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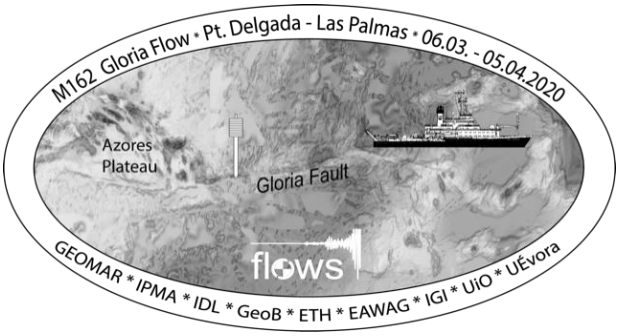
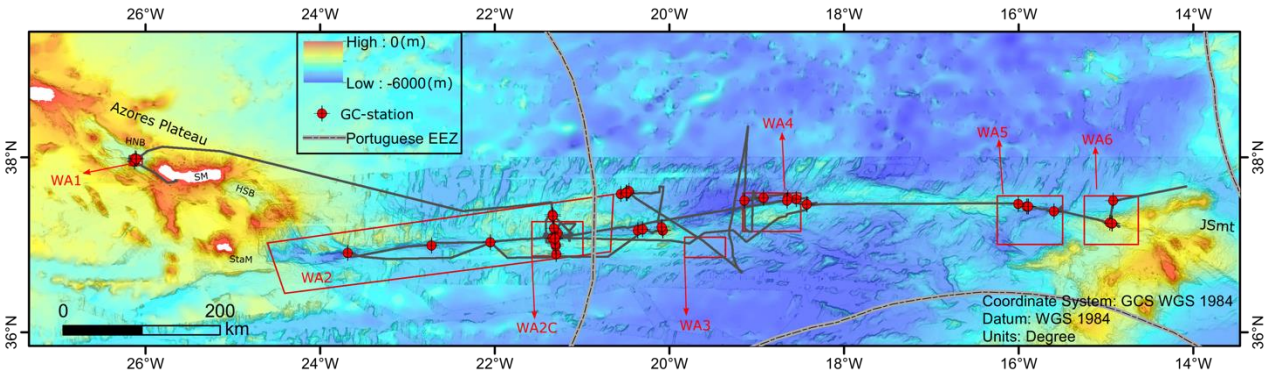
Short Cruise Report
Meteor M162

Ponta Delgada - Emden
06.03.2020 – 10.04.2020
Chief Scientist: Dr. Christian Hensen
Captain: Detlef Korte





Cruise track and working areas (WA 1-6) of M162. Red dots represent coring stations.

Objectives

The overarching aim of cruise M162 was to find out if seismically active oceanic fracture zones like the Gloria Fault are places of active fluid circulation that could represent a link between fluid flow processes between mid-ocean ridges and continental margins. The verification of active fluid flow along the Gloria Fault is relevant with respect to (i) the relationship between fluid flow and seismic activity, (ii) the spread of (chemoautotrophic) ecosystems in the abyssal ocean, (iii) the control of fluids on the strength of the fault interfaces, and/or (iv) the role of fluids in triggering or supporting high magnitude fracture zone earthquakes. Specifically, the following key tasks were to (i) find out if there are sites of active fluid discharge along the Gloria Fault (and more general along transform faults and oceanic fracture zones) and (ii) to constrain the origin of the fluids and decipher processes involved, (iii) search for evidence for ongoing serpentinization, (iv) find indications for existing deep-sea chemoautotrophic ecosystems along the fault system, and (v) analyse the sedimentary record with respect to paleo-seismic events.

Narrative

On March 5, 2020 an international group of 25 scientists arrived on RV Meteor in Ponta Delgada. The collaborating group was formed by members of the GEOMAR Helmholtz-Centre for Ocean Research Kiel, the Faculty of Geosciences at Bremen University, the IPMA in Lisbon, the Dom Luiz Institute at the Faculty of Sciences of the University of Lisbon, at Lisbon University, the University of Évora (Portugal), the ETH Zürich, the EAWAG Dübendorf (Switzerland), the IGI Ltd. Bideford (UK), and the CEED at Oslo University. This first day onboard was used to set up laboratories and prepare all scientific equipment. Unfortunately, due to a severe damage of the AUV “Abyss” that occurred on cruise AL532 this cruise had to be conducted without AUV and team members.

RV Meteor departed from Ponta Delgada in the morning of March 6, 2020. After a transit of only 3 hours Meteor reached the first working area (WA) 1 located in the Hirondelle Basin between the islands Sao Miguel and Terceira. This WA was added to the initial plan as findings made during a previous Meteor cruise suggested the existence of active fluid discharge at the seafloor in this area, hence providing a direct link to the proposed work. Within 48 hours we carried out surveys with Multibeam/Parasound (MB/PS) and the video-guided CTD (VCTD), conducted a heat flow (HF) transect across previous coring locations, and sampled sediments by gravity corer (GC) and video-multicorer (VMUC).

