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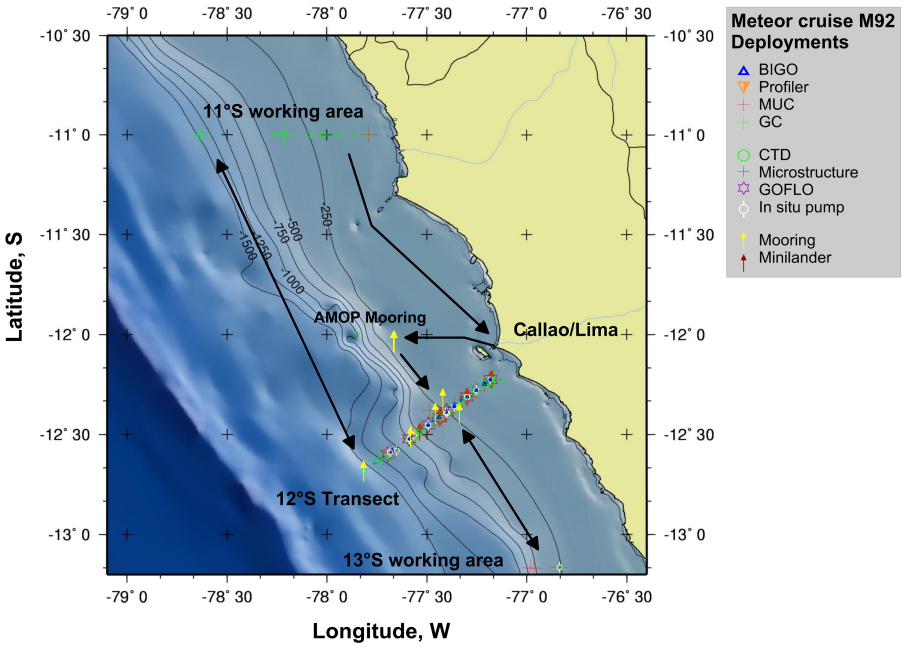
SFB 754

M90 - M91 - M92 - M93
trace gases
oxygen
SFB 754
Eastern South Pacific
SOPRAN

Short cruise report

RV Meteor cruise No. 92
Callao (Peru) - Callao, 5. January – 3. February 2013

Chief Scientist: Dr. Stefan Sommer
Captain: Michael Schneider



Station Map M92

Objectives

Oxygen Minimum Zones (OMZ) are key regions for the biogeochemical cycling of major elements. Questions arise of how OMZ´s are maintained and what are the potential feedbacks of benthic nutrient release on the presently observed spreading of OMZ´s. The research cruise to the Peruvian OMZ was conducted within the context of the 2nd phase of the Kiel SFB-754. Main aims were:

a. to determine variability of benthic nutrient release in response to the hydrodynamic forcing and regional differences in bottom water levels of O_2, NO_3^-, NO_2^-, and sedimentary carbon content (C_{org});

b. to investigate mixing in the benthic boundary layer (BBL) and to quantify diapycnal fluxes of excess N_2, NH_4^+, P, Fe, Si, radium isotopes across the BBL into the stratified interior ocean and into the mixed layer;

c. to investigate processes involved in the respective benthic N, Fe, and P cycles.

Narrative

At the 2. January a small group of scientists arrived in Callao on Meteor ahead of the main group in order to unpack the containers and to start establishing the laboratories. Participants from LEGOS (France) and IMARPE (Peru) institutions were already present on RV Meteor to prepare the long-term mooring AMOP. At the 5. Jan. RV Meteor left Callao harbour in order to deploy the AMOP mooring at a station nearby Callao in a water depth of about 180 m. After successful deployment the RV Meteor went back to Calloa to disembark the French and Peruvian technicians and E. Breitbarth.

At the morning of the 6. Jan. RV Meteor left Callao to head towards the main working area at 12° S. This depth-transect covers water depths from about 70 m to 1500 m and spans over a horizontal distance of about 45 nm. The station work started with deployments of the CTD/water sampling rosette and the TV guided multiple corer in order to test the suitability of the ground for further extended biogeochemical measurements also using different Lander. Subsequently, six sites in water depths of about 70, 150, 250, 400, 750, and 1000 m were designated as main sites for which all physical and biogeochemical measurements will become available. During the night work was continued with bathymetrical mapping. Knowledge on bathymetry is very important to assess where the energy of incident internal waves is dissipated, which is hypothesized to affect the exchange of solutes between the seafloor and the bottom water. In the following days the working programme was continued at the 12°S depth transect with the deployment of Gliders and moorings for hydrographical measurements. In addition 4 mini-lander for current and oxygen measurements were anchored at the seafloor. The glider, moorings and the mini-lander were deployed until the following M93 cruise.

