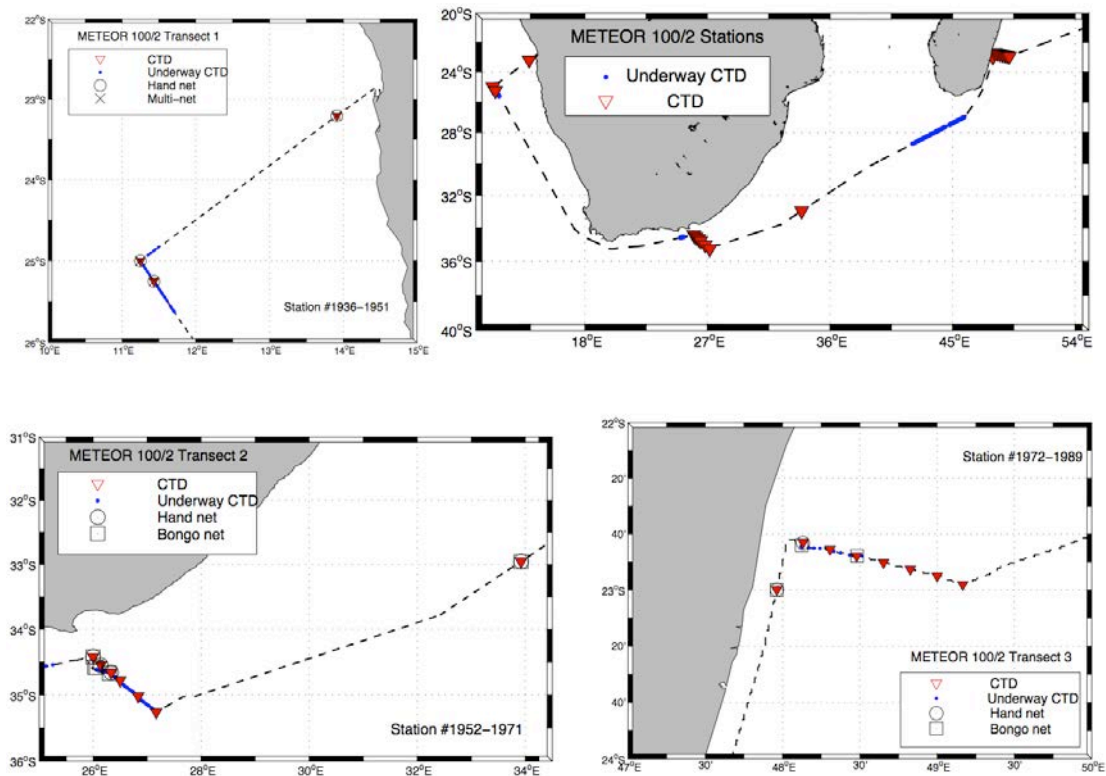


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Short Cruise Report
R/V METEOR M100/2 Walvis Bay – Port Louis
4th October – 21th October 2013
Chief Scientist: Prof. Dr. Martin Visbeck
Captain: Michael Schneider



Cruise track of METEOR cruise M100/2 with locations of CTD/LADCP stations (triangles), underway CTD (blue dot), Bongo-Net (open Squares), Multi-Net (black cross) and hand net stations (open circles).

Objectives

Cruise M100/2 combined hydrographic, biogeochemical, and biological studies in the context of a resurvey of three major current regimes in the South Atlantic and Southern Indian Ocean.

The specific scientific goals of the cruise were:

- to document multi-year time water mass, structure and transport evolution of three boundary current systems (Namibia Upwelling Regime, Agulhas Current System and East Madagascar Current)
- to study the influence of the Benguela Upwelling Systems and the tropical/subtropical front on the temporal and spatial variability of trace gas concentrations in the lower atmosphere.
- to quantify the effects of the oxygen minimum zone in the northern Benguela Current on zooplankton abundance, vertical distribution, physiology, and life-cycle strategies.
- to compare zooplankton biodiversity and community composition between the upwelling system of the Benguela Current and sub-tropical waters of the Agulhas Current and East Madagascar Current in order to teach German and African students the essential role of physical-biological interactions in determining marine productivity and pelagic processes.

