

IMER/FLEX/1/76

VESSEL

R.R.S. CHALLENGER, Cruise 4B/76

CRUISE PERIOD

18-23 March 1976

PERSONNEL

IMER, Edinburgh
 R.H. Bruce, SSO (Senior Scientist)
 D.B. Hollis, HSO
 A.W.G. John, HSO
 IOS, Bidston
 R. Palin, SO

All personnel were present for the duration of the cruise.

ITINERARY

See also attached charts, tow lists and station list.
 (All times are GMT).

16 March	Equipment loaded, set up and tested.
17 March	Sailing delayed because of bad weather and to complete engine repairs.
18 March 13.30	<u>Departed Aberdeen.</u> Set course for centre of FLEX square (see Fig. 1).
14.30	Fitted over-the-side sea-water pump and started logging surface (2m) conductivity, temperature and navigational parameters at 30 sec. intervals. This logging was maintained throughout the cruise.
18.00-18.30	<u>Station 0:</u> Calibration check for CTD system and UOR salinity and temperature sensors. (CTD profile with attached reversing water-bottle.)
18.35	Started UOR Tow 1. Proceeded at 10 knots along IN-OUT line ILSW.
19 March 19.50	Started CPR Tow 1.
01.05	Recovered CPR.
01.20	Recovered UOR. Continued along line ILSW.
02.50-04.42	UOR Tow 2, along line ILSW.
04.56-06.11	<u>Station 9A:</u> CTD profile (with attached reversing water-bottle), 2 reversing water-bottle casts (9 depths). (See Fig. 2.)
06.15	Proceeded towards Station 1 at 2 knots.
06.34-07.01	LHPR oblique plankton haul.
07.15	Increased speed to 5 knots.
07.21-07.40	HSLE oblique plankton haul.
07.48	Started UOR Tow 3. Proceeded at 10 knots towards Station 1.
07.58-10.43	CPR Tow 2.
10.54	Recovered UOR.
11.30-14.00	<u>Station 1A:</u> (SW corner of FLEX square). CTD profile (with calibration sample),

2 reversing water-bottle casts
(9 depths),
Secchi disc observation.

14.13 Started UOR Tow 4.
Proceeded at 10 knots along Leg 1 of
FLEX grid.

14.24- CPR Tow 3.
19.24

19.40 Recovered UOR.

19.50- Station 2A: (NW corner of FLEX square).
21.00 CTD profile,
2 reversing water-bottle casts
(9 depths).

21.25 Started UOR Tow 5.
Proceeded at 9 knots along Leg 2 of FLEX grid.

22.58- CPR Tow 4.

20 March 01.04

01.20 Recovered UOR to investigate possible
fault in towing-tension monitoring system.

02.22- CPR Tow 5.

04.39 Continued along Leg 2.
Wind force 5→7 southerly.

04.50- Station 3A: Reversing water-bottle cast
05.53 (9 depths),
CTD profile (with calibration
sample).

07.20 Started UOR Tow 6
Proceeded along Leg 3 at 10 knots with
heavy following sea (wind force 7→8)

08.24 Recovered UOR to investigate undulation
fault.

09.05- CPR Tow 6
12.07

12.08 Set course for Aberdeen.
(Scientific work cut short because of
apparent medical emergency requiring an
immediate return to port.)

18.00 Hove-to about 100 miles NE of Aberdeen in
Force 8-9 winds.

21 March Hove-to.

22 March 08.00 Seas abated, proceeded towards Aberdeen
at reduced speed.

23 March 07.00 Along-side in Aberdeen

OBJECTIVES

See Cruise Programme IMER/FLEX/1/76

PROCEDURES
AND METHODSAs outlined in the Cruise Programme, but with the following
changes.

- 4.1 Meteorological observations were taken at 6-hourly
intervals only.
- 4.2 The 6-hourly weather reports were transmitted to the
Met. Office, U.K. via the most convenient U.K. shore
station.

EQUIPMENT AND
OTHER PROBLEMSWeather, etc.

1. Departure from Aberdeen was postponed for 1 day
because/

because of bad weather and to complete engine repairs.

2. An apparent medical emergency, requiring an immediate return to Aberdeen, caused scientific operations in the FLEX square to cease at 12.00 hours on 20 March (3½ days early).
3. Force 8-9 southerly gales caused the ship to remain hove-to about 100 miles NE of Aberdeen from 18.15 on the 20th to 08.00 hours on the 22 March. During this time, the medical emergency apparently resolved itself but by then it was too late to be worthwhile returning to the survey area.

