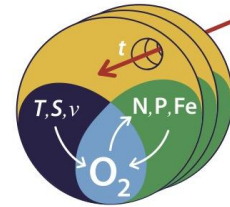


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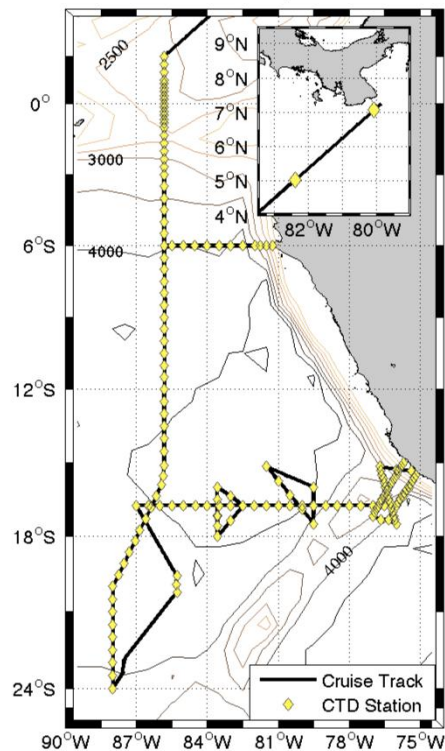
SFB 754

Short Cruise Report
RV Meteor Cruise No. 90

Cristobal (Panama) – Callao (Peru)
October 28 – November 28, 2012

Chief Scientist: Dr. Lothar Stramma
Captain: Thomas Wunderlich

Station Map M90



Objectives

During cruise M90 a combined chemical, physical and biological oceanographic research expedition took place in southeastern tropical Pacific to better understanding the variability of tropical oxygen minimum zones within the framework of the Kiel based SFB 754 (Climate – Biogeochemical interactions in the tropical Oceans).

Key goals for the second phase of SFB754 from data of this cruise were:

- Provide the oxygen distribution of eastern tropical South Pacific oxygen minimum zones with a focus on $\sim 86^{\circ}\text{W}$ and $\sim 16^{\circ}45'\text{S}$ (ship based repeat hydrographic sections);
- Determine long term oxygen trends based on historical data, ship measurements and profiling floats.
- Investigate eddy processes and their importance for lateral mixing and ventilation of the OMZ as well as productivity and nutrient utilization.
- Investigate the relationship between the dissolved Si isotope composition of silicic acid and the N-isotope composition of dissolved nitrate as a function of diatom productivity and water mixing from the centers of coastal upwelling to the open eastern equatorial Pacific Ocean.
- Compare the dissolved and particulate Si isotope compositions in order to investigate the factors controlling fractionation (diatom productivity, transport of water masses, upwelling intensity).

Additional isotope geochemical (Nd isotopes) information on water mass sources and mixing along the cruise track of the proposed cruise complementing the data base obtained during M77/3 and M77/4 through sampling of selected water column profiles. The data collected during cruise M90 will enable a more detailed understanding of the distribution and sources of near coastal water masses, as well as sources at greater distance.

In addition nitrous oxide, short lived nitrogenous compounds and redox-sensitive species were measured to identify key microbial processes occurring in the Oxygen Minimum Zone (OMZ). The ADCP measurements with the 75 kHz and the 38 kHz ADCP provided good current measurements down to about 1200 m depth and were a good measurement component to describe the large scale circulation and to identify the location of the eddies.

Narrative

On 25 October 2012 METEOR called port in Cristobal, Panama. Two scientists arrived on METEOR ahead of the group from Panama City to be present when the 3 containers were placed on the dedicated locations for unpacking. Riots happened in the days before in Colon. These riots escalated on 26 October and the two scientists had to stay in their hotel until the evening for their security. The main scientific group traveled from Panama City to the ship on 27 October, fortunately no riots took place on this day and all scientific crew arrived safe on the ship. The containers were unpacked on 27 October and the instruments were arranged in the labs. In the

afternoon of 28 October the pilot for the Panama Canal came on board, however he had to leave again as the bunker boat arrived too late in the morning and bunkering was not completed in time. Finally the passage through the Panama Canal began on 29 October in the evening. In the morning of 30 October METEOR loaded some lubricants for the engine off Balboa. Finally at 9:00 the transit to the first CTD station began about one day delayed. Two stations in the EEZ of Panama were carried out on October 30 and 31. During the earlier METEOR cruise M77/4 in 2009 Neodymium (Nd) isotopes were measured south of 2°N. As no Nd measurements existed before for the eastern North Pacific, this was a good opportunity to extend the data coverage of Nd towards Middle America. At the same time samples for concentration of REE's (rare earth elements) as well as for samples to be measured in the South Pacific were taken.

