

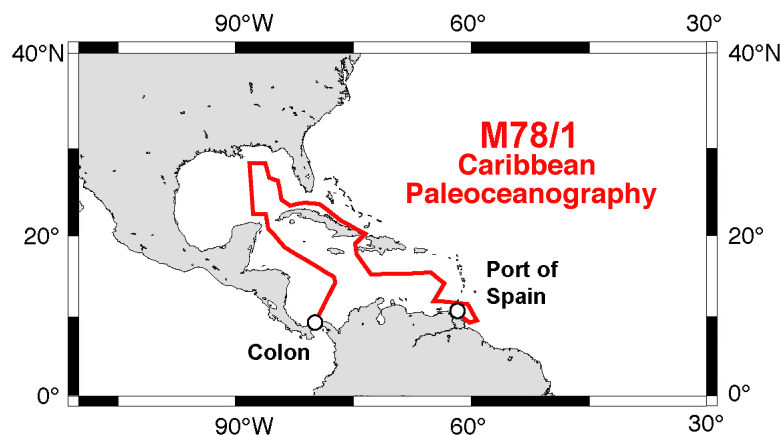
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Short Cruise Report

METEOR Cruise No. 78 Leg 1

Colon (Panama) - Port of Spain (Trinidad and Tobago)

22nd February – 28th March 2009



Surface and Intermediate Water hydrography, planktonic and benthic biota in the Caribbean Sea – Climate, Bio and Geosphere linkages (OPOKA)

Chief Scientist: Joachim Schönfeld

Captain: Niels Jakobi

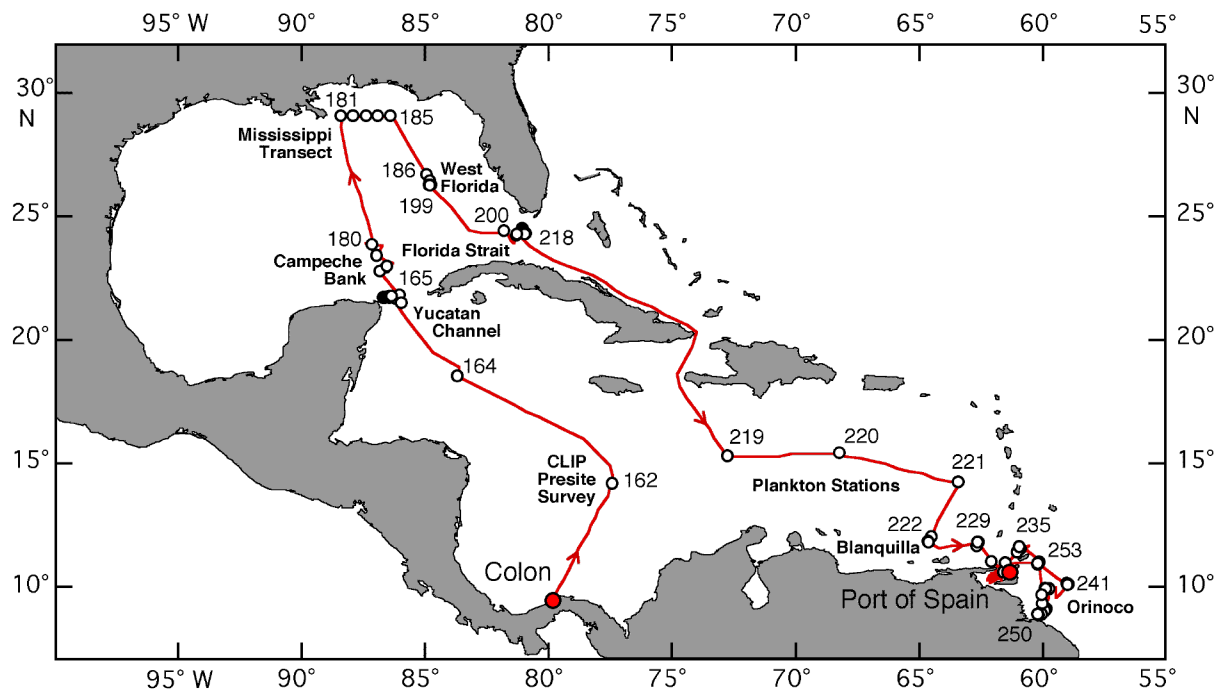


Fig. 1: Cruise track and stations of METEOR cruise M78/1. The station numbers refer to the first or last station in the respective working areas.

1. Objectives

The main scientific objective of R/V METEOR cruise M78/1 was to describe the linkage of the western Atlantic Warm Pool with changes of North Atlantic thermohaline circulation during the late Pleistocene and Holocene. In particular, the spatial-temporal dynamics of the Loop Current as link between the W-Atlantic warm pool in the central Caribbean and the Gulf Stream system had to be assessed. Emphasis was given to temperature and salinity preconditioning of Caribbean surface waters, the short-term dynamics of the Gulf Stream system, and its impact on benthic communities in Caribbean Sea straits. Sediment, water and plankton samples were collected in order to describe the recent and paleoceanographical impact of freshwater shedding from the main rivers into the Caribbean. Plankton tows and hydrographic measurements revealed the environmental conditions and physical fine structure of the surface ocean in the central Caribbean and close to the Orinoco mouth. These data and samples will largely improve the Mg/Ca and oxygen isotope calibration of planktonic foraminifers as palaeoproxies. The topography and internal structures of sedimentary drifts, deep-water mounds and lag sediments in Caribbean sea straits were surveyed with hydroacoustics. Benthic biota and sedimentary processes were documented with OFOS observations and surface sediment samples. The environmental factors in Caribbean sea straits were assessed and historical climate archives from the intermediate water were retrieved.

2. Narrative

The cruise M78/1 began early in the morning on the 19th of February with a long journey for the cruise participants from five cities in Europe, Venezuela and the USA. After spending a night in Panama City near the western entrance of the Panama Canal, we took a bus ride across the Panama land bridge, to arrive around noon on the 20th of February at the METEOR, berthed in Manzanillo International Terminal at Colon. Our containers were already on deck, and the airfreight had arrived completely. We used the one day prolonged harbour time for unpacking, moving of equipment into the laboratories, and installing our instruments.

On the 22nd of February at 14:00 local time, the METEOR set sail and headed for the Hess Escarpment at 14°N 77°W. We had strong headwinds and made only 5 to 7 knots. The first station (M78/1-162) was reached on the 24th of February at 11:30 with a delay of 43 hours. We first performed a CTD cast in order to obtain a sound velocity profile to calibrate the hydroacoustic systems, and a plankton tow with the multi closure net. Thereafter, we performed a hydroacoustic survey across the Hess Escarpment as presite survey for the Caribbean Large Igneous Provinces Project (CLIP; Kai Hörnle, IFM-GEOMAR), which was finished on 25th of February at 2:40.

On the 26th of February at 14:00, we arrived at Misteriosa Bank not far from the Cayman Islands and performed a Plankton Station with CTD hydrocasts, plankton tows, and the new KC-Denmark plankton pump. This device filtered up to 8 cubicmetres of water at a certain depth. The plankton sampling was accomplished by a surface sediment sample retrieved by a Reineck box core.

Then we headed to Yucatan Strait working area at 21°N 86°W where we arrived on the 27th of February at 16:00. Due to favourable winds, we were able to make more than 10 knots during transit and caught up about half of our delay. Our aim was to describe i) the hydrographic structure, ii) the influence of Yucatan currents on benthic communities and iii) characterize the sediment export from the Campeche Bank carbonate platform in this area. We concentrated on the western part of the sea strait and first explored the Mexican slope with hydroacoustics. Then we deployed the OFOS seafloor video observation system to search for deep-water corals. Operating the OFOS was very difficult because of strong currents, high suspension load and bad sight at depth. We initially planned a deployment of the new POZ-Lander deep-sea observatory close to a coral occurrence. As no corals were found, and winds and currents made it almost impossible to keep the METEOR at a fixed position, we abstained from a lander deployment here. An ADCP profile over the Yucatan Current was made, but below 400 m the backscatter was very weak because of the high particle load of the Yucatan Current. The sediment distribution at the Mexican margin was assessed with a transect of grab sampler and box core samples following a Parasound subbottom profiling line. Pure sands of shallow-water carbonate debris were encountered up to 370 m depth. On Sunday, 1st of March, a low-pressure system passed Yucatan Strait, which was followed by strong, cold northerly winds. We continued our hydroacoustic survey at the northeastern flank of Campeche Bank but ground-truthing of the recorded features by seabed sampling was impossible due

to the strong swell. Before departure to the North, we finally were able to retrieve a gravity core and multiple corer on Monday, 2nd of March at 14:00, when wind and waves calmed down. The cores recovered carbonate ooze with a distinct lightness variability.