Around midday on the 8th of March, we started a transit of about 240 NM to the central working area WA2. Here, all investigations could fortunately be based on available seismic information collected during M79. Station work in this area started on March 9 with a long MB/PS survey following the main N-S seismic line recorded on M79. Until March 15 this area was intensely investigated with alternating program of HF- and VCTD-surveys as well as GC and VMUC deployments.

In the night of the 16th of March, we left the central WA2 for a systematic continuation of a set of gravity cores along the major fault trace, which was commenced during Meteor cruise M141. Within 2 days we conducted 3 MB/PS-surveys, 1 HF-profile and 3 GC-deployments up to ~22°40’W.

In the night of the 18th of March, we left the western part of WA2 and headed east to the

end of the major trace of the Gloria Fault at about ~20°20'-20°05'W. In this area, station work was carried out for 2 days, including MB/PS-surveys, one HF-profile and several GC-deployments.

In the night of the 20th of March, we started a combined transit and MB/PS-survey to WA3. Station work in WA3, again including MB/PS- and HF-surveys as well as GC-deployments, was carried out for 2 days. Video-guided instruments could not be used due to increasingly rough weather conditions.

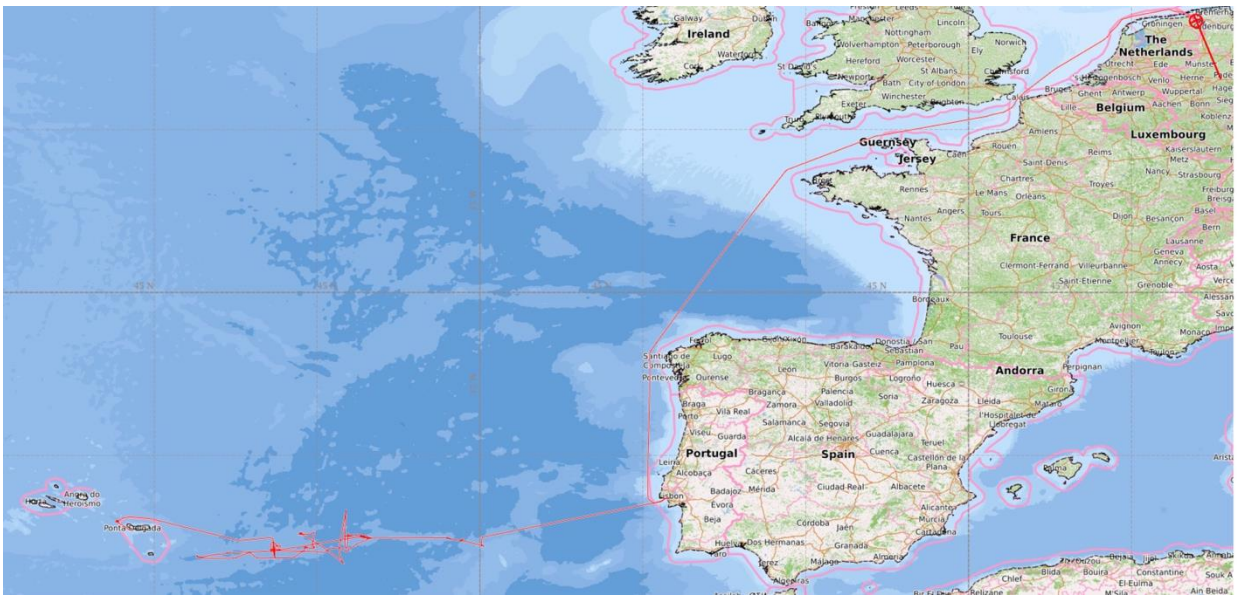
In the night of the 22nd of March, the planned transit to WA4 had to be dropped because of bad weather conditions, which lasted for the whole day and made it impossible to carry out any useful station work. In the morning of the 23rd of March, station work could finally be resumed in WA4. Investigations in this area were carried out until the 26th of March in the morning.

Again, rough weather conditions made it impossible to continue useful station work thereafter during this day. The time was used for a transit back to the central WA2, where a number of GCs were retrieved and another HF-profile was carried out in order to fill some gaps in the data set within the next 2 days.

In the night of the 29th of March, we started the longer transit to WA5, with another stopover in WA4, where again some data gaps were filled by GC-coring and a short HF-survey.

WA5 was reached on the 30th of March. Station work in this area was conducted until April 1, 2020, which again had to be interrupted on March 31 due to bad weather conditions.

