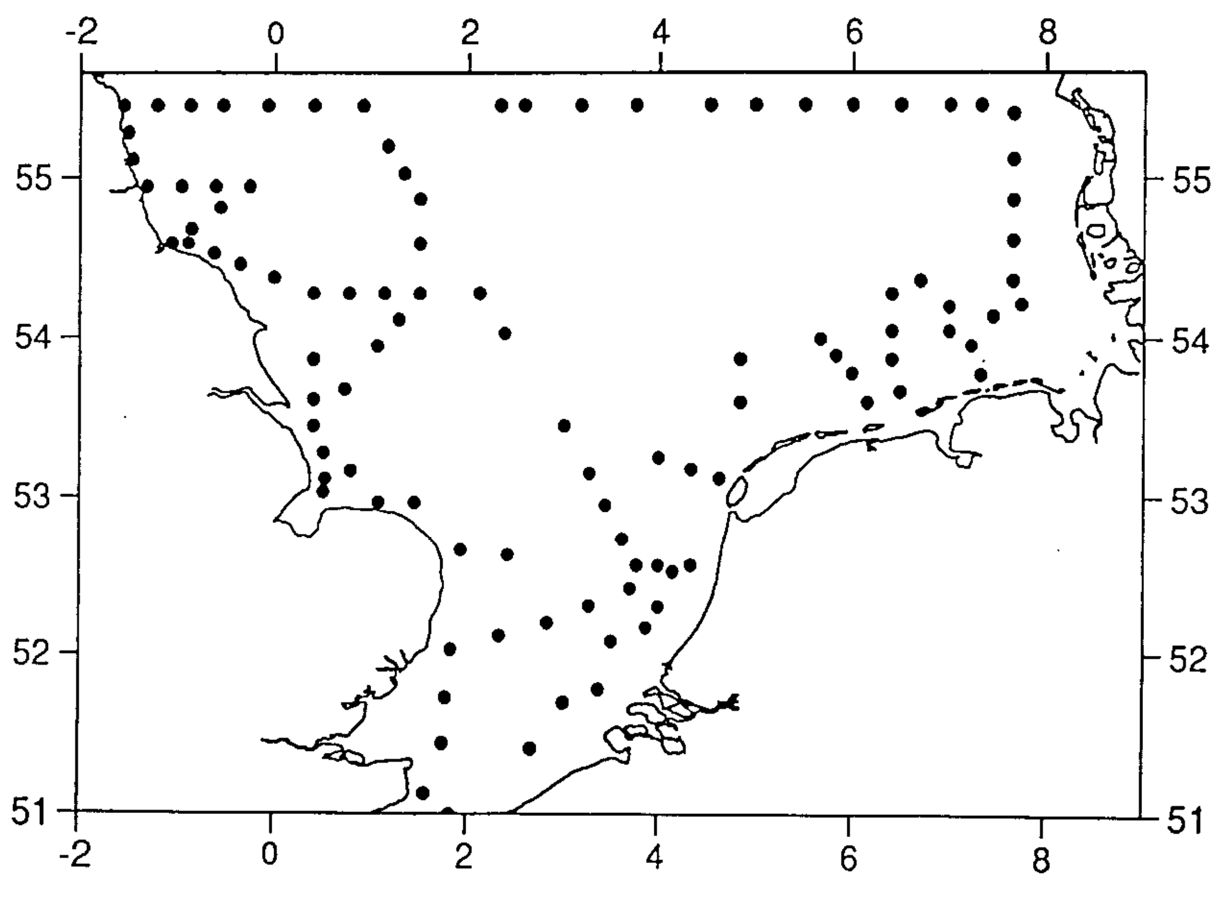
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INSTITUTE OF OCEANOGRAPHIC SCIENCES

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CRUISE REPORT NO. 214

RRS CHALLENGER CRUISE 43
30 DEC 1988-12 JAN 1989

NERC North Sea Community Research Project
Survey Cruise No. 6

Principal Scientist
D J Hydes

1990

DOCUMENT DATA SHEET

AUTHOR HYDES, D J et al	*PUBLICATION DATE* 1990

TITLE

RRS Challenger Cruise 43 30 Dec 1988 - 12 Jan 1989. NERC North Sea Community Research Project Survey Cruise No. 6.

REFERENCE

Institute of Oceanographic Sciences Deacon Laboratory, Cruise Report, No. 214, 25pp.

ABSTRACT

Challenger Cruise 43 was the sixth monthly survey of the southern North Sea conducted as part of the NERC North Sea Community Programme of research in the North Sea, between the Dover Straits and 55°30'N. The weather was moderate and 111 out of 120 planned survey stations were visited. Measurements were made on station and continuously between stations. Parameters sampled include temperature, salinity, dissolved oxygen, nutrients, zooplankton, suspended sediments and trace metals in the water. Dissolved and particulate atmospheric samples were also collected.