On Wednesday, 4th of March 2009, we arrived at the Mississippi Transect on station M78/1-181. Here, we intended to assess the sedimentary record of eastward diminishing influence of Mississippi discharge to surface water hydrography. We successfully performed five sediment stations with multicorer and piston corer sampling, and two CTD casts. Mainly grey terrigenous muds were recovered.

On the 5th of March 2009, we arrived at 14:00 in the West Florida working area. We intended to re-core a location from where a prospective sedimentary record was reported, and to explore deep-water coral occurrences known from the literature. We first deployed a multiple corer and a gravity corer, both were successful. The bathymetry and subsurface characteristics around the coral occurrences were recorded with hydroacoustics on the 5th and 6th of March 2009, followed by an extensive OFOS survey which showed coral occurrences in places. We deployed the POZ-Lander observatory between two coral patches, and it was successfully recovered after 29 hours. A first review of the data showed that the sensors recorded indeed a tidal cycle. In the meantime, we performed plankton tows and a 13-hours CTD station. Unfortunately, the plankton pump failed due to a leakage in a deep-sea socket, which could not be repaired immediately. Furthermore, we verified the OFOS observations by grab and box core sampling in the vicinity of the POZ-Lander position. They recovered coarse sands with coral rubble that covered and a whitish claystone.

After a short transit, we arrived on the 8th of March at 11:40 in the southern Florida Straits. In this area, we intended to explore deep water coral occurrences that are reported in the literature and carry out hydrographic measurements near them. Our aim was to confirm whether deep-water corals are associated with specific density conditions of the surrounding seawater, as has been previously observed in the northeastern Atlantic. Furthermore, we intended to obtain sediment cores and surface sediment samples from the northern slope of the Florida Strait, which complement a sample series taken during the R/V SONNE cruise SO-164 in 2002. We commenced with an extended hydroacoustic survey on the northern slope of the Florida Strait in order to identify suitable locations for sediment coring, and to depict coral mounds on Pourtales Terrace, from where coral occurrences were reported. Surprisingly, the mapping did not show any mounds. We deployed the OFOS system and performed a track across a known colony of deep-water corals. Despite patchy settlements of octocorals and sponges, deep-water corals or even *Lophelia* colonies were not observed in the real time videos. They were identified later, when digital still photos were reviewed. The POZ-Lander was deployed close to the deep-water coral habitats. After 48 h of constant measurements, the lander was successfully retrieved. When recovering the lander, it drifted within the water column by 0.5 miles in 8 minutes within the Florida Current. The sensors recorded a clear tidal signal, both concerning pressure fluctuations and variations in salinity and temperature.

Simultaneously to the lander deployment, we carried out continuous hydrographic measurements with the CTD over 13 hours, took plankton samples with the multinet, and

sampled the sea floor with a grab and box corer. In particular, we extended the sample transect from 2002 to the north heading to Sombrero Key. Medium and coarse carbonate sands with abundant pteropod shells were recovered. We did not proceed into waters shallower than 200 m because we had to keep out the Florida Keys National Marine Sanctuary protected area. Close to the lander position, we retrieved a *Lophelia* fragment with the box grab, which verifies the occurrences of deep-water corals here. Our Parasound records from the northern slope of the southern Florida Straits revealed stratified drifts at depths between 450 and 800 m which overly each other. We retrieved two long piston cores and multicorer samples from the drift bodies at water depths of 530 and 730 m. The sediments were foraminiferal oozes and very soft, sponge-needle rich calcareous oozes, respectively.

We left the southern Florida Straits on the 11th of March at 15:30 heading for the southern Caribbean. After 77 hours transit along an impressive scene of northern Cuba and Windward Passage, we arrived at station M78/1-219 on the 14th of March. At this location, we resumed to work on a series of widely spaced Plankton Stations. At each station, we performed i) hauls with a multiclosing net, ii) hydrocasts with a CTD, iii) measured the pigment distribution with a fluorometer and iv) took water samples for phytoplankton investigations and for trace element and isotopic analyses. The Plankton Stations were preferentially placed at locations where a surface sediment sample was readily available from R/V SONNE cruise SO-164. We finished the Plankton Stations on the 19th of March at 10:30 at station M78/1-222 close to Isla de Blanquilla where we also took a box and gravity core, which recovered a succession of green clays and pale carbonate oozes. We boarded an observer from the Venezuelan Navy at Isla de Blanquilla on the same day. We took advantage of the opportunity at Blanquilla to deploy the rescue vessel METEORIT and examine the feasibility of shallow water deployments. In particular, we took sediment and water samples with a grab and niskin bottle, and performed hydrographic measurements with a hand-held CTD at depths of 4.5 to 40 m.

The regular station work was resumed with a hydroacoustic survey at the southern slope of the Grenada Basin off Venezuela on the 19th of March. We explored locations for sediment coring at mid depth with the Parasound in order to retrieve high-resolution records of intermediate water circulation. The Parasound records showed a steep and structured slope where sedimentary drifts filled small depressions, which were probably generated during erosional phases. Surface sediment sampling with multicorer and box corer was successful, but we retrieved only one piston core with soft, green mud and intercalated metre-thick beds of glauconitic shell sands with redeposited shelf foraminifera and *Lophelia* fragments. We ceased sampling in the Grenada Basin on the 20th of March at 21:00 and turned to the anchorage off Port-of-Spain in the Gulf of Paria, where we boarded two observers from Trinidad and Tobago on the 21st of March in the morning. After taking a short gravity core at the anchorage, we left the Gulf of Paria again heading northeast for the southern slope of Tobago Basin. We had a sediment core from the western side of this basin already, but expected higher sedimentation rates at the southern side due to the higher influx of riverine mud from the South American continent. We successfully retrieved multicorer and piston cores from two sites on wedge-shaped

sedimentary drifts at 200 and 840 m depth. Green clays and sandy clays were recovered. To the west of Trinidad at mid depth, we deployed the POZ Lander for the third time on the 23rd of March at station M78/1-238. We initially expected indications for deep-water coral occurrences here, but found only muddy grounds at 780 m depth. In addition, we performed a CTD hydrocast and multiple closure net deployment on this location. This was the last Plankton Station on this cruises and served as reference of the conditions in the Guyana Current before flowing into the Caribbean Sea. Then we turned south heading for the upper slope off the Orinoco delta. Again, we explored with an extensive hydroacoustic survey locations for sediment coring on channel-levee systems of the upper Orinoco Fan tributary at mid depth, and on wedge-shaped sedimentary drifts on the uppermost slope. Identifying a levee that was apparently suitable for a continuous high-resolution climate archive was not a simple task. Finally, we retrieved two gravity cores and two piston cores, each accompanied by a multicorer, from 280 to 1670 m water depth. Green muds and banded silts were recovered. These cores will facilitate a detailed description of the surface and intermediate circulation from the Guyana Current to Subtropical Underwater and Antarctic Intermediate Water dynamics in the geological past, and they will allow constraints of the land-ocean linkages in much more detail than it has been possible before.

We ceased sediment coring and approached the main tributary of the Orinoco, Boca Grande, on the 25th of March. We came as close as “Buoy 01” at the entrance of the shipping route into the Orinoco Delta. We sampled and described the fresh water lid with hydrocasts, CTD, niskin bottle and bucket water sampling, and we sampled the sea floor with multicorer, box corer, and Rumohr corer. Extremely soft , grey muds were encountered, and only a small Reineck box corer was proven suitable for sea floor sampling here. We also deployed the plankton pump below the fresh water lid. The high-voltage socket could be refurbished successfully, and the pump operated without problems.

