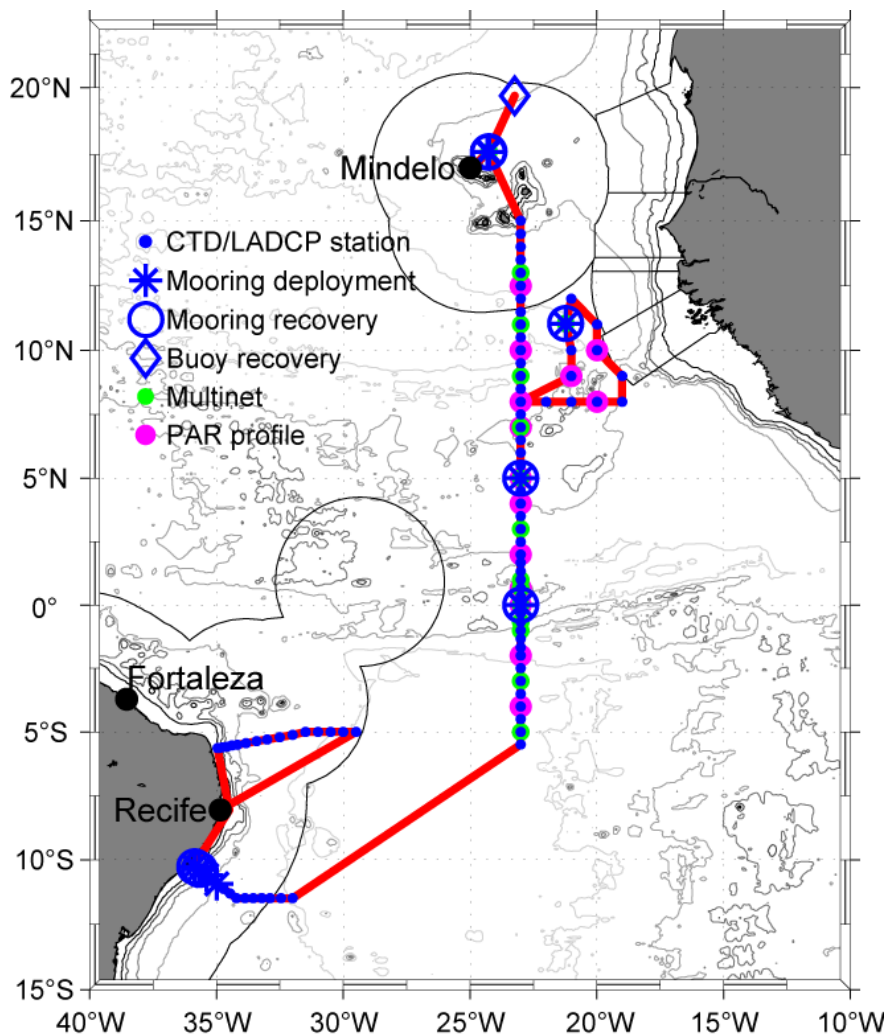


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Short Cruise Report
R/V METEOR M130
Mindelo, Cape Verde – Recife, Brasil
29th August – 3rd October 2016
Chief Scientist: Dr. Marcus Dengler
Captain: Jan F. Schubert



Figs. 1: Bathymetric map with cruise track of R/V METEOR cruise M130 (red solid line) including locations of CTD/LADCP stations, mooring recoveries and redeployments, multinet and photosynthetically active radiation (PAR) profile stations. Territorial waters of different countries are marked with thin black solid lines.

Objectives

A physical - biogeochemical survey was carried out in the north eastern tropical Atlantic and in the western tropical South Atlantic. The measurement program was an integral component of the DFG Collaborative Research Center (SFB) 754 and the BMBF-joint project "Regional Atlantic Circulation and Global Change" (RACE II). The main objective for the works in the oxygen minimum zone (OMZ) of the eastern tropical North Atlantic (ETNA) is to improve oxygen budget estimates. This includes determining oxygen supply by mean advection, diapycnal and lateral eddy fluxes, and quantifying oxygen consumption. Other objectives were investigating the role of zooplankton and its vertical migration for fluxes of particulate and dissolved matter to the OMZ and advancing quantitative understanding of nitrogen fixation in the tropical Atlantic. Main objectives of the measurements program in the region of the western tropical south Atlantic were to investigate the variability of transport and water mass properties of the western boundary circulation as part of the deep and shallow meridional overturning.

A major component of the work program was the recovery of 9 and the redeployment of 8 moorings collecting velocity, oxygen, temperature, and salinity time series. The measurement program included temperature-salinity-depth and oxygen profiles (CTD/O₂), lowered acoustic Doppler current profiles (LADCP), underwater vision profiles (UVP), shipboard velocity profiles, multinet casts, and photosynthetically active radiation profiles. Water samples were analyzed for numerous variables including salinity, oxygen concentrations, tracer concentrations (CFC-12, SF₆), nutrients in micro and nano range, and halocarbons. Additionally, filtered samples were taken for NanoSIMS, flow cytometry, dissolved organic phosphorus, DNA/RNA, particulate organic matter, particulate organic nitrogen, and chlorophyll *a*. Samples of Heme content and dissolved iron were taken from a towed trace metal clean fish. Furthermore, incubations to quantify nitrogen fixation and primary productivity were performed.