Until the 27. Jan. work at 12°S was continued with the deployments of different gears. The day-programme was dominated by the deployment of CTD casts, in situ pumps, GOFLO, TV-MUC, BIGO-lander and Profiler lander as well as moorings and gliders. During the night alternating deployments of CTD casts and the microstructure sensor were conducted. At the 27. Jan. the coax-cable for the deployment of video-guided instruments was changed for operations with the gravity corer. At the 28. Jan. we changed our working area to 11°S, which was investigated during cruise M77, for further gravity corer, microstructure sensor and CTD deployments. During the night of the 29. Jan. RV Meteor headed back to the working area at 12°S in order to complete gravity

corer deployments. At the 30. Jan. we changed our working area to a site at 13°S in order to conduct a deployment of in situ pumps, multiple corer and the CTD water sampling rosette. At the 31. Jan. we stopped our scientific working programme due to an unfortunate accident of the electronic engineer who needed to be immediately transferred into the hospital. During all days the weather was calm allowing for smooth operations off the different gears.

Acknowledgements
We like to thank captain Michael Schneider, his officers and crew of RV METEOR for their support of our scientific programme and for creating a very friendly and professional working atmosphere on board. The ship time of METEOR was provided by the German Science Foundation (DFG) within the core program METEOR/MERIAN. Financial support for the different projects carried out during the cruise was mostly provided though the collaborative research program SFB 754 (Climate – Biogeochemical interactions in the tropical Oceans) supported by the German Science Foundation (DFG). We are grateful for the participation of E. Johnston and J. Salazar from IMARPE (Peru), who performed own measurements and helped with the sampling. We like to thank also the authorities of Peru for their permission to carry out scientific work in their territorial waters.

2 Participants

Name	Discipline	Institution
Sommer, Stefan, Dr.	Benthic Fluxes / Chief Scientist	GEOMAR
Bicking, Seabastian	Benthic fluxes	GEOMAR
Bourbonnais, Anni, Dr.	N-Geochemistry	UMAS
Breitbarth, Eike, Dr.	Fe-Geochemistry	GEOMAR
Cherednichenko, Sergiy	Technician Lander	GEOMAR
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Gier, Johanna	Microbiology	GEOMAR
Glud, Anni	Profiler, Microsensors	SDU
Johnston J.C. Ernesto	Foraminiferal Ecology	IMARPE
Koy, Uwe	Technician Physical Oceanography	GEOMAR
Krahmann, Gerd, Dr.	Phys. Oc., Glider / CTD	GEOMAR
Kriwanek, Sonja	Technician Benthic Fluxes	GEOMAR
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Treude, Tina, Prof. Dr.	Microbiology	GEOMAR
Trinkler, Sven	Geochemistry	GEOMAR

At the 5th Jan. the scientific team was joined by French (LEGOS) and Peruvian (IMARPE) scientists and Dr. E. Breitbarth.

