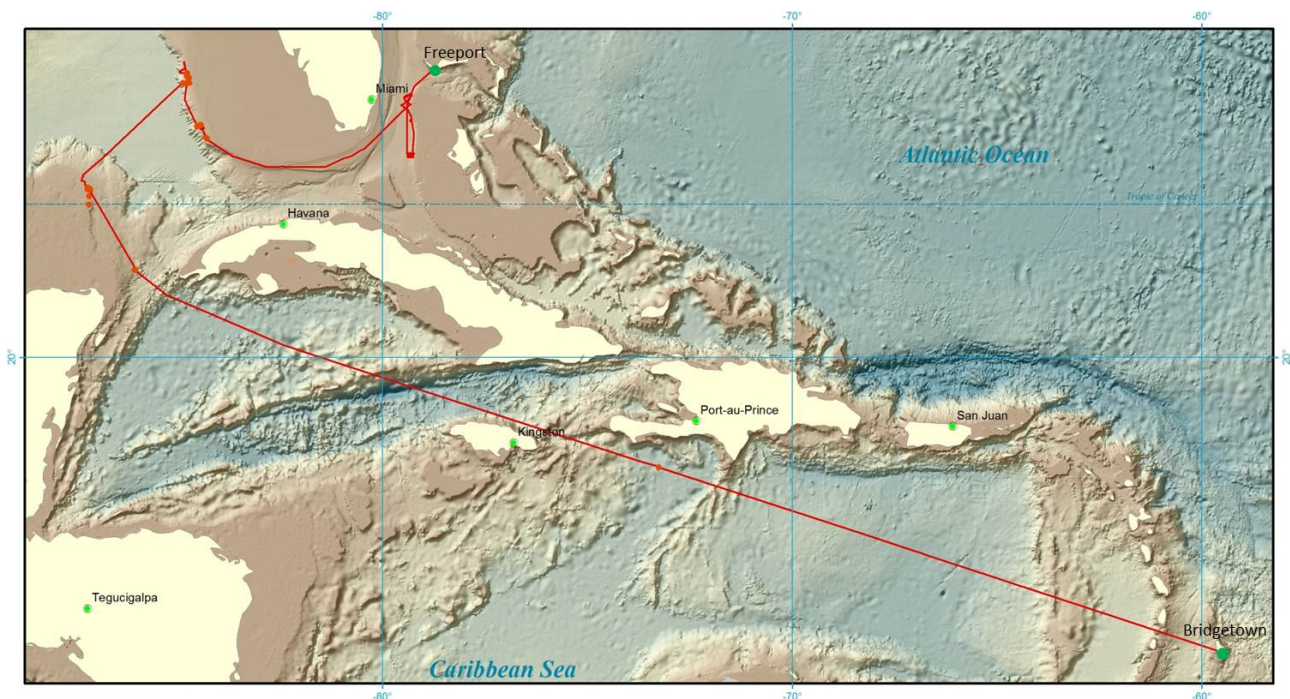


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Short Cruise Report RV MARIA S. MERIAN Cruise MSM 20-4

Bridgetown - Freeport
14.3.2012 – 7.4.2012
Chief Scientist: Dierk Hebbeln
Captain: Friedhelm von Staa



MSM 20-4
Bridgetown, Barbados to Freeport, Bahamas
14.03.2012 – 07.04.2012

0 20 40 80 120 160
Nautical Miles

MSM20-4 Overview
Central Meridian: -60.00
Mercator Projection
by Paul Wintersteller



Objectives

During cruise MSM 20-4 we aimed to study cold-water coral (CWC) ecosystems across a transect from the partly enclosed Gulf of Mexico to the "open" West Atlantic with respect to their distribution, appearance, faunal assemblage and vitality under present and past (glacial) conditions, and to identify the main physical and biological factors that are important in controlling CWC occurrence. The overarching objective was a trans-North Atlantic basin-scale study to compare the West Atlantic CWC occurrences with the well-known CWC ecosystems of the East Atlantic Ocean with respect to their recent situation and a potential linkage between both occurrences regarding their temporal development during the last glacial-interglacial cycle.

