

Scientific Personnel, Leg 2

IOS, Wormley

Principal Scientist

A. S. Langdon

"

Geophysicist

R. C. Pearce

E. R. Miles

R. M. Hunter

R. G. Rothwell

C. J. Spang

Argon

A. W. Gray

R. B. Rice

Report on Cambridge participation

in Discovery Cruise

73, August 1975

IOS, Blacknest

OSB

T. A. G. Francis

I. T. Foster

V. L. C. Satchell

R. C. Eklund

IOS, Barry

Data

I. Havelin

Cambridge

Conductivity

D. M. Hatheway

A. Chilton

Barry Miles

**Leg 2 left Ponta Delgada 3 August Day 215
arrived Southampton 26 August Day 238**

Cherie Williams

See also RRS Discovery Cruise 73 Report

Master

J. J. Harding

Chief Engineer

J. J. Moran

Chief Engineer

C. A. Gortler

Electrical Officer

B. J. Winchcomb

Scientific Personnel, Leg 2

A. S. Laughton	Principal Scientist	IOS, Wormley
R. C. Searle	Geophysics	"
P. R. Miles	"	"
P. M. Hunter	"	"
R. G. Rothwell	"	"
C. J. Spong	"	"
A. W. Gray	Airgun	
R. E. Kirk	PUBS	
R. B. Whitmarsh	"	
J. J. Langford	"	
B. J. P. Burnham	Data	
T. J. G. Francis	OBS	IOS, Blacknest
I. T. Porter	"	"
P. L. C. Mackeith	"	"
R. C. Lilwall	"	
C. Hazelhurst	Data	IOS, Barry
D. H. Matthews	Sonobuoys	Cambridge
A. Claydon	"	"
Mary Nisbet	"	"
Sheila Williams	"	"

Ships Officers

M. A. Harding	Master
J. J. Moran	Mate
C. S. Storrier	Chief Engineer
B. J. Winchester	Electrical Officer

The objective of this Cambridge experiment was to obtain seismograms from OBS laid west of the median valley at 45° from shots fired east of the valley at moderate ranges in order to study the attenuation of P and S waves propagated in the crust and upper mantle as they cross the region of the postulated magma chamber. Four sonobuoys were to be deployed on two occasions at the ends of the shot lines to supply necessary crustal structure information.

In the event, the sonobuoys were layed four times: two for trial on August 5, four in the median valley at the northern end of line D on August 11 for lines D and E, three at the eastern end of line F on August 15 and two in King's Trough on August 19. Two good records were obtained from the test line but only two on lines D and E and only one good and one less good from both lines F and the line in King's Trough. Failures are attributed to water seeping into the hydrophones through potting araldite that had failed to harden completely.

Two tons of explosives were fired in 35 charges during lines D, E and F. Line D, inadvertantly far from straight, extended along the axis of the median valley to a position 40' miles SSW of the Sono-buoys and line E ran 40' miles from SSE to NNW, diagonally across the valley ending near the sonobuoys. Line F extended 70 miles from ESE to WNW from a shot 10 miles east of the sonobuoys to one fired over the crestal mountains west of the median valley among the OBS. The pattern of shots was designed primastily for the OBS from which no records are yet available but the failure of OBS II to pop-up means that we shall not be able to determine the structure under the median valley. (we got only three OBS records: OBS V, the westernmost, did not work)

Setup on board

Sonobuoys and battery charging shared the aft rough lab with airguns. Buoy guts (on a floating bench) and recording arrangements were in the electronic lab. (1). The reset line ran through the ship from the junction box in electronics to the junction box in aft rough. The whip aerial was lashed to the rail on the aftermast platform, a wire dipole was run from the gaff ensign halliyard on the after mast and a forward wire aerial from halliyards on the forestay; the wire aerials did best. Sonobuoys were launched and recovered over the starboard quarter while the ship lay-to with the wind on the starboard side and the propellor was stopped.

(1) Despite the size of the ship we were cramped. We found it essential to earth the Bradley gear and the oscillomink to the hull and we never eleminated interference completely during tape replay.