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Stationlist M92

Station No.	Gear No.	Date 2013	Position Lat. [°S]	Position Long. [°W]	Time [UTC]	Depth [m]
1	CTD/RO 1	05.01.	12°1.976'	77°39.992'	15:04	178
2	AMOP shield 1	05.01.	12°2.032'	77°39.958'	16:55	179
3	AMOP shield 2	05.01.	12°2.031'	77°39.954'	18:29	177.5
4	AMOP Mooring 1	05.01.	12°1.983'	77°39.701'	21:30	180
5	CTD/RO 2	06.01.	12°18.575'	77°17.570'	17:50	143.7
6	MUC 1	06.01.	12°18.558'	77°17.565'	18:38	142
7	CTD/RO 3	06.01.	12°23.360'	77°24.114'	20:15	243.7
8	MUC 2	06.01.	12°23.340'	77°24.178'	20:42	249
9	CTD/RO 4	06.01.	12°29.286'	77°32.272'	23:04	506
10	MUC 3	07.01.	12°29.284'	77°32.268'	00:02	505
11	CTD/RO 5	07.01.	12°31.308'	77°34.953'	01:51	731
12	MUC 4	07.01.	12°31.308'	77°34.952	02:24	750.9
13	MB Bathymetrie 1	07.01.	12°25.790'	77°25.715'	04:53	
14	GLIDER IFM 07	07.01.	12°17.000'	77°39.956'	13:10	878
15	GLIDER IFM 03	07.01.	12°18.500'	77°42.003'	14:26	1223
16	Multi Beam EM 122 2	07.01.	12°18.704'	77°25.625'	16:30	191
17	MUC 5	07.01.	12°23.321'	77°24.176'	17:44	253
18	MUC 6	07.01.	12°23.328'	77°24.184'	18:44	244
19	Mooring KPO 1100	07.01.	12°19.299'	77°25.170'	19:55	197
20	GoFlo 1	07.01.	12°25'	77°26'	20:30	302
21	GoFlo 2	07.01.	12°25'	77°26'	22:50	302
22	Bathymetrie 3	08.01.	12°25.157'	77°26.126'	00:45	
23	MUC 7	08.01.	12°23.293'	77°24.204'	13:15	243
24	MUC 8	08.01.	12°23.293'	77°44.204'	14:09	243
25	CTD/RO 6	08.01.	12°24.904'	77°26.314'	15:09	305

26	MUC 9	08.01.	12°24.903'	77°26.301'	15:50	305
27	Multibeam 4	08.01.	12°25.00'	77°26.44'	16:42	308
28	Multibeam 5	08.01.	12°23.13'	77°28.37'	17:59	298
29	Mooring KPO 1101	08.01.	12°23.66'	77°27.43'	18:39	302
30	BIGO-2-1	08.01.	12°24.905'	77°26.296	22:24	305.5
31	GoFlo 3	08.01.	12°23'	77°24'	23:26	244
32	CTD/RO 7	09.01.	12°23.302'	77°24.214'	00:40	244.7
33	Bathymetrie MB-profile KPO 1101 6	09.01.	12°23.302'	77°24.214'	01:04	245
34	Satellite Mini Lander SLM2-1	09.01.	12°29.21'	77°32.11'	13:02	497
35	POZ-Lander 2	09.01.	12°24.815'	77°26.032'	15:44	298
36	MUC 10	09.01.	12°18.708'	77°17.794'	18:22	145
37	MUC 11	09.01.	12°18.708'	77°17.795'	18:55	144
38	CTD/RO 8	09.01.	12°23.336'	77°24.191'	20:16	244.8
39	In situ pumps 1	09.01.	12°23.337'	77°24.190'	21:25	245
40	In situ pumps 2	09.01.	12°23.337'	77°24.192'	23:30	244.5
41	CTD/RO 9	10.10.	12°13.54'	77°10.52'	03:45	72
42	MUC 12	10.01.	12°13.509'	77°10.513'	04:08	73.6
43	Glidertest/Bathymetry survey 3	10.01.	12°21'	77°40'	07:04	1106
44	BIGO-2-1	10.01.	12°25.01'	77°26.31'	13:21	
45	CTD/RO 10	10.01.	12°41.18'	77°48.88'	15:54	1723,7
46	Multibeam 7	10.01.	12°39.69'	77°48.82'	17:42	1581.5
47	Mooring KPO 1103 4	10.01.	12°40.95'	77°48.90'	19:15	1700
48	MSS 1	11.01.	12°34.003'	77°38.796'	00:08	990
49	CTD/RO 11	11.01.	12°34.863'	77°38.954'	01:31	1002.5
50	In situ pumps 3	11.01.	12°34.863'	77°38.955'	02:22	1026.5
51	MSS 2	11.01.	12°30.455'	77°34.495'	07:00	750
52	CTD/RO 12	11.01.	12°31.406'	77°35.193'	08:58	773
53	CTD/RO 13	11.01.	12°29.201'	77°32.084'	10:13	497.2
54	MUC 13	11.01.	12°13.497'	77°10.515'	13:26	70