Ship's Equipment

1. The control of the auxiliary winch used for the plankton hauls was too coarse making it difficult to achieve precise and repeatable deployment of nets (particularly LHPR) at low speeds (~ 5m/min).

IOS Equipment

1. The mechanical arrangement for triggering the calibration water-bottle on the CTD frame was unreliable. Any bending or mis-alignment could cause pre-triggering or failure to trigger.

IMER Equipment

1. Undulator Faults

- (a) An intermittent fault in the towing-tension monitoring equipment (faulty connection between deck units) caused UOR Tow 5 to be terminated early.
- (b) UOR 2 failed to undulate during its first tow (Tow 6). A wiring fault in the generator had been missed because of incomplete pre-cruise testing.
- (c) UOR 2 was slightly damaged during recovery at the end of Tow 6 in wind force 7. An extra large following sea swept the UOR under the ship's stern where impact with some part of the ship's structure stove in a small area of the fibre-glass nose, slightly bent the towing stirrup and damaged some of the components of the plankton sampler and its drive.

2. Plankton sampling mechanism faults

- (a) The filtering silk was not transported during UOR Tow 5 because of an undetected seizure of the slipping clutch at the end of the previous Tow - caused by grit becoming embedded between the large spur gear and its shaft. The seizure also caused the screws securing the Muffet gear-box to strip their threads.

3. Data logging faults

- (a) Bad contact in pressure channel of MATR logger caused loss of depth data during CPR Tows 2 and 3.
- (b) Unknown fault prevented recording by ODAS throughout UOR Tow 5.

RESULTS AND CONCLUSIONS

The combination of bad weather and medical emergency reduced the effective time available in the FLEX area from the minimum expected 3 days (enough to complete one survey of the FLEX grid) to 30 hours. The UOR faults listed above caused some further loss of sampling, with the result that only about a third of the grid was covered.

Nevertheless, even this limited sampling was probably adequate to describe the "pre-bloom" conditions, at least in the western half of the FLEX square. The cold, dull, stormy weather both before and during this cruise had evidently kept the water column well mixed and prevented the spring phytoplankton bloom from starting. There was little variation of temperature or salinity either with depth or throughout the area, values lying between 6.2 and 6.6°C and 35.15 and 35.20‰ respectively. Phytoplankton concentration (as judged by absence of colour on the filter papers) and zooplankton abundance (as judged by settlement volumes of HSLE samples) were very low. However, the single LHPR haul at the centre of the box showed that Oithona was the most abundant copepod, that there was a fairly large population of adult Calanus in the upper 80m of the water column, and that young copepodites (Stages I & II) were already present in significant numbers.

Date: 7.9.76

Prepared by: R.H. Bruce

Approved by: R.S. Glover

Regular Circulation - CruisesInternal

Glover
Longhurst
Robinson

Heath
Plymouth File(2)

ExternalNERC

Foxton

IOS

Edwards (BODS)

RVB

Stobie

IOS (Bidston)

Cartwright

DAFS (Aberdeen)

Parrish

Additional Circulation for FLEX CruisesMet. Office

White

NMFS

Marak

DAFS

Steele
Adams

IMER

Williams
Bruce
Aiken
John
Hollis
Wood
Hiby
Bottrell
Reid

FLEX Data Centre (Hamburg)