Then we turned north again, retrieved two box cores on the way, which recovered green mud and glauconitic biogenous sand from the outer shelf, and successfully recovered the POZ-Lander off Trinidad on the 26th of March at 5:30 in the morning. We continued our way into the Gulf of Paria where we performed an extensive hydroacoustic survey up to the end of the cruise. On the basis of Parasound records, we identified a coring location in the western Gulf of Paria and took a gravity core there on the 27th of March in the morning. We continued with the hydroacoustic survey and disembarked the Venezuelan Navy observer off Güiria in the afternoon. While still recording Parasound, we used the 27th of March for disassembling our devices, stowing of our equipment and samples, and cleaning the laboratories. The ship reached the harbour of Port-of-Spain on the 28th of March in the morning. We finalised stowing of our containers after lunch, and the cruise ended with the disembarking of the scientists in the afternoon.

3. Participants METEOR 78 Leg 1, scientific party

Name	Expertise	Institution
1. Joachim Schönfeld	Chief Scientist	IFM-GEOMAR
2. Dirk Nürnberg	Palaeotemperatures	IFM-GEOMAR
3. Christian Dullo	Deep water mounds	IFM-GEOMAR
4. Sascha Flögel	CTD, POZ	IFM-GEOMAR
5. Andre Bahr	Sediment sampling	IFM-GEOMAR
6. Brian Haley	Water sampling	IFM-GEOMAR
7. Jutta Heinze	Technician geochemistry	IFM-GEOMAR
8. Asmus Petersen	Sampling gear	IFM-GEOMAR
9. Maik Lange	Sampling gear	IFM-GEOMAR
10. Bernhard Bannert	Electronics	IFM-GEOMAR
11. Thorsten Garlich	Chemical analyses	IFM-GEOMAR
12. Julia Langenbacher	Documentation	IFM-GEOMAR
13. Ralph Schneider	Biomarker	Uni. Kiel
14. Thomas Blanz	Sediment sampling	Uni. Kiel
15. Rosanna Darley	Sediment sampling	Uni. Kiel
16. Margret Bayer	Multinet operation	Uni. Tübingen
17. Anne-Sophie Bayer	Fluorometer operation	Uni. Tübingen
18. Jürgen Titschack	Box core sampling	Uni. Erlangen
19. Nina Joseph	Box core sampling	Uni. Erlangen
20. Christian Hübscher	Hydroacoustics	Uni. Hamburg
21. Pia Pulm	Hydroacoustics	Uni. Hamburg
22. Julie Richey	Sediment sampling	Uni. SFI
23. Christopher Beer	Planktonic foraminifera	NOCS
24. Gregorio Martinez	Scientific observer	IOV
25. Luis Troccoli	Scientific observer	Uni. Oriente
26. Sunil Ramnath	Observer	IMA
27. Aaron Mohammed	Observer	IMA
28. Henry Guaramato	Nautical observer	HNDV
29. Wolf-Thilo Ochsenhirt	Meteorology	DWD

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5. Station list

5.1 Sampling devices

Acronym	Device	Specifications
BC	Reineck box corer	Modified Reineck box corer, 25 x 25 cm, 30 cm maximum penetration, weight 200 kg
BG	Grab sampler	Hydrobios Van Veen grab, 35 x 35 cm, weight 70 kg
CTD	CTD	Seabird 911 with 24 x 10 l carousel water sampler, 6000 m depth range
FP	Fluorometer	Bbe Moldaenke FluoroProbe, distinguishes 4 algal groups, 150 m depth range
GC	Gravity corer	Hydrowerkstätten gravity corer, 12.5 cm inner diameter, maximum length 12 m, head weight 1.5 tons
GKG	Box corer	Modified USNEL box corer (Giant Box Corer), 50 x 50 cm, 50 cm maximum penetration, weight 800 kg
MB	Swathsonder	Kongsberg EM120, 12 to 100 kHz, 256 beams at an angle of 140°, survey width is 5.5 fold of the waterdepth
PS	Parasound	ATLAS Hydrographics, 18 to 39 kHz, focussing 2.5° to 5°, 10 to 10.000 m depth range, 20 m sediment penetration
MBG	Hand-held grab sampler	Hydrobios Van Veen grab, 16 x 16 cm, weight 10 kg
MGC	Pilot corer	Pilot corer as trigger weight for Marinetechnik piston corer, 9.0 cm inner diameter, maximum length 100 cm, head weight 200 kg
MIC	Rumohr corer	Rumohr corer, 5.5 cm inner diameter, maximum length 100 cm, head weight 20 kg
MSN	Multiclosure plankton net	Hydrobios Multinet Midi, 50 x 50 cm, 5 net bags at 100 micron mesh size, 3000 m maximum depth
MUC	Multicorer	Octopus multiple corer, 8 tubes of 10 cm diameter and 60 cm length, weight 600 kg
OFOS	OFOS	Compact unit, b/w video observation system, digital photography
PC	Piston corer	Marinetechnik advanced piston corer, 12.5 cm inner diameter, maximum length 20 m, head weight 2.5 tons
POZ	Deep-sea observatory	KUM POZ-lander, RBR memory CTD with high-precision pressure sensor, uplooking RD instruments ADCP
PP	Plankton pump	KC-Denmark, 20.8 m ³ per hour, 63 micron net bag, 300 m maximum depth
WSB	Water sampler	Bottle, 1.5 litres