55	MUC 14	11.01.	12°13.496'	77°10.515'	13:56	70
56	In situ pumps 4	11.01.	12°18.696'	77°17.790'	15:07	150
57	BIGO-I-1	11.01.	12°18.711'	77°17.803'	19:09	141.5
58	Profiler 1	11.01.	12°18.738'	77°17.810'	21:23	141
59	SLM 3	11.01.	12°13.487'	77°10.530'	22:45	76
60	GoFlo 4	12.01.	12°18.7'	77°18.0'	00:09	145
61	CTD/RO 14	12.01.	12°18.697'	77°18.004'	01:01	145.5
62	MUC 15	12.01.	12°18.696'	77°18.004'	01:40	146
63	CTD/RO 15	12.01.	12°27.196'	77°29.501'	03:20	406
64	MSS 3	12.01.	12°27.196'	77°29.591'	03:55	406
65	MSS 4	12.01.	12°27.196'	77°29.500'	06:34	408
66	CTD/RO 16	12.01.	12°27.535'	77°29.593'	07:23	414
67	MSS 5	12.01.	12°29.22'	77°32.10'	08:42	497.7
68	CTD/RO 17	12.01.	12°29.222'	77°32.106'	09:58	497
69	MUC 16	12.01.	12°14.897'	77°12.707'	12:55	103
70	In situ pumps 5	12.01.	12°13.493'	77°10.807'	14:30	74.2
71	CTD/RO 18	12.01.	12°13.5'	77°10.8'	16:45	74
72	GoFlo 5	12.01.	12°13.5'	77°10.8'	17:17	74
73	BIGO-II-2	12.01.	12°23.305'	77°24.192'	20:01	243.9
74	BIGO-II-3	12.01.	12°23.300'	77°24.186'	21:08	243.8
75	SLM 4	12.01.	12°18.732'	77°17.812'	22:34	148
76	CTD/RO 19	12.01.	12°21.493'	77°21.699'	23:49	188
77	MSS 6	13.01.	12°21.773'	77°21.920'	00:29	200
78	MSS 7	13.01.	12°20.841'	77°21.632'	02:21	200
79	CTD 20	13.01.	12°20.089'	77°19.680'	04:15	169.1
80	MSS 8	13.01.	12°19.546'	77°19.567'	05:01	170
81	MSS 9	13.01.	12°19.029'	77°19.537'	06:44	160
82	CTD/RO 21	13.01.	12°23.287'	77°24.226'	08:30	244
83	MSS 10	13.01.	12°22.850'	77°24.107'	09:16	240

84	CTD/RO 22	13.01.	12°24.788'	77°25.992'	10:27	297
85	BIGO-I-1	13.01.	12°18.703'	77°17.912'	13:08	145
86	MUC 17	13.01.	12°31.395'	77°35.211'	15:15	774
87	MUC 18	13.01.	12°31.373'	77°35.184'	16:45	769.4
88	Profiler 1	13.01.	12°18.56'	77°17.82'	20:00	
89	MUC 19	13.01.	12°18.699'	77°17.807'	21:19	144
90	MUC 20	13.01.	12°18.704'	77°17.808'	21:59	145
91	CTD/RO 23	13.01.	12°18.775'	77°17.824'	22:30	144
92	CTD/RO 24	13.01.	12°23.30'	24.20'	23:44	244.2
93	MUC 21	14.01.	12°27.199	77°29.513'	00:58	410
94	MSS 11	14.01.	12°25.742'	77°28.161'	02:10	350
95	CTD/RO 25	14.01.	12°26.305'	77°28.211'	04:40	355.7
96	Bathymetry survey 8	14.01.	12°24.661'	77°25.123'	05:53	282
97	BIGO-II-3	14.01.	12°24.360'	77°24.300'	13:15	246.4
98	CTD/RO 26	14.01.	12°13.504'	77°10.799'	17:00	75.1
99	MB 9	14.01.	12°22.19'	77°20.14'	18:30	190.4
100	Mooring 5	14.01.	12°23.71'	77°20.20'	20:26	207.6
101	MUC 22	14.01.	12°31.393'	77°35.202'	23:11	774
102	GoFlo	15.01.	12°31.3'	77°35.3'	01:00	774
103	CTD/RO 27	15.01.	12°31.327'	77°35.265'	03:23	772.7
104	MSS 12	15.01.	12°31.327'	77°35.264'	04:10	772.4
105	CTD/RO 28	15.01.	12°13.604'	77°10.937'	09:42	77.1
106	MSS 13	15.01.	12°13.604'	77°10.937'	10:30	76.3
107	MUC 23	15.01.	12°27.199'	77°29.497'	13:05	407
108	MUC 24	15.01.	12°27.197'	77°29.497'	13:54	407
109	Glider	15.01.	12°20.12'	77°34.92'	15:36	415.5
110	BIGO-I-2	15.01.	12°13.506'	77°10.793'	19:27	74
111	CTD 29	15.01.	12°18.729'	77°17.757'	20:57	144.5
112	GoFlo 7	15.01.	12°24.8'	77°26.0'	22:25	298