A secondary aspect of the cruise was to facilitate training, capacity building and knowledge exchange with students from Germany and the South African region.

The cruise was very successful and most objectives were reached and most measurements were carried out as planned with some slight modifications.



Scientific party of the cruise M100/2

Narrative

R/V METEOR departed from Walvis Bay on October 4, 2013 at 9:00 and headed southwest towards the starting point of the first CTD/multinet section at 25°S 11°15'W. A test station was successfully completed in the afternoon. The wind picked up and we decided not to try U-CTD operations during the night in poor visibility. On October 5 we began a U-CTD transect 10 miles northeast of the section starting point. The wind reached 7 Bft and the forecast tells us stronger wind is on its way. After the first CTD and multinet station we decided to reorient the section from heading east towards heading southeast against the wind but heading towards Cape Town. In the evening the wind picked up. Work on deck had to be stopped after two CTD/multi net stations. By 22:00 even U-CTD work had to be cancelled due to increasing amounts of water on deck. Until the morning of October 8 METEOR battled heavy seas and gale force winds never less than 8 Bft. Steaming speed was between 3-5 kn and valuable science / transit time was lost.

On October 10 we left the S. Atlantic Ocean and reached the Indian Ocean 50 nm south of Cape Agulhas. The wind was fair. Between October 11 10:00 and October 12 07:00 we performed a cross section to the South-East across the Agulhas current at 26.5° E. The underway measurements were enhanced with 6 CTD stations, 3 Bongo-Net hauls and U-CTD in-between stations. For the next 24 hours gale force winds from the South West prohibited any station work while on transit to Madagascar. On October 13 at 20:00 we stopped for a short CTD and Bongo net station to sample the off-shelf open ocean ecosystem. In the evening of October 15 a 24h long U-CTD section across an eddy was started. The possible location of the eddy was deduced from real time satellite sea level imagery.

On October 18 we arrived at the last sampling site east of Madagascar. At 3:00 am we took a bong net sample on the inshore side of the East Madagascar Current and from 6:00 am onwards sampled along the 22°45 S transect a total of 6 CTD casts, 2 Bongo nets and two U-CTD sections between stations. A short interruption of the ships power supply cause a one hour break in the SADCP data and computer trouble for the CTD acquisition. Fortunately the cast was almost finished (10 m upcast missing). Early in the morning on October 19 we finished the last station and began steaming towards Mauritius.

The ship arrived at Port Luis on October 21.

Acknowledgements

We greatly appreciate the wonderful working atmosphere as well as the professionalism and seamanship of crew, officers and Captain of R/V METEOR, which made this work a success. Financial support came from the German Ministry of Science and Technology (BMBF).

Participants

Name	Position/Discipline	Institute
1. Visbeck, Martin	Chief scientist	GEOMAR
2. Auel, Holger	Zooplankton	Uni HB
3. Rixen, Tim	Underway biochemistry	Uni HH & ZMT
4. Strydom, Nadine	Fish larvae	NMMU
5. Biastoch, Arne	Ocean modelling	GEOMAR
6. Pinck, Andreas	Technician	GEOMAR
7. Ullgren, Jenny	CTD/U-CTD	UB
8. Hagen, Amelie	Underway biochemistry	Uni HH
9. Vogel, Jefim	CTD/U-CTD/ADCPs	GEOMAR
10. Abel, Rafael	CTD/U-CTD/processing	GEOMAR
11. Durgadoo, Jonathan	CTD/U-CTD	GEOMAR
12. Cheng, Yu	CTD/U-CTD	Uni Miami
13. Schukat, Anna	Zooplankton	Uni HB
14. Simon, Stephanie	Zooplankton	Uni HB
15. H6ring, Flavia	Zooplankton	Uni HB
16. Kaiser, Patricia	Zooplankton	Uni HB
17. Menke, Valerie	Underway biochemistry	ZMT & Uni HH
18. Horstmann, Saskia	Underway biochemistry	Uni HH
19. Schult, Daniel	Underway biochemistry	Uni HH
20. Mashifane, Thulwaneng	CTD/U-CTD	UCT
21. Malan, Neil	CTD/U-CTD	UCT
22. Reddy, Mageshnee	Underway biochemistry	ORI