Gear failures (see table)

All five Hydrophones were carefully floated in Ponta Delgada. The test line went well apart from apparently very low gain on the radio system (small water wave amplitudes despite max gain on Bradley demodulators). We subsequently improved this by attention to earthing but the impression remained of inadequate gain on the radio system. The gains were always set to maximum (40 dB). Radio ranges, on the other hand were better than average.

All the hydrophones had been tested and their frequency response measured before leaving Cambridge but after the test line we discovered that the potting araldite round two of the transducers had become soft and that the leads from these two transducers had only a few K Ω to the case. One of these hydrophones was spontaneously oscillating, producing a square-wave output at c150 hz, clearly audible on the radio. By reshuffling components we were able to lay one of these for line D and E but it didn't work and, moreover, one of the hydrophones that was OK on the test line flooded during line D. By the fourth and final lay we had only two hydrophones, nos, 2 and 4 in use despite re-potting one on board. On line F, and more markedly on the final line (Bob's) one of these (No. 4 attached to S/b 5) produced records which were quiet most of the time but suffered occasional overwhelming bursts of noise very like those caused by flooding. However on inspection on the way home this hydrophone was dry and the reason is not yet known. With this possible exception, all the failures can be explained by flooded hydrophones; there were no failures within the buoys once they were launched.

Prior to each launch we followed the countdown procedure slavishly. This revealed that potentiometers controlling median frequencies and gains had shaken loose on the bench in two f. m. modulator units and showed spontaneous oscillations (hooting) on the D. R. Channel on taperecorder 1.

To do in Cambridge

1. Find the cause for glitches on s/b 5 hydrophone 4 System (perhaps merely low resistance transducer to case)
2. Repot all transducers and make spare units.
3. Realign F. M. mod unit 6.
4. Find fault in T. R. 1

Test Line

2	1	1	3	5	2 transducer 7	didn't seem to have enough gain	good, quietest
3	4	2	6	6	1 transducer 6		good, quiet

Lines D and E

T. R.	Arr.p.	T. X.	Clock	FM mod	Hydrophone preamp no.	Radio records	Tape records
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2	1	1	3	5	2 transducer 7 long grey float	hydrophone flooded. Preamp wet. thrown away. Transducer dried out, patched up with araldite, self vulc. + lasso and reassembled with spare (unnumbered) potted preamp.	
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3	4	2	6	6	1 transducer 6 long grey float	good reception out to 25-30 n. m.	good, very quiet
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1	no number	5	4	2	4 transducer 5 not potted short grey float + 2 small floats	ditto	good, very quiet
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5	6	6	5	1	3 transducer 8 not potted long grey float	noisy and w/w only. hydrophone not flooded, but araldite soft, no low frequency response. So w/w but no ground waves	
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Line F

s/b	T.R.	Amp	T.X.	Clock	FM mod	Hydrophone preamp no.	radio records	Tape recor
1	2	1	1	3	5	(2) transducer 7 spare unnumber	reception still quite good at 30m	good, not quiet as s/5 for Line'
2	3	4	2	6	1	1 transducer 6	hydrophone flooded	-
5	5	no number	5	4	2	4 transducer 5	reception to 25-30 n. m.	noisy - need filtering ev secs or so 'arrivals'.

Prior to this line:- s/b 5 T.R. changed as T.R. 1 has high freq. buzz on DR channel, produced inside recorder
s/b 2 FM mod changed as 1 misaligned head signal on lo gain channel of FM6

King's Trough line

1	2	1	1	3	5	unnumbered transducer 7	O. K.	good, but 2 oscillation
5	5	no number	5	4	2	4 transducer 5	poor due to glitches, filtered	poor due to glitches the useable

Discovery Cr. 73

August 1975

Position of seismic lines D, E, F
and King's Trough line (kt)



KT

1000 FATHOMS

Mizen Head

50

45

Ilha do Faial
Horta
Ilha do Pico
Terceira
Sao Jorge
AZORES
Sao Miguel
Ponta Delgada
Santa Maria

STRAIT OF GIL

25°

20°

15°

Erris Hd.
Westport
Galway
IRI
Ennis
Lirr
Tralee
W. Castlemaine
Valencia Hbr
Cobh

Cabo F...
Vigo
Porto
Avei...
Co...
Figue...
LISBOA
Setub...
Cabo...