Thus, for this expedition the following three core questions have been formulated:

- (1) How diverse are the cold-water corals and the structure and composition of the entire cold-water coral ecosystems in the western Atlantic?
- (2) How did the cold-water coral ecosystems in the western Atlantic developed under varying climate forcing, as e.g. over the last glacial/interglacial cycle?
- (3) Which similarities and/or differences exist between the cold-water coral ecosystems in the western and in the eastern North Atlantic today and through their long-term development?

To answer these questions various target areas in the western Atlantic have been investigated during Leg MSM 20-4. These comprised "potential" CWC mounds along the Campeche Bank (Yucatan Peninsula) and the West Florida Slope within the Gulf of Mexico, and reported CWC occurrences in the Florida Straits. For all working sites station work started with a detailed hydro-acoustic mapping (multibeam echosounder, Parasound) which formed the base for planning optimised dives with an remotely operated vehicle (ROV). Extended video surveys with the ROV Cherokee were used to characterise the facies and fauna and to identify most suited coring sites. Based on this information, positions have been defined to conduct a dedicated sampling (gravity cores, box cores, grabs, water samples) and monitoring (CTD) programme within or in the direct vicinity of the observed cold-water coral ecosystems. During previous expeditions this strategy has already been proven to be very successful in sampling CWC material and data of their surrounding environment.

Narrative

In the evening of March 14, the RV MARIA S. MERIAN left the port of Bridgetown and anchored in the roadstead off the port. After servicing of the multibeam echosounder and after clearing some visa issues the vessel eventually left Barbados in the evening of March 15. Before reaching the first working area off the Mexican peninsula Yucatan 1600 nm of transit had to be passed. In the morning of March 21 we arrived in Mexican waters and started station work with a CTD cast followed by a multibeam echosounder system (MBES) and Parasound mapping along the eastern slope of the Campeche Bank heading towards the first "potential" cold-water coral site along the north-eastern Campeche Bank.

Between March 22 and March 24 the Campeche cold-water coral site has been intensively studied by means of bathymetric mapping, sub-sea floor profiling, water samples and CTD profiling, ROV video observations and targeted ROV sampling, and sediment sampling by grab sampler, box corer and gravity corer. During three ROV dives video observations revealed extended areas with live and dead cold-water coral framework (mainly *Lophelia* and *Enallopsammia*). The cold-water corals colonised the top areas of coalescent ridge structures, whereas the flanks were covered by coral rubble and the depression between the ridges revealed rather muddy sediments.

On March 25 RV MARIA S. MERIAN sailed northward towards the next working area at the West Florida slope. There an almost identical work programme has been followed between March 26 and

March 28. In this region also three ROV dives have been conducted. Here, the observed living cold-water corals and their associated ecosystems live on rocks that most likely have been fallen off a major escarpment ~40 m in height located just west of the zone inhabited by cold-water corals.

Between March 29 and March 30 the focus was on a working area a bit further south, named Southwest Florida slope. The same approach as followed before was also applied here. With two ROV dives a very similar setting as observed further north was found. This result was corroborated by the bathymetric mapping and by the sub-sea floor profiling. Again, the entire working area was characterised by a major escarpment with some few cold-water corals living on rocks in front of it.

Following a full day of transit (March 31), RV MARIA S. MERIAN received customs clearance on the roadstead off Bimini in the morning of April 1. Immediately afterwards, station work commenced a few miles to the northwest with the standard programme. The first ROV dive suffered from the high velocity of the Gulf Stream, nevertheless, it revealed a new view on this setting. Having been described before as a coral mound setting, this dive revealed a partly rocky sea floor probably resulting from a major land slide. This result was supported by a second ROV dive on the following day. Thus, here the cold-water corals use the rocks as settling ground, but they do not produce the mound-like structures at the sea floor by themselves. Station work ended here on April 2.

RV MARIA S. MERIAN spent the remaining days of the expedition (March 3 to March 6) in the working area Great Bahama Bank further south. Again, it has been found that those sea floor elevations that previously have been interpreted as coral mounds are basically rocks with a thin cover of sediments overgrown by partly living cold-water coral ecosystems. Combining the observations of four ROV dives revealed a depth zonation for the living cold-water corals. Whereas these are largely restricted to a depth window of ~580 m to 630 mm abundant fossil cold-water corals at the sea floor in greater as well as in shallower depths show that their depth range must have been greater in the recent past. Numerous ROV samples as well as box and gravity cores have been collected to constrain the temporal development of these ecosystems in the past.

