

Cruise Report 80/FE/09

"FERDER" DRILLING LEG 2

4.9.80 - 19.9.80

by

R. Owens

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INTRODUCTION

This report covers leg 2 of the 1980 "Ferder" drilling programme and follows internal report 80/13 on leg 1.

Leg 2 was the two week period from 4.9.80 to 19.9.80. Throughout this time weather and sea-state were generally poor and commonly very bad. Six borehole sites were occupied with four successfully completed. One site (No. 133) was unsuccessfully attempted four times. Down-time due to problems with ship's equipment was minimal. A fresh drilling crew and their consequent lack of familiarity with the equipment resulted in some loss of drilling time due to avoidable incidents.

PERSONNEL

R Owens	IGS (MGLU)	Senior Scientist
J Chesher	IGS (MGLU)	Geologist
D Evans	IGS (MGLU)	Geologist
C Graham	IGS (MGLU)	Assistant
D Long	IGS (EGU)	Engineering Geologist
G Tulloch	IGS (MGLU)	Assistant
J Wilson		Consultant

EQUIPMENT

a) Ship's Equipment

Descriptions of "Ferder's" equipment and a general ship specification are contained in Marine Geology Unit internal report 80/16.

During the preceding leg of the cruise the state of "Ferder's" equipment resulted in a series of minor stoppages and two major failures. This appeared to result from general lack of maintenance.

These experiences were not repeated on the second leg which was, from this point of view, relatively trouble-free. However, the crew's lack of experience with the equipment caused a number of irritating, avoidable incidents, for example, allowing the bit-guide to get ahead of the drill-string when running in. This caused loss of time on several occasions.

Accommodation was of a very high standard.

b) ICS Equipment

This is fully detailed and described in Marine Geology Unit report 80/16. No problems, other than those caused by accidental damage, were encountered. However, the poor quality control exerted by Christensens on spare parts, notably quin latches and latch springs, did cause some avoidable delays.

SHIP PERFORMANCE

This is covered at length in Marine Geology Unit internal report 80/16 and in the report of the drilling consultant, J. Wilson.

Movement of the ship relative to the seabed template (McLelland's "Stingray") caused problems on several occasions, notably on boreholes 80/7 & 80/12 where an inability to run the overshot, in order to recover the inner core barrel, was due to excessive curvature of the drill-string between the ship and the seabed. This resulted in loss of time and partially drilled boreholes. Station keeping would be improved by the use of six anchors. Any penalty due to increase in anchoring time would be small compared to the benefits of improved position-holding.

One aspect of ship-handling which caused some delay and loss of drilling

time was the captain's insistence on anchoring only in daylight, after "Decca-dawn" and before "Decca-dusk". Whilst the problems of working in the dark are appreciated, it does seem unreasonable to wait for light then the Decca Navigator is otherwise stable, outwith the dusk and dawn periods.

Whilst the constant spirit of willing co-operation and helpfulness of the ships crew must be acknowledged, drilling performance on one of the shifts was considerably marred by the use of a relatively inexperienced mate as a driller, despite the presence of hands who were obviously more competent. Thus, while pipe-handling and deck work were exemplary, drilling could be conducted in a hap-hazard manner, with a consequent deterioration in drilling performance. It is appreciated that a ship's disciplinary heirarchy must be observed. However, this requirement must surely be waived when the question of performance and competence arises when considering the prime reason for the ship's existence, i.e. drilling holes.

Support from the ship's engineers for both IGS and ships equipment minimised such down-time as did occur and their enthusiastic helpfulness is acknowledged.

The problems with laboratory space encountered on leg 1 (see Marine Geology Unit internal report 80/13) were repeated and amplified, particularly when coring borehole 80/8. The problem of finding suitable places to temporarily deposit unexamined and uncurated core could be resolved by fitting a bench below the laboratory, perhaps as an extension to the pre-existing catwalk.

RESULTS

A combination of poor weather conditions and short weather-windows meant that only short boreholes in relatively sheltered locations could be attempted.

Three of the six sites occupied were completed successfully, with the geological objectives accomplished (boreholes 80/8, 80/9 and 80/11). One hole was prematurely terminated due to the approaching end of the contract before satisfactory length of rockhead core was obtained (borehole 80/12). Two sites had to be abandoned due to the weather before significant geological results were obtained (boreholes 80/7a, b, c, d and 80/10).

Total borehole core recovery varied from 4.7% (borehole 80/10) to 74.3% (borehole 80/11) with recovery on individual 5 metre runs varying from nil to 100%. These variations are a complex function of many variables, including borehole lithology, drilling equipment and parameters, sea-state and driller competence.

Borehole results are briefly summarised in appendix I. An account of the geology is given in Marine Geology Unit internal report 80/17.