KEYWORDS

ATMOSPHERIC CHEMISTRY
ATMOSPHERIC PARTICLES
CHALLENGER/RRS - cruise(1988/1989)(43)
CURRENT METER DATA
NORTH SEA
NUTRIENTS
OXYGEN
PRIMARY PRODUCTION
SURVEY
SUSPENDED PARTICULATE MATTER
TRACE METALS
ZOOPLANKTON

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DECKER, U.N.	Electrician
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BISHOP, P.R.	Ship's Cook
ORSBORN, J.A.	Second Steward
LINK, W.J.T.	Steward

ITINERARY

Depart:	Great Yarmouth	30 December 1988
Arrive:	Great Yarmouth	12 January 1989

OBJECTIVES

Challenger Cruise 43 was a component cruise in the fifteen monthly cruises planned as part of the NERC North Sea Community Programme. This was the sixth cruise in the programme. For these cruises a set cruise track covering the different water masses and inputs to the southern North Sea south of 55°30'N has been designed. The aim was to make measurements at the 127 stations on the track. The measurements are: salinity, temperature, transmission, fluorescence, irradiance, nutrients, phytoplankton, dissolved oxygen, suspended solids and trace metals using a CTD rosette water bottle system, and net trawls for zooplankton. Underway measurements are made of temperature, salinity, fluorescence, transmission, and oxygen on instruments fed from a "non-toxic" sea water supply. Irradience and Acoustic Doppler Current Profilers (ADCP) were also measured continuously. Current meter and current profiler moorings were to be serviced at five sites.

NARRATIVE

Preparation of gear from *Challenger* Cruise 43 commenced on the afternoon of 29 December 1988. No problems arose and *Challenger* sailed on time, shortly after 1300Z on 30 December. Fog in the southern bight of the North Sea made us decide to work the NE coast stations at the start rather than the end of the cruise. Station AA was reached at 1600Z. A short boat drill was held, then the Simrad pole was deployed and the underway logging systems started up. Deployment of the CTD system was slow on this first station as several people were new to the system on this cruise. However, we had calm weather for the first few days and under these ideal conditions, working procedures very rapidly improved. By the time the weather deteriorated, the CTD groups were able to deal with the adverse conditions. From station AA we sailed for station AB - mooring site E. We were able to recover the U-shaped current meter mooring at E in the dark because of the calm conditions. From station AB we proceeded to station EQ. The winch wire-out read-out worked at the first station AA but failed at station AB. It did not work subsequently on cruise 43. The read-out system had been unreliable on the previous cruise but the Principal Scientist had not been informed of this fact. From then on the CTD and net had to be done using "tell-tale" distance marks taped on to the winch wirers; an unsatisfactory situation.

Station EQ was reached at 0400Z on 31 December. Station EJ was completed shortly before midnight. At midnight the New Year was rung in with "twelve bells"; a task shared by Jane Merrett and Dennis Burton as the youngest and oldest on board.

New Year's Day was another fine calm day. The ACDP mooring, site C (DM), was reached at 0843Z. The CTD and net were worked prior to searching for the mooring. The ADCP was quickly located and recovered at this site and the new mooring was relayed by 1110Z.

On January 2, the calm weather ended but the wind only increased to steady force 4/5. The corner on to the 55°30'N transect was turned at 1050Z after completing station CY. Mooring site A (CS) was reached in the dark at 2257Z. The lack of lights or radar beacons on the Proudman Oceanographic Laboratory (POL) ADCP units means that night-time recovery cannot be considered. A short search was made to locate the ADCP unit deployed on Cruise 39. This was not successful. A second ADCP unit was then deployed. At this stage the weather charts were suggesting that severe weather would set in from the west which might trap us in the German Bight. On that basis it was decided to work towards the south east via mooring stations D and F and then work the more sheltered Southern Bight stations before attempting the German Bight if the weather improved.

Good progress was made along the track towards mooring D on 3 January. At DX a detour to pick up stations DT, DU and DV to bring us to the mooring site at first light was started. *En route* to DT the weather deteriorated to force 8 and station work was abandoned.

Mooring site D (BB) was reached at 0732Z on 4 January. The weather had slackened enough for the CTD to be deployed and recovered safely using control ropes An acoustic search for the ADPC unit located it at the first attempt but the weather was too poor to attempt a recovery.

Station AI was reached at 0125Z on 5 January. Steady progress was made through the day towards and through the Thames outflow. The weather again deteriorated during the afternoon and station work was ceased after the occupation of station AO. We sheltered for the night behind North Foreland.

The next day, 6 January, was bright and sunny and we moved off to regain our track at 0600Z. The southernmost station AQ was reached at 1000Z. The sea state had greatly improved by the time we reached mooring site F (AE) at 0811Z on 7 January. Deployment of the U-shaped mooring went smoothly and we were underway to station BD to start the German Bight work at 0907Z.

Good progress was made with the German Bight stations and the station furthest into the Bight BY was reached at 2259Z on 8 January. Although January 9 was overcast, the sea state was good and progress was well up to schedule. The water samples in this area were interesting in that they contained noticeable quantities of fish eggs and some phytoplankton material from which chlorophyll was extracted using acetone.

Station CJ on the 55°30'N transect was reached at 0021Z on 10 January. The weather forecast was for improving weather conditions. In fact, the wind strengthened from the west throughout the day. Between stations CP and CQ our speed was down to below six knots, heading straight into the wind. We had intended to complete the 55°30'N transect by re-occupying station CS. However, as the forecast had now caught up with the actual weather, we decided to move south to station EC and then, depending on the weather, re-work the Wash and Humber stations or try to regain mooring site D.