On April 7 in the morning RV MARIA S. MERIAN reached Freeport, Bahamas, and the cruise MSM 20-4 ended.

Acknowledgements

We like to thank captain Friedhelm von Staa, his officers and crew of RV MARIA S. MERIAN for their support of our programme and for creating a very friendly atmosphere on board. We also greatly acknowledge the support by the “Auswärtiges Amt” (German Foreign Office). Its staff in Mexico City, Trinidad, Kingston, Nassau and Washington tried – partly in the last moment – to obtain all necessary permits and visa to make this expedition go to those working areas intended.

The ship time on RV MARIA S. MERIAN was provided by the Deutsche Forschungsgemeinschaft (DFG) within the core program METEOR/MERIAN. This project contributes to the international TRACES (Trans-Atlantic Cold-Water Coral Ecosystem Study) initiative. We also benefited from financial contributions by the research institutes involved. We gratefully acknowledge all this support.

Cruise participants

Name	Discipline	Institution
Hebbeln, Dierk	Marine Geology / Chief Scientist	MARUM
Wienberg, Claudia	Marine Geology	MARUM
Matos, Lelia	Marine Geology	MARUM
Dehning, Klaus	Marine Geology	MARUM
Klann, Marco	Marine Geology	MARUM
Nowald, Nicolas	ROV	MARUM
Ruhland, Götz	ROV	MARUM
Wintersteller, Paul	Marine Geology	MARUM
Freiwald, André	Geobiology	SAM
Beuck, Lydia	Geobiology	SAM
Joseph, Nina	Geobiology	SAM
Wilsenack, Maik	Geobiology	SAM
Dullo, Wolf-Christian	Hydrology	GEOMAR
Glogowski, Silke	Hydrology	GEOMAR
Garlichs, Thorsten	Hydrology	GEOMAR
Jansen, Friedhelm	Meteorology	MPI-HH
Reyes, Hector	Marine Biology	UABCS
Eberli, Gregor	Marine Geology	RSMAS
Taviani, Marco	Marine Biology	ISMAR-CNR
Wilke, Thomas	Journalism	BdW

MARUM	Zentrum für Marine Umweltwissenschaften, Universität Bremen
SAM	Senckenberg am Meer, Wilhelmshaven
GEOMAR	Helmholtz-Zentrum für Ozeanforschung, Kiel
MPI-HH	Max Planck Institut für Meteorologie, Hamburg
UABCS	Universidad Autónoma de Baja California Sur, La Paz, Mexico
RSMAS	Rosenstiel School for Marine Sciences, University of Miami, USA
ISMAR-CNR	Institute of Marine Sciences, National Research Council, Bologna, Italy
BdW	Bild der Wissenschaft, Lübeck