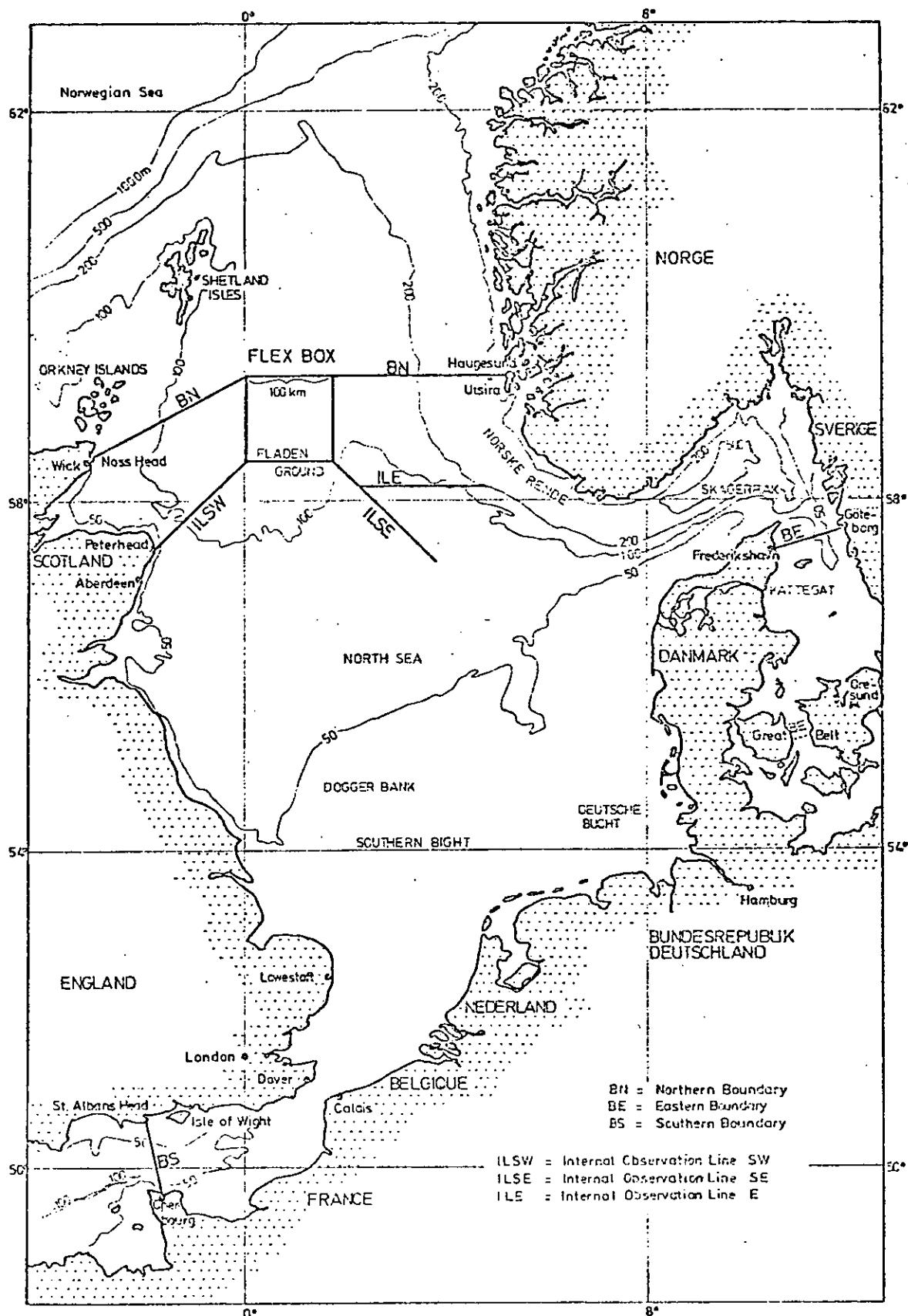
Schulze

IOS (Bidston)