On 11 January the weather decided things for us. Station DZ was successfully completed in a force 8 at 0942Z. At station EI conditions had deteriorated and we were taking water over the bows when hove to. Station work was therefore terminated at 1300Z with 106 stations completed. Continuous logging was stopped at 2400Z. Cruise 43 ended with RRS *Challenger* alongside in Great Yarmouth at 1400Z on 12 January.

The rapid twenty-four hour turn-round time now imposed on the ship meant it was not possible for all the planned computer data reduction to be done before the scientific party had to leave the ship.

ATMOSPHERIC GROUP

Trace inorganic and organics associated with aerosols (Liverpool)

The equipment worked successfully throughout the whole cruise and the many problems which occurred on the last survey cruise did not re-occur. This enabled four pairs of high volume samples of approximately 12-14 hours to be obtained in the first week, both for trace metal and organics. An inorganic cascade impactor sample (approximately 51 hours) was also obtained before rain and worsening weather conditions caused both sets of equipment to be closed and covered. However, three more pairs of "hi-vol" samples and another cascade impactor sample were obtained over the following week.

Problems

Adequate laminar flow hood facilities for the atmospheric group were lacking. The flow hood supplied was rusty inside and blew paint chips and wood chippings on to the samples when first turned on. It was also too small to provide sufficient work surface for changing the filters and preparing the rain samplers without some contamination occurring. The top of the cascade impactor sampler box is not waterproof. Exhaust fumes from other pump outlets on the foredeck need to be piped away from the sampler inlets.

Large particle sampling (Essex)

One cascade impactor sample was obtained of approximately 47 hours' duration. This was despite the fact that the micro switch (which turns the pump on and off as the wind varies in and out of sector, respectively) was broken on leaving Great Yarmouth. The ship's electrician fitted a new switch of the same design after some difficulty. This micro switch worked well until rain occurred then this second switch also seized up (the rocker arm became fixed). For the remainder of the cruise the cascade impactor was operated manually from the mains when the wind was out of sector. Eight small "hi-vol" samples of 8-12 hours were also collected throughout the duration of the cruise.

Rainfall sampling (East Anglia)

As an experiment on this cruise, the collectors were angled into the wind during a sampling event by mounting them on adjustable poles. This proved to be a success since collection efficiency improved greatly. Although only three samples were collected due to lack of rain, these were generally good. It is now felt that with more favourable weather conditions, and the further use of angled collectors, sample quality and volume should improve.

A problem arose following the removal of the laminar hood, previously available to the atmosphere group, to the clean lab. At the start of the cruise the atmospheric group were without the use of a laminar hood, a facility absolutely vital to our work on board. After some trouble, a replacement was found but this proved to be far from satisfactory. Not only was it too small for the rainfall work but the filter-retaining mesh was also rusty and bits were blown through from above. Fortunately, the trace metal group kindly allowed the rainfall work to be undertaken in the clean lab, but this was only practical on this cruise because of a general lack of rain events. With an increase in rain frequency, one laminar-flow hood would have been (and will be in future) insufficient for both the trace metal group and the rainfall work. It is, therefore, vital that the atmospheric group have adequate laminar flow facilities, independent of the trace metal group.

JM, AR

NO_2 Sampling

This cruise was not very successful as far as NO_2 sampling was concerned. The present placements (on the starboard lifeboat rail) were found to have a smaller sampling arc than previously thought. Consequently, the only meaningful samples (approximately six) were collected when the relative wind was to the starboard bow. It is therefore proposed to relocate and sample from the rail on the port side of the forward mast. The sampling arc should here be at least 180°, rather than the 120° at present.

JM, AR

MOORINGS

RVS current meter rigs E, F and B

Rig E was recovered at the start of the cruise but was not deployed because of weather conditions. The current meter data was retrieved and appeared satisfactory.

Rig F was deployed with one S4 current meter and one recording current meter (RCM). Both the recovery and deployment went smoothly.

Rig B was not located by survey cruise 41. Insufficient equipment was available to relay a rig at this site.

AJ, NS

PROUDMAN OCEANOGRAPHIC LABORATORY MOORINGS

Station A

No ADCP was deployed at this position on the previous survey cruise, *Challenger 41*. A short search was made for the ADCP deployed on *Challenger 39* without success. A new ADCP was deployed at the position.

Station C

The ADCP at station C was located on the hull transducer very quickly but took 45 minutes of transmissions with the overside hand-held transducer before finally releasing. It surfaced approximately 300 metres from its logged position. A replacement ADCP was deployed at the same position without incident.

Station D

The ADCP at station D was located on the very first transmission but, owing to poor weather conditions, no attempt was made to recover the instrument. The acoustic beacon was observed to time out and the position noted.