The section along 85°50'W covered before in 1993 and in 2009 was reached at 2°N in the afternoon of 1 November. To measure small scale changes in the equatorial channel, e.g. the Equatorial Undercurrent (EUC) the station spacing between 1°N and 1°S was reduced to 10 sm. The 85°50'W section was continued southward to 6°S reached in the evening of 4 November. To do measurements in a closed box in the eastern Pacific off Peru a section at 6°S measured in 2009 was measured again. The measurements along the section westwards started on 5 November following a transit to the Peruvian shelf from 85°50'W. The section along 6°S was finished on 7 November at 85°50'W and the 85°50'W section was investigated with CTD with bottle samples southward with a half degree station spacing. South of 15°30'S the southward section shifted gradually to 88°W at 20°S, to follow the track of the 1993 WOCE cruise to allow a direct comparison of the parameter distribution of both sections. The southernmost station on this section was made at 24°S on 13 November. From 24°S a transit followed to the region of the STRATUS mooring located at 19°56.3'S, 85°17.6'W.

On 15 November the 1994 WOCE section at 16°45'S was reached at 87°W and was measured eastward. However, one goal of the cruise M90 was to investigate eddies and eddies along the sections were measured with additional cross-sections. An anticyclonic eddy centered at about 83°30'W was crossed right in the middle on the 16°45'S section, and on 17 and 18 November a south-north section across the anticyclonic eddy was carried out. Afterwards the 16°45'S section was resumed eastward to 79°30'W, where a survey of a cyclonic eddy started on 19 November. The station work eastward along the 16°45'S section was resumed on 21 November and ended on 23 November on the Peruvian shelf.

An anticyclonic eddy was located here right of the coast centered at about 16°30'S, 76°30'W. From 24 November through the evening of 26 November two CTD sections with a station spacing of about 10 sm were made across this eddy. After a final ADCP section almost perpendicular at the cost at 15°S to 77°W RV METEOR was heading towards Callao, where the cruise M90 ended in the morning of 28 November 2012.

Acknowledgements

We like to thank captain Thomas Wunderlich, his officers and crew of RV METEOR for their support of our measurement program and for creating a very friendly and professional work 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 through the collaborative research program SFB 754 (Climate – Biogeochemical interactions in the tropical Oceans) supported by the German Science Foundation (DFG). We also benefited from the participation of W. Garcia, A. Lorenzo and L. Beltran from IMARPE (Peru), who performed own measurements and helped with the sampling. We like to thank also the authorities of Panama and Peru for their permission to carry out scientific work in their territorial waters. We gratefully acknowledge all this support.

2 Participants

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Baustian, Tina	Oxygen, nutrients	GEOMAR
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Stationlist M90