Station list R.V. METEOR cruise M78/1

Station		Device	Location	Date	Start				at Depth				End						
No.	Leader				Coordinates			Time (UTC)	Coordinates			Time (UTC)	Coordinates			Time (UTC)	Coordinates		
					Latitude	Longitude	Depth (m)		Latitude	Longitude	Depth (m)		Latitude	Longitude	Depth (m)				
188-1	Hübscher	MB-PS	W-Florida Slope	06.03.2009	1:32	26° 12.67' N	84° 41.54' W	353											
189-1	Dullo, Flügel	OFOS	W-Florida Slope	06.03.2009	4:54	26° 10.52' N	84° 44.31' W	624	5:14	26° 10.77' N	84° 44.05' W	600	7:07	26° 12.50' N	84° 43.42' W	496			
189-2	Dullo, Flügel	OFOS	W-Florida Slope	06.03.2009	8:19	26° 18.73' N	84° 45.32' W	525	8:36	26° 18.84' N	84° 45.28' W	522	10:28	26° 20.13' N	84° 44.97' W	454			
190-1	Dullo, Flügel	OFOS	W-Florida Slope	06.03.2009	11:47	26° 12.19' N	84° 43.84' W	533					14:20	26° 12.19' N	84° 43.84' W	534			
190-2	Dullo, Flügel	POZ	W-Florida Slope	06.03.2009	13:25	26° 12.19' N	84° 43.84' W	536	14:02	26° 12.18' N	84° 43.84' W	531	14:21	26° 12.19' N	84° 43.84' W				
191-1	Bayer, Beer	MSN, FP	W-Florida Slope	06.03.2009	15:38	26° 12.51' N	84° 46.24' W	850	16:04	26° 12.51' N	84° 46.23' W	855	16:32	26° 12.52' N	84° 46.24' W	848			
191-2	Bayer, Beer	MSN	W-Florida Slope	06.03.2009	16:38	26° 12.52' N	84° 46.24' W	850	16:42	26° 12.51' N	84° 46.24' W	850	16:48	26° 12.52' N	84° 46.24' W	849			
191-3	Bayer, Beer	MSN	W-Florida Slope	06.03.2009	16:52	26° 12.52' N	84° 46.24' W	849	17:23	26° 12.52' N	84° 46.24' W	850	17:53	26° 12.52' N	84° 46.24' W	849			
191-4	Bayer, Beer	MSN	W-Florida Slope	06.03.2009	17:58	26° 12.51' N	84° 46.24' W	849	18:02	26° 12.51' N	84° 46.24' W	849	18:10	26° 12.52' N	84° 46.24' W	849			
191-5	Schönfeld	PP	W-Florida Slope	06.03.2009	18:35	26° 12.51' N	84° 46.24' W	849	18:36	26° 12.51' N	84° 46.24' W	849	19:31	26° 12.52' N	84° 46.24' W	850			
191-6	Schönfeld	BG	W-Florida Slope	06.03.2009	19:50	26° 12.51' N	84° 46.24' W	849	20:00	26° 12.52' N	84° 46.24' W	850	20:47	26° 12.52' N	84° 46.24' W	849			
192-1	Schönfeld	BG	Living Lophelia, point 1	06.03.2009	21:14	26° 11.82' N	84° 43.99' W	553	21:32	26° 11.80' N	84° 43.95' W	549	21:55	26° 11.80' N	84° 43.95' W	550			
192-2	Schönfeld	BG	Living Lophelia, point 2	06.03.2009	21:58	26° 11.80' N	84° 43.95' W	549	22:14	26° 11.80' N	84° 43.95' W	551	22:37	26° 11.80' N	84° 43.95' W	548			
192-3	Schönfeld	MGC	Living Lophelia, point 3	06.03.2009	22:54	26° 11.80' N	84° 43.95' W	549	23:10	26° 11.80' N	84° 43.95' W	549	23:25	26° 11.80' N	84° 43.95' W	553			
192-4	Petersen	MGC	Living Lophelia, point 4	06./07.03.2009	23:29	26° 11.80' N	84° 43.95' W	549	23:43	26° 11.80' N	84° 43.95' W	548	0:00	26° 11.80' N	84° 43.95' W	548			
193-1	Schönfeld	BG	Pebbles area	07.03.2009	0:08	26° 11.78' N	84° 43.97' W	549	0:24	26° 11.78' N	84° 43.97' W	549	0:42	26° 11.77' N	84° 43.97' W	548			
193-2	Schönfeld	BG	Pebbles area	07.03.2009	0:44	26° 11.77' N	84° 43.97' W	548	1:00	26° 11.77' N	84° 43.97' W	549	1:22	26° 11.77' N	84° 43.97' W	548			
194-1	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	1:52	26° 12.18' N	84° 43.88' W	538	2:14	26° 12.18' N	84° 43.88' W	538	2:30	26° 12.18' N	84° 43.88' W	539			
194-2	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	2:40	26° 12.19' N	84° 43.88' W	538	3:16	26° 12.19' N	84° 43.88' W	539	3:40	26° 12.18' N	84° 43.88' W	538			
194-3	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	4:14	26° 12.18' N	84° 43.88' W	538	4:34	26° 12.18' N	84° 43.88' W	538	4:54	26° 12.18' N	84° 43.88' W	538			
194-4	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	5:03	26° 12.19' N	84° 43.88' W	538	5:27	26° 12.18' N	84° 43.88' W	538	5:51	26° 12.18' N	84° 43.88' W	538			
194-5	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	6:06	26° 12.18' N	84° 43.88' W	538	6:28	26° 12.19' N	84° 43.88' W	538	6:44	26° 12.18' N	84° 43.88' W	538			
194-6	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	6:06	26° 12.18' N	84° 43.88' W	538	6:28	26° 12.19' N	84° 43.88' W	538	6:44	26° 12.18' N	84° 43.88' W	538			
194-7	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	7:00	26° 12.18' N	84° 43.88' W	538	7:22	26° 12.18' N	84° 43.88' W	538	7:42	26° 12.18' N	84° 43.88' W	538			
194-8	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	7:58	26° 12.18' N	84° 43.88' W	538	8:18	26° 12.18' N	84° 43.88' W	538	8:52	26° 12.18' N	84° 43.88' W	539			
194-9	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	9:00	26° 12.18' N	84° 43.88' W	538	9:20	26° 12.19' N	84° 43.88' W	538	9:51	26° 12.19' N	84° 43.88' W	538			
194-10	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	10:11	26° 12.19' N	84° 43.88' W	538	10:29	26° 12.18' N	84° 43.88' W	538	10:48	26° 12.18' N	84° 43.88' W	538			
194-11	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	11:59	26° 12.18' N	84° 43.88' W	539	12:19	26° 12.18' N	84° 43.88' W	538	12:40	26° 12.19' N	84° 43.88' W	538			
194-12	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	12:53	26° 12.18' N	84° 43.88' W	538	13:24	26° 12.18' N	84° 43.88' W	538	13:48	26° 12.18' N	84° 43.88' W	538			
194-13	Dullo, Flügel	CTD	W-Florida Slope	07.03.2009	14:08	26° 12.18' N	84° 43.88' W	539	14:26	26° 12.18' N	84° 43.88' W	538	14:52	26° 12.18' N	84° 43.88' W	538			
195-1	Schönfeld	BG	W-Florida Slope	07.03.2009	15:40	26° 11.20' N	84° 44.05' W	572	15:56	26° 11.20' N	84° 44.05' W	572	16:16	26° 11.20' N	84° 44.05' W	569			
196-1	Schönfeld	BG	W-Florida Slope	07.03.2009	16:34	26° 11.07' N	84° 44.05' W	580	16:56	26° 11.07' N	84° 44.05' W	580	17:20	26° 11.07' N	84° 44.05' W	580			
197-1	Schönfeld	BG	W-Florida Slope	07.03.2009	17:34	26° 10.82' N	84° 44.07' W	598	17:55	26° 10.81' N	84° 44.07' W	597	18:20	26° 10.81' N	84° 44.07' W	598			
198-1	Dullo, Flügel	POZ	W-Florida Slope	07.03.2009	18:46	26° 12.26' N	84° 44.15' W	554					19:10	26° 12.27' N	84° 43.97' W	530			
199-1	Schönfeld	MGC	W-Florida Slope	07.03.2009	19:31	26° 11.07' N	84° 44.06' W	581	19:44	26° 11.07' N	84° 44.06' W	582	20:07	26° 11.07' N	84° 44.06' W	582			
200-1	Hübscher	MB-PS	Florida Straits	08.03.2009	16:38	24° 22.12' N	81° 45.68' W	190					22:00	23° 56.45' N	81° 24.09' W	1156			
200-2	Dullo, Flügel	CTD	Florida Straits	08.03.2009	22:15	23° 56.34' N	81° 23.61' W	1160	22:54	23° 56.58' N	81° 22.96' W	1143	23:46	23° 56.85' N	81° 22.12' W	1119			
200-3	Hübscher	MB-PS	Florida Straits	09.03.2009	0:17	23° 57.29' N	81° 24.75' W	1126					1:10	23° 53.48' N	81° 21.33' W	1262			
201-1	Hübscher	MB-PS	Florida Straits	09.03.2009	6:43	24° 15.17' N	80° 54.09' W	469					9:29	24° 15.70' N	80° 55.31' W	434			
202-1	Titschack, Dullo	OFOS	Florida Straits	09.03.2009	10:43	24° 14.06' N	80° 55.91' W	568	11:07	24° 14.39' N	80° 55.42' W	559	13:48	24° 15.68' N	80° 53.13' W	454			
202-2	Titschack, Dullo	OFOS	Florida Straits	09.03.2009	15:00	24° 14.71' N	80° 55.72' W	521	15:16	24° 14.90' N	80° 55.37' W	466	17:04	24° 15.64' N	80° 53.69' W	453			
203-1	Dullo, Flügel	POZ	Florida Straits	09.03.2009	17:56	24° 14.81' N	80° 55.43' W	475					18:41	24° 15.27' N	80° 54.54' W	458			
204-1	Hübscher	MB-PS	Florida Straits	09.03.2009	18:45	24° 15.32' N	80° 54.46' W	464					20:20	24° 28.63' N	81° 1.84' W	186			
205-1	Schönfeld	BG	Sombrero Key Transekt	09.03.2009	20:31	24° 28.51' N	81° 2.24' W	195	20:41	24° 28.55' N	81° 2.04' W	195	20:50	24° 28.65' N	81° 1.73' W	196			
206-1	Schönfeld	BC	Sombrero Key Transekt	09.03.2009	21:31	24° 26.07' N	81° 0.64' W	200	21:40	24° 26.15' N	81° 0.40' W	201	21:48	24° 26.18' N	81° 0.18' W	200			
206-2	Schönfeld	BG	Sombrero Key Transekt	09.03.2009	21:55	24° 26.22' N	81° 0.02' W	212	22:02	24° 26.26' N	80° 59.81' W	213	22:10	24° 26.33' N	80° 59.58' W	205			
207-1	Schönfeld	BC	Sombrero Key Transekt	09.03.2009	22:58	24° 21.87' N	80° 58.34' W	275	23:10	24° 21.95' N	80° 58.04' W	269	23:18	24° 22.04' N	80° 57.80' W	272			
207-2	Schönfeld	BG	Sombrero Key Transekt	09.03.2009	23:23	24° 22.10' N	80° 57.67' W	271	23:35	24° 22.22' N	80° 57.34' W	260	23:42	24° 22.29' N	80° 57.11' W	255			
208-1	Schönfeld	BG	Sombrero Key Transekt	09.03.2009	0:24	24° 18.41' N	80° 56.73' W	309	0:35	24° 18.50' N	80° 56.46' W	313	0:47	24° 18.60' N	80° 56.12' W	314			