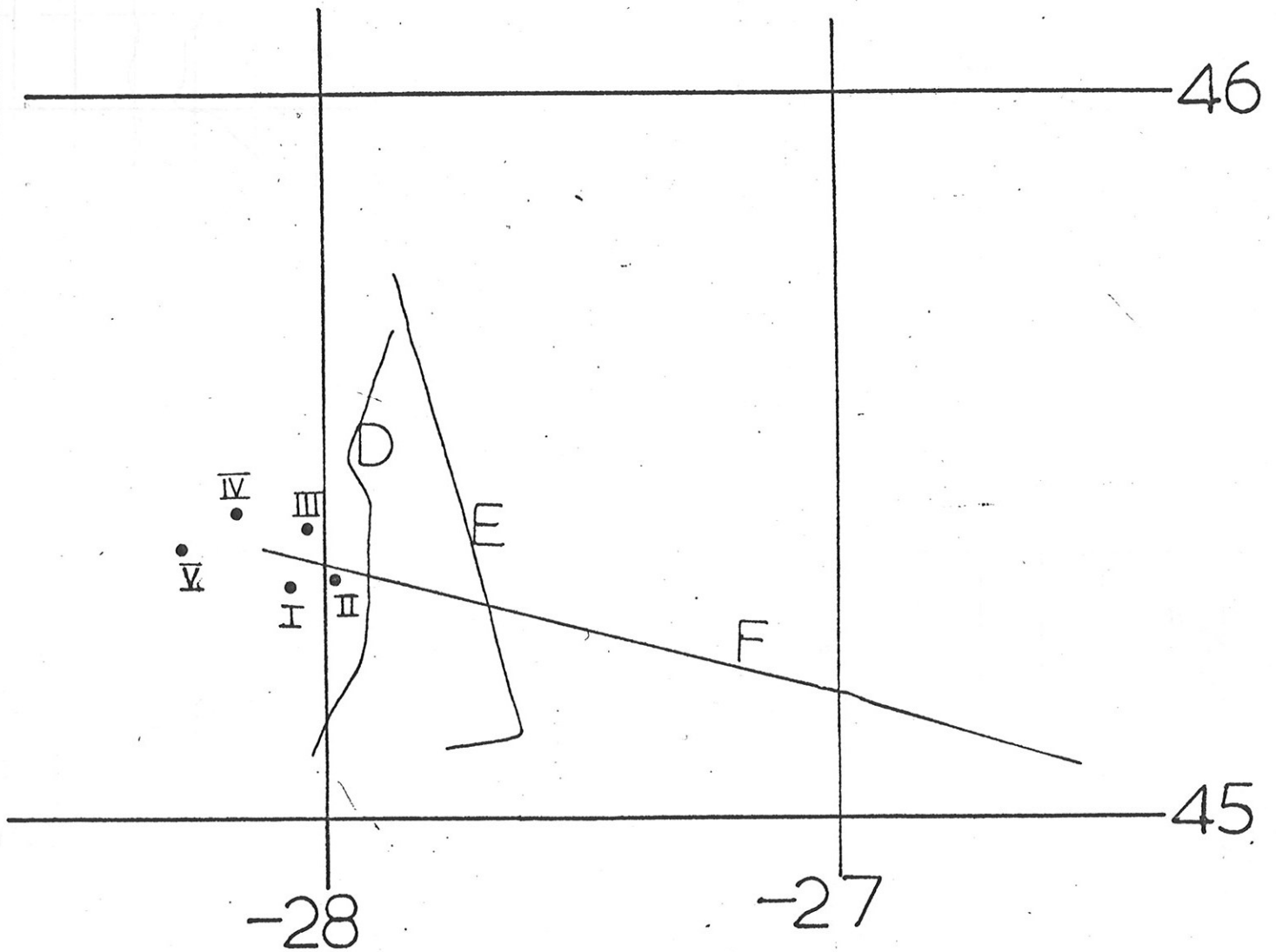
1000 FATHOMS

1000

1000

20MS

Larger scale chart to show the positions of OBS in relation to the seismic lines D, E, and F.



● position of OBS

Distribution

Participants (4)

Owen

Mason

Theobald

Prof Jacobs

Dr Laughton (IOS)

Spare (3)