Stat.	CTD	Date	Time	Latitude	Longitude	Depth [m]	Max. p [db]	Comment
ME900/1552-1	001	30.10.12	00:35	07° 04.713' N	80° 04.740' W	2167	2000	1, 5, 8, 10, 11,14, 15s, 16, 17, 18
ME900/1553-1	002	31.10.12	18:03	05° 02.691' N	82° 23.021' W	3055	2956	1, 5, 7, 8, 10, 11, 14, 16, 17, 18
ME900/1554-1	003	01.11.12	20:17	02° 00.036' N	85° 49.978' W	2622	1203	5, 8, 14
ME900/1555-1	004	01..11.12	23:02	01° 40.016' N	85° 4 9.998' W	2630	2534	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18
ME900/1555-2	005	02.11.12	01:50	01° 40.007' N	85° 50.000' W	2632	252	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 17, 18
ME900/1556-1	006	02.11.12	04:06	01° 19.999' N	85° 50.003' W	2957	1202	
ME900/1557-1	007	02.11.12	06:46	01° 00.005' N	85° 50.000' W	2796	1202	
ME900/1558-1	008	02.11.12	08:34	00° 50.000' N	85° 49.990' W	2710	1205	
ME900/1559-1	009	02.11.12	10:26	00° 39.945' N	85° 50.073' W	2764	1202	1, 5, 8, 10
ME900/1560-1	010	02.11.12	12:29	00° 30.022' N	85° 50.000' W	2826	1201	14
ME900/1561-1	011	02.11.12	14:20	00° 20.002' N	85° 50.075' W	3052	1201	
ME900/1562-1	012	02.11.12	16:08	00° 10.013' N	85° 49.960' W	2904	1202	14
ME900/1563-1	013	02.11.12	18:54	00° 00.018' N	85° 50.007' W	2929	2832	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17
ME900/1563-2	014	02.11.12	21:10	00° 00.002' N	85° 49.975' W	2932	201	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17
ME900/1564-1	015	02.11.12	22:36	00° 10.006' S	85° 50.193' W	2728	1204	14
ME900/1565-1	016	03.11.12	00:31	00° 19.974' S	85° 49.980' W	3033	1204	14
ME900/1566-1	017	03.11.12	02:19	00° 29.979' S	85° 50.128' W	2783	1203	
ME900/1567-1	018	03.11.12	04:34	00° 39.996' S	85° 50.134' W	2535	1201	
ME900/1568-1	019	03.11.12	06:06	00° 49.992' S	85° 50.003' W	2421	1203	
ME900/1569-1	020	03.11.12	07:56	00° 59.988' S	85° 50.019' W	2251	1203	1, 7, 10, 13
ME900/1570-1	021	03.11.12	10:39	01° 19.992' S	85° 50.036' W	2466	1201	
ME900/1571-1	022	03.11.12	13:19	01° 39.988' S	85° 50.099' W	2549	1202	14
ME900/1572-1	023	03.11.12	16.10	02° 00.023' S	85° 49.988' W	2779	1202	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 17
ME900/1572-2	024	03.11.12	17:50	02° 00.022' S	85° 49.985' W	2787	220	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15s, 17
ME900/1573-1	025	03.11.12	20:06	02° 20.012' S	85° 50.018' W	3137	1203	
ME900/1574-1	026	03.11.12	22:47	02° 40.001' S	85° 50.006' W	3171	1202	14
ME900/1575-1	027	04.11.12	01:25	03° 00.054' S	85° 50.005' W	3235	1205	14
ME900/1576-1	028	04.11.12	04:58	03° 29.993' S	85° 49.987' W	3408	1203	5, 10, 13
ME900/1577-1	029	04.11.12	08:28	04° 00.001' S	85° 49.972' W	3466	1203	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13
ME900/1577-2	030	04.11.12	10:15	04° 00.002' S	85° 49.975' W	3462	201	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13
ME900/1578-1	031	04.11.12	13:20	04° 30.002' S	85° 49.926' W	3573	1202	14
ME900/1579-1	032	04.11.12	16:47	05° 00.046' S	85° 50.063' W	3838	1201	5, 10, 14, 15
ME900/1580-1	033	04.11.12	20:16	05° 30.005' S	85° 50.013' W	3920	1201	14
ME900/1581-1	034	04.11.12	23:53	05° 59.988' S	85° 50.037' W	4124	1203	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 15s, 17
ME900/1581-2	035	05.11.12	01:47	05° 59.997' S	85° 50.005' W	4121	201	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 17
ME900/1582-1	036	06.11.12	01:28	06° 00.022' S	81° 15.508' W	204	198	1,2,3, 4, 5, 8, 9, 10,11, 12, 13, 15s, 17
ME900/1583-1	037	06.11.12	03:20	05° 59.998' S	81° 29.997' W	2437	1201	1, 2, 3, 5, 8, 9, 10, 11, 13, 17
ME900/1583-2	038	06.11.12	05:03	05° 59.996' S	81° 29.997' W	2444	202	1, 2, 3, 5, 8, 9, 10, 11, 12, 13, 17
ME900/1584	039	06.11.12	06:48	06° 00.032' S	81° 45.012' W	4780	1203	5, 9, 10, 11, 12, 17
ME900/1585-1	040	06.11.12	08:54	05° 59.993' S	81° 59.992' W	?	1203	14
ME900/1586-1	041	06.11.12	12:13	06° 00.013' S	82° 30.090 W	4235	1201	1, 4, 5, 9, 10, 11, 12, 17
ME900/1587-1	042	06.11.12	15:29	05° 59.997' S	83° 00.014' W	5430	1201	14
ME900/1588-1	043	06.11.12	19:04	06° 00.007' S	83° 29.997' W	4052	1201	1, 5, 9, 10, 11, 12, 13, 17
ME900/1589-1	044	06.11.12	22:39	06° 00.077' S	84° 00.245' W	4096	1203	14
ME900/1590-1	045	07.11.12	02:05	05° 59.992' S	84° 31.061' W	4188	1201	1, 3, 5, 9, 10
ME900/1591-1	046	07.11.12	05:37	05° 59.993' S	85° 00.021' W	4069	1201	