Station list MSM 20-4

Station No. GeoB No.	Ship No. MSM20/	Device	Date	Time	Latitude	Longitude	Water Depth	Recovery	Remarks
			(in 2012)	(UTC)	(°N)	(°W)	(m)	(m)	
Carribean Sea									
16301-1		CTD+WS	18.03.	17:10	17°26.382	73°15.403	4000		test station
16301-2		ROV	18.03.	18:02	17°26.474	73°15.342	4000		test dive#1 down to 200m
16302-1		ROV	20.03.	17:05	22°12.888	82°11.684	3603		Posidonia test down to 200m water depth
Yucatan/Campeche									
16303-1	089-1	CTD+WS	21.03.	14:59	22°00.980	86°02.952	1246		
16304-1	090-1	MBES+PS	21.03.	16:26	21°59.540	86°09.430	1000		
		<i>end</i>	22.03.	05:18	23°50.090	87°12.320	510		
16305-1	091-1	CTD+WS	22.03.	05:21	23°49.875	87°12.271	506		
16306-1	092-1	MBES+PS	22.03.	06:37	23°52.371	87°13.865	532		
		<i>end</i>	22.03.	11:49	23°51.160	87°07.590	649		
16307-1	093-1	ROV	22.03.	13:51	23°40.829	87°10.031	547		dive #2, strong currents, sampling of live and dead Lophelia
		<i>end</i>	22.03.	16:20	23°50.485	87°10.714	577		
16308-1	094-1	BC	22.03.	18:02	23°50.121	87°10.484	565	<0.05	few sediment with fossil corals
16309-1	095-1	BC	22.03.	20:03	23°49.731	87°10.319	578	<0.05	few coral fragments
16309-2	095-2	BC	22.03.	20:38	23°49.732	87°10.319	580	./.	not released
16310-1	096-1	BC	22.03.	22:18	23°29.443	87°10.217	566	0.32	coral rubble
16310-2	096-2	GC (6m)	22.03.	23:07	23°49.443	87°10.217	565	5.01	coral-bearing core, over-penetrated, top (~2m) was lost
16310-3	096-3	GC (12m)	23.03.	01:04	23°49.450	87°10.220	573	10.60	coral-bearing core
16311-1	097-1	MBES+PS	23.03.	02:04	23°42.280	87°09.900	589		
		<i>end</i>	23.03.	12:10	23°49.300	87°09.910	587		
16312-1	098-1	ROV	23.03.	14:31	23°50.345	87°11.761	523		dive #3, 5 samples
		<i>end</i>	23.03.	18:31	23°52.519	87°12.485	531		
16313-1	099-1	BC	23.03.	18:49	23°52.367	87°12.373	525	0.31	coral rubble
16313-2	099-2	GC (12m)	23.03.	19:34	23°52.365	87°12.373	553	2.51	coral-bearing core, lithified sediments/ corals at the base
16314-1	100-1	GC (12m)	23.03.	20:52	23°50.876	87°11.612	544	./.	empty
16315-1	101-1	BC	23.03.	22:09	23°50.052	87°08.044	652	./.	box corer tilted
16316-1	102-1	CTD+WS	24.03.	00:20	23°51.510	87°12.120	576		JoJo- CTD for 12 hours; water sampling
16316-2	102-2	CTD+WS	24.03.	01:12	23°51.650	87°12.120	570		
16316-3	102-3	CTD+WS	24.03.	02:09	23°51.730	87°12.130	566		
16316-4	102-4	CTD+WS	24.03.	03:08	23°51.730	87°12.130	571		
16316-5	102-5	CTD+WS	24.03.	04:01	23°51.720	87°12.130	559		
16316-6	102-6	CTD+WS	24.03.	05:02	23°51.770	87°12.130	573		
16316-7	102-7	CTD+WS	24.03.	05:57	23°51.650	87°12.150	546		coral framework in the CTD frame
16316-8	102-8	CTD+WS	24.03.	07:00	23°51.740	87°12.130	565		
16316-9	102-9	CTD+WS	24.03.	07:58	23°51.700	87°12.150	560		
16316-10	102-10	CTD+WS	24.03.	09:00	23°51.810	87°12.120	560		

