ANTARCTIC MARINE GEOPHYSICS 1979-80

RRS BRANSFIELD

CRUISE REPORT

Department of Geological Sciences
Birmingham University

Preliminary Cruise

As in previous years the opportunity to run geophysical lines was taken during the base relief period prior to the main geophysics cruise. For this purpose Mr M. Gallon of Research Vessel Base, Barry and Mr P. Barber of Birmingham University joined the ship in the Falklands at Christmas.

For the optimum positioning of geophysical tracks some deviation from shortest passage time between the bases was needed. The scope for such detours was limited as the Bransfield had a very tight schedule, particularly after the delay of the unscheduled run to Comodoro Rivadavia. Despite this, much useful background data was obtained and no duplication of existing lines occurred.

In harbour at Stanley and on the journey to Comodoro much of the equipment was found to be in a poor condition and repairs were made to the gravimeter and attempted on the depth recorder. The laboratory satellite navigation system also developed a fault during this period.

The magnetometer was streamed approximately 200 miles south of the Falklands en route for Signy Is. at mid-afternoon on the 4th January. Initial teething problems of a minor fault in the magnetometer and a breakdown of the ship's gyros were overcome. The satellite navigator was repaired the next day - the remainder of the leg produced no problems, the Bransfield arriving at Signy in the early morning of the 6th January.

The ship departed for Bird Island on the evening of the 6th January and arrived on the morning of the 8th January. The trip was uneventful apart from the retrieval of the magnetometer due to heavy brash ice of limited extent to the north of Laurie Is.

adopted in the 77-78 and 78-79 seasons with the welcome addition of a gravimeter aboard. On arrival in Montevideo considerable equipment repair was carried out and during the first half of the surveying period a great deal of instrument failure was experienced which occasioned John Price many hours of work to repair. We were, however, most fortunate to experience a spell of excellent sea conditions for the duration of the survey which enabled good quality geophysical records to be obtained. There was no loss of survey time due to adverse weather conditions.

Narrative

The Bransfield left Montevideo on the 14th February with P.L. Barber, M. Gallon, E.C. King, J. Price and R. Whittington forming the geophysical team. A course was laid towards the S. Orkney Islands. The ship was diverted to Stanley in order to let Mike Gallon fly back to the U.K. following a family bereavement.

At 2200 (ship time) on the 18th February, at 200 miles from the Falklands the magnetometer was streamed. Surveying commenced two hours later after some vibration-induced problems were overcome. At 1700 on the 19th February the ship went onto single engine working in order to time the arrival at the iceberg grounding area close to the S. Orkney Is. in daylight. The hydrophone was streamed at 0900 on 20th February; however, a split occurred in the No. 1 spring section at a position where the tube was thin due to abrasion and the compression of overlying sections. The spring section was taken out for repair and the second hydrophone was streamed. After some initial problems reflection profiling was commenced at a speed of about 5 knots.

and all the equipment was once again streamed. Another attempt to run westward onto the Peninsula shelf was made but at 0330 on 1st March ice was again encountered. It was then decided to concentrate the remainder of the time available on the S. Orkney Block and its margins.

Further icing of the airgun and compressed air lines was experienced on 29th February and 1st March, after which the frequency of draining the compressor was increased to ½ hour intervals instead of 2 hours and the incidence of icing problems dropped considerably.

On the 2nd and 3rd March surveying continued across the S. Orkney Block and then off to the S.E. It was hoped to extend the magnetic anomaly sequence found in the Weddell Sea up to the Block margin but more pack ice was encountered at 0400 on 4th which forced the ship N.E. The Silent 700 printer was made to work again on the 3rd so the Magnavox Sat Nav was again usable.

After investigating the N.E.-S.W. trending ridge and trough feature to the S.E. of the S. Orkney Block a line was run across the South Scotia Ridge into a poorly surveyed area to the N.E. of the S. Orkneys. Several crossings of the S. Orkney trough were then obtained on the 6th and 7th March. From the 8th to 0100 on the 11th survey lines were run across the eastern half of the S. Orkney Block and included a Sonobuoy refraction line.

After a short visit to Signy Is. to pick up B.A.S. personnel a course was made for S. Georgia and a magnetometer line observed at 13 knots. The magnetometer was retrieved at 0130 on the 13th March near S. Georgia when the sensor developed symptoms of seawater contamination.

ingoing and outgoing for their willing assistance with, and acceptance of the discomforts of, laboratory watch-keeping.