113	In situ pumps 6	16.01.	12°23.304'	77°24.196'	00:30	243
114	CTD/RO 30	16.01.	12°23.30'	77°24.20'	03:17	243.8
115	CTD/RO 31	16.01.	12°23.304'	77°24.196'	04:10	244
116	MSS 14	16.01.	12°22.781'	77°24.160'	04:40	231.1
117	MSS 15	16.01.	12°20.776'	77°21.734'	07:33	200
118	CTD/RO 32	16.01.	12°21.503'	77°21.722'	09:28	194.3
119	CTD 33	16.01.	12°31.398'	77°35.196'	12:55	772.3
120	MUC 25	16.01.	12°31.397'	77°35.195'	13:53	773
121	MUC 26	16.01.	12°31.397'	77°35.196'	15:01	773
122	Glider IFM 12 1	16.01.	12°34.04'	77°32.00'	16:48	734.2
123	Glider IFM 12 1	16.01.	12°34.02'	77°32.03'	18:44	739.3
124	BIGO-II-3	16.01.	12°31.366'	77°34.997'	20:22	756
125	Profiler 2	16.01.	12°31.438'	77°34.961'	23:12	757
126	GoFlo 8	17.01.	12°35.9'	77°41.7'	01:30	1022
127	CTD/RO 34	17.01.	12°37.82'	77°44.14'	03:58	1194
128	MSS 16	17.01.	12°28.485'	77°31.809'	06:30	480
129	CTD/RO 35	17.01.	12°29.194'	77°31.918'	08:10	493
130	MSS 17	17.01.	12°26.391'	77°29.383'	09:29	400
131	BIGO-I-2	17.01.	12°13.528'	77°11.133'	13:48	76.8
132	CTD/RO 36	17.01.	12°18.675'	77°17.845'	14:44	144
133	In situ pumps 7	17.01.	12°18.675'	77°17.845'	16:10	150
134	Glider IFM 11	17.01.	12°30.43'	77°27.25'	18:50	423.5
135	GoFlo 9	17.01.	12°27.2'	77°29.5'	20:50	407
136	MUC 27	17.01.	12°27.185'	77°29.508'	23:02	408
137	In situ pumps 8	18.01.	12°21.356'	77°29.507'	00:27	400
138	CTD/RO	18.01.	12°27.35'	77°29.5'	03:22	400
139	MSS 18	18.01.	12°14.238'	77°12.876'	06:08	110
140	CTD/RO 38	18.01.	12°14.908'	77°12.715'	08:05	100
141	MSS 19	18.01.	12°15.873'	77°15.890'	09:05	130