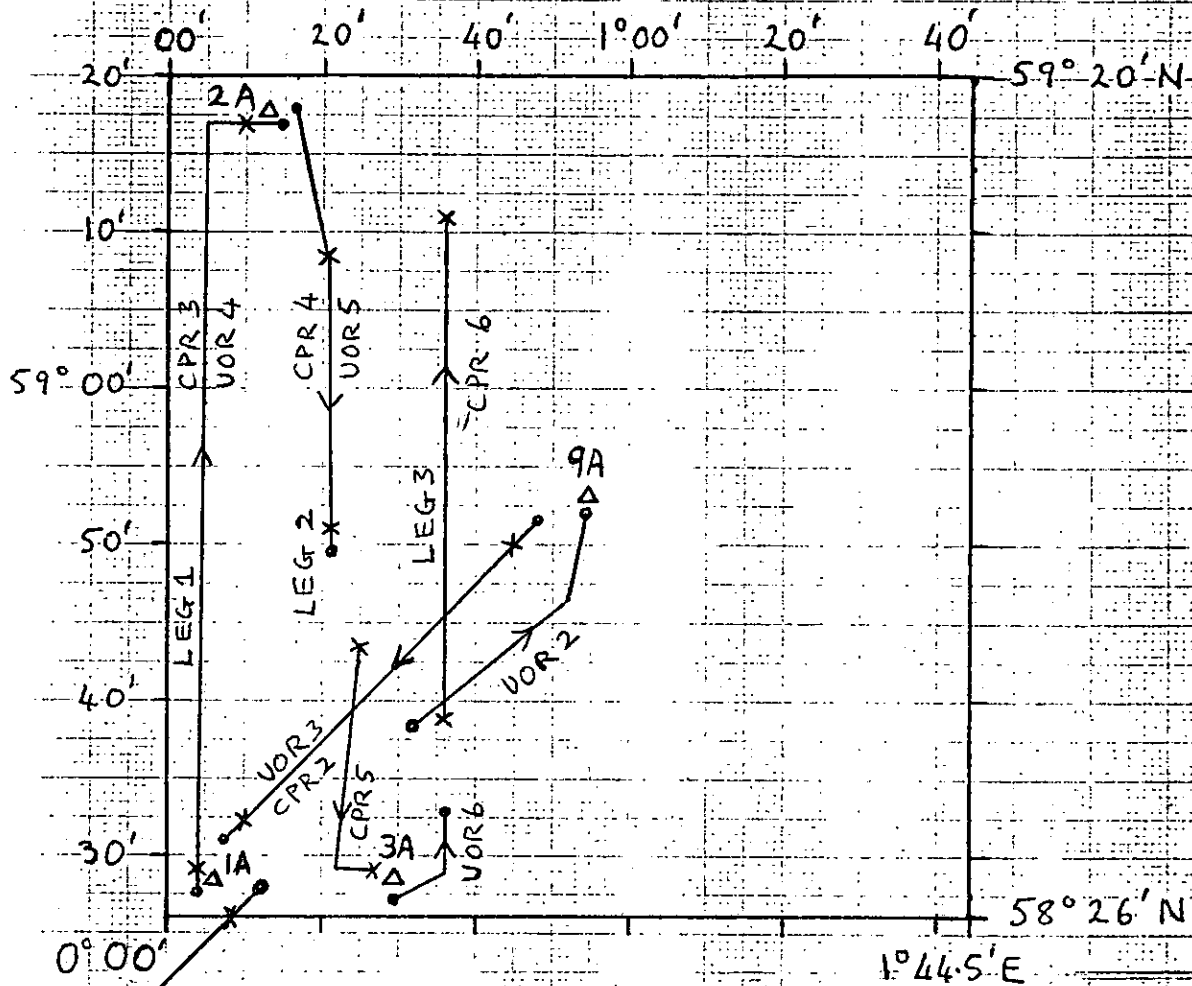
Palin

Fig.1

Observation Lines and Areas in JONSDAP 76



FLEX BOX



- △ HYDRO-STATIONS
- START & FINISH OF VOR TOWS
- X START & FINISH OF CPR TOWS

FIGURE 2.

UOR TOW LIST (p. 1 of 1)

UOR Tow No.	Location	Action	Date	Time (GMT)	Position		Dist. towed (n. miles)	No. of Undula- tions	Av. Und. Leng. (n. miles)	Depth Range (m)	Silk No.	Av. Silk Trans. rate (miles/ div.)	Tape No.	Comments
					Lat. N	Long.								
1	ILSW →	Shoot Haul	18 March 19 "	18.35 01.20	57°35' 58°28'	01°20'W 00°11'E	71	39	1.82	10-56	F1/UOR/1	1.64	F1/1	UTV3/ODAS/2 STD/3/3/2 All data and samples valid.
2	ILSW →	Shoot A/C Haul	19 " " " " "	02.50 04.00 04.42	58°39' 58°46.7' 58°52.5'	00°32'E 00°52.7'E 00°54.1'E	19	11	1.73	10-57	F1/UOR/2	1.45	F1/2	All data and samples valid.
3	Sta. 9 → Sta. 1	Shoot Haul	19 " " "	07.48 10.54	58°51.3' 58°30.9'	00°48.1'E 00°07.4'E	30	18	1.67	9-58	F1/UOR/2	1.38	F1/2	"
4	FLEX grid: Leg 1	Shoot A/C Haul	19 " " " " "	14.13 19.08 19.40	58°27.5' 59°17.1' 59°17.1'	00°03.7'E 00°05.0'E 00°14.1'E	55	31	1.77	9-57	F1/UOR/2	2.16	F1/3	"
5	FLEX grid: Leg 2	Shoot Haul	19 " 20 "	21.25 01.20	59°17.8' 58°49.5'	00°16.5'E 00°21.4'E	29	18	1.61	?	F1/UOR/2	-	F1/4	No valid data nor samples
6	FLEX grid: Leg 3	Shoot A/C Haul	20 " " " " "	07.20 08.00 08.24	58°27.2' 58°29.2' 58°33.3'	00°28.2'E 00°36.2'E 00°36.2'E	9	-	-	54	F1/UOR/3	1.45	F1/5	UTV 2 No undulations
Totals							213	107						