ME900/1592-1	047	07.11.12	09:03	05° 59.994' S	85° 29.996' W	4135	1201	
ME900/1593-1	048	07.11.12	14:18	06° 29.981' S	85° 50.003' W	4136	1202	1, 3, 14
ME900/1594-1	049	07.11.12	17:56	07° 00.112' S	85° 50.006' W	3990	1202	9, 10, 14
ME900/1595-1	050	07.11.12	21:42	07° 29.929' S	85° 50.034' W	4156	1201	14
ME900/1596-1	051	08.11.12	01:22	07° 59.989' S	85° 49.972' W	4227	1202	1, 3, 5, 7, 9, 10, 11, 13
ME900/1596-2	052	08.11.12	02:56	07° 59.987' S	85° 49.969' W	4225	202	1, 3, 5, 7, 9, 10, 11, 12, 13, 15s
ME900/1597-1	053	08.11.12	06:05	08° 30.012' S	85° 49.978' W	4249	1203	
ME900/1598-1	054	08.11.12	09:34	09° 00.075' S	85° 49.869' W	4266	1202	
ME900/1599-1	055	08.11.12	13:06	09° 29.992' S	85° 50.000' W	4392	1202	1, 8, 10, 14
ME900/1600-1	056	08.11.12	20:46	10° 00.011' S	85° 50.005' W	4430	1202	1, 3, 4, 5, 7, 9, 10, 11, 12, 13, 15
ME900/1600-2	057	08.11.12	22:36	10° 00.011' S	85° 50.008' W	4438	203	1, 3, 4, 5, 7, 9, 10, 11, 12, 13, 15, 20
ME900/1601-1	058	09.11.12	01:42	10° 29.989' S	85° 50.003' W	4341	1202	14
ME900/1602-1	059	09.11.12	05:13	11° 00.022' S	85° 50.138' W	4839	1202	1, 9, 10
ME900/1603-1	060	09.11.12	08:44	11° 29.980' S	85° 49.955' W	4457	1201	
ME900/1604-1	061	09.11.12	12:17	12° 00.004' S	85° 50.012' W	4409	4450	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 17, 18
ME900/1604-2	062	09.11.12	16:08	11° 59.982' S	85° 50.081' W	4407	301	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15s, 17
ME900/1605-1	063	09.11.12	19:12	12° 29.998' S	85 50.024' W	4375	1204	14
ME900/1606-1	064	09.11.12	22:45	12° 59.936' S	85° 50.006' W	4071	1211	9, 10
ME900/1607-1	065	10.11.12	02:27	13° 30.000' S	85° 50.036' W	4706	1201	14
ME900/1608-1	066	10.11.12	06:05	13° 59.979' S	85° 50.054' W	4695	1201	1, 3, 4, 5, 7, 9, 10, 11, 13
ME900/1608-2	067	10.11.12	07:40	13° 59.969' S	85° 50.003' W	4605	201	1, 3, 4, 5, 7, 9, 10, 11, 12, 13
ME900/1609-1	068	10.11.12	11:05	14° 31.958' S	85° 50.079' W	4608	1203	
ME900/1610-1	069	10.11.12	15:22	15° 07.976' S	85° 50.015' W	4703	1201	1, 8, 9, 10, 15
ME900/1611-1	070	10.11.12	18:36	15° 31.959' S	85° 53.004' W	4667	1202	14
ME900/1612-1	071	10.11.12	21:35	15° 54.994' S	85° 57.031' W	4661	1202	1, 3, 4, 5, 7, 9, 10, 11, 13
