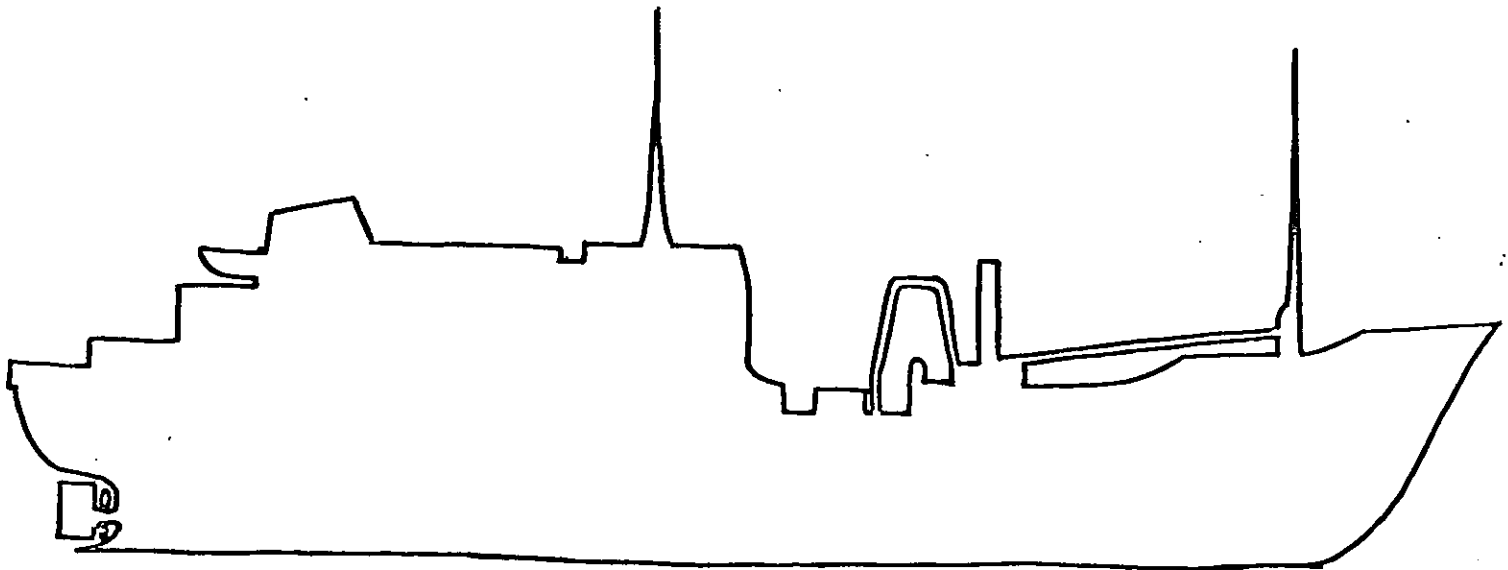


M. I. A. S.

15 NOV 1978



RRS SHACKLETON

Cruise 5/76

Edinburgh University
Department of Geology

6th-21st October, 1976

RRS 'Shackleton' Cruise 5/76

Operating Area and Objectives

Porcupine Abyssal Plain adjacent to Goban Spur and Porcupine Seabight.

The objectives were to complete the westernmost part of a larger survey designed to investigate the geological structure and history of the continental margin south-west of Ireland. More specifically, detailed information on variations in the gravity field and on sediment distribution over the abyssal plain were sought.

Scientific Personnel

R. A. Scrutton (University of Edinburgh) (Principal Scientist)

G. Yarwood (University of Edinburgh)

P. Black (University of Edinburgh)

J. Chalmers (I.G.S., Edinburgh)

D. Heathershaw (I.O.S., Barry)

M. Beney (I.O.S., Barry)

A. Collier (I.O.S., Barry)

J. Burnham (I.O.S., Barry)

Narrative

SHACKLETON sailed from Barry at 09.00A on 6th October. The first objective was two short N-S gravity traverses west of the Scillies for the Institute of Geological Sciences. Bad weather curtailed these, however, and the ship proceeded WSW to the main survey area. Logging of gravity and bathymetric data began again at 08.30A, 8th October at the continental shelf edge. When the abyssal plain was reached (01.00A, 9th October) the magnetometer and seismic profiling equipment were streamed. After only four hours recording the seismic signal was lost, not to be regained until 12th October. The fault appears to have been a combination of amplifier breakdown and excessive 50HZ noise.

Gravity, magnetic and bathymetric recording continued at 10 knots with short periods at 3 knots to test the seismic equipment, until severe weather conditions required the ship to heave to at 11.30A, 11th October. Recording was resumed at 19.00A, 11th, with seismic profiling resumed at 16.30A, 12th. All systems were now working well, but at 18.30A, 13th October, the ship again had to heave to in a severe storm. All/...

All equipment over the stern was recovered and SHACKLETON rode out the storm until 14.00A, 14th October.

At this point, weather and sea state were so persistently bad that the original survey pattern had to be abandoned and 'safe' courses chosen. Gravity, magnetic and bathymetric recording were begun again at 18.30A, 14th October. Seismic profiling was resumed at 16.10A, 15th, and all systems operated with only minor interruptions until 13.00A, 17th. The original survey pattern was regained at 07.30A, 16th.