23. Lester, Nina	Zooplankton	UCT & DAFF
24. Ragoasha, Moagabo	CTD/U-CTD	UCT
25. Braby, Laura	CTD/U-CTD/salinometer	UCT
26. Libuku, Victor	Underway biochemistry	Uni HB
27. Rabary, Jean	CTD/U-CTD	IH.SM
28. Ramanantsoa, Dani	CTD/U-CTD	IH.SM
29. Sonnabend, Hartmut	Meteorology	DWD Hamburg
30. Stelzner, Martin	Meteorology	DWD Hamburg

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- Uni HB** BreMarE – Bremen Marine Ecology (FB 2), University of Bremen, P.O. Box 330440, 28334 Bremen – Germany.
- Uni HH** Institute of Biogeochemistry and Marine Chemistry, University of Hamburg, Bundesstraße 55, D-20146 Hamburg - Germany
- ZMT** Leibniz Center for Tropical Marine Ecology, Fahrenheitstr. 6, D-28359 Bremen - Germany

Institute	Number
GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel	6
Universität Bremen (Uni-B)	6
Universität Hamburg (Uni-HH)	3
Zentrum für Marine Tropenökologie (ZMT)	2
Geophysical Institute, University of Bergen, Norway (UB)	1
RSMAS University of Miami, USA	1
University of Cape Town, South Africa (UCT)	5
Nelson Mandela Metropolitan University, South Africa (NMMU)	1
Oceanographic Research Institute, South Africa (ORI)	1
Institut Halieutique et des Sciences Marines, Madagascar (IH.SM)	2

Station List: of R/V METEOR cruise M100/2.

Station No.	Date Oct. 2013	Gear	Time	Latitude	Longitude	Station Depth m	Remarks
1936-1	4	CTD/rosette	12:28	23° 12.44' S	13° 54.74' E	130	T, S, P, O2, FL, Currents
1937-1	4	Hand net	12:36	23° 12.44' S	13° 54.74' E	30 - 0	Foraminifera
1938-1	4	Multiple net	12:52	23° 12.44' S	13° 54.74' E	150 - 0	Vertical haul
1939-1	4	Hand net	13:09	23° 12.43' S	13° 54.76' E	30 - 0	Foraminifera
1941-1	5	CTD - underway	07:11	24° 50.08' S	11° 29.60' E	200	T, S, P - dummy
1942-1	5	CTD - underway	07:30	24° 51.86' S	11° 26.81' E	200	T, S, P - probe 1
1942-1	5	CTD - underway	07:40	24° 52.91' S	11° 25.49' E	200	T, S, P - probe 1
1942-1	5	CTD - underway	07:55	24° 54.43' S	11° 23.32' E	200	T, S, P - probe 1
1942-1	5	CTD - underway	08:10	24° 55.91' S	11° 21.10' E	200	T, S, P - probe 1
1943-1	5	CTD/rosette	09:00	24° 59.99' S	11° 14.97' E	1000	T, S, P, O2, FL, Currents
1944-1	5	Hand net	09:01	24° 59.99' S	11° 14.97' E	30 - 0	Foraminifera
1945-1	5	Multiple net	10:16	24° 59.99' S	11° 14.97' E	800 - 0	Vertical haul