Master	J. Cole, S.J. Lawrence.
Mates	N. Beer, G. Phippen.
	R. Plumley, J. Horscholl, P. Smart.
Engineers	R. Chant, A. Allison, J. Grey
	M.S. Thabrew, M. Goodall.
Electrical officers	H. Speakman, G. Lewis.
Radio officer	H. O'Gorman.
Catering officer	E. Heathorn.
Bosun	E. Johnson.

B.A.S. Watchkeepers

Main cruise

J. Ainge, D. Bielby, A. Spearey, D. Patrick.

Preliminary cruise

M. Burchet
K. Cameron
R. Davies
P. Gibbs
T. Godsmark
F. Grzegorzsk
P. Hall
R. Headland
S. Holdich
B. James
G. Koyman
T. Lachlan-Cope
M. Lewis
M. Leeson
G. Nieuwenhuijs
B. Mackie
D. McChrohan
M. Mosley
T. Nettleship
M. Peacock
P. Sayers
N. Simpson
S. Smith
P. Wallis
G. Westmacott
J. Williams

With apologies to anyone forgotten

CRUISE REPORT FOR R.R.S. BRANSFIELD

12TH FEBRUARY 1980 TO 19TH MARCH 1980

GENERAL

The weather was excellent and caused no problems although prevailing ice conditions prevented large sections of work being undertaken in some areas. The ambient temperature caused problems both with the airguns and the A.M.G. Array and some precautions may have to be taken to prevent similar difficulties on this years Shackleton Cruise. The high amplitude vibrations experienced in the Laboratories on this Ship especially above 10 Knots caused some equipment faults with long periods of maintenance. If this ship is used again some extra precautions will have to be taken.

SYSTEMS ON BOARD

1. Profiling System comprising:- Compressor, Airgun (600B & 1500C) A.M.G. Seismic Array, Pre-amplifier, Filters, Bell & Howell Tape Recorder, E.P.C. Recorders.

2. Gravity Meter - La Coste & Romberg, Printer, Interface Box.

3. Magnetometer - Varian + 2 Fish.

4. Master Clock System.

5. Precision Depth Recorder. Kelvin Hughes MS38 & T45.

6. Satellite Navigator with ASR 33 and Silent 700 Printers.

1. Profiling System

a) Compressor

This was a Reavell Sat 7H driven by a diesel engine and gave no problems. However, a leak developed in the water pump when the equipment was finally switched off.

b) Airgun Bolt 600B

Initial problems caused by incorrect assembly were overcome, but the gun was found to freeze up after about 6 hours of operation, this occured both in the air filter and around the Shuttle. This short period of operation was unacceptable and the equipment was retrieved and not used again.

c) Airgun Bolt 1500C

This equipment was used for the majority of the Cruise, both with the 40 cu. ins. and the 160 cu. ins. chambers, again problems were experienced with icing especially when sea temperatures fell below 0.3°C. One major problem being that ice collected in the filter causing it to shatter, ruining the Operating and Firing Seals, the guns were then operated without filters to prevent a reoccurrance of this problem.

b) Relay Output Unit

The power unit failed and was replaced with an external supply. A modification to the fix marker button was carried out to overcome R.F. interferance problems.

5. Precision Depth Recorder - Kelvin Hughes MS38 and T45

The equipment worked after tuning and adjustments were completed although a slight roll on the ship caused the signal to disappear. A transformer on the recorder failed and a power unit from the spare recorder was also replaced. The Equipment will require an overhaul by RVS before next season.

6. Satellite Navigator - Magnavox

A receiver and computer operated satisfactory although the Alerts program gave some problems.

a) ASR 33 Teletype

This suffered from vibrations. The motor became loose and damaged the helical gears. The keyboard contacts shattered and will need replacement.

b) Silent 700 Teletype

This was unserviceable when I arrived and investigations revealed several faults, mainly due to vibration. When these were corrected the unit functioned well until full speed was resumed, when the unit failed due to optic-disc misalignment.

CONCLUSION

An extra Instrumentation Engineer would have been useful although the programme was not stopped completely by equipment failure. The major problems were ice in the air lines and guns. It would be advisable to investigate the addition of antifreeze to the compressed air, this is sometimes done by geophysical companies operating in Arctic Waters.

I am grateful for the assistance of the BAS Diesel Mechanic who helped me with the airguns throughout the cruise.

John D. Price,
27th March, 1980.