Station list R.V. METEOR cruise M78/1

Station		Device	Location	Date	Start				at Depth				End						
No.	Leader				Coordinates			Time (UTC)	Coordinates			Time (UTC)	Coordinates			Time (UTC)	Coordinates		
					Latitude	Longitude	Depth (m)		Latitude	Longitude	Depth (m)		Latitude	Longitude	Depth (m)				
M78/1-					(UTC)				(UTC)				(UTC)						
208-2	Schönfeld	BG	Sombrero Key Transekt	09.03.2009	0:52	24° 18.67' N	80° 55.98' W	315	1:02	24° 18.79' N	80° 55.70' W	320	1:14	24° 18.86' N	80° 55.43' W	326			
209-1	Schönfeld	BG	Sombrero Key Transekt	09.03.2009	2:00	24° 16.64' N	80° 55.88' W	384	2:12	24° 16.75' N	80° 55.67' W	381	2:26	24° 16.94' N	80° 55.43' W	376			
210-1	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	3:20	24° 14.79' N	80° 55.30' W	480	3:34	24° 14.94' N	80° 55.11' W	459	3:52	24° 15.09' N	80° 54.86' W	458			
210-2	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	4:14	24° 14.91' N	80° 55.23' W	462	4:30	24° 15.06' N	80° 54.99' W	452	4:50	24° 15.24' N	80° 54.70' W	454			
210-3	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	5:08	24° 14.87' N	80° 55.20' W	456	5:23	24° 15.04' N	80° 55.00' W	454	5:41	24° 15.27' N	80° 54.69' W	452			
210-4	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	6:00	24° 14.86' N	80° 55.18' W	455	6:18	24° 15.12' N	80° 54.87' W	457	6:33	24° 15.32' N	80° 54.59' W	457			
210-5	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	7:00	24° 14.86' N	80° 55.14' W	455	7:15	24° 15.08' N	80° 54.89' W	453	7:30	24° 15.31' N	80° 54.61' W	455			
210-6	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	8:00	24° 14.86' N	80° 55.13' W	452	8:17	24° 15.09' N	80° 54.83' W	458	8:30	24° 15.22' N	80° 54.57' W	458			
210-7	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	9:00	24° 14.87' N	80° 55.17' W	455	9:15	24° 15.08' N	80° 54.86' W	457	9:38	24° 15.39' N	80° 54.35' W	515			
210-8	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	10:00	24° 15.04' N	80° 55.00' W	454	10:17	24° 15.23' N	80° 54.69' W	458	10:34	24° 15.41' N	80° 54.32' W	514			
210-9	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	11:00	24° 14.81' N	80° 55.23' W	470	11:15	24° 14.99' N	80° 54.94' W	456	11:31	24° 15.20' N	80° 54.63' W	456			
210-10	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	11:57	24° 14.92' N	80° 55.20' W	463	12:13	24° 15.10' N	80° 54.82' W	459	12:30	24° 15.27' N	80° 54.46' W	461			
210-11	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	13:15	24° 14.82' N	80° 55.15' W	456	13:30	24° 15.07' N	80° 54.90' W	454	13:48	24° 15.30' N	80° 54.65' W	457			
210-12	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	14:04	24° 14.98' N	80° 55.09' W	459	14:22	24° 15.19' N	80° 54.78' W	457	14:42	24° 15.46' N	80° 54.49' W	457			
210-13	Dullo, Flögel	CTD	POZ Position 2, Florida Str.	10.03.2009	15:04	24° 14.94' N	80° 55.07' W	459	15:20	24° 15.17' N	80° 54.82' W	457	15:40	24° 15.45' N	80° 54.48' W	459			
211-1	Bayer, Beer	MSN, FP	Florida Straits	10.03.2009	16:18	24° 15.02' N	80° 54.99' W	455	16:34	24° 15.24' N	80° 54.72' W	454	16:52	24° 15.48' N	80° 54.39' W	461			
211-2	Bayer, Beer	MSN	Florida Straits	10.03.2009	17:08	24° 14.76' N	80° 55.23' W	475	17:16	24° 14.90' N	80° 55.08' W	453	17:22	24° 15.01' N	80° 54.96' W	455			
211-3	Bayer, Beer	MSN, CTD	Florida Straits	10.03.2009	17:33	24° 14.82' N	80° 55.13' W	458	17:54	24° 15.19' N	80° 54.70' W	457	18:15	24° 15.39' N	80° 54.28' W	463			
211-4	Bayer, Beer	MSN, CTD	Florida Straits	10.03.2009	18:35	24° 15.10' N	80° 55.22' W	454	18:42	24° 15.27' N	80° 55.09' W	447	18:50	24° 15.45' N	80° 54.86' W	455			
211-5	Schönfeld	MSN, CTD	Florida Straits	10.03.2009	19:04	24° 15.10' N	80° 55.14' W	453	19:19	24° 15.50' N	80° 54.81' W	456	19:38	24° 15.91' N	80° 54.48' W	443			
211-6	Schönfeld	MSN, CTD	Florida Straits	10.03.2009	20:00	24° 14.91' N	80° 55.06' W	456	20:18	24° 15.30' N	80° 54.69' W	453	20:39	24° 15.78' N	80° 54.31' W	446			
212-1	Nürnberg	MUC	Florida Straits	10.03.2009	23:38	24° 10.76' N	81° 16.13' W	730	0:05	24° 11.10' N	81° 15.74' W	723	0:28	24° 11.32' N	81° 15.43' W	720			
212-2	Nürnberg, Schneider	PC	Florida Straits	11.03.2009	1:00	24° 10.74' N	81° 16.10' W	732	1:20	24° 10.92' N	81° 15.84' W	729	2:26	24° 11.75' N	81° 14.89' W	709			
212-3	Nürnberg, Schneider	PC	Florida Straits	11.03.2009	4:34	24° 10.74' N	81° 16.33' W	727	5:12	24° 11.06' N	81° 15.89' W	722	5:54	24° 11.22' N	81° 15.68' W	719			
213-1	Titschack, Joseph	BG	Florida Straits	11.03.2009	8:58	24° 14.26' N	80° 55.52' W	566	9:17	24° 14.61' N	80° 55.07' W	540	9:43	24° 15.01' N	80° 54.45' W	461			
214-1	Titschack, Joseph	BG	Florida Straits	11.03.2009	10:26	24° 14.14' N	80° 55.72' W	564	10:46	24° 14.41' N	80° 55.26' W	544	11:06	24° 14.74' N	80° 54.70' W	456			
215-1	Titschack, Joseph	BG	Florida Straits	11.03.2009	11:28	24° 15.32' N	80° 53.96' W	479	11:45	24° 15.50' N	80° 53.48' W	468	12:00	24° 15.67' N	80° 53.07' W	459			
215-2	Titschack, Joseph	BG	Florida Straits	11.03.2009	12:28	24° 15.29' N	80° 54.03' W	474	12:46	24° 15.50' N	80° 53.52' W	476	13:04	24° 15.73' N	80° 53.04' W	460			
216-1	Dullo, Flögel	POZ	POZ Position 2, Florida Str.	11.03.2009	13:55	24° 15.19' N	80° 54.86' W	453					14:30	24° 15.83' N	80° 53.61' W	454			
217-1	Titschack, Joseph	BG	Florida Straits	11.03.2009	15:16	24° 14.62' N	80° 55.09' W	538	15:40	24° 15.00' N	80° 54.60' W	461	15:58	24° 15.25' N	80° 54.16' W	467			
218-1	Nürnberg, Schneider	PC	Florida Straits	11.03.2009	18:23	24° 13.86' N	81° 15.20' W	578	18:55	24° 14.21' N	81° 14.82' W	547	19:31	24° 14.71' N	81° 14.25' W	509			
218-2	Nürnberg, Schneider	MUC	Florida Straits	11.03.2009	19:55	24° 13.96' N	81° 15.07' W	569	20:14	24° 14.21' N	81° 14.83' W	547	20:34	24° 14.36' N	81° 14.67' W	536			
219-1	Dullo, Flögel	CTD	Central Caribbean	15.03.2009	2:06	15° 18.27' N	72° 47.09' W	2965	3:40	15° 18.30' N	72° 47.06' W	2961	5:05	15° 18.30' N	72° 47.06' W	2964			
219-2	Bayer, Beer	MSN, FP	Central Caribbean	15.03.2009	5:22	15° 18.30' N	72° 47.06' W	2962	5:54	15° 18.30' N	72° 47.06' W	2962	6:28	15° 18.30' N	72° 47.06' W	2960			
219-3	Bayer, Beer	MSN	Central Caribbean	15.03.2009	6:35	15° 18.30' N	72° 47.06' W	2962	6:40	15° 18.30' N	72° 47.06' W	2961	6:47	15° 18.30' N	72° 47.06' W	2963			
219-4	Bayer, Beer	MSN	Central Caribbean	15.03.2009	6:51	15° 18.30' N	72° 47.06' W	2966	7:19	15° 18.30' N	72° 47.06' W	2961	7:51	15° 18.30' N	72° 47.06' W	2962			
219-5	Bayer, Beer	MSN	Central Caribbean	15.03.2009	7:56	15° 18.30' N	72° 47.06' W	2962	8:00	15° 18.30' N	72° 47.06' W	2960	8:09	15° 18.30' N	72° 47.06' W	2959			
219-6	Bayer, Beer	MSN	Central Caribbean	15.03.2009	8:13	15° 18.30' N	72° 47.06' W	2961	9:54	15° 18.30' N	72° 47.06' W	2962	11:26	15° 18.29' N	72° 47.06' W	2964			
219-7	Bayer, Schönfeld	MSN	Central Caribbean	15.03.2009	11:33	15° 18.30' N	72° 47.06' W	2962	11:48	15° 18.30' N	72° 47.06' W	2960	12:06	15° 18.30' N	72° 47.06' W	2963			
219-8	Bayer, Schönfeld	MSN	Central Caribbean	15.03.2009	12:11	15° 18.29' N	72° 47.06' W	2963	12:26	15° 18.30' N	72° 47.06' W	2960	12:43	15° 18.30' N	72° 47.06' W	2961			
220-1	Dullo, Flögel	CTD	Plankton station 4	16.03.2009	19:17	15° 23.99' N	68° 12.01' W	4482	19:21	15° 24.00' N	68° 12.00' W	4484	19:30	15° 23.99' N	68° 12.00' W	4477			
220-2	Dullo, Flögel	CTD	Plankton station 4	16.03.2009	19:47	15° 23.99' N	68° 12.00' W	4483	22:12	15° 23.99' N	68° 12.00' W	4481	0:16	15° 23.99' N	68° 12.00' W	4482			
220-3	Bayer, Beer	MSN, FP	Plankton station 4	17.03.2009	0:28	15° 23.99' N	68° 12.00' W	4481	0:52	15° 23.99' N	68° 12.00' W	4479	1:20	15° 23.99' N	68° 12.00' W	4481			
220-4	Bayer, Beer	MSN	Plankton station 4	17.03.2009	1:26	15° 24.00' N	68° 12.00' W	4477	1:32	15° 23.99' N	68° 12.00' W	4481	1:38	15° 23.99' N	68° 12.00' W	4478			
220-5	Bayer, Beer	MSN	Plankton station 4	17.03.2009	1:46	15° 23.99' N	68° 12.00' W	4479	2:12	15° 23.99' N	68° 12.00' W	4481	2:40	15° 24.00' N	68° 12.00' W	4478			
220-6	Bayer, Beer	MSN	Plankton station 4	17.03.2009	2:44	15° 23.99' N	68° 12.00' W	4479	2:47	15° 23.99' N	68° 12.00' W	4482	2:52	15° 23.99' N	68° 12.00' W	4482			
220-7	Bayer, Beer	MSN	Plankton station 4	17.03.2009	2:56	15° 23.99' N	68° 12.00' W	4481	4:26	15° 23.99' N	68° 12.00' W	4487	5:58	15° 23.99' N	68° 12.00' W	4487			
220-8	Schönfeld, Bayer	MSN	Plankton station 4	17.03.2009	6:03	15° 23.99' N	68° 12.00' W	4481	6:23	15° 23.99' N	68° 12.00' W	4481	6:37	15° 23.99' N	68° 12.00' W	4477			
220-9	Schönfeld, Bayer	MSN	Plankton station 4	17.03.2009	6:41	15° 23.99' N	68° 12.00' W	4482	7:03	15° 23.99' N	68° 12.00' W	4482	7:18	15° 23.99' N	68° 12.00' W	4483			