1946-1	5	Multiple net	11:16	25° 0.08' S	11° 14.76' E	2400 - 0	Vertical haul
1947-1	5	CTD - underway	12:14	25° 3.49' S	11° 17.23' E	200	T, S, P - probe 2
1947-1	5	CTD - underway	12:27	25° 4.84' S	11° 18.28' E	200	T, S, P - probe 2
1947-1	5	CTD - underway	12:40	25° 6.12' S	11° 19.30' E	200	T, S, P - probe 2
1947-1	5	CTD - underway	12:57	25° 7.80' S	11° 20.59' E	200	T, S, P - probe 2
1947-1	5	CTD - underway	13:06	25° 8.68' S	11° 21.26' E	200	T, S, P - probe 2
1947-1	5	CTD - underway	13:20	25° 10.12' S	11° 22.34' E	200	T, S, P - probe 2
1948-1	5	CTD/rosette	14:15	25° 14.98' S	11° 25.98' E	1000	T, S, P, O2, FL, Currents
1949-1	5	Hand net	14:23	25° 14.98' S	11° 25.98' E	30 - 0	Foraminifera
1950-1	5	Multiple net	15:04	25° 14.99' S	11° 25.96' E	800 - 0	Vertical haul
1951-1	5	CTD - underway	16:11	25° 15.77' S	11° 26.56' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	16:24	25° 16.99' S	11° 27.46' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	16:37	25° 18.17' S	11° 28.33' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	16:49	25° 19.26' S	11° 29.12' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	17:04	25° 20.58' S	11° 30.09' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	17:15	25° 21.62' S	11° 30.86' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	17:28	25° 22.77' S	11° 31.70' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	17:41	25° 23.84' S	11° 32.48' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	17:52	25° 24.74' S	11° 33.14' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	18:05	25° 25.76' S	11° 33.89' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	18:20	25° 27.07' S	11° 34.85' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	18:34	25° 28.26' S	11° 35.72' E	200	T, S, P - probe 2
1951-1	5	CTD - underway	18:52	25° 29.76' S	11° 36.82' E	200	T, S, P
1951-1	5	CTD - underway	19:35	25° 33.13' S	11° 39.30' E	200	T, S, P - probe 1
1951-1	5	CTD - underway	19:46	25° 33.97' S	11° 39.91' E	200	T, S, P - probe 1
1951-1	5	CTD - underway	19:58	25° 34.88' S	11° 40.58' E	200	T, S, P - probe 1
1951-1	5	CTD - underway	20:09	25° 35.70' S	11° 41.18' E	200	T, S, P - probe 1
1951-1	5	CTD - underway	20:18	25° 36.34' S	11° 41.65' E	200	T, S, P - probe 1
1951-1	5	CTD - underway	20:27	25° 37.02' S	11° 42.15' E	200	T, S, P - probe 1

