Institute of Geological Sciences
Marine Geology Unit
Report number 83/9

m.v. WHITETHORN CRUISE
LEG 4 - 26th MAY - 8th JUNE 1983
BRESSAY BANK / BERGEN BANK AREAS

by
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1. INTRODUCTION

Following on from Leg 3 the object of this leg was to complete the remaining vibrocore stations planned for the Bressay Bank / Bergen Bank areas , together with selected Shipek grab / gravity corer sites.

Although the weather during this leg was extremely variable the majority of the planned sites were completed.

2. PERSONNEL

M. Stoker	(Chief Scientist)
A. Fyfe	(Day Geologist)
D. Long	(Day Laboratory)
A. Crosby	(Surveyor)
A. Davies	(Geochemist)
J. Pheasant	(Engineer)
N. Campbell	(Engineer)
G. Lott	(Night Geologist)
P. Balson	(Night Laboratory)

3. AREA

Bressay Bank area (59° - 60°N, 0° - 2°E) and including part of the Bergen Bank area (59° - 60°N, 2° - 4°E), within the UK sector (Figure 1).

4.RESULTS

Equipment	Shipek	Gravity corer (sediment)	Vibrocorer
No of stations	106	79	27

Total number of stations occupied: 106

5. EQUIPMENT PERFORMANCE

On the ship's side the equipment was satisfactory. The only problem that arose was a snagged cable on the vibrocorer tugger winch, located on the starboard side of the lower deck, caused by a crossover of the cable when winding in during recovery of the vibrocorer. This meant that the gravity corer tugger winch had to be used while a new cable was fitted. This was completed by the IGS engineers, who also fitted a grid immediately above the starboard side tugger winch which now enables a visual check to be kept, from the upper deck, on the winch cable as it winds in during vibrocorer recovery.

IGS equipment was satisfactory with the exception of two Shipek grabs which proved extremely difficult to cock. These grabs were subsequently replaced.

6. TIME ANALYSIS

On passage	23%	
Traversing	30%	Working
Anchoring	6%	time
On station	12%	
Weather	29%	Down time

7. GEOLOGICAL RESULTS (A. Fyfe)

Surface sediments

Over most of the area, the surface sediments comprise olive grey very fine to fine grained sands. In the southern part of the sheet, these sands tend to be finer grained with a significant mud content, while in the north the sediment is cleaner and better sorted. The sand is dominantly quartzose with subordinate rock fragments, glauconite, lignitic wood fragments and biogenic material. The lithic grains are generally subangular to subrounded but in some parts well rounded grains make up much of the sediment. Most of the rock fragments appear to be of metamorphic origin. The biogenic fraction comprises worn shell fragments, echinoid spines and diverse forams. The abundance of forams appears to be greater in the North.

Quaternary

The major Quaternary units defined on the geophysical interpretation were identified during the shallow sampling. The acoustically transparent and layered unit in the southeast was found to comprise very soft sandy muds interlaminated with highly plastic clays and well sorted very fine sands. This is thought to be a late glacial deposit, possibly a lateral equivalent of the Witch Ground Formation to the south and/or the Flags Formation to the north. This unit has also been identified elsewhere on the sheet, in some cases correlating with the geophysical interpretation and in other cases at variance with it. This seems to indicate that the sediments occur in small pockets. At one site there was an overpowering smell of hydrogen sulphide gas eminating from the core.

The acoustically transparent diffusely layered unit with its strong basal reflector which was seen over most of the rest of the sheet was found to be a grey fine grained well sorted quartz sand. In the northeast this occurs as an outstanding topographic feature. In places this sand was found to be thixotropic and the quartz grains to be very well rounded. Glauconite, well rounded shell debris, small pebbles and some lignitic wood fragments were also observed. These sands may be a lateral variation of the Cape Shore Formation which to the north occurs as muddy sands.

In the southwest very soft highly plastic clays were penetrated. In some places these are colour banded brown and grey with interlaminated silts. Elsewhere they are monotonous grey, again usually with silty/very fine sandy laminae and lenses. They are probably lateral equivalents of the Witch Ground Formation and correspond to the soft clays seen in the northwest Fladen area.

In the western part of the area, on the Bressay Bank itself and in the northern part of the sheet stiff to hard clays were penetrated. These had not been identified on the geophysical records and form an interesting feature. They are grey and appear to be sandy and variably calcareous with shell fragments and in some cases small pebbles. They sometimes have a till-like appearance and may be equivalents of the Ferder Formation to the north.

8. CONCLUSIONS

Despite some poor weather at the beginning of Leg 4, legs 3 and 4 together almost completed the sampling programme in the Bressay Bank / Bergen Bank areas. Over the two legs 93 of the 100 planned vibrocore sites were sampled.