142	CTD/RO 39	18.01.	12°16.495'	77°15.891'	09:53	130
143	BIGO-II-3	18.01.	12°31.348'	77°34.975'	13:11	756
144	In situ pumps 9	18.01.	12°31.183'	77°35.093'	13:45	750
145	Glider IFM 06 1	18.01.	12°33.56'	77°32.46'	17:30	730
146	Profiler 2	18.01.	12°31.42'	77°35.14'	18:31	
147	Mooring KPO 1102	18.01.	12°30.82'	77°34.82'	19:40	707
148	CTD/RO 40	18.01.	12°31.427'	77°34.957'	20:44	755
149	MSS 20	18.01.	12°31.491'	77°34.833'	21:40	750
150	CTD/RO 41	19.01.	12°36.599'	77°42.999'	00:59	1085
151	MSS 21	19.01.	12°36.682'	77°42.963'	02:16	1095
152	CTD/RO 42	19.01.	12°38.586'	77°45.633'	05:41	1340
153	MSS 22	19.01.	12°38.651'	77°45.585'	06:59	1350
154	CTD/RO 43	19.01.	12°41..517'	77°51.026'	09:23	2018
155	MUC 28	19.01.	12°35.396'	77°41.000'	13:01	1025
156	MUC 29	19.01.	12°35.377'	77°40.976'	14:35	1024
157	In situ pumps 10	19.01.	12°31.4'	77°35.2'	16:56	750
158	CTD 44/RO	19.01.	12°31.385'	77°35.209'	20:42	772
159	BIGO-I-3	19.01.	12°34.911'	77°40.365'	22:16	989
160	Multi Beam 10	20.01.	12°34.69'	77°45.58'	00:42	1002.8
161	Profiler 3	20.01.	12°35.402'	77°41.306'	13:24	1011
162	CTD 45	20.01.	12°35.404'	77°41.013'	15:01	1025
163	MUC 30	20.01.	12°35.404'	77°41.013'	16:34	1024
164	MUC 31	20.01.	12°35.404'	77°41.008'	17:55	1026
165	BIGO-II-4	20.01.	12°16.690'	77°14.995'	22:04	128.4
166	In situ pumps 11	20.01.	12°13.489'	77°10.805'	23:30	80
167	CTD/RO 46	21.01.	12°13.488'	77°10.804'	01:50	80
168	MSS 23	21.01.	12°13.488	77°10.804'	02:38	80
169	MSS 24	21.01.	12°16.759'	77°15.020'	04:45	125
170	CTD/RO 47	21.01.	12°17.346'	77°15.108'	06:36	130

171	MSS 25	21.01.	12°19.643'	77°19.922'	07:58	170
172	CTD/RO 48	21.01.	12°20.238'	77°19.896'	08:44	173
173	BIGO-I-3	21.01.	12°34.91'	77°40.45'	12:36	988
174	CTD/RO 49	21.01.	12°35.4'	77°41.0'	13:39	1025
175	In situ pumps 12	21.01.	12°35.400'	77°41.002'	15:00	1026.1
176	Profiler 3	21.01.	12°35.286'	77°41.432'	18:06	
177	MUC 32	21.01.	12°27.215'	77°29.539'	20:13	409
178	MUC 33	21.01.	12°23.285'	77°24.217'	21:45	244
179	CTD/RO 50	21.01.	12°23.604'	77°23.911'	22:51	245
180	ISP 13	21.01.	12°23.603'	77°23.911'	21:30	246
181	CTD/RO 51	22.01.	12°23.603'	77°23.911'	02:56	245
182	MSS 26	22.01.	12°22.534'	77°23.935'	03:38	250
183	MSS 27	22.01.	12°22.014'	77°23.413'	05:38	225
184	CTD/RO 52	22.01.	12°23.329'	77°23.391'	07:03	233
185	MSS 28	22.01.	12°20.501'	77°21.718'	08:10	200
186	CTD/RO	22.01.	12°21.534'	77°21.698'	09:23	196
187	BIGO-II-4	22.01.	12°16.77'	77°15.08'	12:50	129.1
188	ISP 14	22.01.	12°16.732'	77°15.097'	14:00	129
189	Profiler 4	22.01.	12°23.600'	77°23.900'	18:39	245
190	GoFlo 10	22.01.	12°31.3'	77°35.2'	20:30	775
191	In situ pumps 15	22.01.	12°27.189'	77°29.500'	23:51	408
192	CTD/RO 54	23.01.	12°27.188'	77°29.499'	02:23	407
193	MSS 29	23.01.	12°27.188'	77°29.498'	03:00	400
194	MSS 30	23.01.	12°25.248'	77°28.221'	05:11	350
195	CTD/RO 55	23.01.	12°26.270'	77°28.348'	06:39	363
196	MSS 31	23.01.	12°24.384'	77°25.776'	07:49	300
197	CTD/RO 56	23.01.	12°24.885'	77°25.845'	08:30	296
198	MUC 34	23.01.	12°23.300'	77°24.230'	18:46	243.9
199	MUC 35	23.01.	12°23.302'	77°24.222'	19:22	244.6