GB, AJ

NUTRIENT DETERMINATIONS

The nutrients determined on this cruise were: ammonia, nitrate, nitrite, phosphate and silicate. Sea water samples were run against a distilled water blank. Because of this, a correction for diffraction effects in the colorimeter cells will need to be made to the final data when the colorimeter has been calibrated. Satisfactory results were achieved on all five channels. The only problems encountered were: the ammonia channel becomes noisy as the PVC tubing used at the moment between the chemistry manifold and the colorimeter deteriorates over a period of a few days. Noisy base lines on Channels 1 (phosphate) and 5 (nitrite) were present during the latter half of the cruise. This problem disappeared at the end of the cruise when tied up in Yarmouth so was probably induced by ship's motion.

Particularly interesting results were obtained at two adjacent stations. At Station DY on the Dogger Bank, levels of nitrate and silicate were low and small jelly organisms were found in the zooplankton haul. This suggests that a diatom bloom had recently taken place and had to be grazed down. At station DX over the Outer Silver Pit, a strong nepheloid layer was present close to the bottom. Total nitrogen concentrations were constant through the water column but in the nepheloid layer interconversion of nitrate and ammonia appeared to have occurred.

DJH

PRIMARY PRODUCTION AND OXYGEN DETERMINATIONS

A total of ten simulated, on-deck primary production experiments were carried out. Also 350 samples were taken for subsequent analysis for chlorophyll to calibrate the fluorimeters. Fifty-seven duplicate samples were collected and preserved in formalin and Lugol's Iodine for subsequent microscopic analysis to determine taxonomic distribution. As the whole survey area was covered, this will provide a good set of biological data for winter base-line conditions.

The oxygen sampling systems, however, gave reason for some disquiet. A total of ten calibrations were carried out for the vertical profiling system and the CTD algorithms seem to be wildly out. Thirty-one calibrations of the non-toxic supply system were carried out though the replication did not appear to be very good. Some possibilities for these discrepancies are listed below.

1. The Finnpipette became totally blocked at one stage. It is possible that, on a previous cruise, it had been used without a tip as the base of the tapered barrel was black, or the caustic solutions used were affecting the piston. Either way, it may be preferable to use disposable glass syringes. At the very least, a spare should be supplied.

2. It is difficult to judge the end point of the reaction in any sort of sea as the movement of the water in the water bath affects the 100% transmission position.

3. The most serious problem of all is the aeration of the non-toxic sea water supply. this is quite noticeable, even in relatively calm conditions, but in any sort of seaway becomes absurd. There is sufficient bubbling to cause the plastic taps to vibrate and the outflow resembles a soda-syphon. The problem is well known to the ship's staff as well as the RVS technicians and base staff. The inflow through the hull is too small for the size of pump and is sampling the bubbles entrapped by the hull. It is also possible that, because of the back pressure, the pump is actually drawing in air. The debubbler provided was totally ineffective. To operate, the inflow should be a the bottom and outflow at the top, which is then gravity fed. The straight-through system as provided could increase the problems for, if the water level in the container drops, the venturin effect could draw in air instead of de-bubbling it. The whole argument of inserting a debubbler is spurious as this, by inference, admits that the water has been aerated and consequently bears no relation to the saturation conditions occurring in the surface sea water.

MJ, JMcC

RVS EQUIPMENT

CTD/Rosette

There were no problems with the operation of the CTD/Rosette. The deployment of the CTD went well even in rough conditions, the only problem that occasionally happened was the bottom of the runners on the frame caught on the lip of the STB gate.

There were a number of failures with the water bottles. These were repaired during the cruise.

One of the digital thermometers needed its battery changed when readings started to drift.

ADCP

This worked continually throughout the cruise without any problems.

Surface sampling

All worked well except for the fluorimeter which stopped working because of a break in the power cable. The cable was replaced and the fluorimeter was put back on-line.

Other equipment

The winch metering system was found to be faulty on joining the ship and did not work throughout the cruise.

After working well for the first two days, the precision echo-sounder (PES) recorder in the main laboratory developed problems with the drive motor which within a few days had ground to a halt. The recorder in the plot which was not working was repaired and used for the remainder of the cruise.

AJ, NS

SUSPENDED SEDIMENTS

The aim of the cruise was to take samples of sea water at three levels at each CTD station, to filter them for suspended solids load and to obtain the particle size distribution using a Coulter counter. Regular samples from the surface transmissometer were also filtered.

Samples were filtered at almost every CTD station, a few being missed when they occurred very shortly after the dawn dip and there was no time to process them. Some filter papers were damaged in removing them from the stands and these are probably unusable.

The Coulter counter worked satisfactorily and once filtering became a routine operation it was possible to process one set of surface, mid-depth and bottom samples each watch. The only problems were occasional blockages and air locks. It was found impossible to work in much more than force 5/6 as the mercury would keep resetting. The results after the first couple of samples should be usable.

Daily zero and air-reading checks were made on the surface and CTD transmissometers, after cleaning the windows. These proved satisfactory throughout. Air bubbles in the non-toxic supply had a very large effect on the surface transmissometer readings when the wind was strong on the starboard side. A larger header tank or a bubble trap might solve this problem.