ME900/1612-2	072	10.11.12	23:14	15° 55.000' S	85° 57.003' W	4662	202	1, 3, 4, 5, 7, 9, 10, 11, 12, 13, 15s
ME900/1613-1	073	11.11.12	02:27	16° 21.986' S	86° 09.993' W	4549	1202	14
ME900/1614-1	074	11.11.12	06:07	16° 49.981' S	86° 23.000' W	4508	1202	9, 10
ME900/1615-1	075	11.11.12	09:38	17° 16.951' S	86° 37.067' W	4519	1202	
ME900/1616-1	076	11.11.12	13:13	17° 43.971' S	86° 50.983' W	4529	1201	
ME900/1617-1	077	11.11.12	16:51	18° 10.997' S	87° 04.000' W	4401	4419	1, 5, 9, 10, 11, 12, 14, 15s, 17
ME900/1618-1	078	11.11.12	22:00	18° 37.985' S	87° 18.056' W	4429	1202	14
ME900/1619-1	079	12.11.12	01:34	19° 04.989' S	87° 31.016' W	4436	1501	9, 10
ME900/1620-1	080	12.11.12	05:26	19° 32.014' S	87° 45.997' W	4351	1202	
ME900/1621-1	081	12.11.12	09:11	19° 59.996' S	88° 00.032' W	4342	1203	
ME900/1621-2	082	12.11.12	10:08	19° 59.998' S	88° 00.084' W	4348	1202	1, 5, 9, 10, 11, 12, 15
ME900/1622-1	083	12.11.12	13:44	20° 29.989' S	88° 00.014' W	4331	1201	14
ME900/1623-1	084	12.11.12	17:26	20° 50.983' S	88° 00.009' W	4220	1202	9, 10, 14
ME900/1624-1	085	12.11.12	21:00	21° 30.006' S	88° 00.007' W	4225	1202	14
ME900/1625-1	086	13.11.12	00:39	21° 59.967' S	88° 00.036' W	4133	1202	1, 5, 9, 10, 11, 12
ME900/1626-1	087	13.11.12	04:24	22° 29.985' S	88° 00.010' W	4089	1001	
ME900/1627-1	088	13.11.12	07:54	22° 59.978' S	87° 59.976' W	4013	1201	
ME900/1628-1	089	13.11.12	11:27	23° 29.987' S	88° 00.039' W	4121	4156	1, 5, 8, 9, 10, 11, 12, 14, 15, 17, 18
ME900/1628-2	090	13.11.12	14:46	23° 30.000' S	88° 00.006' W	5761	401	1, 5, 8, 9, 10, 11, 12, 16, 16, 17, 18
ME900/1629-1	091	13.11.12	17:52	23° 59.972' S	87° 59.997' W	3969	1202	14
ME900/1630-1	092	14.11.12	19:38	20° 14.967' S	85° 17.003' W	4498	1202	14
ME900/1631-1	093	14.11.12	22:29	19° 55.089' S	85° 19.250' W	4564	2003	1, 5, 10
ME900/1632-1	094	15.11.12	01:40	19° 34.988' S	85° 17.018' W	4879	1202	14
ME900/1633-1	095	15.11.12	18:31	16° 45.032' S	87° 00.034' W	4467	1502	1, 5, 6, 9, 10, 11, 12, 15s
ME900/1634-1	096	15.11.12	22:22	16° 45.186' S	86° 29.983' W	4537	1502	14
ME900/1635-1	097	16.11.12	02:12	16° 45.025' S	85° 59.999' W	4615	1501	14