In the early morning of the of the 2nd of April we arrived in the last working area (WA6). Fortunately, weather conditions finally allowed for the deployment of all gears. Station work had to be resumed in the night of the 4th of April to allow for a timely arrival in Lisbon in the morning of the 5th of April, 2020. Due to the Corona-Virus Pandemic, the subsequent cruise M163 had been cancelled and Meteor was recalled to Germany, instead of calling at Las Palmas (Canary Islands). The stopover in Lisbon was used to disembark 6 scientists based in Portugal and 1 in Croatia. The final transit with destination Emden was used for packing of the equipment, final analyses and data evaluation. RV Meteor moored after a successful cruise in Emden at about 14:00 on the 10th of April.



Overall track chart of R/V Meteor cruise M162.

In addition to the scientific work performed during M162, specific measures were taken with respect to sustainable ocean research. On request of the Foreign Ministry of Portugal, the Parasound system was only used for station work, but not on transits between working areas within the Portuguese EEZ. In addition, when using the Parasound system a whale-observation team (H. Adao, K. Sroczynska) was operating on the bridge during daytime. In one instance, a Parasound survey had to be interrupted due to the sight of whales.

Acknowledgements

The scientific party of M162 is indebted to captain Detlef Korte and the crew of RV Meteor for their highly professional and always reliable support during the whole cruise. It was a pleasure working in this friendly atmosphere during the entire duration of the expedition. For financial support, we wish to thank the German Science foundation (DFG) and GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel.

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14)	Jan-Niklas Schmidt	Heat Flow	GeoB
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20)	Sergiy Cherednichenko	Video	GEOMAR
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Stationsliste

				Time (UTC)					Begin / on seafloor		End / off seafloor	
Date UTC	St. No. M162	St. No Meteor	Instrument	Begin	Start Sci. Program	End Sci. Program	End	Duration hh:mm	Latitude N°	Longitude W°	Latitude N°	Longitude W°
06.03.20	1	M162_1-1_MB_PS	MB/PS-1	13:00	13:00	19:30	19:30	07:30	37°55.801	026°06.147	37°57.912	026°04.523
06.03.20	2	M162_2-1 HF	HF-1	21:10	22:05	06:37	07:43	10:33	37°58.907	026°04.227	37°57.363	026°06.505
06.03.20	2.1	M162_2-1 HF	HF-1	-	22:05	22:21	-	00:16	37°58.880	026°04.224	37°58.880	026°04.224
06.03.20	2.2	M162_2-1 HF	HF-1	-	23:03	23:19	-	00:16	37°58.721	026°04.459	37°58.721	026°04.459
07.03.20	2.3	M162_2-1 HF	HF-1	-	00:03	00:19	-	00:16	37°58.560	026°04.710	37°58.560	026°04.707
07.03.20	2.4	M162_2-1 HF	HF-1	-	01:02	01:10	-	00:08	37°58.411	026°04.947	37°58.411	026°04.947
07.03.20	2.5	M162_2-1 HF	HF-1	-	01:49	02:05	-	00:16	37°58.250	026°05.181	37°58.251	026°05.184
07.03.20	2.6	M162_2-1 HF	HF-1	-	02:45	02:53	-	00:08	37°58.087	026°05.422	37°58.086	026°05.420
07.03.20	2.7	M162_2-1 HF	HF-1	-	03:26	03:42	-	00:16	37°57.986	026°05.586	37°57.987	026°05.588
07.03.20	2.8	M162_2-1 HF	HF-1	-	04:21	04:28	-	00:07	37°57.831	026°05.769	37°57.831	026°05.797
07.03.20	2.9	M162_2-1 HF	HF-1	-	05:04	05:20	-	00:16	37°57.687	026°06.047	37°57.687	026°06.047
07.03.20	2.10	M162_2-1 HF	HF-1	-	06:21	06:37	-	00:16	37°57.362	026°06.505	37°57.363	026°06.505
07.03.20	3	M162_3-1 GC	GC-1	08:44	09:55	09:57	10:50	02:06	37°57.200	026°07.513	37°57.198	026°07.513
07.03.20	4	M162_4-1 GC	GC-2	11:46	12:34	12:36	13:27	01:41	37°59.401	026°07.124	37°59.400	026°07.124
07.03.20	5	M162_5-1 GC	GC-3	14:05	14:51	14:53	15:59	01:54	37°58.852	026°06.467	37°58.858	026°06.488
07.03.20	6	M162_6-1 CTD	V-CTD-1	19:00	21:00	01:04	03:55	08:55	37°58.048	026°05.252	37°57.533	026°06.234
08.03.20	7	M162_7-1 TVMUC	V-MUC-1	08:12	09:27	12:11	13:31	05:19	37°58.048	026°05.320	37°58.480	026°06.433
09.03.20	8	M162_8-1 MB_PS	MB/PS-2	11:26	11:26	18:55	18:55	07:29	37°28.698	021°21.120	36°52.640	021°17.196
09.03.20	9	M162_9-1 HF	HF-2	20:35	21:49	08:26	09:28	12:53	37°04.363	021°18.709	37°09.673	021°19.164