1951-1	5	CTD - underway	20:37	25° 37.74' S	11° 42.68' E	200	T, S, P – probe 1
1952-1	11	CTD - underway	04:34	34° 34.73' S	25° 1.68' E	105	T, S, P – probe 2
1952-1	11	CTD - underway	04:44	34° 34.34' S	25° 4.01' E	105	T, S, P – probe 2
1952-1	11	CTD - underway	04:53	34° 34.00' S	25° 6.11' E	105	T, S, P – probe 2
1952-1	11	CTD - underway	05:01	34° 33.69' S	25° 8.00' E	105	T, S, P – probe 2
1952-1	11	CTD - underway	05:10	34° 33.34' S	25° 10.16' E		Cast Cancelled
1952-1	11	CTD - underway	05:32	34° 32.50' S	25° 15.32' E	150	T, S, P – probe 2
1953-1	11	CTD/rosette	09:14	34° 25.19' S	25° 59.96' E	310	T, S, P, O2, FL
1954-1	11	Hand net	09:16	34° 25.20' S	25° 59.93' E	30 - 0	Foraminifera
1955-1	11	Bongo net	09:38	34° 25.23' S	25° 59.82' E	200 - 0	Double-oblique haul
1956-1	11	CTD/rosette	12:18	34° 32.75' S	26° 8.44' E	1655	T, S, P, O2, FL, Currents
1957-1	11	Hand net	12:19	34° 32.77' S	26° 8.37' E	30 - 0	Foraminifera
1958-1	11	Bongo net	13:48	34° 34.61' S	26° 3.70' E	7 - 0	Double-oblique haul
1958-1	11	Bongo net	14:06	34° 34.70' S	26° 1.81' E	7 - 0	Double-oblique haul
1959-1	11	CTD - underway	15:05	34° 37.10' S	26° 3.84' E	200	T, S, P – probe 1
1959-1	11	CTD - underway	15:20	34° 37.47' S	26° 6.18' E	200	T, S, P – probe 1
1959-1	11	CTD - underway	15:35	34° 37.86' S	26° 8.57' E	200	T, S, P – probe 1
1959-1	11	CTD - underway	15:44	34° 38.09' S	26° 10.02' E	200	T, S, P – probe 1
1959-1	11	CTD - underway	15:56	34° 38.40' S	26° 11.97' E	200	T, S, P – probe 1
1959-1	11	CTD - underway	16:10	34° 38.77' S	26° 14.29' E	200	T, S, P – probe 1
1959-1	11	CTD - underway	16:20	34° 39.04' S	26° 15.97' E	200	T, S, P – probe 1
1960-1	11	CTD/rosette	16:50	34° 39.54' S	26° 19.98' E	2480	T, S, P, O2, FL, Currents
1961-1	11	Hand net	16:50	34° 39.54' S	26° 19.98' E	30 - 0	Foraminifera
1962-1	11	Bongo net	18:28	34° 40.40' S	26° 18.04' E	200 - 0	Double-oblique haul
1963-1	11	CTD - underway	19:35	34° 42.30' S	26° 21.37' E	200	T, S, P
1963-1	11	CTD - underway	19:50	34° 43.63' S	26° 23.95' E	200	T, S, P
1963-1	11	CTD - underway	20:03	34° 44.82' S	26° 26.25' E	200	T, S, P
1964-1	11	CTD/rosette	20:32	34° 46.81' S	26° 30.01' E	2000	T, S, P, O2, FL, Currents
1965-1	11	CTD - underway	22:20	34° 50.97' S	26° 33.71' E	200	T, S, P – probe 1
1965-1	11	CTD - underway	22:31	34° 52.05' S	26° 35.53' E	200	T, S, P – probe 1
1965-1	11	CTD - underway	22:45	34° 53.46' S	26° 37.88' E	200	T, S, P – probe 1
1965-1	11	CTD - underway	23:00	34° 54.98' S	26° 40.41' E	200	T, S, P – probe 1
1965-1	11	CTD - underway	23:14	34° 56.40' S	26° 42.79' E	200	T, S, P – probe 1
1965-1	11	CTD - underway	23:26	34° 57.61' S	26° 44.82' E	200	T, S, P – probe 1
1966-1	12	CTD/rosette	00:12	35° 1.19' S	26° 50.03' E	2000	T, S, P, O2, FL, Currents
1967-1	12	CTD - underway	02:03	35° 4.20' S	26° 52.64' E	200	T, S, P-probe
1967-1	12	CTD - underway	02:11	35° 5.03' S	26° 53.99' E	200	T, S, P – probe 2
1967-1	12	CTD - underway	02:26	35° 6.61' S	26° 56.55' E	200	T, S, P – probe 2
1967-1	12	CTD - underway	02:37	35° 7.78' S	26° 58.43' E	200	T, S, P – probe 2
1967-1	12	CTD - underway	02:48	35° 8.93' S	27° 0.30' E	200	T, S, P – probe 2
1967-1	12	CTD - underway	02:59	35° 10.09' S	27° 2.16' E	200	T, S, P – probe 2
1967-1	12	CTD - underway	03:15	35° 11.80' S	27° 4.85' E	200	T, S, P – probe 2
1967-1	12	CTD - underway	03:27	35° 13.18' S	27° 6.68' E	200	T, S, P – probe 2
1968-1	12	CTD/rosette	03:55	35° 15.59' S	27° 10.08' E	2000	T, S, P, O2, FL, Currents
1969-1	13	CTD/rosette	17:52	32° 57.30' S	33° 55.34' E	200	T, S, P, O2, FL, Currents

