P6

Brief Cruise Report

RRS Frederick Russell cruise 20/84 8-17 November

a) Objectives: to study the metabolism of autotrophic sulphur-oxidizing bacteria symbiotic in pogonophores, bivalve molluscs and other infauna of the soft sediments of the continental slope in the Bay of Biscay, and to measure the sulphide and sulphate content and rate of sulphate reduction in the sediments in relation to the global sulphur cycle.

b) Area: in view of the changes in dates and ships allocated for this project it was decided to concentrate the present cruise in the area under French control, the Shamrock submarine canyon at approximately 48 N., 8 W. The bathymetry, sediments, and fauna are known from previous cruises of 'Sarsia' and 'F. Russell', and the ground is less than 24 hrs steaming from Plymouth.

c) Sea and weather: conditions were such that only half the allotted cruise time was available for the scientific work.

d) Conduct of cruise: the officers, crew and scientific party behaved admirably under difficult conditions. In addition to the problems from weather, which are covered in the Captain's report there were a number of mechanical and gear failures: i) the dredge wire tension gauge was not working initially, possibly due to seizure, but was eventually freed under the load of 1700 m of wire and after spraying with penetrating oil, though full sensitivity was not given until 11 November; ii) the PES failed on 15 November, seriously handicapping the last two days of work; iii) shortage of water caused return to port one day early and lost another working day. In the five days available 34 lowerings were made in depths from 900 to 1900 metres (18 GP corer, 9 anchor dredge, 3 naturalists dredge, 2 box-corer and 2 water-bottles). Less than half the planned scientific sampling was completed, but a full experimental and analytical programme was carried out in the laboratories, the instruments all working well, including the Liquid Scintillation Counter loaned by LKB instruments.

e) Equipment: gear from RVS, Barry was not all satisfactory; the GP corer worked well, and so did the Box-corer until its actuating wire parted (see separate report on loss); the pingers were supplied set to too low a ping rate, without instructions for change, and gave a weaker ping than a similar model supplied by IOS, Wormley; the single element transducer ('dolphin') had a worse signal noise ratio than the hull-mounted transducer, and its use was discontinued; the absence of a PES 'fish' was a great handicap when tryung to receive the weak signals reflected from steep slopes.

f) Ship performance: in heavy seas and cross-swells the vessel gave a performance judged inferior to that obtained in 1981 when the trawl winches and after goalposts were in place; the unsteady motion accentuated the problems of working with radioactive substrates; and even with the help of a special gimbal table it was virtually impossible to get accurate weighings of tissue samples. When hove-to in force 8 the vessel was reasonably comfortable and felt safe and reliable.

g) Recommendations: i) the winches need more maintenance between refits, especially with regard to meter read-outs and tension gauges; ii) a PES fish must be fitted, but perhaps the mounting needs repositioning closer to midships; iii) the sea-keeping performance needs attention from the point of view of scientific work, not only from that of safety; iv) the ridge along the after deck at the stern doors should be removed as it causes difficulties in shooting gear and the scientific personnel trip over it; v) the dredge wire run is unsatisfactory, especially the top roller which takes too long to change from gantry operation to stern roller operation; vi) the stern rollers are positioned too close inboard for easy shooting of dredges; vii) the winch readouts in the laboratory should be moved to the scientific control room, as recommended 3 years ago; viii) direct intercom is needed between the scientific control room and winch control positions, otherwise more gear is going to be lost; ix) a crane is needed closer to the gantry than the present position; x) an A-frame on the port side aft of the winch would greatly help coring and dredging in bad weather.

A. J. Southward

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Principal Scientist

19 November 1984

MBA station list for cruise 20/84, RRS "Frederick Russell", 8-17 Nov

No	Date	position N	position W	depth m	gear used	comment or result
1/1	9th	47 52.2	08 05.15	800	AD	nil, tension gauge malfunction
1/2	"	47 51.9	08 03.3	830	AD	bag full mud
2/2	"	47 50.7	08 02.7	1130	AD	nil, bag damaged
3/1	10th	47 49.6	08 07.0	1240	AD	bag full mud
3/2	"	47 49.4	08 07.1	1250	AD	bag full mud
3/3	"	47 49.25	08 07.5	1250	GPC	10 cm core only
3/4	"	47 49.5	08 07.7	1400	GPC	90 cm core
3/5	"	47 49.6	08 07.75	1430	GPC	nil
3/6	"	47 49.6	08 07.75	1410	GPC	core pushed into top tube
3/7	"	47 49.2	08 07.12	1290	GPC	1m core, sloppy
3/8	"	47 49.4	08 07.35	1290	RBC	good full box, sub-core taken
4	11th	47 50.9	08 07.0	1230	ND	coral
				Bad weather		
5/1	13th	47 49.1	08 08.0	1180	AD	nil, bag torn
5/2	"	47 48.4	08 09.9	1500	AD	bag full mud
5/3	"	47 48.0	08 10.7	1470	AD	bag full clay
				Bad weather		
6/1	14th	47 50.3	08 09.9	1090	GPC	nil, rough sea
6/2	"	47 50.6	08 11.1	1317	GPC	" " "
6/3	"	47 50.7	08 11.3	1350	GPC	" " "
6/4	"	47 50.7	08 11.4	1520	GPC	" " "
7/1	"	47 49.4	08 07.7	1400	GPC	10 cm core, sloppy
7/2	"	47 49.5	08 07.8	1450	WB	near bottom water samples
7/3	"	47 49.3	08 07.4	1340	GPC	1 m core
7/4	"	47 48.8	08 08.9	1460	GPC	nil
7/5	"	47 48.2	08 09.5	1350	GPC	1 m core
7/6	"	47 48.3	08 09.6	1465	GPC	nil
8/1	15th	47 49.4	08 07.4	1430	RBC	lost on hauling
8/2	"	47 49.1	08 07.9	1350	GPC	1 m core
8/3	"	47 49.4	08 07.8	1500	GPC	nil
8/4	"	47 48.9	08 08.1	1480	ND	full of clay
8/5	"	47 48.05	08 08.55	1230	ND	shells and stones
8/6	"	47 48.7	08 12.4	1900	WB	series to 1500 m only
9/1	16th	47 48.3	08 09.5	1460	GPC	core fell out
9/2	"	47 48.4	08 09.2	1410	GPC	> 1 m core
9/3	"	47 49.0	08 08.9	1400	AD	nil, warp tangled

AD	Plymouth Anchor Dredge, deep-sea pattern
ND	Naturalists Dredge
GPC	General purpose corer, 2 m barrel
RBC	Reineck Box Corer
WB	IOS plastic water sampling bottles