Station No. GeoB No.	Ship No. MSM20/	Device	Date	Time	Latitude	Longitude	Water Depth	Recovery	Remarks
			(in 2012)	(UTC)	(°N)	(°W)	(m)	(m)	
16316-11	102-11	CTD+WS	24.03.	10:04	23°51.850	87°12.130	564		
16316-12	102-12	CTD+WS	24.03.	11:01	23°51.520	87°12.120	563		
16316-13	102-13	CTD+WS	24.03.	12:01	23°51.520	87°12.130	558		
16317-1	103-1	ROV	24.03.	13:37	23°51.120	87°12.110	542		dive #4, 1 sample, dive aborted due to technical problems
		<i>end</i>	24.03.	15:02	23°51.770	87°12.530	555		
16318-1	104-1	GC (12m)	24.03.	16:58	23°51.399	87°12.160	556	4.73	coral-bearing core
16319-1	105-1	BC	24.03.	18:06	23°51.649	87°12.088	579	./.	not released
16319-2	105-2	BC	24.03.	18:46	23°51.636	87°12.069	578	0.42	coral rubble
16319-3	105-3	GC (12m)	24.03.	19:30	23°51.642	87°12.080	579	7.95	some layers with coral fragments
16320-1	106-1	BC	24.03.	20:41	23°50.309	87°09.009	625	0.40	drift sediment
16320-2	106-2	GC (12m)	24.03.	21:28	23°50.305	87°09.003	626	4.39	off-mound core, drift sediment body
16321-1	107-1	BC	25.03.	00:22	23°50.009	87°08.027	640	0.41	abundant coral (large) fragments
16322-1	108-1	MBES+PS	25.03.	01:04	23°50.160	87°08.030	643		
		<i>end</i>	25.03.	04:02	24°01.420	87°20.630	529		
West Florida Slope									
16323-1	109-1	CTD+WS	25.03.	23:52	26°11.756	84°52.908	1514		
16324-1	110-1	CTD+WS	26.03.	02:17	26°11.914	84°43.550	527		
16325-1	111-1	MBES+PS	26.03.	02:47	26°11.900	84°43.550	527		
		<i>end</i>	26.03.	11:09	26°20.250	84°44.220	386		
16326-1	112-1	ROV	26.03.	13:39	26°24.910	84°46.646	501		dive #5, aborted due to technical problems , 5 samples
		<i>end</i>	26.03.	16:45	26°24.428	84°46.643	497		
16327-1	113-1	Grab	26.03.	18:18	26°24.047	84°46.456	501	bulk	sandy sediments
16328-1	114-1	Grab	26.03.	19:08	26°23.852	84°46.390	515	bulk	sandy sediments
16329-1	115-1	Grab	26.03.	19:56	26°23.657	84.46.323	513	bulk	sandy sediments
16330-1	116-1	Grab	26.03.	20:50	26°23.467	84°46.256	512	bulk	sandy sediments
16331-1	117-1	Grab	26.03.	21:44	26°23.631	84°46.296	510	bulk	few carbonatic rocks, sponges, <i>Anthomastos</i>
16331-2	117-2	Grab	26.03.	22:24	26°23.630	84°46.296	510	bulk	rocks with antipatharia attached
16332-1	118-1	Grab	26.03.	23:23	26°23.077	84°46.129	506	bulk	sandy sediments
16333-1	119-1	MBES+PS	27.03.	03:06	26°26.238	84°47.089	509		
		<i>end</i>	27.03.	12:21	26°20.140	84°45.530	518		
16334-1	120-1	ROV	27.03.	13:19	26°20.177	84°45.564	519		dive #6, 6 samples
		<i>end</i>	27.03.	15:26	26°20.195	84°45.492	508		
16335-1	121-1	BC	27.03.	16:38	26°20.197	84°45.590	509	./.	not released
16335-2	121-2	BC	27.03.	17:07	26°20.196	84°45.589	508	bulk	few sediment and coral rubble
16336-1	122-1	Grab	27.03.	18:09	26°20.206	84°45.488	498	bulk	few coral rubble
16337-1	123-1	Grab	27.03.	18:52	26°20.223	84°45.588	508	./.	not released
16337-2	123-2	Grab	27.03.	19:26	26°20.222	84°45.588	507	bulk	coral rubble
16337-3	123-3	BC	27.03.	20:13	26°20.244	84°45.588	509	bulk	very few coral rubble
16338-1	124-1	GC (6m)	27.03.	21:16	26°22.314	84°45.850	480	1.21	sandy sediments
16339-1	125-1	GC (6m)	27.03.	22:26	26°25.225	84°46.225	500	bulk	sandy sediments