1970-1	13	Hand net	17:54	32° 57.31' S	33° 55.35' E	30 - 0	Foraminifera
1971-1	13	Bongo net	18:11	32° 57.34' S	33° 55.33' E	200 - 0	Double-oblique haul
1972-1	15	CTD - underway	15:00	28° 43.76' S	42° 4.14' E	310	T, S, P – probe 2
1972-1	15	CTD - underway	15:14	28° 42.64' S	42° 6.61' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	15:33	28° 41.11' S	42° 9.98' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	16:17	28° 37.51' S	42° 17.90' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	16:41	28° 35.59' S	42° 22.11' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	17:04	28° 33.76' S	42° 26.13' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	17:24	28° 32.19' S	42° 29.59' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	17:43	28° 30.69' S	42° 32.89' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	18:04	28° 29.01' S	42° 36.56' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	18:42	28° 26.05' S	42° 43.08' E	410	T, S, P – probe 1
1972-1	15	CTD - underway	19:00	28° 24.67' S	42° 46.10' E	410	T, S, P – probe 1
1972-1	15	CTD - underway	19:19	28° 23.23' S	42° 49.26' E	410	T, S, P – probe 1
1972-1	15	CTD - underway	19:38	28° 21.80' S	42° 52.39' E	410	T, S, P – probe 1
1972-1	15	CTD - underway	19:57	28° 20.37' S	42° 55.54' E	410	T, S, P – probe 1
1972-1	15	CTD - underway	20:14	28° 19.09' S	42° 58.33' E	410	T, S, P – probe 1
1972-1	15	CTD - underway	20:32	28° 17.75' S	43° 1.27' E	410	T, S, P – probe 1
1972-1	15	CTD - underway	20:55	28° 16.03' S	43° 5.04' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	21:16	28° 14.49' S	43° 8.42' E		Cast stopped early
1972-1	15	CTD - underway	21:37	28° 12.97' S	43° 11.74' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	21:56	28° 11.59' S	43° 14.76' E	410	T, S, P – probe 2
1972-1	15	CTD - underway	22:52	28° 7.48' S	43° 23.77' E	410	T, S, P – probe 1
1972-1	15	CTD - underway	23:17	28° 5.66' S	43° 27.74' E	410	T, S, P – probe 1
1972-1	15	CTD - underway	23:50	28° 3.30' S	43° 32.91' E	410	T, S, P – probe 1
1972-1	16	CTD - underway	00:10	28° 1.88' S	43° 36.00' E	410	T, S, P – probe 1
1972-1	16	CTD - underway	01:09	27° 57.81' S	43° 44.91' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	01:28	27° 56.51' S	43° 47.75' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	01:45	27° 55.35' S	43° 50.27' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	02:07	27° 53.87' S	43° 53.50' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	02:24	27° 52.73' S	43° 56.01' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	02:41	27° 51.58' S	43° 58.51' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	03:00	27° 50.31' S	44° 1.27' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	03:19	27° 49.05' S	44° 4.02' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	03:39	27° 47.74' S	44° 6.88' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	03:58	27° 46.52' S	44° 9.55' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	04:16	27° 45.34' S	44° 12.13' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	04:39	27° 43.82' S	44° 15.43' E	410	T, S, P – probe 2
1972-1	16	CTD - underway	05:08	27° 41.90' S	44° 19.61' E	410	T, S, P – probe 1
1972-1	16	CTD - underway	05:25	27° 40.76' S	44° 22.10' E	410	T, S, P – probe 1
1972-1	16	CTD - underway	05:43	27° 39.56' S	44° 24.72' E	410	T, S, P – probe 1
1972-1	16	CTD - underway	06:01	27° 38.36' S	44° 27.33' E	410	T, S, P – probe 1
1973-1	16	CTD - underway	08:15	27° 29.53' S	44° 46.56' E	310	T, S, P – probe 1
1973-1	16	CTD - underway	08:28	27° 28.72' S	44° 48.32' E	310	T, S, P – probe 1
1973-1	16	CTD - underway	08:41	27° 27.88' S	44° 50.15' E	310	T, S, P – probe 1

