

Return to King

From Tim Rana's

G/52/73

Report of Cruise 4/73 of RRS Shackleton

8 May - 4 June 1973

N.E. Atlantic

Summary

The main purpose of this cruise was to place an array of three Ocean Bottom Seismographs on the sea floor in the FAMOUS area and allow them to record there simultaneously for as long as possible. Thanks to generally good weather and no major setbacks this was achieved. The three seismographs were launched on 10 May, 11, 13 and recovered on 18, 19, 20 respectively. In addition to the possible occurrence of earthquakes (at the time of writing the seismograph tapes are still sealed up in their pressure vessels) charges were fired both near the sea surface and on the sea floor for the seismographs to record. Sonobuoys were deployed as additional receivers for the near surface shots. The location of the seismographs and the configuration of the various seismic lines are shown in Figure 2.

The existence of an excellent bathymetric chart of the FAMOUS area, kindly provided for us by Dr J D Phillips of Woods Hole, made any bathymetric surveying on our part superfluous. Our main activity when not involved in the seismic work therefore consisted of dredging. Seven dredge stations were conducted, six of which were successful in getting rocks. These will be studied by Dr J R Cann of the University of East Anglia.

A third type of activity in the area involved airgunning past a single sonobuoy whose hydrophone was suspended at a depth of 500 metres. This work was done for the benefit of Miss Sandy Smith, who is studying the output pulses of airguns in various configurations with a view to improving interpretation of seismic reflection records. It was conducted well away from the seismographs as the seafloor and bears no particular relevance to the FAMOUS area itself.

Navigation while in the FAMOUS area was based on satellite navigation and radar fixes on a moored radar transponder buoy. Although recovered and

relaid a number of times the latter was always moored in the deep water patch at the junction of the rift and fracture zones at approximately $36^{\circ} 56'N$, $33^{\circ} 12'W$. All the seismograph launch points and dredge stations were in radar range of this site and the deep water gave mooring there the greatest life expectancy.

For most of the time in the FAMOUS area we were alone but on the 17 were joined by the French ship D'Entrecasteaux and a little later by the RV Knorr of Woods Hole. We caused some disturbance to the former on the 17 with our seismic shooting, but were not inconvenienced ourselves until the 20 when we found the Knorr operating its Deep Tow over OBS III just before it was due to leave the bottom. This hindered us in two ways: we were unable to manoeuvre freely and the acoustic pingers/transponders used in the Deep Tow operation were recording on our PDR at ranges of up to 5 miles. Over the R/T Knorr informed us that their pingers were operating on 10, 10.5, 11 and 12 kHz. Our PDR operates at 10.2 kHz and when sounding has a beamwidth of 20° and a bandwidth of 50 Hz (3db points). However, when listening for an OBS pinger we operate in a listen-only mode in which the beamwidth is 45° and the bandwidth is also increased. It is not surprising therefore that we should have recorded 10 and 10.5 kHz pingers operated by Knorr. Because of this and because the ship was not free to occupy the position directly over where we considered OBS III to be, the OBS III pinger was never observed. Nevertheless OBS III was sighted on the surface within half an hour of its scheduled arrival there, so in spite of much fuming and nail-biting all turned out well in the end.

Finally on the way home 5 days were spent conducting a magnetic survey some 200 miles to the northwest of Cape Finisterre. This survey should throw light on the triple junction associated with the opening of the Bay of Biscay and will be worked up by Miss Carol Williams.

Personnel

Dr T J G Francis	IGS Blacknest		Senior Scientist
Mr I T Porter	"		
Dr D H Matthews	Geodesy and Geophysics, Cambridge)	
Miss Sandy Smith	")	
Mr A W Claydon	")	
Mr M MacCormack	")	until Terceira
Miss Mary Fowler	")	
Mr P L Firstbrook	University East Anglia		
Mr J C Goff	"		
Mr D Lewis	NERC Research Vessel Base		
Mr B M Coulthard	"		
Mr P J Ibbotson	")	
Miss Carol Williams	Geodesy and Geophysics, Cambridge)	after Terceira

Daily Log (All times ship time. Add one hour to give GMT.)

3 May 0915 Shackleton arrived Ponta Delgada.
Francis and Porter join.

3-7 May Preparation of Ocean Bottom Seismographs for sea.

8 May 0900 Shackleton left Ponta Delgada.

9 May 2200 Arrived FAMOUS area.
Radar Transponder Buoy laid at $36^{\circ} 57'N$, $33^{\circ} 12'W$.
Reconnaissance of possible dredge sites during night.

10 May 0730 Returned to Transponder Buoy to find it adrift.
Relaid in same position.
1141 OBS I launched.
1500 Tracking of OBS I completed.
1740-0040/11 Dredge Station 183. Lots of rocks, and mud.