Narrative

Due to a late arrival of a one of our container carrying dangerous goods in Mindelo, São Vicente, Cape Verde, the departure of R/V METEOR was delayed by one day. Customs cleared the delayed container in the morning of August 29th and we were able to leave port at 11:00 local time (12:00 UTC). The working program started 6 hours later with a successful recovery of a mooring at the Cape Verde ocean observatory (CVOO) site 50 nautical miles (nm) northwest of São Vicente. During the night, a full-depth profile with the conductivity-temperature-depth-oxygen (CTD/O₂) rosette system was measured and plankton samples with a multinet were collected. The main CVOO mooring was successfully recovered in the early morning of August 30th. After additional CTD, multinet and microstructure stations and trace metal clean water sampling using a towed fish, R/V METEOR left the CVOO site for an emergency recovery of a drifting buoy about 150 nm to the northeast. The buoy was originally deployed off Cape Blanc just outside the EEZ of Mauritania and had broken loose a month before our cruise. It weight 2.3 tons and had a diameter of 3 meters and was equipped with a dust collector for investigating Saharan dust deposition and meteorological sensors. The rescue of the buoy, owned by the Royal Netherlands Institute of Sea Research (NIOZ), was coordinated jointly with the DFG Senatskommission für Ozeanographie, the Leitstelle Deutsche Forschungsschiffe and the National Marine Faculty at NIOZ. Prior to the recovery, it was agreed that NIOZ will refund the dedicated ship time within the OFEG barter ship-time frame work. Thanks to the professionalism of METEOR's crew, the recovery of the buoy was completed within a few hours, minimizing the loss of ship time for our cruise. The vessel returned to the CVOO cite on Sep. 1st at 4:00 UTC to redeploy the CVOO mooring and to

collect additional water samples with the CTD rosette system and the towed fish. The CVOO related activities were completed 13h later at 17:00 UTC.

CTD/O₂ section work along 23°W started at 15°N on September 2nd, 10:00 UTC and ended at 5.5°S on September 19th, 10:30 UTC. CTD/O₂ profiles were collected to a depth of 1200m between 15°N and 5.5°N and to full ocean depth between 5°N and 5.5°S. In addition to the CTD/O₂ sensors and the attached underwater vision system, a chlorophyll sensor, turbidity sensor and an optical nitrate sensor was attached to the rosette frame. The latter could only be used during casts less than 2000 m deep. Additionally, an upward and a down-looking acoustic Doppler current profiler (LADCP) were attached to the rosette to measure full depth velocity profiles. Apart from CTD profiles, spectroradiometer profiles were collected every mid-day to infer the distribution of photosynthetically active radiation in the upper 100 m of the water column, multinet casts were performed to a depth of 1000m at several positions along the transect for the sampling of zooplankton and microstructure profiles of velocity shear and temperature were collected to infer mixing levels and to determine diapycnal oxygen and nutrient fluxes. Water sampling focussed on resolving the vertical spreading of an artificial tracer that was released in the center of the oxygen minimum zone at 11°N, 21°S in December 2012 and on the upper water column to obtain information about nitrogen fixation. Additionally, two shipboard ADCPs with a frequency of 38 kHz and 75 kHz were continuously sampling horizontal velocities in the upper 600 and 1000 m, respectively, and two thermosalinographs were measuring near-surface temperature and salinity. All systems worked well throughout the cruise. However, in the morning of September 11th contact to the tethered microstructure profiler was lost while the profiler was descending during a microstructure station (MSS) at 6°S, 23°W. When we attempted to recover the profiler using the winch, the microstructure cable broke and the profiler (serial number 32) was lost. The most likely explanation for the broken cable is that it was damaged by the bite of a fish. Microstructure measurements performed later during the cruise were done with a spare profiler (serial number 26) that had an identical sensor setup.

In the afternoon of September 5th, the 23°W transect was discontinued to conduct a survey focussing on determining the variability of the artificial tracer concentrations in the region between 8°N and 11.5°N, 19°W and 23°W. Water samples were taken at stations where tracer concentrations had been determined during the previous R/V METEOR cruises M97, M105 and M116. During the survey, a mooring at 11°N, 21°13'W was recovered and redeployed in the morning and evening of September 8th, respectively. This position approximately marks the centre of the oxygen minimum zone of the tropical Atlantic. The mooring was equipped with velocity, temperature, salinity and oxygen sensors. The tracer survey was completed in the morning of September 10th.

In the morning of September 11th, a mooring at 23°W, 5°N was recovered. The mooring's instrumentation was identical to the those deployed at the 11°N mooring. Similar to the 11°N mooring, all sensors had worked well, but some of the oxygen loggers had stopped data recording early - a few weeks or months after mooring deployment in 2015. This error was due to a falsely adjusted operational mode of the recording units that caused elevated power consumption. R/V Meteor reached the equator just after midnight on September 15th. In the morning of that day, the equatorial mooring was successfully recovered and redeployed in the afternoon. Again, all sensors had worked well and we were particularly happy to have retrieved complete velocity, temperature, oxygen and salinity time series from a moored profiler that climbed the mooring wire between 1000m and 2500m depth.

After finalizing the 23°W section in the morning of September 19th, R/V METEOR headed southwest towards the western boundary off Brazil. During the two-day transit a crossing-the-line ceremony and the "Bergfest" provided a welcomed change. The work program along the

11°S section started at 11.5°S, 32°W in the evening of September 21st. During the 11°S section work, 4 moorings were recovered and redeployed and the data of two pressure inverted echo sounders were read-out using acoustic modems. All mooring operations went well and we were very happy about the returned data - 37 of the 38 instruments mounted to the moorings recorded full data sets. Additionally, 20 full-depth CTD/O₂ profiles were collected along the 11°S section. The last CTD/O₂ station along 11°S was completed shortly after midnight of September 27th. The final CTD/O₂ section along 5°S was started in the morning of September 28th and completed in the late afternoon of October 1st. A total of 19 full depth CTD/O₂ stations were collected at 5°S. R/V Meteor arrived as scheduled in Recife at 6:00 in the morning of October 3rd.