Station No. GeoB No.	Ship No. MSM20/	Device	Date	Time	Latitude	Longitude	Water Depth	Recovery	Remarks
			(in 2012)	(UTC)	(°N)	(°W)	(m)	(m)	
16340-1	126-1	CTD+WS	27.03.	23:58	26°20.193	84°45.587	519		JoJo- CTD for 12 hours; water sampling
16340-2	126-2	CTD+WS	28.03.	00:58	26°20.194	84°45.588	520		
16340-3	126-3	CTD+WS	28.03.	01:58	26°20.184	84°45.587	521		
16340-4	126-4	CTD+WS	28.03.	02:57	26°20.194	84°45.587	520		
16340-5	126-5	CTD+WS	28.03.	03:58	26°20.195	84°45.587	521		
16340-6	126-6	CTD+WS	28.03.	04:49	26°20.195	84°45.588	521		
16340-7	126-7	CTD+WS	28.03.	05:57	26°20.197	84°45.588	520		
16340-8	126-8	CTD+WS	28.03.	06:57	26°20.194	84°45.586	520		
16340-9	126-9	CTD+WS	28.03.	07:49	26°20.193	84°45.588	520		
16340-10	126-10	CTD+WS	28.03.	08:58	26°20.198	84°45.587	520		
16340-11	126-11	CTD+WS	28.03.	10:04	26°20.194	84°45.588	520		
16340-12	126-12	CTD+WS	28.03.	10:58	26°20.194	84°45.588	520		
16340-13	126-13	CTD+WS	28.03.	11:58	26°20.193	84°45.589	520		
16341-1	127-1	ROV	28.03.	13:28	26°18.673	84°44.359	449		dive #7, 5 samples
		<i>end</i>	28.03.	16:13	26°19.218	84°44.388	409		
16342-1	128-1	Grab	28.03.	17:34	26°20.475	84°46.742	629	bulk	coral rubble and sandy sediments
16343-1	129-1	Grab	28.03.	18:28	26°20.559	84°46.775	631	./.	empty
16344-1	130-1	CTD+WS	28.03.	21:28	26°12.012	84°47.305	1002		
Southwest Florida Slope									
16345-1	131-1	CTD+WS	29.03.	04:52	25°14.991	84°32.017	1274		
16346-1	132-1	MBES+PS	29.03.	06:06	25°14.999	84°31.997	510		
		<i>end</i>	29.03.	11:54	25°13.724	84°26.098	545		
16347-1	133-1	ROV	29.03.	13:13	25°16.060	84°26.951	568		dive #8; 10 samples
		<i>end</i>	29.03.	18:13	25°16.513	84°26.413	429		
16348-1	134-1	Grab	29.03.	19:09	25°16.529	84°26.491	413	bulk	two rocks (~10 cm in diameter)
16348-2	134-2	Grab	29.03.	19:43	25°16.529	84°26.489	413	bulk	very few small coral rubble
16348-3	134-3	Grab	29.03.	20:25	25°16.533	84°26.485	411	bulk	very few sand and very few small coral rubble
16348-4	134-4	Grab	29.03.	21:02	25°16.531	84°26.477	411	./.	empty
16349-1	135-1	MBES+PS	29.03.	21:37	25°16.370	84°26.661	502		
		<i>end</i>	30.03.	12:39	24°57.600	84°17.350	500		
16350-1	136-1	ROV	30.03.	13:08	24°57.581	84°17.359	487		dive #9, 7 samples
		<i>end</i>	30.03.	18:20	24°58.517	84°17.932	472		
16351-1	137-1	GC (6m)	30.03.	19:30	24°59.051	84°18.342	478	./.	empty, a bit of sand in the core catcher
16352-1	138-1	Grab	30.03.	20:24	24°58.636	84°18.102	468	./.	empty, a bit of sand
16353-1	139-1	Grab	30.03.	21:14	24°58.428	84°17.916	458	bulk	rocks (20x30 cm)
16354-1	140-1	Grab	30.03.	22:08	24°58.163	84°17.972	471	bulk	sandy sediments
16355-1	141-1	MBES+PS	30.03.	22:50	24°58.741	84°17.522	462		
		<i>end</i>	31.03.	01:01	25°56.400	84°16.920	463		
Bimini Slope									
16356-1	142-1	CTD+WS	01.04.	17:35	25°49.500	79°27.999	766		
16357-1	143-1	MBES+PS	01.04.	18:14	25°49.500	79°28.000	766		