CONCLUSIONS

1. Satisfactory geological results were obtained at half of the sites occupied despite the difficult and uncertain weather conditions.
2. The repair and maintenance effort necessarily expended by "Ferder's" crew during leg 1 showed benefits in the low level of ship's equipment - related down time on this leg.

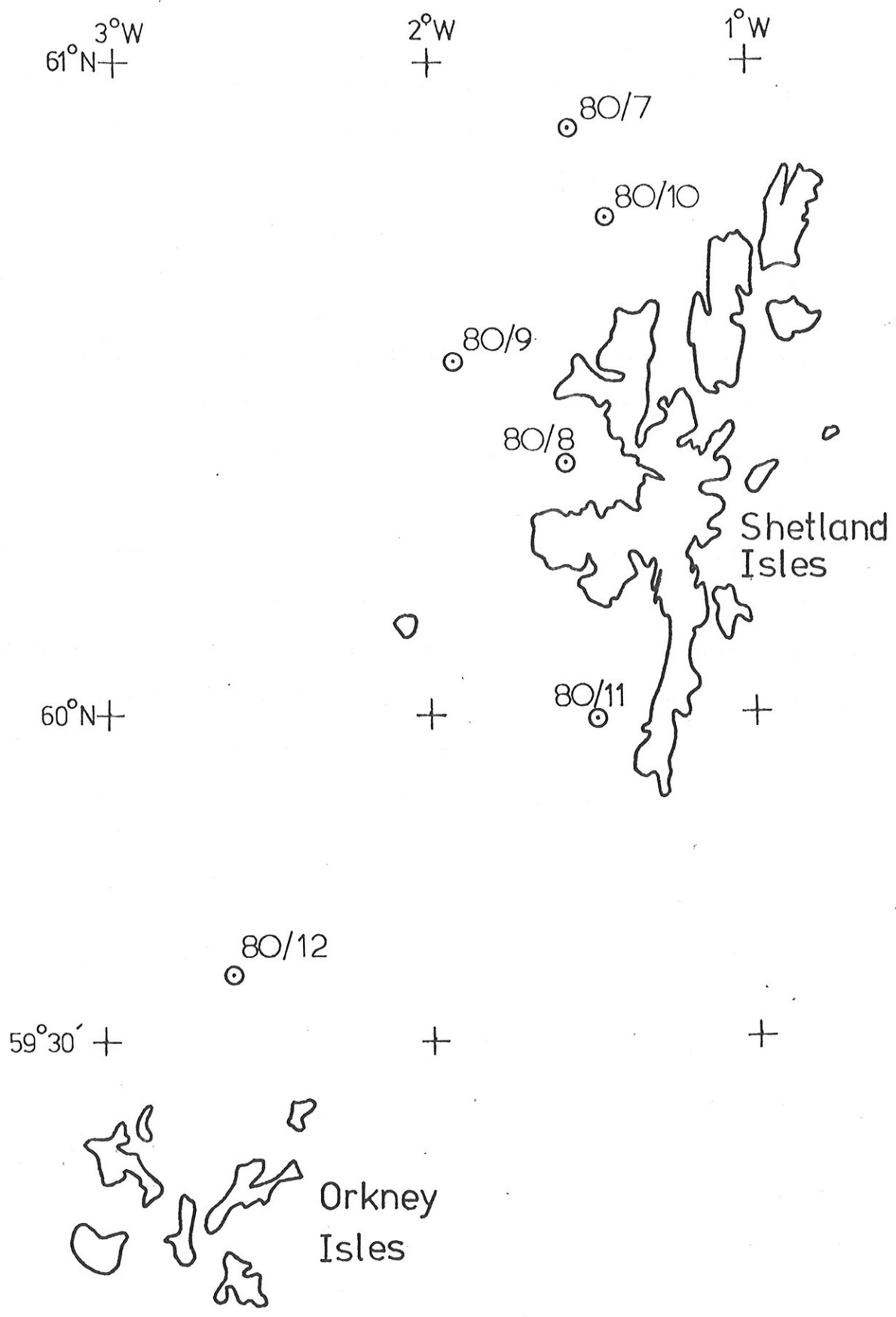
3. The practice of using an inexperienced ship's officer as a driller is detrimental to the smooth running and success of coring operations. To ensure any degree of success, it necessitated a high degree of involvement of the drilling consultant and IGS personnel in the minutiae of drilling practice.
4. A post-cruise analysis of drilling results is needed in order that IGS may profit fully from the experience and be able to establish optimal values for drilling parameters in given circumstances.