CPR TOW LIST (p. 1 of 1)

CPR Tow No.	Location	Action	Date	Time (GMT)	Position Lat.N. Long.		Silk No.	MATR Tape No.	Distance towed (n.miles)	Average Silk Transport Rate (miles/div.)	Comments
1	ILSW →	Shoot Haul	18 March 19 "	19.50 01.05	57°45' 58°26'	01°05'W 00°08'E	F1/CPR/1	F1/CPR/1	56	5.7	All data and samples valid
2	Sta.9 → Sta.1	Shoot Haul	19 " 19 "	07.58 10.43	58°50.3' 58°32.1'	00°45.9'E 00°09.5'E	F1/CPR/1	F1/CPR/1	26	4.8	All T data and samples valid
3	FLEX grid: Leg 1	Shoot A/C Haul	19 " 19 " 19 "	14.24 19.08 19.24	58°29.7' 59°17.1' 59°17.1'	00°03.9'E 00°05.0'E 00°09.6'E	F1/CPR/1	F1/CPR/1	51	5.3	"
4	FLEX grid: Leg 2	Shoot Haul	19 " 20 "	22.58 01.04	59°08.2' 58°50.9'	00°20.9'E 00°21.3'E	F1/CPR/1	F1/CPR/2	18	7.1	All data and samples valid
5	FLEX grid: Leg 2	Shoot A/C Haul	20 " 20 " 20 "	02.22 04.22 04.39	58°43.8' 58°28.8' 58°28.6'	00°24.5'E 00°21.6'E 00°27.0'E	F1/CPR/1	F1/CPR/2	18		
6	FLEX grid: Leg 3	Shoot Haul	20 " 20 "	09.05 12.07	58°39.3' 59°10.7'	00°36.2'E 00°36.1'E	F1/CPR/1	F1/CPR/3	32	5.7	"
Total									201		

HYDRO-STATION LIST (p. 1 of 1)

Station No.	Date	Messenger Time (GMT)	Position		Sounding (m)	Depths Sampled (m)	CTD Cast (Max. depth)	S	‰	SAMPLE NUMBERS			PHYTOPLANKTON		
			Lat. N.	Long.						Nutrients	Silicate	Chla	Reid	Gillbricht	
0	18 March	18.26	57°35'	01°20'W	85	75	75	+	*	-	-	-	-	-	
9A	19	"	05.10	58°53'	00°54'E	120	110	110	+	-	-	-	-	-	
			05.25	"	"	"	40,60,80, 100,110	-	+	F1/9A/40- -110	F1/9A/40 -110	F1/9A/40 -110	FR5 -9	-	
			**	06.07	"	"	"	3,10,20,30	-	+	F1/9A/3 -30	F1/9A/3 -30	F1/9A/3 -30	FR1 -4	-
1A	19	"	12.00	58°28'	00°04'E	140	60	125	+	-	-	-	-	-	
			12.16	"	"	"	40,60,80, 100,130	-	+	F1/1A/40 -130	F1/1A/40 -130	F1/1A/40 -130	FR14 -18	FG6 -10	
			13.05	"	"	"	3,10,20,30	-	+	F1/1A/3 -30	F1/1A/3 -30	F1/1A/3 -130	FR10 -13	FG1-2, FG4-5	
2A	19	"	20.03	59°18'	00°13'E	128	-	120	-	-	-	-	-	-	
			20.20	"	"	"	40,60,80, 100,120	-	+	-	-	-	-	-	-
			20.55	"	"	"	3,10,20,30	-	+	-	-	-	-	-	-
3A	20	"	05.09	58°28'	00°29'E	140	40,60,80, 100,130	-	+	F1/3A/40 -130	F1/3A/40 -130	F1/3A/40 -130	FR23 -27	-	
			05.33	"	"	"	3,10,20,30	-	+	F1/3A/3 -30	F1/3A/3 -30	F1/3A/3 -30	FR19 -22	-	
			05.49	"	"	"	120	120	+	-	-	-	-	-	-

* + indicates that salinity samples were taken and analysed on board

** LHPR and HSLE oblique plankton hauls were taken on leaving this station

	<u>LHPR</u>	<u>HSLE</u>
Starting Time	06.33	07.21
Starting Position	58°53.4'N, 00°53.9'E	58°52.6'N, 00°5.30'E
Duration of haul	29 min	20 min
Maximum depth	120 m	?
No. of samples	19	2

Secchi disc observations taken at this station