MJ, JMcC

ZOOPLANKTON SAMPLING

During Cruise 43, zooplankton samples were taken at eighty stations covering the whole survey area. This was done to get an idea of the species distribution, the density and the biovolume of the zooplankton. For this reason, vertical hauls were made from 2 to 4 metres above the bottom to the surface with a 300 mm mesh-sized plankton net on eighty stations.

The samples collected in this way were rinsed out of the net and then filtrated over a 47 mm 300-mesh filter. This filter was added to a partly-filled measuring cylinder in order to measure the biovolume. After this, the filter and the plankton were rinsed into a plastic sample bottle and formaldehyde added. The bottles were numbered with the CTD station number and the letter code of that station. In the same way, samples were collected with a 50 mm mesh hand net on 51 stations.

A preliminary result appears to be that zooplankton was mixed with a surprising amount of phytoplankton at some stations. In the German Bight, the samples consisted of more than 90% of eggs, probably fish eggs, giving a total biovolume that was much greater than in the other areas.

Stations where eggs were found are:

Station	Biovolume (ml)	cast depth (m)
BR	4.2	32
BS	9.9	35
BU	15.9	35
BV	18	35
BW	18	35
BX	30	28
BY	19	25
CC	1.1	22
CD	1.6	26
CE	4.9	20
CF	1.2	22
CG	10.1	28
CH	6.9	25
CI	6.9	40
CJ	eggs disappeared	40

JH

DISSOLVED AND PARTICULATE TRACE METAL SAMPLING

On 106 CTD stations, Go-Flo bottles, modified and cleaned for trace metal sampling, were deployed on the rosette. Samples for trace metal analysis were normally taken at about 10 m but, in some cases, where the water column was stratified or where the transmissometer readings indicated variability in suspended particulate material, additional samples were taken at depths which represented the phenomena. Procedures to minimise contamination were employed during the sampling and subsequent treatment of samples. Water from the Go-Flo bottles was filtered under pressure in the clean container laboratory, using either 47 mm or 142 mm Nuclepore 0.4 *m pore diameter filters. The former were used for filtration of relatively small volumes (up to *ca.* 2 litres) and the latter for the larger volumes (up to *ca.* 25 litres) required to provide sufficient suspended particulate material for chemical analysis.

Aliquots of *ca.* 1 litre of filtrate were acidified to pH *ca.* 2 and stored for subsequent analysis ashore by chelation/solvent extraction and atomic absorption spectrophotometry for metals including nickel, copper, manganese, cadmium and lead. For 48 stations, aliquots were stored frozen for subsequent spectrofluorimetric analysis of aluminium, ashore.

Sixty-seven samples of suspended particulate material were taken from large volume samples. The majority (80%) were from stations previously occupied during *Challenger* Cruise 33 but 18 additional stations were sampled, with priority being given to the representation of estuarine plumes (Tyne, Tees, Rhine, Elbe).

The sampling system performed satisfactorily, although problems were encountered with some of the Go-Flo bottles. GF No. 8 required minor modifications after being repaired at SUDO prior to *Challenger* 42 whilst GF No. 9 required a new silicone rubber 'O'-ring in the lower ball valve assembly and a new lanyard. Modifications to GF No. 14 during this cruise requires its transport to SUDO for cleaning.

Further Comments

Installation of a water still in the fish laboratory has significantly reduced the amount of people traffic to the clean container.

It is suggested that on future cruises where trace metal work is being carried out, the Chief Officer informs the PSO prior to ship's maintenance work (e.g. paint chipping) being carried out in the vicinity of the CTD/rosette and the Go-Flo bottle rack on the clean container. Action can then be taken to prevent contamination of trace metal sampling gear.

MA, DB, GM, AT

CHALLENGER 43 - Station List

					Position		
Station Number	Code	Year	Julian Day	Start Time	Latitude	Longitude	Depth
1135	AAB	88	365	18.01	52°41.5'N	2°25.8'E	34
1136	ABB	88	365	22.50	52°41.1'N	2°26.3'E	50
1137	EGA	88	366	04.09	53°00.7'N	1°27.2'E	28
1138	EPA	88	366	06.04	53°01.5'N	1°01.4'E	15
1139	EOB	88	366	08.11	53°13.2'N	0°46.4'E	23
1140	ENA	88	366	10.16	53°04.7'N	0°29.7'E	33
1141	EMB	88	366	11.24	53°09.7'N	0°30.6'E	22
1142	ELB	88	366	13.10	53°19.8'N	0°30.2'E	17
1143	DGB	88	366	14.48	53°30.2'N	0°24.3'E	15
1144	DPB	88	366	16.27	53°40.5'N	0°23.8'E	22
1145	DOB	88	366	18.15	53°55.0'N	0°23.9'E	47
1146	EKB	88	366	20.40	53°42.6'N	0°43.0'E	32
1147	EJB	88	366	23.17	54°00.8'N	1°04.1'E	43
1148	EIA	89	001	01.14	54°09.9'N	1°17.5'E	65
1149	DZA	89	001	03.10	54°20.0'N	1°30.6'E	48
1150	EHA	89	001	05.06	54°20.2'N	1°07.3'E	43
1151	EGB	89	001	06.54	54°20.7'N	0°43.3'E	61
1152	DMB	89	001	09.00	54°19.9'N	0°24.1'E	60
1153	DLB	89	001	13.16	54°26.0'N	0°00.3'W	62
1154	DKB	89	001	15.28	54°31.1'N	0°21.0'W	58
1155	DJB	89	001	16.55	54°35.3'N	0°37.2'W	53
1156	DIB	89	001	18.39	54°39.1'N	0°52.9'W	44
1157	DHB	89	001	19.35	54°39.1'N	1°02.6'W	28
1158	DGB	89	001	21.05	54°43.9'N	0°50.8'W	58
1159	DFA	89	001	22.52	54°51.9'N	0°32.7'W	66
1160	DEA	89	002	00.34	54°60.0'N	0°14.8'W	93