Acknowledgements

We are grateful to Capitan Schubert und his crew for the excellent collaboration and the pleasant working atmosphere during the cruise. The crew of FS METEOR greatly contributed to the success of the cruise. The ship time of METEOR was provided by the German Science Foundation (DFG) within the core program METEOR/MERIAN. Financial support was provided by the German Science Foundation (DFG) as part of the SFB754 (Climate Biogeochemistry Interactions in the Tropical Ocean) and by the German Federal Ministry of Education and Research (BMBF) as part of the cooperative project “Regional Atlantic Circulation and Global Change” (RACE II, 03F0729D).

M130 Participants

No.	Name	Function	Institution
1	Dengler, Marcus, Dr.	Chief scientist	GEOMAR
2	Al Balushi, Hajar	CTD/MSS watch, LADCP	GEOMAR
3	Bruto, Leonardo, Dr.	Moorings, CTD/MSS watch	UFPE
4	Burmeister, Kristin	Mooring processing, ADCP, CTD/MSS watch	GEOMAR
5	Caricchio Espinheira, Camilla	Observer	Brazil
6	Dürschlag, Julia	N ₂ -fixation, incubation, CARD fish	MPI Bremen
7	Faustmann, Jannik	UVP, Multinet	GEOMAR
8	Fernandez Carrera, Ana, Dr.	N ₂ -filtration, incubation	GATECH
9	Gutekunst, Sören Dr.	Tracer, CFC-12, SF ₆	GEOMAR
10	Hahn, Johannes, Dr.	Optodes, Mooring processing CTD/MSS watch	GEOMAR
11	Hauschildt, Jaard	CTD/MSS watch, moored profiler	GEOMAR
12	Hemmen, Joost	CTD/MSS watch, aerosol	GEOMAR
13	Ivanciu, Ioana	CTD/MSS watch, Optodes	GEOMAR
14	Kiko, Rainer Dr.	Underwater Vision Profiler, multinet, driftnet	GEOMAR
15	Kloewer, Milan	CTD/MSS watch, Aerosols	GEOMAR
16	Krahmann, Gerd, Dr.	CTD and LADCP processing	GEOMAR
17	Kriest, Iris, Dr.	Multinet, nutrients	GEOMAR
18	Li, Pingyang	Tracer, CFC-12, SF ₆	GEOMAR
19	Link, Rudolf	CTD technical, MicroCATs,	GEOMAR
20	Louropoulou, Evangelia	Heme, nutrients	GEOMAR
21	Maas, Josefine	Oxygen titration, CHBr ₃	GEOMAR
22	Niehus, Gerd	Moorings, releaser	GEOMAR
23	Papenburg, Uwe	Moorings, current meters, ADCPs	GEOMAR
24	Patey, Matt, Dr.	Nano-nutrients, ammonium, Fe	GEOMAR
25	Philippi, Miriam	N ₂ -fixation, incubation, CARD fish	MPI Bremen
26	Rohleder, Christian	Meteorology	DWD
27	Stöven, Tim, Dr.	Tracer, CFC-12, SF ₆	GEOMAR
28	Subramaniam, Ajit, Dr.	Biooptics, phytoplankton, incubation, N ₂ -fixation	LDEO
29	Wagner, Partick	CTD/MSS watch, microCATs	GEOMAR
30	Witt, Rene	Optodes, Moorings, CTD/MSS	GEOMAR

GEOMAR GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel, Düsternbrooker Weg 20, 24105 Kiel, Germany, <http://www.geomar.de>

DWD Deutscher Wetterdienst, Seeschiffahrtsberatung, Bernhard-Nocht-Straße 76, 20359 Hamburg, Germany, <http://www.dwd.de>

LDEO Lamont Doherty Earth Observatory at Columbia University, 61 Rt 9W Palisades, New York 10964, USA, <http://www.ldeo.columbia.edu/>

MPI Bremen Max-Planck Institute for Marine Microbiology, Celsiusstrasse 1, 28359 Bremen, Germany, <http://www.mpi-bremen.de>

UFPE Universidade Federal de Pernambuco, Av. Arquitetura, s/n, 50740-550 - Cidade Universitária, Recife, Brasil, <http://www.ufpe.br/docean/index.php>

UVIGO Grupo Oceanografía Biológica, Universidade de Vigo, Campus As Lagoas-Marcosende, 36310 Vigo, Spain, <http://gobio.webs.uvigo.es>