11 May 0130-0740 Dredge Station 184. Lots of rocks.
0815 Back at Transponder Buoy.
1137 OBS II launched.
1500 Tracking of OBS II completed.
Moved south.
2037-0011/12 Airgunning to single sonobuoy at approx $36^{\circ} 35'N$,
 $33^{\circ} 21'W$ (Sandy's exp.).

12 May 0940-1154 Sandy's experiment, repeat performance.
1455 Back at Transponder Buoy. Starting OBS III launch
procedure.
1730 OBS III failed pre-launch checks. Launch abandoned.
OBS III dismantled, taken into lab for check out.
Ship lying to.

13 May 0200 OBS III reassembled.
1119 OBS III launched.
1310 OBS III pinger last seen. Switched off early?
Clock jump?
1600-1700 Two test bottom charges dropped in median valley
between OBS I and II.
Only one heard to fire on PDR, at 1800.
2030-2340 Dredge station 185. Dredge returned empty and throttled.
Weak link broken.

14 May 0020-0510 Dredge station 186. A few rocks and pieces of coral.
1003-1519 27 bottom charges laid down and across median valley
in vicinity of OBS I and OBS II (Station 187).
1535-2118 26 out of 27 charges heard to fire on PDR.
Overnight Ship lay to while blown exhaust gasket replaced on
main engine.

15 May c1000 Two sonobuoys laid, approximately over OBS I.
1030-1321 Four test shots fired. Problems.
Sonobuoys recovered.
c1700 Two sonobuoys relaid.
1800-2135 14 shots (51b-2001b) fired on line down median valley
from OBS I (Station 188).

16 May	0010-0028	Four ranging shots to find sonobuoys.
	0130	Sonobuoys recovered.
	0200	Transponder buoy recovered. Batteries put on charge.
	1122-2030	Moved south. Airgunning to single sonobuoy at approx 36° 34'N, 33° 20'W. (Sandy's experiment part 3).
	2330	Moved north. Relaid Transponder buoy. Transponder not working. Recovered. Transponder drawing excessive current. Batteries seem OK.
17 May	1000	Relaid Transponder buoy with inferior transponder. Two sonobuoys laid approximately over OBS III.
	1414-1549	14 shots (51b-100lb) fired on line 110° from OBS III (Station 189).
	1705-1715	Two ranging shots to find sonobuoys.
	2001-2131	Sonobuoys recovered and relaid over OBS III position. 12 shots (251b-200lb) fired on line 290° from OBS III (Station 189). Some of these shots disturbed D'Entrecasteaux, French ship operating a few miles away over median valley. She had divers down at time.
	2305-0010/18	Five ranging shots to find sonobuoys.
18 May	0100	Sonobuoys recovered.
	0700-1030	Dredge station 190. A few rocks.
	1120-1450	Dredge station 191. One small boulder.
	1500	Start recovery of OBS I.
	1700	OBS I pinger seen leaving bottom.
	1820	OBS I on board.
	2000	Recovered Transponder buoy. Batteries put on charge.
19 May	1000	Relaid Transponder buoy with good transponder. Moved away to check transponder range.
	1330	Start recovery of OBS II.
	1700	OBS II lift-off seen on PDR.
	1817	OBS II inboard. Moved to OBS III position. Intend to remain there listening for OBS III pinger because of possible early lift-off.
20 May		Still over OBS III position. Knorr (Woods Hole) and D'Entrecasteaux operating in same vicinity. Knorr doing Deep Tow, here pingers/acoustic transponders booming in at up to 5 miles range. PDR record looks like knitting! Difficult to distinguish OBS III pinger.
	1700	Scheduled lift off for OBS III. No pinger trace seen on PDR, but distinct bang heard which could have been explosive bolt.
	1752	OBS III sighted on surface.
	1900	OBS III inboard. Pinger functioning, clock correct.
	2035-2400	Dredge station 192. Lots of rocks.

21 May 0100 Recovered Transponder Buoy.
 Set course for Terceira.
 On passage to Terceira.
 1015-1415 Airgunning to single sonobuoy at approx 37° 25'N,
 31° 22'W - Sandy's experiment, final showing.
 On passage to Terceira.

22 May 1330 Shackleton arrived Angra do Heroismo, Terceira.
 Williams and Ibbotson join ship.

23 May Matthews, Smith, Fowler, Claydon, MacCormack depart.
 1100 Shackleton left Angra. Ship unable to get sufficient
 water.