APPENDIX I

Ship's Log Leg 4 Thursday 26th May - Wednesday 8th June

Thursday 26th May

00.00 - 21.00	In port, Scrabster
21.00	Departed from Scrabster
21.00 - 24.00	Steaming towards Bressay Bank area

Friday 27th May

00.00 - 13.00	Steaming towards Bressay Bank area
13.00 - 17.45	Steaming away from Bressay Bank area towards Orkney for shelter, in deteriorating weather
17.45 - 24.00	At anchor in Bay of Holland on South side of Stronsay

Saturday 28th May

00.00 - 24.00	At anchor in Bay of Holland, Stronsay

Sunday 29th May

00.00 - 08.30	At anchor in Bay of Holland, Stronsay
08.30	Weighed anchor
08.30 - 19.30	Steaming towards Bressay Bank area
19.30 - 21.00	Vibrocoring - Bressay Bank SW
21.00 - 24.00	Routine sampling

Monday 30th May

00.00 - 06.30	Routine sampling
06.30 - 16.00	Hove to - waiting on weather
16.00 - 18.30	Routine sampling
18.30 - 22.30	Hove to - waiting on weather
22.30 - 24.00	Routine sampling

Tuesday 31st May

00.00 - 08.00	Routine sampling
08.30 - 22.00	Vibrocoring - Bressay Bank NW
22.00 - 24.00	Routine sampling

Wednseday 1st June

00.00 - 08.00	Routine sampling
08.00 - 22.00	Vibrocoring - Bressay Bank NW and SW
22.00 - 24.00	Routine sampling

Thursday 2nd June

00.00 - 06.00	Routine sampling
06.00 - 24.00	Hove to - waiting on weather

Friday 3rd June

00.00 - 05.30	Hove to - waiting on weather
05.30 - 09.00	Routine sampling
09.00 - 17.30	Hove to - waiting on weather
17.30 - 24.00	Routine sampling

Saturday 4th June

00.00 - 08.00	Routine sampling
08.00 - 22.00	Vibrocoring - Bressay Bank NW and NE

22.00 - 24.00 Routine sampling

Sunday 5th June
00.00 - 12.00 Routine sampling
12.00 - 22.00 Vibrocoring - Bressay Bank NE and Bergen Bank NW
22.00 - 24.00 Routine sampling

Monday 6th June
00.00 - 08.00 Routine sampling
08.00 - 17.30 Vibrocoring - Bressay Bank NE and SE
17.30 - 24.00 On passage from Bressay Bank to Blyth

Tuesday 7th June
00.00 - 24.00 On passage from Bressay Bank to Blyth

Wednesday 8th June
00.00 - 07.00 On passage from Bressay Bank to Blyth

APPENDIX II

SHIP TIME ANALYSIS LEG 4 DATES 25-05-83 TO 7-06-83

Time complete to nearest 0.1 hour (6min)

DATE	26-5	27-5	28-5	29-5	30-5	31-5	01-6
WORKING TIME							
In port	21.0						
On passage	3.0	17.5		10.5			
Traversing				2.5	7.5	13.2	15.0
Anchoring				1.1		3.4	3.8
On station				1.3	2.5	7.4	5.2
DOWN TIME							
Weather			6.5	24.0	8.6	14.0	
SHIP							
Propulsion							
Power supply							
Anchoring							
Handling systems							
IGS							
Camera							
Grab							
Gravity corer							
Vibrocorer							
Rock drill							
Other							
Winches							
Power cables							

NUMBER OF STATIONS

	26-5	27-5	28-5	29-5	30-5	31-5	01-6
Grab				4	11	15	15
Rock corer							
Sediment corer				3	11	9	10
Vibrocorer				1		6	5
Drill							
Other							

REMARKS

SHIP TIME ANALYSIS LEG 4 DATES 25-05-83 TO 07-06-83

Complete to nearest 0.1 hour(6min)

DATE	02-6	03-6	04-6	05-6	06-6	07-6	08-6	TOTALS hrs
WORKING TIME								
In port							17.0	38.0
On passage					6.8	24.0	7.0	68.8
Traversing	5.1	6.8	13.7	16.7	9.0			89.5
Anchoring	0.1	0.4	4.6	2.3	3.0			18.7
On station	1.0	2.3	5.7	5.0	5.2			35.6
DOWN TIME								
Weather	17.8	14.5						85.4
SHIP								
Propulsion								
Power supply								
Anchoring								
Handling systems								
IGS								
Camera								
Grab								
Gravity corer								
Vibrocorer								
Rock drill								
Other								
Winches								
Power cables								

NUMBER OF STATIONS

	02-6	03-6	04-6	05-6	06-6	07-6	08-6	TOTALS
Grab	6	13	14	14	14			106
Rock corer								
Sediment corer	6	13	8	10	9			79
Vibrocorer			6	4	5			27
Drill								
Other								

REMARKS

FIGURE 1

LOCATION OF BRESSAY BANK AND BERGEN BANK SURVEY AREAS.