M130 station list

Station METEOR / Gear	Date and Time UTC	Latitude [°]	Longitude [°]	Comments
931-1 KPO 1156	29.08. 18:25 - 21:20	17°36.27'N	024°18.82'W	Mooring recovery
932-1 FISH 1	29.08. 22:15 - 22:45	17°35.01'N	024°17.26'W	Towed-Fish deployment
933-1 CTD 1	29.08. 22:45 - 30.08. 02:40	17°34.93'N	024°17.01'W	CTD station (3573m/bottom)
934-1 MSN 1	30.08. 02:50 - 03:35	17°34.95'N	024°17.02'W	Multinet (1050m)
935-1 CTD 2	30.08. 04:00 - 07:00	17°34.93'N	024°17.02'W	CTD station (3573m/bottom)
936-1 KPO 1143	30.08. 07:10 - 12:50	17°36.40'N	024°14.98'W	Mooring recovery (CVOO)
937-1 MSN 2	30.08. 13:25 - 14:10	17°34.97'N	024°17.05'W	Multinet (1050m)
938-1 FISH 2	30.08. 14:30 - 31.08. 10:30	17°35.01'N	024°17.26'W	Towed-Fish deployment
939-1 CTD 3	30.08. 15:30 - 17:00	17°34.97'N	024°17.04'W	CTD station (1200m)
940-1 MSS 1	30.08. 17:16 - 18:00	17°35.24'N	024°16.89'W	MSS station (200m)
941-1 CTD 4	30.08. 19:10 - 19:30	17°42.15'N	024°12.81'W	CTD station (200m), incubation
942-1 Buoy	31.08. 10:40 - 15:20	19°42.73'N	023°11.00'W	Buoy recovery (Dutch dust buoy)
943-1 FISH 3	31.08. 15:30 - 01.09. 09:20	17°35.01'N	024°17.26'W	Towed-Fish deployment
944-1 CTD 5	01.09. 04:20 - 05:44	17°35.01'N	024°17.01'W	CTD station (1000m)
945-1 CTD 6	01.09. 06:36 - 09:10	17°35.00'N	024°17.02'W	CTD station (3591m/bottom)
946-1 KPO 1179	01.09. 10:30 - 15:10	17°36.394'N	024°14.980'W	Mooring deployment (CVOO)
947-1 CTD 7	01.09. 16:10 - 17: 10	17°34.87'N	024°17.05'W	CTD station (1200m/bottom)
948-1 FISH 4	01.09. 17:40 - 03.09. 22:00	17°35.01'N	024°17.26'W	Towed-Fish deployment
949-1 CTD 8	02.09. 09:55 - 10:45	15°00.02'N	023°00.00'W	CTD station (1200m)
950-1 MSS 2	02.09. 10:45 - 11:30	15°00.05'N	023°59.90'W	MSS station (200m)
951-1 SR 1	02.09. 15:00 - 15:15	14°29.93°N	022°29.94'W	Spectroradiometer station
952-1 CTD 9	02.09. 15:30 - 16:30	14°29.92°N	022°29.94'W	CTD station (1200m)
953-1 MSS 3	02.09. 16:30 - 17:15	14°29.99°N	023°00.00'W	MSS station (200m)
954-1 WP2 1	02.09. 20:30 - 21:05	14°00.01°N	023°00.00'W	WP2 net
955-1 CTD 10	02.09. 20:45 - 21:30	14°00.01°N	023°00.00'W	CTD station (1200m)
956-1 MSS 4	02.09. 21:45 - 22:30	13°59.96°N	023°00.00'W	MSS station (200m)
957-1 CTD 11	03.09. 01:30 - 02:30	13°30.02°N	023°00.00'W	CTD station (1200m)
958-1 MSN 3	03.09. 05:30 - 06:15	13°00.00'N	023°00.01'W	Multinet (1050m)
959-1 CTD 12	03.09. 06:30 - 07:30	13°00.20°N	023°00.00'W	CTD station (1200m)
960-1 MSS 5	03.09. 07:45 - 08:15	13°00.00°N	023°00.00'W	MSS station (200m)
961-1 CTD 13	03.09. 08:45 - 09:00	13°00.00°N	023°00.00'W	CTD station (200m)
962-1 CTD 14	03.09. 12:30 - 13:30	12°30.00°N	023°00.00'W	CTD station (1200m)
963-1 WP2 2	03.09. 12:45 - 13:15	12°30.00°N	023°00.00'W	WP2 net
964-1 SR 2	03.09. 13:30 - 14:00	12°30.00°N	023°00.00'W	Spectroradiometer station
965-1 MSS 6	03.09. 14:00 - 14:45	12°30.00°N	023°00.00'W	MSS station (200m)
966-1 CTD 15	03.09. 18:00 - 19:00	12°00.00°N	023°00.00'W	CTD station (1200m)
967-1 WP2 3	03.09. 18:05 - 18:55	12°00.00°N	023°00.00'W	WP2 net
968-1 FISH 5	03.09. 23:15 - 08.09. 11:15	11°28.00'N	023°00.00'W	Towed-Fish deployment
969-1 CTD 16	03.09. 23:30 - 00:30	11°27.80°N	022°59.30'W	CTD station (1200m)
970-1 MSS 7	04.09. 00:30 - 01:15	11°27.50°N	022°59.00'W	MSS station (200m)
971-1 MSN 4	04.09. 04:00 - 04:30	11°00.00'N	023°00.00'W	Multinet (1050m)
972-1 CTD 17	04.09. 04:45 - 05:30	11°00.00°N	023°00.00'W	CTD station (1200m)
973-1 MSS 8	04.09. 05:45 - 06:20	11°00.00°N	023°00.00'W	MSS station (200m)
974-1 CTD 18	04.09. 09:30 - 10:30	10°30.00°N	023°00.00'W	CTD station (1200m)
975-1 SR 3	04.09. 13:30 - 14:00	10°00.00°N	023°00.00'W	Spectroradiometer station
976-1 CTD 19	04.09. 14:15 - 15:15	10°00.00°N	023°00.00'W	CTD station (1200m)
977-1 WP2 4	04.09. 14:20 - 15:10	10°00.00°N	023°00.00'W	WP2 net