200	CTD 57	23.01.	12°23.350'	77°24.222'	20:09	245.7
201	BIGO-1-4	23.01.	12°21.502'	77°21.712'	21:19	195
202	Profiler 4	23.01.	12°23.43'	77°23.94'	22:23	243.9
203	MB 11	24.01.	12°12.887'	77°11.051'	00:02	75
204	In situ pumps 16	24.01.	12°30.326'	77°33.845'	13:15	600
205	CTD 58	24.01.	12°30.326'	77°33.856'	16:33	603.7
206	Glider IFM 08	24.01.	12°33'	77°34'	18:00	600
207	BIGO-2-5	24.01.	12°27.207'	77°29.517'	19:37	409
208	MUC 36	24.01.	12°25.588'	77°25.203'	20:54	296
209	Profiler 5	24.01.	12°35.380'	77°40.995'	23:08	1023
210	CTD 59	25.01.	12°35.434'	77°41.033'	00:31	1024
211	In situ pumps 17	25.01.	12°27.21'	77°29.52'	02:46	408.5
212	GoFlo 11	25.01.	12°18.9'	77°17.5'	07:07	144
213	MSS 213	25.01.	12°14.177'	77°11.898'	08:35	90
214	CTD/RO 60	25.01.	12°14.684'	77°12.189'	09:29	96
215	MSS 33	25.01.	12°14.684'	77°12.192'	10:01	95
216	CTD/RO 61	25.01.	12°21.386'	77°21.751'	12:52	193.9
217	BIGO-1-4	25.01.	12°21.469'	77°21.694'	13:42	195.3
218	MUC 37	25.01.	12°13.503'	77°10.111'	15:47	71
219	MUC 38	25.01.	12°13.518'	77°10.084'	16:14	72
220	MUC 39	25.01.	12°13.531'	77°10.060'	16:36	71
221	Glider	25.01.	12°15.72'	77°22.39'	18:00	154.4
222	Glider	25.01.	12°18.75'	77°26.77'	18:54	202.9
223	MUC 40	25.01.	12°35.385'	77°40.513'	21:24	1030
224	Profiler 5	25.01.	12°35.450'	77°41.158'	23:10	1019
225	CTD/RO 62	25.01.	12°35.522'	77°41.058'	23:39	1028
226	MSS 34	26.01.	12°35.451'	77°40.888'	00:59	1000
227	CTD/RO 63	26.01.	12°36.897'	77°41.259'	03:03	1103
228	MSS 35	26.01.	12°31.417'	77°35.203'	05:01	775

229	CTD/RO 64	26.01.	12°32.723'	77°35.554'	06:53	862
230	MSS 36	26.01.	12°30.997'	77°34.706'	08:10	700
231	CTD/RO 65	26.01.	12°31.371'	77°35.223'	10:09	773
232	BIGO-2-5	26.01.	12°27.22'	77°29.60'	13:00	410.6
233	Glider IFM 10	26.01.	12°24.202'	77°29.530'	13:42	340
234	MUC 41	26.01.	12°30.508'	77°33.975'	15:35	617
235	MUC 42	26.01.	12°30.754'	77°34.176'	16:40	648
236	MUC 43	26.01.	12°30.757'	77°34.179'	17:40	646
237	CTD/RO 66	26.01.	12°30.757'	77°34.180'	18:31	648
238	MUC 44	26.01.	12°22.699'	77°29.100'	20:30	307
239	In situ pumps 18	26.01.	12°21.51'	77°21.70'	21:58	197.3
240	CTD/RO 67	27.01.	12°14.692'	77°12.396'	02:08	98.8
241	CTD/RO 68	27.01.	12°13.126.'	77°10.215'	02:53	70
242	MSS 37	27.01.	12°14.141'	77°11.650'	03:33	85
243	CTD/RO 69	27.01.	12°14.654'	77°11.862'	05:03	91
244	MSS 38	27.01.	12°13.571'	77°10.323'	06:06	75
245	CTD/RO 70	27.01.	12°14.177'	77°10.501'	08:15	78
246	MSS 39	27.01.	12°13.595'	77°10.332'	09:00	80
247	MUC 45	27.01.	12°21.492'	77°21.701'	12:55	194.8
248	MUC 46	27.01.	12°16.697'	77°15.002	14:07	129
249	BIGO-1-5	27.01.	12°14.898'	77°12.705'	15:44	101
250	Glider IFM 03	27.01.	12°19.84'	77°26.24'	17:32	214.4
251	Profiler 6	27.01.	12°30.755'	77°34.175'	19:37	650
252	GC 1	27.01.	12°35.400'	77°40.493'	22:08	1031
253	GC 2	27.01.	12°37.051'	77°43.635'	23:45	1121.7
254	GC 3	28.01.	12°27.191'	77°29.490'	02:00	407.2
255	GC 4	28.01.	10°59.995'	78°0.914'	13:01	188
256	CTD/RO 71	28.01.	11°0.106'	78°0.958'	13:35	188.7
257	CTD/RO 72	28.01.	10°59.991'	77°56.693'	14:39	150