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Station		Device	Location	Date	Start				at Depth				End						
No.	Leader				Coordinates			Time	Coordinates			Time	Coordinates			Time	Coordinates		
					M78/1-	Latitude	Longitude		Depth (m)	(UTC)	Latitude		Longitude	Depth (m)	(UTC)		Latitude	Longitude	Depth (m)
221-1	Dullo, Flögel	CTD	Plankton station 6	18.03.2009	11:55	14° 11.91' N	63° 25.46' W	0	12:14	14° 11.90' N	63° 25.45' W	1533	12:28	14° 11.92' N	63° 25.45' W	1534			
221-2	Dullo, Flögel	CTD	Plankton station 6	18.03.2009	12:40	14° 11.97' N	63° 25.40' W	1535	13:28	14° 11.95' N	63° 25.42' W	1536	14:14	14° 11.90' N	63° 25.43' W	1535			
221-3	Bayer, Beer	MSN, FP	Plankton station 6	18.03.2009	14:24	14° 11.90' N	63° 25.43' W	1536	14:52	14° 11.90' N	63° 25.43' W	1541	15:18	14° 11.90' N	63° 25.43' W	1535			
221-4	Bayer, Beer	MSN	Plankton station 6	18.03.2009	15:22	14° 11.90' N	63° 25.43' W	1537	15:27	14° 11.90' N	63° 25.43' W	1535	15:34	14° 11.90' N	63° 25.43' W	1534			
221-5	Bayer, Beer	MSN	Plankton station 6	18.03.2009	15:45	14° 11.89' N	63° 25.43' W	1536	16:03	14° 11.89' N	63° 25.43' W	1535	16:31	14° 11.89' N	63° 25.43' W	1536			
221-6	Bayer, Beer	MSN	Plankton station 6	18.03.2009	16:36	14° 11.89' N	63° 25.43' W	1537	16:40	14° 11.89' N	63° 25.43' W	1534	16:47	14° 11.89' N	63° 25.43' W	1535			
221-7	Bayer, Schönfeld	MSN, CTD	Plankton station 6	18.03.2009	16:52	14° 11.89' N	63° 25.43' W	1533	17:11	14° 11.89' N	63° 25.43' W	1533	17:25	14° 11.89' N	63° 25.43' W	1535			
221-8	Bayer, Schönfeld	MSN, CTD	Plankton station 6	18.03.2009	17:29	14° 11.89' N	63° 25.43' W	1534	17:47	14° 11.89' N	63° 25.43' W	1535	18:04	14° 11.89' N	63° 25.43' W	1535			
222-1	Dullo, Flögel	CTD	E of Isla de Blanquilla	19.03.2009	6:21	12° 1.49' N	64° 28.57' W	1023	6:57	12° 1.48' N	64° 28.70' W	1026	7:33	12° 1.51' N	64° 28.96' W	1037			
222-2	Bayer, Beer	MSN, FP	Plankton station 7-Blanquilla	19.03.2009	7:48	12° 1.50' N	64° 28.55' W	1024	8:14	12° 1.55' N	64° 28.70' E	1029	8:42	12° 1.61' N	64° 28.95' W	1034			
222-3	Bayer, Beer	MSN	Plankton station 7-Blanquilla	19.03.2009	8:55	12° 1.48' N	64° 28.49' W	1020	9:01	12° 1.50' N	64° 28.59' W	1023	9:08	12° 1.53' N	64° 28.68' W	1030			
222-4	Bayer, Beer	MSN	Plankton station 7-Blanquilla	19.03.2009	9:14	12° 1.52' N	64° 28.65' W	1023	9:40	12° 1.56' N	64° 28.80' W	1029	10:08	12° 1.61' N	64° 28.98' W	1037			
222-5	Bayer, Beer	MSN	Plankton station 7-Blanquilla	19.03.2009	10:25	12° 1.51' N	64° 28.55' W	1023	10:28	12° 1.52' N	64° 28.60' W	1024	10:34	12° 1.54' N	64° 28.68' W	1025			
222-6	Bayer, Schönfeld	MSN, CTD	Plankton station 7-Blanquilla	19.03.2009	10:40	12° 1.52' N	64° 28.60' W	1022	10:58	12° 1.57' N	64° 28.80' W	1031	11:13	12° 1.61' N	64° 28.95' W	1039			
222-7	Bayer, Schönfeld	MSN-CTD	Plankton station 7-Blanquilla	19.03.2009	11:25	12° 1.48' N	64° 28.56' W	1021	11:45	12° 1.55' N	64° 28.80' W	1028	11:57	12° 1.59' N	64° 28.94' W	1033			
222-8	Titschack, Richey	GKG	Isla de Blanquilla	19.03.2009	12:24	12° 1.42' N	64° 28.22' W	1009	12:49	12° 1.48' N	64° 28.50' W	1019	13:18	12° 1.50' N	64° 28.58' W	1033			
222-9	Nürnberg	GC	Isla de Blanquilla	19.03.2009	13:46	12° 1.44' N	64° 28.31' W	1012	14:07	12° 1.49' N	64° 28.50' W	1018	14:32	12° 1.52' N	64° 28.60' W	1023			
223-1	Schönfeld	MBG	Isla de Blanquilla	19.03.2009	18:13	11° 48.90' N	64° 35.84' W	15					18:14	11° 48.90' N	64° 35.84' W	15			
223-2	Schönfeld	MBG	Isla de Blanquilla	19.03.2009	18:15	11° 48.90' N	64° 35.84' W	15					18:15	11° 48.90' N	64° 35.84' W	15			
224-1	Schönfeld	MBG	Isla de Blanquilla	19.03.2009	18:27	11° 49.06' N	64° 35.94' W	5					18:28	11° 49.06' N	64° 35.94' W	5			
225-1	Schönfeld	MBG	Isla de Blanquilla	19.03.2009	18:45	11° 48.94' N	64° 35.97' W	35					18:46	11° 48.94' N	64° 35.97' W	35			
226-1	Schönfeld	MBG	Isla de Blanquilla	19.03.2009	19:10	11° 48.95' N	64° 35.95' W	27					19:11	11° 48.95' N	64° 35.95' W	35			
226-2	Schönfeld	MBG	Isla de Blanquilla	19.03.2009	19:13	11° 48.91' N	64° 35.97' W	40					19:14	11° 48.91' N	64° 35.97' W	40			