978-1	CTD 20	04.09. 18:30 - 21:45	09°30.00°N	023°00.00'W	CTD station (4622m/bottom)
979-1	WP2 5	04.09. 19:40 - 20:20	09°30.00°N	023°00.00'W	WP2 net
980-1	MSS 9	04.09. 22:00 - 22:30	09°30.00°N	023°00.00'W	MSS station (200m)
981-1	CTD 21	04.09. 23:00 - 23:30	09°30.00°N	023°00.00'W	CTD station (600m)
982-1	MSN 5	05.09. 03:00 - 03:30	09°00.00'N	023°00.00'W	Multinet (1050m)
983-1	CTD 22	05.09. 03:45 - 04:30	09°00.00°N	023°00.00'W	CTD station (1200m)
984-1	MSS 10	05.09. 04:45 - 05:30	09°00.00°N	023°00.00'W	MSS station (200m)
985-1	CTD 23	05.09. 08:30 - 09:00	08°30.00°N	023°00.00'W	CTD station (200m)
986-1	MSS 11	05.09. 09:00 - 09:45	08°30.00°N	023°00.00'W	MSS station (200m)
987-1	CTD 24	05.09. 09:45 - 10:45	08°30.00°N	023°00.00'W	CTD station (1200m)
988-1	SR 4	05.09. 14:00 - 14:20	08°00.00°N	023°00.00'W	Spectroradiometer station
989-1	CTD 25	05.09. 14:30 - 15:20	08°00.00°N	023°00.00'W	CTD station (1200m)
990-1	WP2 6	05.09. 14:40 - 15:20	08°00.00°N	023°00.00'W	WP2 net
991-1	MSS 12	05.09. 15:30 - 16:10	08°00.00°N	023°00.00'W	MSS station (200m)
992-1	CTD 26	05.09. 22:15 - 23:15	08°00.00°N	022°00.00'W	CTD station (1200m)
993-1	WP2 7	05.09. 22:20 - 23:00	08°00.00°N	022°00.00'W	WP2 net
994-1	CTD 27	06.09. 05:10 - 06:10	08°00.00°N	020°58.50'W	CTD station (1200m)
995-1	CTD 28	06.09. 22:15 - 23:15	08°00.00°N	020°00.00'W	CTD station (600m)
996-1	WP2 8	06.09. 11:30 - 12:15	08°00.00°N	020°00.00'W	WP2 net
997-1	SR 5	06.09. 12:20 - 12:40	08°00.00°N	020°00.00'W	Spectroradiometer station
998-1	CTD 29	06.09. 18:00 - 18:45	08°00.00°N	019°00.00'W	CTD station (600m)
999-1	WP2 9	06.09. 18:10 - 18:40	08°00.00°N	019°00.00'W	WP2 net
1000-1	CTD 30	07.09. 00:30 - 01:15	09°00.00°N	019°00.00'W	CTD station (600m)
1001-1	CTD 31	07.09. 06:00 - 07:15	09°00.00°N	020°00.00'W	CTD station (1000m)
1002-1	CTD 32	07.09. 11:45 - 12:30	10°00.00°N	020°00.00'W	CTD station (600m)
1003-1	SR 6	07.09. 12:40 - 13:00	10°00.00°N	020°00.00'W	Spectroradiometer station
1004-1	CTD 33	07.09. 19:00 - 19:30	11°00.00°N	020°00.00'W	CTD station (600m)
1005-1	CTD 34	08.09. 04:00 - 05:00	12°00.00°N	021°00.00'W	CTD station (1200m)
1006-1	KPO 1142	08.09. 11:15 - 15:06	11°02.42°N	021°13.04'W	Mooring recovery
1007-1	WP2 10	08.09. 12:00 - 15:15	11°02.42°N	021°13.04'W	WP2 net
1008-1	MSN 6	08.09. 15:15 - 16:00	11°01.09'N	021°09.45'W	Multinet (1050m)
1009-1	KPO 1178	08.09. 17:00 - 21:02	11°02.224'N	021°13.277'W	Mooring deployment
1010-1	CTD 35	08.09. 21:40 - 23:00	11°01.80°N	021°12.50'W	CTD station (1200m)
1011-1	MSS 13	08.09. 23:10 - 23:50	11°00.00°N	021°11.60'W	MSS station (200m)
1012-1	MSN 7	09.09. 00:00 - 00:45	10°59.00'N	023°11.10'W	Multinet (1050m)
1013-1	CTD 36	09.09. 06:30 - 07:00	10°00.00°N	021°00.00'W	CTD station (1200m)
1014-1	CTD 37	09.09. 10:30 - 11:00	09°30.00°N	021°00.00'W	CTD station (200m)
1015-1	FISH 6	09.09. 11:00 - 11.09. 09:15	09°30.00'N	021°00.00'W	Towed-Fish deployment
1016-1	CTD 38	09.09. 14:15 - 15:30	09°00.00°N	021°00.00'W	CTD station (1200m)
1017-1	WP2 11	09.09. 14:15 - 15:15	09°00.00°N	021°00.00'W	WP2 net
1018-1	SR 7	09.09. 15:40 - 16:00	09°00.00°N	021°00.00'W	Spectroradiometer station
1019-1	CTD 39	10.09. 09:00 - 10:00	07°30.00°N	023°00.00'W	CTD station (1200m)
1020-1	CTD 40	10.09. 13:00 - 13:45	07°00.00°N	023°00.00'W	CTD station (1200m)
1021-1	WP2 12	10.09. 13:00 - 13:45	07°00.00°N	023°00.00'W	WP2 net
1022-1	MSS 14	10.09. 13:50 - 14:40	07°00.00°N	023°00.00'W	MSS station (200m)
1023-1	SR 8	10.09. 14:40 - 15:00	07°00.00°N	023°00.00'W	Spectroradiometer station
1024-1	MSN 8	10.09. 15:00 - 15:45	07°00.00°N	023°00.00'W	Multinet (1050m)
1025-1	WP2 11	10.09. 15:00 - 15:45	07°00.00°N	023°00.00'W	WP2 net
1026-1	CTD 41	10.09. 16:20 - 17:10	07°00.00°N	023°00.00'W	CTD station (1200m)
1027-1	CTD 42	10.09. 20:00 - 21:00	06°30.00°N	023°00.00'W	CTD station (1200m)
1028-1	MSS 15	10.09. 21:00 - 21:45	06°30.00°N	023°00.00'W	MSS station (200m)
1029-1	CTD 43	11.09. 00:45 - 01:30	06°00.00°N	023°00.00'W	CTD station (1200m)
1030-1	MSS 16	11.09. 01:30 - 01:45	06°00.00°N	023°00.00'W	MSS station (200m)
1031-1	CTD 44	11.09. 05:00 - 06:00	05°30.00°N	023°00.00'W	CTD station (1200m)
1032-1	KPO 1141	11.09. 09:10 - 12:20	05°01.35°N	023°00.00'W	Mooring recovery