24 May 0800 Shackleton arrived Ponta Delgada.
 1600 Shackleton left Ponta Delgada.
 On passage to 44° 22'N, 14° 57'W.

27 May 0710 Arrived 44° 22'N, 14° 57'W. Began magnetic survey
 NW of Finisterre.

1 June 1905 Arrived 45° 14', 14° 40'W - end of magnetic survey.
 Set course for Barry.

4 June 0730 Arrived Barry.

Note Added 5 June 1973

The seismographs arrived back in the laboratory today and were opened up. Unfortunately the tape recorder of OBS I failed to unclamp, and no record was obtained from this instrument. The other two seismographs ran the correct amount of tape and these will be played back in the next couple of weeks.

T J G Francis
 Institute of Geological Sciences
 Blacknest

5 June 1973

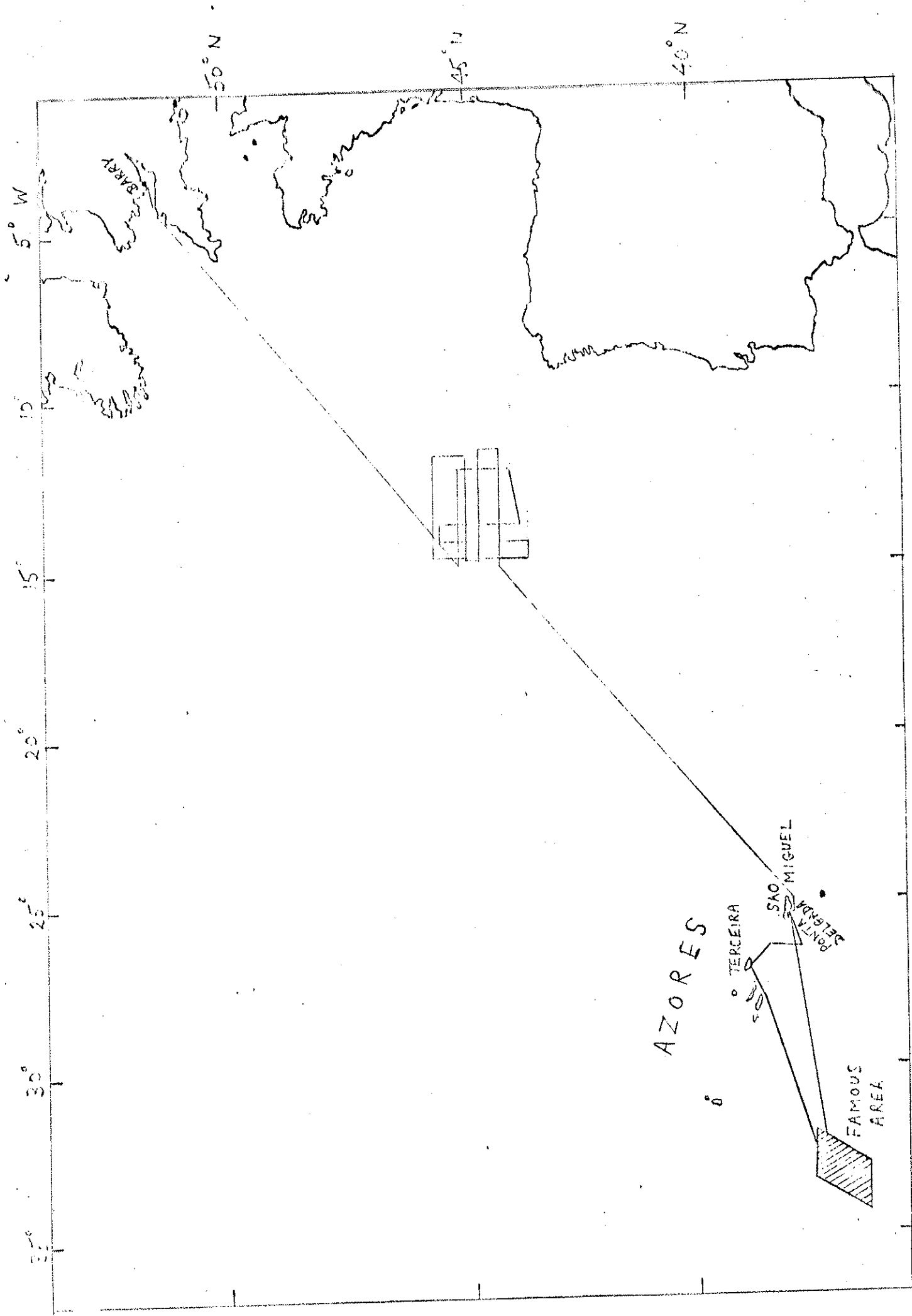


FIGURE 1 R.R.S. SHACKLETON TRACK CHART 8th MAY - 4th JUNE 1973



FIGURE 2 R.R.S. SHACKLETON
 OPERATIONS IN VARIOUS AREAS
 - - - - - LINE OF NEAR SURFACE STOTS
 LINE OF BOTTOM CHARGES
 ~~~~~ DREDGE STATIONS