CHALLENGER 43 - Station List - continued (2)

					Position		
Station Number	Code	Year	Julian Day	Start Time	Latitude	Longitude	Depth
1160	DEA	89	002	00.34	54°60.0'N	0°14.8'W	93
1161	DDA	89	002	02.56	55°00.1'N	0°35.5'W	72
1162	DCA	89	002	04.16	54°60.0'N	0°57.0'W	83
1163	DBA	89	002	05.54	55°00.0'N	1°18.0'W	42
1164	DAB	89	002	07.25	55°10.0'N	1°26.9'W	38
1165	CZB	89	002	09.24	55°19.8'N	1°29.8'W	43
1166	CYB	89	002	10.54	55°30.0'N	1°33.1'W	34
1167	CSB	89	002	12.49	55°29.9'N	1°11.5'W	92
1168	CWB	89	002	14.22	55°30.0'N	0°52.1'W	94
1169	CVB	89	002	16.24	55°30.1'N	0°32.3'W	65
1170	CUB	89	002	18.38	55°30.0'N	0°04.2'W	74
1171	CTB	89	002	20.57	55°29.8'N	0°24.0'E	74
1172	CSB	89	002	23.06	55°29.9'N	0°54.0'E	87
1173	EDB	89	003	03.38	55°15.3'N	1°10.0'E	69
1174	ECB	89	003	05.24	55°05.1'N	1°20.6'E	34
1175	EBB	89	003	06.55	54°55.5'N	1°30.5'E	30
1176	EAB	89	003	09.30	54°39.1'N	1°23.4'E	37
1177	DZB	89	003	12.01	54°30.0'N	1°29.5'E	52
1178	DYB	89	003	15.01	54°19.8'N	2°08.7'E	37
1179	DXB	89	003	17.17	54°02.3'N	2°19.3'E	69
1180	BBB	89	004	09.33	53°27.7'N	3°01.0'E	28
1181	BAB	89	004	13.17	53°12.3'N	3°15.7'E	28
1182	AZB	89	004	16.11	52°60.0'N	3°26.3'E	27
1183	AYB	89	004	18.47	52°46.9'N	3°36.9'E	32
1184	AEB	89	004	20.58	52°36.9'N	3°46.1'E	30

CHALLENGER 43 - Station List continued (3)

Station Number	Code	Year	Julian Day	Start Time	Position: Latitude	Position: Longitude	Depth
1185	AFA	89	004	22.40	52°37.0'N	4°00.4'E	27
1186	AIA	89	005	01.42	52°28.4'N	3°42.4'E	27
1187	AJA	89	005	04.58	52°21.1'N	3°15.9'E	42
1188	AKB	89	005	08.06	52°14.8'N	2°49.8'E	39
1189	ALB	89	005	11.12	52°10.4'N	2°20.9'E	52
1190	AMB	89	005	14.08	52°03.0'N	1°50.0'E	29
1191	ANB	89	005	16.57	51°46.7'N	1°48.2'E	25
1192	AOB	89	005	19.03	51°29.5'N	1°44.3'E	37
1193	APB	89	006	08.13	51°40.8'N	2°54.6'E	55
1194	AQB	89	006	01.03	51°40.8'N	2°54.6'E	33
1195	ARB	89	006	15.03	51°40.8'N	2°54.6'E	35
1196	ASB	89	006	17.49	51°44.8'N	2°60.0'E	33
1197	ATB	89	006	20.15	51°49.8'N	3°21.7'E	27
1198	AUB	89	006	23.15	52°08.2'N	3°29.7'E	33
1199	AVA	89	007	01.08	52°13.2'N	3°52.2'E	27
1200	AWA	89	007	02.19	52°21.1'N	4°00.2'E	24
1201	AHA	89	007	03.59	52°34.6'N	4°09.1'E	27
1202	AGA	89	007	05.02	52°37.1'N	4°20.1'E	21
1203	AFB	89	007	06.55	52°36.9'N	3°60.0'E	28
1204	AEB	89	007	08.29	52°36.9'N	3°45.8'E	30
1205	BDB	89	007	14.04	53°18.1'N	3°60.0'E	28
1206	BEB	89	007	16.03	53°13.7'N	4°20.0'E	31
1207	BFB	89	007	17.30	53°25.4'N	4°42.3'E	22
1208	BGB	89	007	21.01	53°39.0'N	4°50.0'E	31
1209	BHB	89	007	23.09	53°55.0'N	4°49.9'E	40