258	CTD/RO 73	28.01.	10°59.999'	77°51.954'	15:34	117
259	CTD/RO 74	28.01.	10°59.996'	77°47.410'	16:30	80
260	CTD/RO 75	28.01.	11°0.021'	78°5.287'	18:23	248
261	CTD/RO 76	28.01.	11°0.033'	78°12.669'	19:42	363
262	GC 5	28.01.	10°59.999'	78°12.605'	20:25	366
263	GC 6	28.01.	10°59.998'	78°12.605'	21:03	361
264	CTD/RO 77	28.01.	10°59.992'	78°15.307'	21:52	400
265	GC 7	29.01.	10°59.989'	78°38.011'	00:18	1485
266	CTD/RO 78	29.01.	11°0.049'	78°38.018'	01:21	1500
267	BIGO-1-5	29.01.	12°14.89'	77°12.79'	13:00	101.1
268	GC 8	29.01.	12°14.500'	77°9.611'	13:41	78
269	CTD/RO 79	29.01.	12°16.690'	77°14.999'	14:39	128
270	GC 9	29.01.	12°23.276'	77°24.198'	16:15	243.2
271	GC 10	29.01.	12°23.294'	77°24.200'	16:47	243.6
272	GC 11	29.01.	12°23.299'	77°24.201'	17:21	243
273	GC 12	29.01.	12°23.327'	77°24.205'	17:46	243.8
274	GC 13	29.01.	12°23.353'	77°24.210'	18:14	244.7
275	MSS 40	29.01.	12°20.744'	77°34.136'	19:54	645
276	CTD/RO 80	29.01.	12°31.345'	77°33.922'	20:58	680
277	Profiler 6	29.01.	12°30.634'	77°34.233'	21:57	
278	GoFlo 12	29.01.	12°21.5'	77°21.7'	23:45	195
279	CTD/RO 81	30.01.	12°21.490'	77°21.713'	00:52	195
280	MSS 41	30.01.	12°21.489'	77°21.713'	01:34	195
281	CTD/RO 82	30.01.	12°22.517'	77°21.065'	03:21	204
282	In situ pumps 19	30.01.	13°9.897'	76°50.109'	12:00	253.5
283	CTD/RO 83	30.01.	13°9.897'	76°50.110'	16:09	254
284	MUC 47	30.01.	13°9.800'	76°50.127'	17:08	254
285	In situ pumps 20	30.01.	13°9.90'	76°50.10'	17:52	255.1
286	MUC 48	30.01.	13°10.041'	76°58.889'	21:45	599

287	MUC 49	30.01.	13°10.203''	76°57.802'	23:06	501
288	CTD/Ro 84	31.01.	12°13.128'	77°10.215'	04:56	68
289	MUC 50	31.01.	10°59.997'	77°47.388'	13:07	83.1

Abbreviations of the different gears/Measured parameter

Water column

CTD/RO (CTD Watersampling rosette): Physical properties, nutrients, N-isotope geochemistry
Glider: Physical properties, turbulence, O_2
GOFLO: Fe measurements
In situ pumps: radiotracer and C,N,P composition of particles
MSS (Microstructure Sensor): Physical properties and turbulence
Mooring: Currents (ADCP)

Benthos

BIGO-I, BIGO-II (Biogeochemical observatory, lander): Geochemistry, Microbiology
GC (Gravity corer): Geochemistry, Microbiology
MUC (Multiple corer video-guided): Geochemistry, Microbiology, Foraminifera
MB (Multibeam): bathymetrical mapping, Total: 65.7 h 458.4 nm
Profiler: Microprofiles, NO_3^- and O_2
SLM (Satelite lander MOLAB): ADCP current measurements
POZ Lander (Physical Oceanography Lander): ADCP current measurements