RECOMMENDATIONS

1. A written statement as to the drilling experience of likely ship's deck personnel should be incorporated in any contract document.
2. The number of anchors normally used should be increased to six where practicable.
3. Anchoring at night is feasible and the contract should specify this as a requirement in order to save unnecessary waiting time.
4. The Senior Scientist's copy of the contract should be accompanied by the IGS interpretation of clauses thought likely to cause dispute or contention. In particular, the allocation of financial responsibility for ship's equipment and consumables should be clearly stated.

BOREHOLE SITES

⊙ 80/7 Site drilled — leg 2 'Ferder', 1980.



APPENDIX I

BOREHOLE DATA

Site No	Borehole No.	Dates Occupied	Depth Drilled (m)	Core Recovery (%)	Gamma Log	Geology	Comments
153	80/7	7-7.9.80 15-16.9.80	23.0	6.6	No	Pleistocene till over unknown rockhead at approx. 23m.	Site occupied twice without satisfactory results. Poor rate of penetration in till required use of rock-roller. Weather caused abandonment at probable rockhead before coring
87	80/8	7-8.9.80	48.0	49.7	No	Holocene sands and muds to 25m; Pleistocene till to 34.5m. Rockhead Permo-Triassic sandstone.	Drilling string tripped at rockhead to change wing bit for diamond bit. No gamma log run to save time & allow occupation of next site during "Decca day".
119	80/9	8-11.9.80	37.5	14.6	Yes	Holocene sands to 3m(approx) overlying Pleistocene till to 33.7m. Rockhead Lewisian (?) gneiss.	On run in the bit guide was found to be outside the string, necessitating a trip. During drilling inability to recover the core barrel required a further trip. This was probably due to movement of the ship bending the drill string.
108	80/10	11-13.9.80	17.0	4.7	No	Holocene sands to 5m(approx) over rockhead or till. Short core of mudstone (Dalradian or Devonian) at 10m.	On run-in bit guide found to be outside the string, requiring a trip. Drillstring and template pulled in bad weather and hole re-started but finally abandoned due to weather.
82	80/11	14.9.80	7.0	74.3	No	Holocene sands and muds over Permo-Triassic sandstone at 5m below seabed	Hole completed without problems. Logging considered superfluous in view of core recovery.

Site No	Borehole No.	Dates Occupied	Depth Drilled (m)	Core Recovery (%)	Gamma Log	Geology	Comments
136	80/12	17-18.9.80	11.0	14.3	No	Holocene sands over (?) Permo-Triassic sandstone. Rockhead at 10.8m	Borehole had to be attempted twice because first hole lost due to caving caused by swabbing when pulling a 9m joint. Terminated prematurely by end of contract.

APPENDIX II

TIME UTILISATION ANALYSIS

TIME UTILISATION ANALYSIS

DATE	IN PORT	ON PASSAGE	BETWEEN STATIONS	ANCHORING	ON STATION	DOWNTIME			NO. V/E STATIONS	NO. GS/CS STATIONS	REMARKS
						WEATHER	EQUIP'T	SHIP			
4.9. 80	6.75	5.25	-						Not Applicable		Crew change at Lerwick; sailing delayed by late delivery of victuals.
5.9. 80		6.50		3.00	14.50						Anchoring includes 1 hr wait for Decca dawn
6.9. 80					21.50	1.50		1.0			Repairs to power swivel leak.
7.9. 80			6.00	5.00	12.00	1.00					
8.9. 80			2.00	3.70	15.00		2.00	1.3			a) adjusting inner barrel to clearance for diamond coring. b) repairs to anchor winches
9.9. 80					24.00						Drilling time includes 4.5hrs lost by having to pick up and reposition template. Ship had drifted off position.
10.9. 80					21.00			3.0			Repairs to mud hose.
TOTAL											
%											

TIME UTILISATION ANALYSIS

DATE	IN PORT	ON PASSAGE	BETWEEN STATIONS	ANCHORING	ON STATION	DOWNTIME			NO. V/E STATIONS	NO. GS/CS STATIONS	REMARKS
						WEATHER	EQUIP'T	SHIP			
11.9. 80			3.0	2.5	15.33 (1.42)			1.75			Bit guide ahead of drill string; tripped to adjust.
12.9. 80					17.8	4.5		1.7			Modifications to bit guide
13.9. 80			7.0	3.5	11.5			2.0			a) Anchoring time include wait for Decca dawn b) Repairs to hydraulic hoses on slips
14.9. 80			1.5	10.25	12.25						Anchoring time includes waiting for Decca dawn.
15.9. 80			6.5	2.0	13.5	2.0					
16.9. 80			18.5	2.75	2.75						a) Anchoring time include: wait for Decca dawn b) Steaming includes boat transfer and echo-sound traverse
17.9. 80				9.0	15.0						Anchoring includes wait for Decca dawn
TOTAL %											