ME900/1636-1	098	16.11.12	06:07	16° 44.952' S	85° 30.000' W	4575	1502	9, 10
ME900/1637-1	099	16.11.12	09:51	16° 45.060' S	84° 59.988' W	4805	1503	
ME900/1638-1	100	16.11.12	13:37	16° 45.007' S	84° 30.011' W	4608	1500	14
ME900/1639-1	101	16.11.12	17:26	16° 44.984' S	83° 59.992' W	4640	1503	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 15
ME900/1639-2	102	16.11.12	19:20	16° 44.982' S	83° 59.992' W	4668	252	1, 2, 3, 4, 5, 6, 8, 9, 7, 10, 11, 12, 13, 14, 21
ME900/1640-1	103	16.11.12	22:24	16° 44.968' S	83° 30.088' W	4703	1503	14
ME900/1641-1	104	17.11.12	02:01	16° 44.981' S	82° 59.997' W	5337	1502	15s
ME900/1642-1	105	17.11.12	06:03	16° 44.956' S	82° 30.023' W	5778	1502	1, 3, 9, 10, 18,
ME900/1643-1	106	17.11.12	11:20	17° 21.977' S	83° 01.993' W	4670	1503	9, 10
ME900/1644-1	107	17.11.12	16:45	17° 59.994' S	83° 35.007' W	4439	1502	1, 2, 3, 5, 9, 10, 13, 14, 15s, 17, 21
ME900/1645-1	108	17.11.12	19:57	17° 34.981' S	83° 34.966' W	4366	1501	1, 3, 5, 9, 10, 13, 14
ME900/1646-1	109	17.11.12	23:13	17° 09.936' S	83° 34.879' W	4614	1502	1, 3, 4, 5, 6, 7, 9, 10, 11, 13, 16, 17
ME900/1646-2	110	18.11.12	01:14	17° 09.995' S	83° 34.994' W	5571	201	1, 3, 4, 5, 6, 7, 9, 10, 11, 13, 17, 18, 21
ME900/1647-1	111	18.11.12	05:04	16° 30.019' S	83° 34.958' W	4544	1501	9, 10, 13
ME900/1648-1	112	18.11.12	08:46	15° 59.965' S	83° 35.020' W	5612	1502	1, 9, 13, 17, 21
ME900/1649-1	113	18.11.12	13:41	16° 21.984' S	83° 02.027' W	4925	1501	14, 15s
ME900/1650-1	114	18.11.12	20:47	16° 44.889' S	82° 00.036' W	5042	1501	1, 5, 9, 10, 13, 16, 17, 21
ME900/1651-1	115	19.11.12	00:39	16° 45.035' S	81° 30.008' W	4534	1501	10, 13, 14
ME900/1652-1	116	19.11.12	04:25	16° 44.998' S	80° 59.994' W	4596	1501	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 16, 17, 21
ME900/1652-2	117	19.11.12	06:18	16° 44.998' S	80° 59.994' W	4588	201	1, 3, 5, 6, 8, 9, 10, 11, 13, 16, 17, 18, 21
ME900/1653-1	118	19.11.12	09:33	16° 45.096' S	80° 30.028' W	4620	1502	
ME900/1654-1	119	19.11.12	13:16	16° 45.017' S	80° 00.036' W	4447	1502	1, 9, 10, 15s
ME900/1655-1	120	19.11.12	17:04	16° 45.042' S	79° 30.066' W	4502	1501	14
ME900/1656-1	121	19.11.12	21:53	15° 59.932' S	79° 30.037' W	4650	1504	1, 5, 6, 7, 9, 10, 11, 13, 16, 17, 21