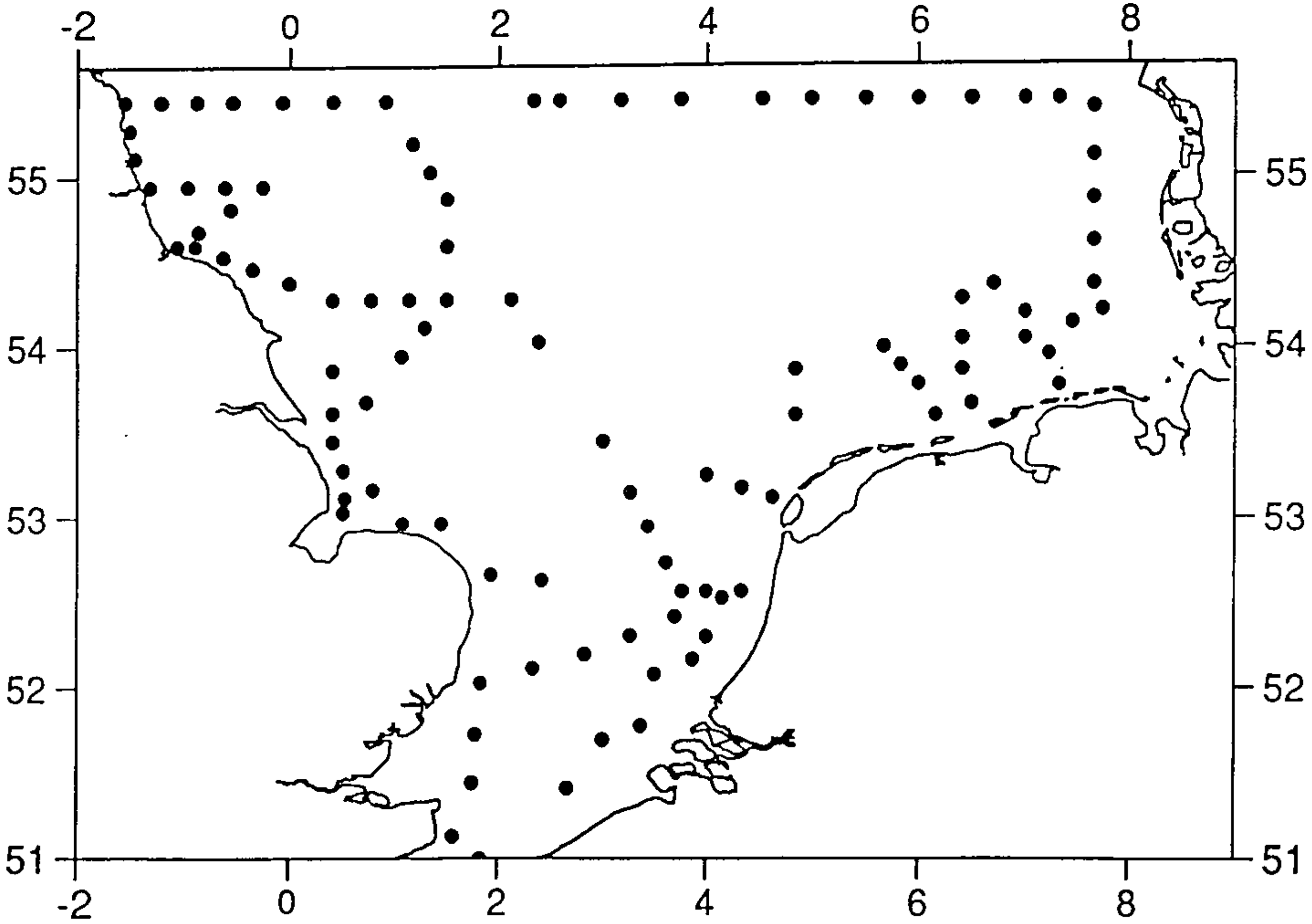
CHALLENGER 43 - Station List continued (4)

Station Number	Code	Year	Julian Day	Start Time	Position Latitude	Position Longitude	Depth
1210	BLA	89	008	03.08	54°03.0'N	5°39.5'E	37
1211	BMA	89	008	04.32	53°56.3'N	5°49.9'E	33
1212	BNA	89	008	05.53	53°50.2'N	6°00.4'E	30
1213	BOB	89	008	07.37	53°39.0'N	6°09.7'E	26
1214	BPB	89	008	09.10	53°42.9'N	6°30.1'E	23
1215	BQB	89	008	10.59	53°55.0'N	6°24.8'E	28
1216	BRB	89	008	12.49	54°06.0'N	6°24.9'E	36
1217	BSB	89	008	14.57	54°20.0'N	6°24.7'E	38
1218	BUB	89	008	16.53	54°25.0'N	6°42.3'E	37
1219	BVB	89	008	18.49	54°15.0'N	7°00.0'E	37
1220	BWB	89	008	20.20	54°06.1'N	7°00.4'E	35
1222	BYB	89	008	23.07	53°49.6'N	7°19.9'E	27
1223	BZA	89	009	02.59	54°11.5'N	7°27.9'E	37
1224	CAA	89	009	04.37	54°16.0'N	7°44.9'E	27
1225	CBA	89	009	05.56	54°25.0'N	7°40.0'E	26
1226	CCB	89	009	07.58	54°39.9'N	7°40.1'E	22
1227	CDB	89	009	10.16	54°55.0'N	7°40.1'E	22
1228	CEB	89	009	12.15	55°09.9'N	7°40.0'E	23
1229	CFB	89	009	14.48	55°27.0'N	7°40.1'E	25
1230	CGB	89	009	16.45	55°29.9'N	7°19.8'E	31
1231	CHB	89	009	19.08	55°30.0'N	7°00.0'E	28
1232	CHB	89	009	19.23	55°30.1'N	6°59.9'E	28
1233	CIB	89	009	21.56	55°29.9'N	6°29.9'E	42
1234	CJB	89	010	00.33	55°30.0'N	6°00.3'E	50
1235	CKA	89	010	02.50	55°30.0'N	5°30.0'E	53

