails when commencing anchoring (possibly failed prior to this)
- 2200 Unable to locate fault in track plotter. Call Decca Aberdeen for advice
- 2300 Confirm failure of internal power circuit in track plotter. Arrange with Decca to obtain replacement at Aberdeen tomorrow.
- 2400 Steam for Aberdeen

Tues 5 May

- 0800 Lying off Aberdeen. Decca phone and advise no 220V (DC) track plotters available, only 110V or 24V (DC). Agree to attempt to use 24V supply for Atlas Deso.
- 1200 Decca repairman aboard; jury-rigs 24V power supply to new track-plotter
- 1330 Replacement complete, put Decca man ashore and steam for closest VE station
- 1935 Commence anchoring at 58-02/177
- 2330 Finish vibrocoring, steam for night work area

Wed 6 May

0720 Finish night work at 58-01/256
0745 Commence anchoring at 58-01/257
2050 Finish vibrocoring at 58-01/261; steam for night operations area.

Thurs 7 May

0530 Finish night operations, steam for first vibrocore site
0705 Commence anchoring at 58-01/268
2100 Discontinue vibrocoring during approach to final site.
Fishing fleet on site in thick fog.
2140 Commence night operations at 58-01/274

Fri 8 May

0700 Heavy swell and fog; unable to anchor, continue gravity coring and shipek grabbing.
1500 Abandoned work - vessel rolling very heavily ($>45^{\circ}$). Steaming slowly into swell in thickening fog.
2100 Swell and fog abating; steam to commence night activities at approx 58°N ; $00^{\circ}20'\text{W}$

Sat 9 May

0710 Commence anchoring at 58-02/191. Sea calm with slight swell; very foggy

Sun 10 May

0010 Finish vibrocoring at 58-01/287; steam for first night site.
0109 Commence night work
0350 Gravity corer lost at 58-02/197
0930 Commence anchoring at 58-02/201. Wind force 6, swell moderate and building. Visibility approx 200m in thick fog.
1445 Abandon vibrocoring due to weather. Prepare for gravity coring.

Sun 10 May (cont'd)

1710 Splicing etc complete, commence work at 58-02/203.
Visibility still approx. 200m

Mon 11 May

0530 Finish night work, steam for first vibrocoring station
0655 Anchoring at 58-02/216, in sunshine! (first time fog has
lifted in four days.)
2330 Finished vibrocoring at 58-02/221; steaming for first night
location.

Tues 12 May

0011 Commenced night work
0500 Finished night work, steaming for first VE site
0635 Commence anchoring at 58-02/228
1825 Finish vibrocoring at 58-02/232. Steam for Aberdeen in
SE gale and dense fog.

Wed 13 May

0700 Alongside at Aberdeen
1200 D Evans aboard
1500 R Owens off