226-3	Schönfeld	CTD	Isla de Blanquilla	19.03.2009	19:16	11° 48.91' N	64° 35.97' W	40					19:18	11° 48.91' N	64° 35.97' W	40			
226-4	Haley	WSB	Isla de Blanquilla	19.03.2009	19:20	11° 48.68' N	64° 35.99' W	200					19:22	11° 48.68' N	64° 35.99' W	200			
227-1	Hübscher, Pulm	MB-PS	off St. George	20.03.2009	10:03	11° 47.54' N	62° 36.51' W	1029					17:12	11° 32.84' N	62° 39.92' W	281			
228-1	Nürnberg	MUC	Off St. George	20.03.2009	17:57	11° 37.78' N	62° 39.52' W	447	18:14	11° 37.78' N	62° 39.51' W	447	18:33	11° 37.78' N	62° 39.51' W	460			
228-2	Nürnberg	MUC	Off St. George	20.03.2009	18:51	11° 37.78' N	62° 39.51' W	458	19:10	11° 37.78' N	62° 39.51' W	447	19:26	11° 37.78' N	62° 39.51' W	457			
228-3	Nürnberg	PC	Off St. George	20.03.2009	20:11	11° 37.77' N	62° 39.40' W	447	20:45	11° 37.79' N	62° 39.51' W	447	21:25	11° 37.84' N	62° 40.01' W	445			
229-1	Nürnberg	MUC	Off St. George	20.03.2009	22:58	11° 47.53' N	62° 38.56' W	877	23:30	11° 47.54' N	62° 38.60' W	878	23:54	11° 47.54' N	62° 38.60' W	877			
229-2	Nürnberg	GC	Off St. George	21.03.2009	0:22	11° 47.54' N	62° 38.60' W	879	0:40	11° 47.54' N	62° 38.60' W	881	1:04	11° 47.54' N	62° 38.60' W	880			
230-1	Schönfeld	GKG	Off Paria Peninsula	21.03.2009	7:06	11° 1.84' N	62° 5.61' W	100	7:12	11° 1.84' N	62° 5.61' W	100	7:22	11° 1.84' N	62° 5.61' W	101			
231-1	Schönfeld	MGC	Port of Spain Anchorage	21.03.2009	14:26	10° 37.49' N	61° 36.23' W	10	14:29	10° 37.49' N	61° 36.23' W	10	14:32	10° 37.48' N	61° 36.23' W	10			
232-1	Schönfeld	GKG	Off Trinidad	21.03.2009	17:44	10° 59.00' N	61° 31.49' W	159	17:53	10° 59.00' N	61° 31.49' W	122	18:02	10° 59.00' N	61° 31.49' W	216			
233-1	Hübscher, Pulm	MB-PS	N. Tobago	22.03.2009	23:00	11° 31.41' N	60° 54.93' W	470					9:09	11° 24.57' N	61° 1.15' W	211			
234-1	Nürnberg	MUC	N. Tobago	22.03.2009	9:46	11° 24.37' N	61° 2.95' W	203	10:01	11° 24.32' N	61° 2.96' W	200	10:12	11° 24.32' N	61° 2.96' W	203			
234-2	Nürnberg	PC	N. Tobago	22.03.2009	10:47	11° 24.32' N	61° 2.96' W	201	11:15	11° 24.32' N	61° 2.96' W	201	11:50	11° 24.32' N	61° 2.96' W	201			
235-1	Nürnberg	PC	N. Tobago	22.03.2009	14:14	11° 36.38' N	60° 58.25' W	841	14:54	11° 36.53' N	60° 57.86' W	852	15:36	11° 36.52' N	60° 57.85' W	852			
235-2	Nürnberg	MUC	N. Tobago	22.03.2009	16:04	11° 36.53' N	60° 57.85' W	855	16:31	11° 36.53' N	60° 57.85' W	852	16:58	11° 36.53' N	60° 57.85' W	849			
236-1	Dullo, Flögel	CTD	E. Tobago, Prospector Slope	22.03.2009	23:23	10° 59.73' N	60° 11.93' W	1567	0:15	11° 0.80' N	60° 12.08' W	1587	1:00	11° 1.53' N	60° 12.20' W	1595			
237-1	Hübscher, Pulm	MB-PS	E. Tobago, Prospector Slope	23.03.2009	1:42	10° 59.95' N	60° 11.74' W	1571					4:02	10° 57.04' N	60° 12.73' W	1390			
238-1	Flögel, Bannert	POZ	E. Tobago, Prospector Slope	23.03.2009	4:54	10° 56.33' N	60° 14.68' W	782					6:04	10° 57.04' N	60° 14.92' W	865			
238-2	Dullo, Flögel	CTD	E. Tobago, Prospector Slope	23.03.2009	6:26	10° 56.28' N	60° 14.86' W	735	7:03	10° 56.98' N	60° 14.91' W	822	7:29	10° 57.40' N	60° 15.01' W	975			
238-3	Bayer, Beer	MSN+FP	Plankton station 8	23.03.2009	7:51	10° 56.52' N	60° 14.75' W	791	8:18	10° 57.11' N	60° 14.87' W	900	8:48	10° 57.72' N	60° 14.93' W	1083			
238-4	Bayer, Beer	MSN	Plankton station 8	23.03.2009	8:54	10° 57.75' N	60° 14.94' W	1072	9:00	10° 57.92' N	60° 14.94' W	1095	9:06	10° 58.13' N	60° 14.94' W	1136			
238-5	Bayer, Beer	MSN	Plankton station 8	23.03.2009	9:38	10° 56.35' N	60° 14.74' W	777	10:03	10° 56.95' N	60° 14.86' W	846	10:31	10° 57.55' N	60° 14.92' W	1031			
238-6	Bayer, Beer	MSN	Plankton station 8	23.03.2009	10:36	10° 57.55' N	60° 14.91' W	1026	10:41	10° 57.70' N	60° 14.92' W	1077	10:48	10° 57.92' N	60° 14.93' W	1085			
239-1	Hübscher, Pulm	MB-PS	Orinoco	23.03.2009	18:34	10° 9.78' N	59° 6.29' W	1612					20:11	10° 8.03' N	59° 1.08' W	1738			
240-1	Nürnberg	MUC	Orinoco	23.03.2009	20:39	10° 8.88' N	59° 2.31' W	1683	21:24	10° 8.88' N	59° 2.31' W	1674	22:12	10° 8.79' N	59° 2.48' W	1683			