1033-1	WP2 12	11.09. 10:30 - 12:30	05°01.06°N	023°00.00'W	WP2 net
1034-1	SR 9	11.09. 12:45 - 13:00	05°01.06°N	023°00.00'W	Spectroradiometer station
1035-1	MSN 9	11.09. 13:20 - 14:00	05°00.00°N	023°00.00'W	Multinet (1050m)
1036-1	WP2 13	11.09. 13:30 - 14:00	05°00.00°N	023°00.00'W	WP2 net
1037-1	CTD 45	11.09. 14:00 - 15:00	05°00.00°N	023°00.00'W	CTD station (1200m)
1038-1	KPO 1177	11.09. 16:04 - 19:27	05°01.005'N	022°59.997'W	Mooring deployment
1039-1	FISH 7	11.09. 19:30 - 12.09. 09:10	05°00.00°N	023°00.00'W	Towed-Fish deployment
1040-1	CTD 46	11.09. 20:00 - 22:30	05°00.00°N	023°00.00'W	CTD station (4197m/bottom)
1041-1	MSN 10	11.09. 22:30 - 23:15	05°00.00°N	023°00.00'W	Multinet (1050m)
1042-1	CTD 47	12.09. 03:00 - 05:20	04°30.00°N	023°00.00'W	CTD station (4100m/bottom)
1043-1	CTD 48	12.09. 03:00 - 05:20	04°02.70°N	023°00.00'W	CTD station (200m)
1044-1	SR 10	12.09. 13:05 - 13:20	04°00.00°N	023°00.00'W	Spectroradiometer station
1045-1	CTD 49	12.09. 13:25 - 16:00	04°00.00°N	023°00.00'W	CTD station (4198m/bottom)
1046-1	WP2 14	12.09. 13:30 - 13:50	04°00.00°N	023°00.00'W	WP2 net
1047-1	CTD 50	12.09. 19:20 - 22:00	03°30.00°N	023°00.00'W	CTD station (4370m/bottom)
1048-1	FISH 8	12.09. 22:00 - 15.09. 08:00	03°30.00°N	023°00.00'W	Towed-Fish deployment
1049-1	MSN 11	13.09. 01:00 - 01:45	03°00.00°N	023°00.00'W	Multinet (1050m)
1050-1	CTD 51	13.09. 02:00 - 04:40	03°00.00°N	023°00.00'W	CTD station (4620m/bottom)
1051-1	CTD 52	13.09. 08:00 - 10:45	02°30.00°N	023°00.00'W	CTD station (4690m/bottom)
1052-1	WP2 15	13.09. 08:15 - 10:30	02°30.00°N	023°00.00'W	WP2 net
1053-1	SR 11	13.09. 14:00 - 14:20	02°00.00°N	023°00.00'W	Spectroradiometer station
1054-1	CTD 53	13.09. 14:20 - 17:00	02°00.00°N	023°00.00'W	CTD station (4300m/bottom)
1055-1	CTD 54	13.09. 19:00 - 21:30	01°40.00°N	023°00.00'W	CTD station (4120m/bottom)
1056-1	CTD 55	14.09. 00:00 - 03:00	01°20.00°N	023°00.00'W	CTD station (4690m/bottom)
1057-1	MSN 12	14.09. 05:15 - 06:00	01°00.00°N	023°00.00'W	Multinet (1050m)
1058-1	CTD 56	14.09. 06:00 - 07:30	01°00.00°N	023°00.00'W	CTD station (1200m)
1059-1	CTD 57	14.09. 08:10 - 10:20	01°00.00°N	023°00.00'W	CTD station (3180m/bottom)
1060-1	CTD 58	14.09. 12:45 - 14:00	00°40.00°N	023°00.00'W	CTD station (1200m/bottom)
1061-1	WP2 16	14.09. 13:10 - 14:00	00°40.00°N	023°00.00'W	WP2 net
1062-1	SR 12	14.09. 14:15 - 14:30	00°40.00°N	023°00.00'W	Spectroradiometer station
1063-1	MSN 13	14.09. 14:40 - 15:20	00°40.00°N	023°00.00'W	Multinet (1050m)
1064-1	WP2 17	14.09. 14:45 - 15:15	00°40.00°N	023°00.00'W	WP2 net
1065-1	MSS 17	14.09. 15:30 - 16:10	00°40.00°N	023°00.00'W	MSS station (200m)
1066-1	CTD 59	14.09. 16:15 - 18:40	00°40.00°N	023°00.00'W	CTD station (3830m/bottom)
1067-1	WP2 18	14.09. 16:45 - 18:30	00°40.00°N	023°00.00'W	WP2 net
1068-1	CTD 60	14.09. 21:10 - 23:30	00°20.00°N	023°00.00'W	CTD station (3870m/bottom)
1069-1	CTD 61	15.09. 01:45 - 02:30	00°00.00°N	023°00.00'W	CTD station (1200m/bottom)
1070-1	MSN 14	15.09. 02:40 - 03:30	00°00.00°N	023°00.00'W	Multinet (1050m)
1071-1	MSS 18	15.09. 03:30 - 04:15	00°00.00°N	023°00.00'W	MSS station (200m)
1072-1	CTD 62	15.09. 04:50 - 07:10	00°00.00°N	023°00.00'W	CTD station (3860m/bottom)
1073-1	KPO 1140	15.09. 07:45 - 11:30	00°00.48°N	023°06.90'W	Mooring recovery
1074-1	WP2 19	15.09. 09:20 - 11:30	00°00.48°N	023°06.90'W	WP2 net
1075-1	MSN 14	15.09. 12:00 - 12:45	00°00.00°N	023°02.00'W	Multinet (1050m)
1076-1	SR 13	15.09. 12:45 - 13:15	00°00.00°N	023°02.00'W	Spectroradiometer station
1077-1	KPO 1176	15.09. 16:22 - 19:35	00°00.55°S	023°06.783'W	Mooring deployment
1078-1	CTD 63	15.09. 22:10 - 01:30	00°20.00°S	023°00.00'W	CTD station (4580m/bottom)
1079-1	FISH 9	15.09. 22:20 - 19.09. 09:00	00°20.00°S	023°00.00'W	Towed-Fish deployment
1080-1	CTD 64	16.09. 04:00 - 05:00	00°40.00°S	023°00.00'W	CTD station (1200m)
1081-1	MSN 15	16.09. 05:00 - 05:45	00°40.00°S	023°00.00'W	Multinet (1050m)
1082-1	MSS 19	16.09. 05:45 - 06:30	00°40.00°S	023°00.00'W	MSS station (200m)
1083-1	CTD 65	16.09. 06:45 - 09:00	00°40.00°S	023°00.00'W	CTD station (3550m/bottom)
1084-1	CTD 66	16.09. 11:45 - 14:15	01°00.00°S	023°00.00'W	CTD station (4080m/bottom)
1085-1	WP2 20	16.09. 11:50 - 15:3	01°00.00°S	023°00.00'W	WP2 net (4 casts)