Station No. GeoB No.	Ship No. MSM20/	Device	Date	Time	Latitude	Longitude	Water Depth	Recovery	Remarks
			(in 2012)	(UTC)	(°N)	(°W)	(m)	(m)	
Bimini Slope									
16356-1	142-1	CTD+WS	01.04.	17:35	25°49.500	79°27.999	766		
16357-1	143-1	MBES+PS	01.04.	18:14	25°49.500	79°28.000	766		
		end	01.04.	19:17	25°51.950	79°27.300	744		
16358-1	144-1	ROV	01.04.	21:38	25°52.520	79°27.905	750		dive #10; strong currents!
		end	01.04.	23:18	25°53.685	79°27.885	695		
16359-1	145-1	GC (6m)	02.04.	00:48	25°51.940	79°27.974	734		few corals and lithified sediment in the core catcher
16360-1	146-1	GC (6m)	02.04.	01:41	25°51.810	79°27.972	700	2.00	Core bent, top disturbed
16361-1	147-1	MBES+PS	02.04.	02:12	25°51.930	79°28.424	747		
		end	02.04.	11:33	25°58.680	79°17.180	430		
16362-1	148-1	ROV	02.04.	13:15	25°55.690	79°18.642	514		dive #11, 16 samples
		end	02.04.	18:27	25°57.244	79°18.579	520		
16363-1	149-1	Grab	02.04.	19:37	25°55.492	79°17.542	465	bulk	slightly sandy mud
16363-2	149-2	GC (6m)	02.04.	20:21	25°55.493	79°17.542	465	5.69	overpenetration, top is lost (~30-40 cm)
16363-3	149-3	GC (12m)	02.04.	21:39	25°55.490	79°17.540	465	10.27	off-mound core
16364-1	151-1	GC (6m)	03.04.	01:21	25°42.931	79°32.356	830	1.60	sandy sediments
16365-1	152-1	MBES+PS	03.04.	01:47	25°43.269	79°32.309	834		
		end	03.04.	12:38	24°33.000	79°21.050	663		
Great Bahama Bank Slope									
16366-1	153-1	ROV	03.04.	14:03	24°33.120	79°21.081	673		dive #12; dive aborted due to technical problems, 5 samples
		end	03.04.	15:54	24°33.559	79°21.060	648		
16367-1	154-1	CTD+WS	03.04.	17:16	24°33.194	79°21.059	661		
16367-2	154-2	BC	03.04.	17:58	24°33.193	79°21.058	660	0.29	Enallopsamia rubble, muddy sediments
16368-1	155-1	BC	03.04.	18:47	24°33.227	79°21.062	663	0.47	Enallopsammia rubble, muddy sediments
16368-2	155-2	GC (6m)	03.04.	19:40	24°33.214	79°21.060	661	0.53	coral-bearing core
16369-1	156-1	GC (6m)	03.04.	20:32	24°33.193	79°21.058	660	2.29	same position as 16367, corals at the top
16370-1	157-1	BC	03.04.	21:57	24°35.791	79°21.241	629	./.	not released,
16370-2	157-2	BC	03.04.	23:01	24°35.806	79°21.248	636	./.	not released
16371-1	158-1	BC	03.04.	23:59	24°35.799	79°21.170	619	./.	not released
16371-2	158-2	BC	04.04.	00:40	24°35.748	79°21.170	608	./.	empty
16372-1	159-1	MBES+PS	04.04.	01:10	24°35.758	79°21.191	615		
		end	04.04.	12:18	24°33.340	79°21.330	685		
16373-1	160-1	ROV	04.04.	13:01	24°33.511	79°21.316	682		dive #13, 3 samples
		end	04.04.	14:18	24°34.749	79°21.139	610		
16374-1	160-5	ROV	04.04.	15:53	24°33.730	79°19.804	654		dive #14, 6 samples
		end	04.04.	17:54	24°34.376	79°19.876	660		
16375-1	161-1	BC	04.04.	19:09	24°33.524	79°21.297	677	bulk	foraminifera-pteropod sand with coral rubble
16376-1	162-1	BC	04.04.	19:56	24°33.564	79°21.230	673	0.21	<i>Lophelia</i> rubble (abundant, large!)
16377-1	163-1	BC	04.04.	20:41	24°33.624	79°21.212	641	bulk	few coral fragments, live <i>Aphrocallistes</i>