ME900/1656-2	122	19.11.12	23:57	15° 59.995' S	79° 30.005' W	4648	152	1, 5, 6, 7, 9, 10, 11, 13, 16, 17, 21
ME900/1657-1	123	20.11.12	12:03	15° 09.998' S	81° 30.005' W	4740	1502	1, 2, 3, 5, 8, 9, 10, 11, 12, 13, 15s
ME900/1658-1	124	20.11.12	17:08	15° 44.996' S	80° 59.960' W	4518	1500	3, 5, 9, 10, 11, 12, 13, 14
ME900/1659-1	125	20.11.12	22:17	16° 19.988' S	80° 30.005' W	4592	1501	1, 3, 4, 4, 5, 7, 9, 10, 11, 13
ME900/1659-2	126	20.11.12	23:50	16° 20.003' S	80° 30.002' W	4588	353	1, 3, 4, 5, 7, 9, 10, 11, 12, 13
ME900/1660-1	127	21.11.12	04:42	16° 54.969' S	80° 00.091' W	4359	1503	3, 5, 6, 9, 10, 11, 12, 13, 17
ME900/1661-1	128	21.11.12	09:58	17° 29.976' S	79° 30.052' W	3713	1504	1, 3, 5, 6, 9, 10, 11, 13, 17
ME900/1661-2	129	21.11.12	11:37	17° 29.986' S	79° 29.998' W	3737	202	1, 3, 5, 6, 9, 10, 11, 12, 13, 17
ME900/1662-1	130	21.11.12	18:21	16° 44.983' S	79° 00.051' W	4215	1502	1, 2, 5, 8, 9, 10, 11, 12, 14, 15s
ME900/1663-1	131	21.11.12	22:05	16° 44.943' S	78° 30.092' W	3573	1503	14
ME900/1664-1	132	22.11.12	01:59	16° 44.984' S	78° 00.060' W	2828	2829	1, 3, 5, 7, 9, 10, 11, 13, 14, 15
ME900/1664-2	133	22.11.12	04:22	16° 44.982' S	78° 00.056' W	3863	353	1, 3, 5, 7, 9, 10, 11, 12, 13, 15
ME900/1665-1	134	22.11.12	07:33	16° 45.034' S	77° 30.058' W	2596	1504	
ME900/1666-1	135	22.11.12	11:16	16° 45.016' S	76° 59.981' W	3242	1502	1, 2, 3, 5, 7, 8, 9, 10, 11, 13, 17
ME900/1666-2	136	22.11.12	12:49	16° 45.002' S	77° 00.000' W	3236	253	1, 2, 3, 5, 8, 9, 10, 11, 12, 13, 17, 18
ME900/1667-1	137	22.11.12	15:52	16° 44.974' S	76° 29.933' W	3582	1502	15s
ME900/1668-1	138	22.11.12	19:21	16° 44.959' S	76° 00.037' W	4136	4156	1, 3, 4, 5, 6, 7, 9, 10, 11, 13, 14, 16, 17, 21
ME900/1668-2	139	22.11.12	22:38	16° 45.003' S	76° 00.021' W	4123	252	1, 3, 4, 5, 6, 7, 9, 10, 11, 13, 16, 17, 21
ME900/1669-1	140	23.11.12	00:07	16° 37.947' S	75° 54.870' W	4260	1504	
ME900/1670-1	141	23.11.12	02:04	16° 28.968' S	75° 50.994' W	4373	1501	9, 10
ME900/1671-1	142	23.11.12	04:16	16° 21.969' S	75° 42.041' W	4245	1502	
ME900/1672-1	143	23.11.12	06:05	16° 13.970' S	75° 39.966' W	4414	1501	1, 3, 4, 5, 6, 7, 9, 10, 11, 13, 16, 17, 21
ME900/1673-1	144	23.11.12	08:04	16° 13.995' S	75° 40.012' W	4407	251	1, 3, 4, 5, 6, 7, 9, 10, 11, 13, 16,