1086-1	SR 14	16.09. 14:20 - 14:45	01°00.00°S	023°00.00'W	Spectroradiometer station
1087-1	MSN 16	16.09. 14:45 - 15:30	01°00.00°S	023°00.00'W	Multinet (1050m)
1088-1	MSS 20	16.09. 15:30 - 16:15	01°00.00°S	023°00.00'W	MSS station (200m)
1089-1	CTD 67	16.09. 16:15 - 17:45	01°00.00°S	023°00.00'W	CTD station (1200m)
1090-1	CTD 68	16.09. 20:15 - 23:00	01°20.00°S	023°00.00'W	CTD station (4780m/bottom)
1091-1	CTD 69	17.09. 01:30 - 04:30	01°40.00°S	023°00.00'W	CTD station (4900m/bottom)
1092-1	CTD 70	17.09. 06:45 - 09:45	02°00.00°S	023°00.00'W	CTD station (5200m/bottom)
1093-1	SR 15	17.09. 13:00 - 13:30	02°30.00°S	023°00.00'W	Spectroradiometer station
1094-1	CTD 71	17.09. 13:30 - 17:00	02°30.00°S	023°00.00'W	CTD station (5740m/bottom)
1095-1	WP2 21	17.09. 14:06 - 14:15	02°30.00°S	023°00.00'W	WP2 net
1096-1	CTD 72	17.09. 20:15 - 23:30	03°00.00°S	023°00.00'W	CTD station (5440m/bottom)
1097-1	MSN 17	17.09. 23:30 - 00:15	03°00.00°S	023°00.00'W	Multinet (1050m)
1098-1	CTD 73	18.09. 00:30 - 01:00	03°00.00°S	023°00.00'W	CTD station (200m)
1099-1	CTD 74	18.09. 06:15 - 07:15	03°30.00°S	023°00.00'W	CTD station (5400m/bottom)
1100-1	CTD 75	18.09. 10:45 - 14:15	04°00.00°S	023°00.00'W	CTD station (5810m/bottom)
1101-1	WP2 22	18.09. 11:30 - 13:45	04°00.00°S	023°00.00'W	WP2 net
1102-1	SR 16	18.09. 14:30 - 14:45	04°00.00°S	023°00.00'W	Spectroradiometer station
1103-1	CTD 76	18.09. 17:45 - 21:00	04°30.00°S	023°00.00'W	CTD station (5120m/bottom)
1104-1	CTD 77	19.09. 00:15 - 03:15	05°00.00°S	023°00.00'W	CTD station (5160m/bottom)
1105-1	MSN 18	19.09. 03:30 - 04:15	05°00.00°S	023°00.00'W	Multinet (1050m)
1106-1	CTD 78	19.09. 07:30 - 10:30	05°30.00°S	023°00.00'W	CTD station (5050m/bottom)
1107-1	FISH 10	19.09. 10:40 - 22.09. 03:00	05°30.00'S	023°00.00'W	Towed-Fish deployment
1108-1	CTD 79	21.09. 21:00 - 00:00	11°30.00°S	032°00.00'W	CTD station (5000m/bottom)
1109-1	CTD 80	22.09. 02:45 - 06:00	11°30.00°S	032°27.00'W	CTD station (4830m/bottom)
1110-1	CTD 81	22.09. 08:30 - 10:45	11°30.00°S	032°53.00'W	CTD station (3470m/bottom)
1111-1	CTD 82	22.09. 13:00 - 16:30	11°30.00°S	033°13.00'W	CTD station (4250m/bottom)
1112-1	CTD 83	22.09. 18:30 - 21:45	11°30.00°S	033°33.00'W	CTD station (4980m/bottom)
1113-1	CTD 84	22.09. 23:45 - 02:30	11°30.00°S	033°53.00'W	CTD station (4480m/bottom)
1114-1	CTD 85	23.09. 04:30 - 07:15	11°30.00°S	034°13.00'W	CTD station (4480m/bottom)
1115-1	KPO 1147	23.09. 12:35 - 15:08	10°56.32°S	034°58.81'W	Mooring recovery
1116-1	KPO 1146	23.09. 18:02 - 20:09	10°36.51°S	035°23.85'W	Mooring recovery
1117-1	FISH 11	23.09. 21:15 - 24.09. 16:45	10°40.11'S	035°18.90'W	Towed-Fish deployment
1118-1	CTD 86	24.09. 03:45 - 06:45	11°18.80°S	034°28.21'W	CTD station (4450m/bottom)
1119-1	CTD 87	24.09. 08:45 - 11:15	11°07.80°S	034°43.93'W	CTD station (4200m/bottom)
1120-1	CTD 88	24.09. 13:15 - 16:30	11°07.80°S	034°43.93'W	CTD station (4070m/bottom)
1121-1	KPO 1172	24.09. 18:02 - 20:47	10°56.411°S	034°59.600'W	Mooring deployment
1122-1	FISH 12	24.09. 21:00 - 25.09. 09:00	10°56.41°S	034°59.60'W	Towed-Fish deployment
1123-1	CTD 89	24.09. 22:00 - 00:30	10°51.40°S	035°05.66'W	CTD station (3980m/bottom)
1124-1	CTD 90	25.09. 01:30 - 04:00	10°46.40°S	035°11.60'W	CTD station (3850m/bottom)
1125-1	CTD 91	25.09. 05:00 - 07:30	10°41.40°S	035°17.60'W	CTD station (3660m/bottom)
1126-1	KPO 1171	25.09. 10:00 - 12:35	10°36.497°S	035°23.564'W	Mooring deployment
1127-1	KPO 1145	25.09. 15:00 - 17:00	10°22.81°S	035°41.05'W	Mooring recovery
1128-1	KPO 1144	25.09. 18:20 - 19:00	10°16.00°S	035°51.93'W	Mooring recovery
1129-1	FISH 13	25.09. 21:00 - 26.09. 08:00	10°16.16°S	035°51.91'W	Towed-Fish deployment
1130-1	CTD 92	25.09. 22:45 - 01:00	10°36.80°S	035°23.95'W	CTD station (3460m/bottom)
1131-1	CTD 93	26.09. 02:00 - 04:00	10°31.70°S	035°29.55'W	CTD station (3160m/bottom)
1132-1	CTD 94	26.09. 04:45 - 07:15	10°26.95°S	035°35.25'W	CTD station (2800m/bottom)
1133-1	CTD 95	26.09. 08:15 - 10:00	10°22.50°S	035°40.05'W	CTD station (2280m/bottom)
1134-1	KPO 1170	26.09. 10:58 - 13:04	10°22.793'S	35°40.784'W	Mooring deployment
1135-1	PIES 1	26.09. 14:45 - 16:45	10°13.63'S	35°52.25'W	PIES acoustic data readout
1136-1	PIES 2	26.09. 17:00 - 17:30	10°14.07'S	35°51.80'W	PIES acoustic data readout
1137-1	KPO 1169	26.09. 18:45 - 19:15	10°15.993'S	35°51.682'W	Mooring deployment