Station No. GeoB No.	Ship No. MSM20/	Device	Date	Time	Latitude	Longitude	Water Depth	Recovery	Remarks
			(in 2012)	(UTC)	(°N)	(°W)	(m)	(m)	
16377-2	163-2	GC (6m)	04.04.	21:27	24°33.625	79°21.212	635	5.65	coral-bearing core
16378-1	164-1	GC (6m)	04.04.	22:34	24°33.570	79°21.231	673	1.24	tube bent; <i>Lophelia</i> fragments in the weight of the corer
16379-1	165-1	GC (6m)	04.04.	23:56	24°33.638	79°21.199	634	5.01	coral-bearing core, top (~20cm) as bulk sample (sieved)
16379-2	165-2	BC	05.04.	00:54	24°33.636	79°21.200	622	./.	not released
16379-3	165-3	BC	05.04.	01:28	24°33.636	79°21.200	623	./.	not released
16380-1	166-1	MBES+PS	05.04.	02:14	24°33.491	79°21.125	676		
		end	05.04.	11:00	24°37.105	79°21.029	687		
16381-1	167-1	ROV	05.04.	13:09	24°36.855	79°20.845	695		dive #15, 7 samples
		end	05.04.	16:20	24°37.771	79°20.719	694		
16382-1	168-1	BC	05.04.	17:40	24°37.425	79°20.711	658	0.28	coral rubble
16382-2	168-2	GC (6m)	05.04.	18:26	24°37.424	79°20.702	663	1.09	coral-bearing core
16383-1	169-1	GC (6m)	05.04.	19:21	24°37.536	79°20.750	669	0.78	tube bent; coral-bearing core, lithified sediment at the base
16384-1	170-1	GC (6m)	05.04.	20:25	24°38.580	79°17.698	633	5.73	off-mound core, overpenetrated, core top (~20cm) lost
16385-1	171-1	GC (12m)	05.04.	22:09	24°33.620	79°21.220	655	1.32	coral-bearing core, same position as 16377-2
16386-1	172-1	CTD+WS	05.04.	23:01	24°33.507	79°21.225	678		JoJo- CTD for 12 hours; water sampling
16386-2	172-2	CTD+WS	06.04.	00:01	24°33.508	79°21.225	679		
16386-3	172-3	CTD+WS	06.04.	01:00	24°33.508	79°21.224	678		
16386-4	172-4	CTD+WS	06.04.	02:00	24°33.507	79°21.225	678		
16386-5	172-5	CTD+WS	06.04.	03:00	24°33.508	79°21.224	678		
16386-6	172-6	CTD+WS	06.04.	04:01	24°33.508	79°21.225	678		
16386-7	172-7	CTD+WS	06.04.	05:01	24°33.508	79°21.225	677		
16386-8	172-8	CTD+WS	06.04.	06:00	24°33.506	79°21.224	678		
16386-9	172-9	CTD+WS	06.04.	07:00	24°33.509	79°21.224	678		
16386-10	172-10	CTD+WS	06.04.	07:59	24°33.506	79°21.226	678		
16386-11	172-11	CTD+WS	06.04.	09:00	24°33.505	79°21.226	678		
16386-12	172-12	CTD+WS	06.04.	10:00	24°33.507	79°21.224	678		
16386-13	172-13	CTD+WS	06.04.	10:59	24°33.506	79°21.226	678		
16386-14	172-14	CTD+WS	06.04.	12:00	24°33.505	79°21.227	678		
16387-1	173-1	ROV	06.04.	13:45	24°35.780	79°16.583	560		dive #16; aborted due to strong currents
		end	06.04.	14:03	24°35.737	79°16.605	561		
16388-1	173-2	ROV	06.04.	15:17	24°35.593	79°16.790	572		dive #17, 5 samples
		end	06.04.	16:44	24°35.705	79°16.933	583		
16389-1	174-1	MBES+PS	06.04.	18:18	24°35.712	79°17.942	613		
		end	06.04.	19:47	24°36.020	79°21.564	691		

MBES+PS : Mapping (EM120 & 1002), Parasound
CTD+WS: CTD and rosette water sampler
BC: 50*50 cm box corer
GC: gravity corer with either 6 m or 12 core barrel length
Grab: Van-Veen-type grab sampler
ROV: Remotely Operated Vehicle