1973-1	16	CTD - underway	08:53	27° 27.10' S	44° 51.84' E	310	T, S, P – probe 1
1973-1	16	CTD - underway	09:06	27° 26.23' S	44° 53.72' E	310	T, S, P – probe 1
1973-1	16	CTD - underway	09:35	27° 24.27' S	44° 57.99' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	09:49	27° 23.31' S	45° 0.08' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	10:03	27° 22.33' S	45° 2.21' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	10:16	27° 21.40' S	45° 4.22' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	10:29	27° 20.46' S	45° 6.26' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	10:49	27° 19.01' S	45° 9.43' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	11:11	27° 17.38' S	45° 12.96' E	310	T, S, P – probe 1
1973-1	16	CTD - underway	11:27	27° 16.17' S	45° 15.59' E	310	T, S, P – probe 1
1973-1	16	CTD - underway	11:41	27° 15.05' S	45° 18.01' E	310	T, S, P – probe 1
1973-1	16	CTD - underway	11:55	27° 13.94' S	45° 20.42' E	310	T, S, P – probe 1
1973-1	16	CTD - underway	12:15	27° 12.34' S	45° 23.91' E	310	T, S, P – probe 1
1973-1	16	CTD - underway	12:41	27° 10.34' S	45° 28.40' E	310	T, S, P (?)
1973-1	16	CTD - underway	12:55	27° 9.28' S	45° 30.84' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	13:04	27° 8.61' S	45° 32.41' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	13:23	27° 7.18' S	45° 35.71' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	13:37	27° 6.13' S	45° 38.13' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	13:50	27° 5.18' S	45° 40.34' E	310	T,S,P, Stopwatch error
1973-1	16	CTD - underway	14:03	27° 4.24' S	45° 42.51' E	335	T, S, P – probe 2
1973-1	16	CTD - underway	14:18	27° 3.14' S	45° 45.06' E	360	T, S, P – probe 2
1973-1	16	CTD - underway	14:32	27° 2.12' S	45° 47.42' E	310	T, S, P – probe 2
1973-1	16	CTD - underway	14:47	27° 1.04' S	45° 49.90' E	310	T, S, P – probe 2
1974-1	18	CTD/rosette	00:00	22° 59.86' S	47° 57.80' E	200	T, S, P, O2, FL, Currents
1975-1	18	Hand net	00:10	22° 59.88' S	47° 57.78' E	30 - 0	Foraminifera
1976-1	18	Bongo net	00:24	22° 59.93' S	47° 57.75' E	200 - 0	Double-oblique haul
1977-1	18	CTD/rosette	04:22	22° 43.04' S	48° 7.97' E	1530	T, S, P, O2, FL, Currents
1978-1	18	Hand net	04:28	22° 43.17' S	48° 7.90' E	30 - 0	Foraminifera
1979-1	18	Bongo net	05:26	22° 43.96' S	48° 7.44' E	200 - 0	Double-oblique haul
1980-1	18	CTD - underway	06:24	22° 44.64' S	48° 7.29' E	310	T, S, P – probe 2
1980-1	18	CTD - underway	06:41	22° 44.87' S	48° 10.20' E	310	T, S, P – probe 2
1980-1	18	CTD - underway	06:52	22° 45.00' S	48° 12.18' E	310	T, S, P – probe 2
1980-1	18	CTD - underway	07:05	22° 45.14' S	48° 14.49' E	310	T, S, P – probe 2
1981-1	18	CTD/rosette	07:35	22° 45.47' S	48° 18.43' E	2900	T, S, P, O2, FL, Currents
1982-1	18	CTD - underway	09:29	22° 46.18' S	48° 19.91' E	410	T, S, P – probe 2
1982-1	18	CTD - underway	09:44	22° 46.77' S	48° 22.53' E	410	T, S, P – probe 2
1982-1	18	CTD - underway	10:04	22° 47.50' S	48° 25.96' E	410	T, S, P – probe 2
1983-1	18	CTD/rosette	10:35	22° 47.83' S	48° 28.77' E	2000	T, S, P, O2, FL, Currents
1984-1	18	Bongo net	11:58	22° 47.71' S	48° 28.95' E	150 - 0	Double-oblique haul
1985-1	18	CTD - underway	12:36	22° 47.85' S	48° 30.76' E	410	T, S, P – probe 2
1985-1	18	CTD - underway	12:54	22° 48.88' S	48° 33.77' E	410	Record not clear
1986-1	18	CTD/rosette	13:46	22° 50.20' S	48° 39.19' E	2000	T, S, P, O2, FL, Currents
1987-1	18	CTD/rosette	16:08	22° 52.59' S	48° 49.58' E	2000	T, S, P, O2, FL, Currents
1988-1	18	CTD/rosette	18:36	22° 55.02' S	48° 59.99' E	2000	T, S, P, O2, FL, Currents
1989-1	18	CTD/rosette	20:56	22° 58.03' S	49° 9.96' E	2000	T, S, P, O2, FL, Currents