1138-1	FISH 14	26.09. 19:30 – 01.10. 13:30	10°16.16°S	035°51.91'W	Towed-Fish deployment
1139-1	CTD 96	26.09. 20:30 - 21:30	10°19.51°S	035°46.12'W	CTD station (1680m/bottom)
1140-1	CTD 97	26.09. 22:30 - 23:00	10°16.30°S	035°52.04'W	CTD station (800m/bottom)
1141-1	CTD 98	26.09. 23:30 - 00:00	10°15.32°S	035°52.63'W	CTD station (490m/bottom)
1142-1	CTD 99	27.09. 00:30 - 00:45	10°14.67°S	035°53.59'W	CTD station (210m/bottom)
1143-1	CTD 100	28.09. 06:00 - 06:30	05°38.88°S	034°57.56'W	CTD station (300m/bottom)
1144-1	CTD 101	28.09. 07:00 - 07:30	05°38.04°S	034°55.94'W	CTD station (680m/bottom)
1145-1	CTD 102	28.09. 08:15 - 09:30	05°37.35°S	034°54.01'W	CTD station (1560m/bottom)
1146-1	CTD 103	28.09. 10:30 - 12:30	05°35.53°S	034°46.04'W	CTD station (2650m/bottom)
1147-1	CTD 104	28.09. 14:00 - 16:00	05°34.74°S	034°36.04'W	CTD station (3360m/bottom)
1148-1	CTD 105	28.09. 18:15 - 21:00	05°32.65°S	034°24.05'W	CTD station (3700m/bottom)
1149-1	CTD 106	28.09. 23:00 - 01:45	05°30.19°S	034°10.04'W	CTD station (4080m/bottom)
1150-1	CTD 107	29.09. 04:00 - 06:45	05°26.58°S	033°50.05'W	CTD station (4290m/bottom)
1151-1	CTD 108	29.09. 09:30 - 12:15	05°21.71°S	033°25.01'W	CTD station (4440m/bottom)
1152-1	CTD 109	29.09. 15:00 - 19:00	05°17.71°S	033°00.03'W	CTD station (4460m/bottom)
1153-1	CTD 110	29.09. 19:45 - 22:30	05°17.69°S	033°00.01'W	CTD station (4480m/bottom)
1154-1	CTD 111	30.09. 02:45 - 04:30	05°12.34°S	032°30.10'W	CTD station (4480m/bottom)
1155-1	CTD 112	30.09. 08:00 - 10:30	05°07.00°S	032°00.03'W	CTD station (4480m/bottom)
1156-1	CTD 112	30.09. 14:15 - 15:15	05°00.02°S	031°30.01'W	CTD station (4480m/bottom)
1157-1	CTD 114	30.09. 16:00 - 19:00	05°00.00°S	031°30.00'W	CTD station (4480m/bottom)
1158-1	CTD 115	30.09. 22:30 - 01:00	05°00.00°S	031°00.07'W	CTD station (4480m/bottom)
1159-1	CTD 116	01.10. 04:45 - 07:15	05°00.00°S	030°30.02'W	CTD station (4320m/bottom)
1160-1	CTD 117	01.10. 10:45 - 13:30	05°00.00°S	030°00.04'W	CTD station (4480m/bottom)
1161-1	CTD 118	01.10. 17:00 - 19:45	05°00.00°S	029°30.01'W	CTD station (4480m/bottom)