CHALLENGER 43 - Station List continued (5)

					Position		
Station Number	Code	Year	Julian Day	Start Time	Latitude	Longitude	Depth
1236	CLA	89	010	05.04	55°30.0'N	4°59.0'E	45
1237	CMB	89	010	07.07	55°30.2'N	4°30.8'E	33
1238	CNB	89	010	10.37	55°29.8'N	3°45.2'E	34
1239	COB	89	010	13.29	55°30.1'N	3°09.9'E	37
1240	CPB	89	010	17.05	55°29.8'N	2°34.9'E	48
1241	CQB	89	010	20.44	55°30.2'N	2°02.3'E	66
1242	ECA	89	011	01.54	55°05.0'N	1°20.2'E	33
1243	EBB	89	011	03.39	54°55.5'N	1°30.4'E	27
1244	EAB	89	011	06.16	54°39.0'N	1°22.9'E	37
1245	DZB	89	011	09.20	54°20.0'N	1°29.9'E	46

Note: The first two letters of the code (*e.g.* DZB) refer to the position on the grid of stations used throughout the North Sea Programme. The third letter A or B indicates whether a plankton haul was taken (A), or not (B).



Station Positions: RRS *Challenger* Cruise 43 30 Dec 1988-12 Jan 1989

Short Cruise Report for RVS

North Sea Survey Challenger 43

30 December 1988 – 12 January 1989

D J Hydes – Principal Scientist

Objectives

To make station and underway measurements around the set NSP track in the southern North Sea. At stations, CTD and water bottle casts were made, at most stations plankton net trawls were also made. Underway measurements were made with instruments fed from the "non-toxic" seawater supply. The "special" ~~measurements made~~ work done on this survey was the collection of clean samples of seawater for trace metal analysis. Current meter and current profiler moorings were recovered and redeployed at four sites.

Summary of outcome/results

Due to the favorable weather conditions this cruise was successful in achieving a large portion of the ambitious track set for the survey cruises. Three periods of time were lost due to bad weather the longest being on the last day. One hundred and eleven CTD and bottle casts were made. A current meter mooring was recovered at site E and redeployed at site F. ADCP pop-up moorings were recovered and deployed at sites A and C. The skill of the officers is to be commended for maintaining the ship as a stable platform when performing station work in adverse conditions. The deck crew worked well during mooring operations. Very good relations were enjoyed with all officers and crew who were supportive and helpful.

D J Hydes Challenger 43 RVS-

Points for attention.

1. The notoriously unreliable optical system of wire-out and wire-speed on the mid-ships winch did not work at all on this cruise. A mechanical back up system should be fitted immediately.

2. Both Mufax PES systems are faulty – these are essential for mooring work.

3. A communication system or alarm had not been wired up in the clean container.

4. An extra clean bench is required for 'Atmospheric work' when the clean container is on. Some of the "Atmospheric work" is incompatible with the metal work in the clean container.

5. Air is entering the non-toxic seawater supply – a faulty pump is suspected – this is a serious problem for the underway dissolved oxygen measurements.

6. A reiteration of a point made in November – Challenger requires a 'dirty mess area'.

D J Hydes 12/1/89.

Additional Points

Cruise 39 November

Stations were run in letter code order. "Missing" stations were those W and NW of mooring site "D".
Temperature structure was still present ~~in~~ at mooring site A, and the thermistor rig was ~~re~~ redeployed there.

Cruise 43 January

Fog in southern bight led us to change station running order. Order was ① Wash and Humber and NE coast out to mooring "A". ② Mooring "A" to mooring "F". ③ southern bight ④ German Bight and 55° 30'N transect. Bad weather prevented us from regaining mooring site "A".
Immediate points of interest noted on board included.

① At Dogger Bank station DY. A recent diatom bloom had probably occured which had greatly reduced the nitrate and silicate concentrations in the water column. Small jelly organisms were found in the zooplankton net at that site.

② At the Outer Silver Pit station DX, an intense bottom nepheloid layer was present. An interconversion of ammonia and nitrate was associated with this layer.

③ In the German Bight and Jutland Current area, variable high counts of fish eggs and phytoplankton where collected in the zooplankton hauls.