								17, 18, 21
ME900/1673-1	145	23.11.12	09:27	16° 06.924' S	75° 35.039' W	5297	5359	1, 10, 15s
ME900/1674-1	146	23.11.12	13:48	15° 59.998' S	75° 26.025' W	5187	1501	10
ME900/1675-1	147	23.11.12	15:36	15° 52.974' S	75° 24.039' W	3758	1502	1, 9,10
ME900/1676-1	148	23.11.12	17:38	15° 45.003' S	75° 19.019' W	2084	1501	5, 8,9, 10, 11, 21
ME900/1677-1	149	23.11.12	19:29	15° 37.014' S	75° 14.994' W	1217	1205	
ME900/1678-1	150	23.11.12	21:16	15° 29.981' S	75° 09.998' W	778	745	
ME900/1679-1	151	23.11.12	23:24	15° 19.833' S	75° 20.829' W	199	200	1, 3, 5, 6, 8, 9, 10, 11, 13, 17, 21
ME900/1679-2	152	23.11.12	00:34	15° 19.833' S	75° 20.829' W	202	92	1, 3, 5, 6, 8, 9, 10, 11, 13, 15s, 17, 18, 21
ME900/1680-1	153	24.11.12	04:08	15° 16.982' S	76° 00.019' W	2914	1501	17
ME900/1681-1	154	24.11.12	08:44	15° 09.967' S	76° 42.022' W	3795	1501	1, 5, 9, 10, 11, 12
ME900/1682-1	155	24.11.12	11:10	15° 19.952' S	76° 39.048' W	3491	1502	
ME900/1683-1	156	24.11.12	13:26	15° 29.982' S	76° 36.001' W	3247	1501	5, 9, 10, 11, 12, 14, 15s, 17
ME900/1684-1	157	24.11.12	15:55	15° 40.001' S	76° 33.004' W	3027	1503	
ME900/1685-1	158	24.11.12	18:03	15° 49.988' S	76° 30.035' W	3154	1502	5, 9, 10, 11, 12, 14
ME900/1686-1	159	24.11.12	20:11	15° 59.985' S	76° 27.007' W	3239	1502	
ME900/1687-1	160	24.11.12	22:19	16° 09.979' S	76° 24.028' W	3352	1503	9, 10, 11, 12, 14
ME900/1688-1	161	25.11.12	00:36	16° 20.008' S	76° 21.030' W	3619	1502	
ME900/1689-1	162	25.11.12	02:48	16° 29.990' S	76° 17.988' W	3735	1501	1, 5, 9, 10, 11, 12, 17
ME900/1690-1	163	25.11.12	05:03	16° 39.994' S	76° 14.999' W	3932	1502	
ME900/1691-1	164	25.11.12	07:10	16° 49.981' S	76° 11.991' W	4016	1501	
ME900/1692-1	165	25.11.12	09:16	16° 59.993' S	76° 08.986' W	4149	1502	5, 9, 10, 11
ME900/1693-1	166	25.11.12	11:28	17° 10.016' S	76° 05.971' W	4168	1504	
ME900/1694-1	167	25.11.12	13:36	17° 19.975' S	76° 02.976' W	4399	1501	
ME900/1695-1	168	25.11.12	15:44	17° 29.997' S	76° 00.037' W	4320	1501	1, 5, 9, 10, 11
ME900/1696-1	169	25.11.12	18:46	17° 20.012' S	76° 19.926' W	4101	1200	
ME900/1697-1	170	25.11.12	21:26	17° 19.991' S	76° 39.978' W	4206	1203	15s
ME900/1698-1	171	26.11.12	00:19	17° 10.018' S	77° 00.057' W	3656	1202	5, 9, 10
ME900/1699-1	172	26.11.12	02:21	16° 59.992' S	76° 54.018' W	3435	1201	
ME900/1700-1	173	26.11.12	04:19	16° 49.988' S	76° 48.012' W	3453	1201	5, 9, 10
ME900/1701-1	174	26.11.12	06:18	16° 39.863' S	76° 41.917' W	3347	1204	
ME900/1702-1	175	26.11.12	08:16	16° 30.012' S	76° 36.045' W	3266	1202	
ME900/1703-1	176	26.11.12	10:16	16° 19.986' S	76° 30.023' W	3361	1202	
ME900/1704-1	177	26.11.12	12:17	16° 09.990' S	76° 24.028' W	3333	1203	
ME900/1705-1	178	26.11.12	14:14	15° 59.998' S	76° 18.015' W	3283	1201	
ME900/1706-1	179	26.11.12	16:16	15° 49.988' S	76° 11.007' W	3605	1202	
ME900/1707-1	180	26.11.12	18:10	15° 39.988' S	76° 06.037' W	3137	268	Only downcast to ~ 270 m, problems with the wire on the winch
ME900/1708-1	181	26.11.12	19:47	15° 30.011' S	76° 00.026' W	4684	1200	
ME900/1709-1	182	26.11.12	21:45	15° 20.021' S	75° 54.013' W	3003	1202	
ME900/1710-1	183	26.11.12	23:41	15° 09.972' S	75° 48.004' W	929	906	
ME900/1711-1	184	27.11.12	01:36	14° 59.998' S	75° 42.007' W	158	150	

1	Oxygen
2	Fe(II), peroxide
3	N ₂ O
4	N ₂ O incubations
5	Dissolved Gas
6	Anammox

7	N ₂ fixation
8	Trace metals
9	¹⁵ N
10	Nutrients
11	pH
12	Chlorophyll
13	DNA
14	Salinity (only for CTD calibration)
15	PFOS (15s: surface only from pump)
16	REEs
17	Si isotopes
18	Nd isotopes
19	Biomass
20	Diatoms
21	Pigments