Station list R.V. METEOR cruise M78/1

Station		Device	Location	Date	Start				at Depth				End			
No.	Leader				Time (UTC)	Coordinates			Time (UTC)	Coordinates			Time (UTC)	Coordinates		
						Latitude	Longitude	Depth (m)		Latitude	Longitude	Depth (m)		Latitude	Longitude	Depth (m)
240-2	Nürnberg	GC	Orinoco	23.03.2009	22:39	10° 8.93' N	59° 2.23' W	1670	23:18	10° 8.88' N	59° 2.32' W	1672	0:00	10° 8.84' N	59° 2.39' W	1684
241-1	Hübscher, Pulm	MB-PS	Orinoco	24.03.2009	0:30	10° 7.61' N	59° 2.96' W	1669					0:30	10° 7.61' N	59° 2.96' W	1669
242-1	Nürnberg	MUC	Orinoco, core station 1, 600m	24.03.2009	13:38	9° 57.25' N	59° 48.06' W	592	14:00	9° 57.32' N	59° 48.12' W	591	14:22	9° 57.27' N	59° 48.33' W	591
242-2	Nürnberg	PC	Orinoco, core station 2, 600m	24.03.2009	14:58	9° 57.35' N	59° 47.99' W	596	15:15	9° 57.35' N	59° 48.11' W	596	15:48	9° 57.46' N	59° 48.39' W	586
243-1	Nürnberg	PC	Orinoco, core station 3	24.03.2009	17:19	9° 59.50' N	59° 56.74' W	348	17:44	9° 59.49' N	59° 56.93' W	341	18:18	9° 59.49' N	59° 57.17' W	338
243-2	Nürnberg	MUC	Orinoco, core station 3	24.03.2009	18:42	9° 59.50' N	59° 56.76' W	345	18:58	9° 59.50' N	59° 56.91' W	341	19:12	9° 59.50' N	59° 56.99' W	340
244-1	Nürnberg	MUC	Orinoco, core station 4	24.03.2009	20:39	9° 56.95' N	59° 56.03' W	280	20:54	9° 56.93' N	59° 56.11' W	278	21:06	9° 56.93' N	59° 56.11' W	279
244-2	Nürnberg	GC	Orinoco, core station 4	24.03.2009	21:38	9° 56.94' N	59° 56.10' W	285	21:48	9° 56.93' N	59° 56.11' W	278	22:00	9° 56.93' N	59° 56.11' W	285
245-1	Hübscher, Pulm	MB-PS	Orinoco	25.03.2009	22:15	9° 56.82' N	59° 55.80' W	285					10:27	8° 57.79' N	60° 6.92' W	27
246-1	Schönfeld, Flögel	CTD	Boca Grande Orinoco	25.03.2009	12:26	9° 9.99' N	59° 54.04' W	64	12:31	9° 10.01' N	59° 54.04' W	64	12:36	9° 10.03' N	59° 54.04' W	64
246-2	Petersen, Nürnberg	MUC	Boca Grande Orinoco	25.03.2009	12:56	9° 10.00' N	59° 54.00' W	64	13:00	9° 10.00' N	59° 54.00' W	64	13:02	9° 10.00' N	59° 54.00' W	64
247-1	Dullo, Flögel	CTD	Boca Grande Orinoco	25.03.2009	14:00	9° 6.01' N	59° 57.00' W	58	14:04	9° 6.01' N	59° 57.00' W	58	14:08	9° 6.01' N	59° 57.00' W	58
247-2	Schönfeld	PP	Boca Grande Orinoco	25.03.2009	14:20	9° 6.01' N	59° 57.00' W	58	14:24	9° 6.01' N	59° 57.00' W	58	15:20	9° 6.01' N	59° 57.00' W	59
247-3	Nürnberg	MUC	Boca Grande Orinoco	25.03.2009	15:30	9° 6.01' N	59° 57.00' W	58	15:33	9° 6.01' N	59° 57.00' W	59	15:38	9° 6.01' N	59° 57.00' W	60
248-1	Schönfeld	CTD	Boca Grande Orinoco	25.03.2009	16:59	8° 58.00' N	60° 5.00' W	53	17:24	8° 58.00' N	60° 5.00' W	55	17:48	8° 58.00' N	60° 5.00' W	50
248-2	Schönfeld	BC	Boca Grande Orinoco	25.03.2009	17:54	8° 58.00' N	60° 5.00' W	49	17:56	8° 58.00' N	60° 5.00' W	37	18:02	8° 58.00' N	60° 5.00' W	50
248-3	Schönfeld	BC	Boca Grande Orinoco	25.03.2009	18:14	8° 58.00' N	60° 5.00' W	39	18:17	8° 58.00' N	60° 5.00' W	51	18:26	8° 58.00' N	60° 5.00' W	52
248-4	Schönfeld	MIC	Boca Grande Orinoco	25.03.2009	18:36	8° 58.00' N	60° 5.00' W	50	18:40	8° 58.00' N	60° 5.03' W	52	18:47	8° 58.00' N	60° 5.04' W	44
249-1	Schönfeld	BUCKET	Boca Grande Orinoco	25.03.2009	19:50	8° 56.49' N	60° 12.66' W	9					19:50	8° 56.49' N	60° 12.66' W	9
250-1	Schönfeld	CTD	Boca Grande Orinoco	25.03.2009	20:27	8° 57.38' N	60° 14.00' W	10	20:28	8° 57.38' N	60° 14.00' W	10	20:39	8° 57.37' N	60° 13.98' W	9
250-2	Schönfeld	BC	Boca Grande Orinoco	25.03.2009	20:47	8° 57.37' N	60° 13.97' W	9	20:48	8° 57.37' N	60° 13.97' W	10	20:50	8° 57.37' N	60° 13.97' W	9
250-3	Schönfeld	BC	Boca Grande Orinoco	25.03.2009	20:54	8° 57.37' N	60° 13.95' W	9	20:55	8° 57.37' N	60° 13.95' W	9	20:57	8° 57.37' N	60° 13.95' W	9
250-4	Schönfeld, Titschack	BC	Boca Grande Orinoco	25.03.2009	21:08	8° 57.38' N	60° 13.94' W	9	21:09	8° 57.38' N	60° 13.93' W	9	21:12	8° 57.38' N	60° 13.92' W	9
251-1	Schönfeld	GKG	Eastern Orinoco Delta	26.03.2009	0:00	9° 22.00' N	60° 2.97' W	70	0:08	9° 22.00' N	60° 2.98' W	68	0:12	9° 22.00' N	60° 2.98' W	68
252-1	Schönfeld	GKG	Eastern Orinoco Delta	26.03.2009	2:30	9° 42.99' N	60° 4.01' W	80	2:34	9° 43.00' N	60° 4.01' W	81	2:42	9° 43.00' N	60° 4.01' W	81
253-1	Flögel, Bannert	POZ	E. Tobago, Prospector Slope	26.03.2009	9:37	10° 57.39' N	60° 14.71' W	1027	9:39	10° 57.42' N	60° 14.72' W	332	9:40	10° 57.43' N	60° 14.73' W	1022
254-1	Hübscher, Pulm	MB-PS	Gulf of Paria	26.03.2009	17:57	10° 54.03' N	61° 45.97' W	113					13:38	10° 32.00' N	61° 52.96' W	19
255-1	Nürnberg	GC	Gulf of Paria	27.03.2009	14:14	10° 31.95' N	61° 52.84' W	20	14:24	10° 31.95' N	61° 52.84' W	19	14:24	10° 31.95' N	61° 52.84' W	19
256-1	Hübscher, Pulm	MB-PS	Gulf of Paria	27.03.2009	14:40	10° 31.86' N	61° 52.53' W	19					16:00	10° 35.26' N	61° 45.85' W	47