Deteriorating weather conditions again made the desired courses impossible. The seismic profiling equipment was recovered and at 16.00A, 17th, a course was set for the I.G.S. survey lines west of the Scillies. Recording of gravity, magnetics and bathymetry took place until 03.00A, 18th, when severe weather conditions required the ship to heave to once again. The magnetometer was recovered. At 17.00A, 18th, the course was resumed in steadily improving conditions. The I.G.S. gravity survey was begun at 13.30A, 19th, and completed 10.00A, 20th October. SHACKLETON then proceeded to Barry and docked at 08.00A, 21st October.

Results

The following equipment was used:-

I.O.S. Precision Echo Sounder

Varian Proton Precession magnetometer

LaCoste-Romberg S Series gravimeter

Single channel Geomechanique hydrophone array

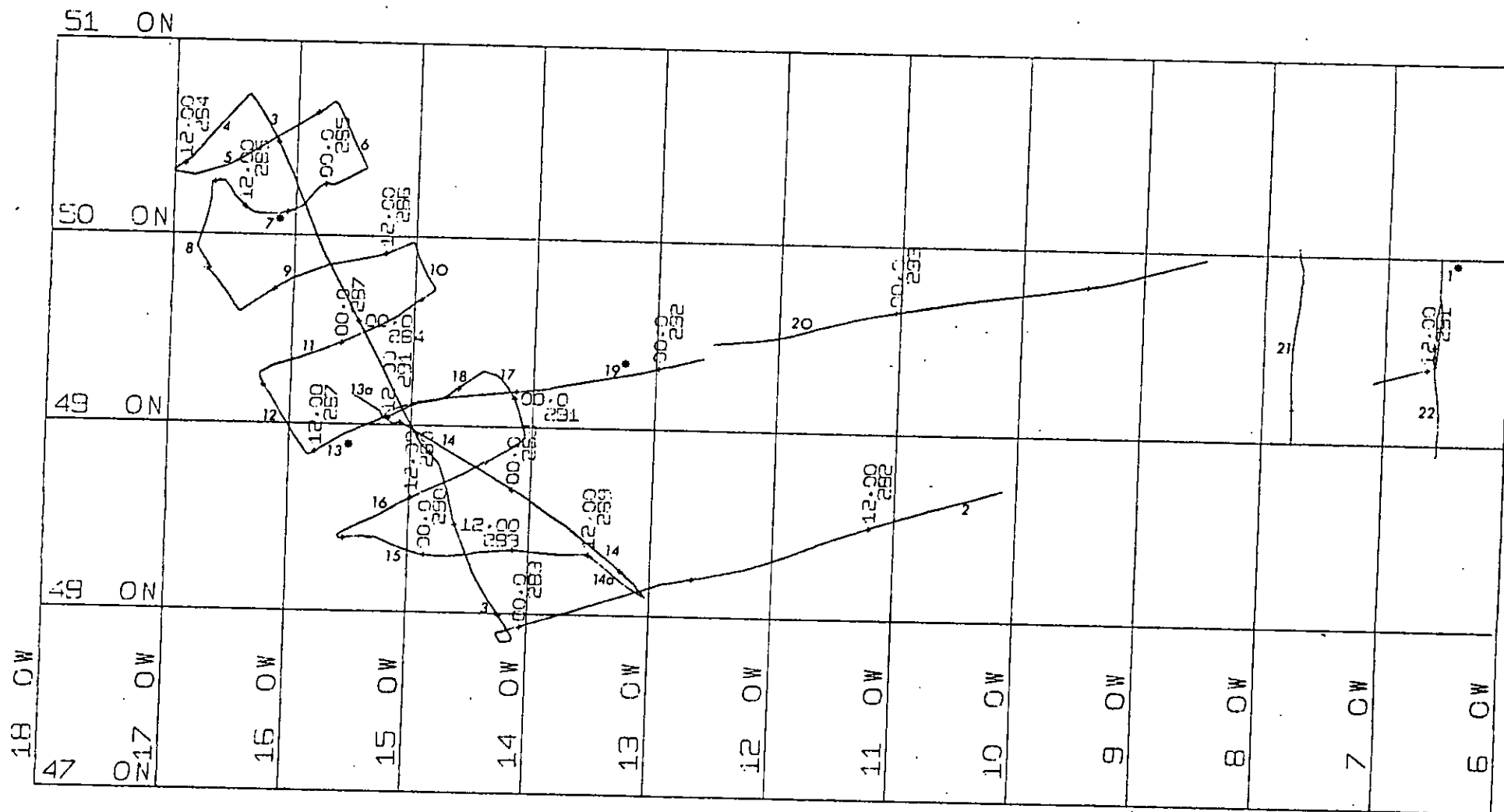
Two Bolt PAR 600B air-guns with 40 in³ chambers

EPC 4100 dry paper profile recorder

Considering the appalling weather conditions throughout the cruise, the data were of very good quality. The seismic records continuously showed oceanic basement despite sea condition frequently up to force 8. The mean mis-tie of the gravity data was only 2 mGal. 2560 km of bathymetric and gravity data, 2100 km of magnetic and 590 km of seismic profiling data were obtained.

Digital logging of navigation data, PES, gravimeter and magnetometer outputs was made every second. These values/...

These values were processed on board on the I.O.S. IBM 1130 shipborne computer. At the end of each five-day period, navigation, profile and posted-value plots were obtained and at the end of the cruise 10 minute values of the various parameters were stored on magnetic tape.



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MERCATOR PROJECTION

SCALE 1 TO 3000000. (NATURAL SCALE AT LAT. 57°)

INTERNATIONAL SPHEROID