				Time (UTC)					Begin / on seafloor		End / off seafloor	
Date UTC	St. No. M162	St. No Meteor	Instrument	Begin	Start Sci. Program	End Sci. Program	End	Duration hh:mm	Latitude N°	Longitude W°	Latitude N°	Longitude W°
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09.03.20	9.2	M162_9-1 HF	HF-2	-	22:48	23:05	-	00:17	37°04.755	021°18.736	37°04.760	021°18.737
09.03.20	9.3	M162_9-1 HF	HF-2	-	23:59	00:16	-	00:17	37°05.187	021°18.783	37°05.187	021°18.782
10.03.20	9.4	M162_9-1 HF	HF-2	-	01:23	01:39	-	00:16	37°05.905	021°18.826	37°05.905	021°18.826
10.03.20	9.5	M162_9-1 HF	HF-2	-	02:51	02:59	-	00:08	37°06.711	021°18.875	37°06.711	021°18.873
10.03.20	9.6	M162_9-1 HF	HF-2	-	04:04	04:19	-	00:15	37°07.271	021°18.935	37°07.271	021°18.935
10.03.20	9.7	M162_9-1 HF	HF-2	-	05:51	05:59	-	00:08	37°08.141	021°18.990	37°08.141	021°18.987
10.03.20	9.8	M162_9-1 HF	HF-2	-	08:10	08:26	-	00:16	37°09.673	021°19.169	37°09.673	021°19.167
10.03.20	10	M162_10-1 TVMUC	V-MUC-2	10:40	12:20	15:59	17:09	06:29	37°18.246	021°20.076	37°19.659	021°20.209
10.03.20	11	M162_11-1 CTD	V-CTD-2	17:46	20:13	22:55	02:15	08:31	37°19.658	021°20.207	37°20.952	021°20.324
11.03.20	12	M162_12-1 HF	HF-3	02:33	03:38	03:46	08:38	06:05	37°20.953	021°20.324	37°20.849	021°20.292
11.03.20	12.1	M162_12-1 HF	HF-3	-	03:38	03:46	-	00:08	37°20.952	021°20.326	37°20.952	021°20.326
11.03.20	13	M162_13-1 MB_PS	MB/PS-3	10:05	10:05	19:36	19:36	09:31	37°15.802	021°24.936	37°09.349	021°08.778
11.03.20	14	M162_14-1 HF	HF-4	21:40	23:05	07:21	08:50	11:10	37°20.846	021°20.286	37°18.029	021°20.331
11.03.20	14.1	M162_14-1 HF	HF-4	-	23:05	23:12	-	00:07	37°20.847	021°20.284	37°20.847	021°20.284
12.03.20	14.2	M162_14-1 HF	HF-4	-	00:39	00:56	-	00:17	37°20.212	021°20.245	37°20.212	021°20.245
12.03.20	14.3	M162_14-1 HF	HF-4	-	02:16	02:24	-	00:08	37°19.790	021°20.206	37°19.788	021°20.207
12.03.20	14.4	M162_14-1 HF	HF-4	-	03:21	03:37	-	00:16	37°19.375	021°20.178	37°19.376	021°20.176
12.03.20	14.5	M162_14-1 HF	HF-4	-	04:26	04:42	-	00:16	37°18.972	021°20.146	37°18.971	021°20.145
12.03.20	14.6	M162_14-1 HF	HF-4	-	05:45	06:02	-	00:17	37°18.415	021°20.083	37°18.416	021°20.082

				Time (UTC)					Begin / on seafloor		End / off seafloor	
Date UTC	St. No. M162	St. No Meteor	Instrument	Begin	Start Sci. Program	End Sci. Program	End	Duration hh:mm	Latitude N°	Longitude W°	Latitude N°	Longitude W°
12.03.20	14.7	M162_14-1 HF	HF-4	-	07:04	07:21	-	00:17	37°18.031	021°20.330	37°18.031	021°20.329
12.03.20	15	M162_15-1 GC	GC-4	11:07	12:17	12:19	13:31	02:24	37°20.647	021°20.327	37°20.611	021°20.362
12.03.20	16	M162_16-1 GC	GC-5	14:09	15:17	15:20	16:40	02:31	37°19.711	021°20.239	37°19.711	021°20.239
12.03.20	17	M162_17-1 GC	GC-6	18:34	19:52	19:54	21:23	02:49	37°04.541	021°18.818	37°04.444	021°18.736
12.03.20	18	M162_18-1 MB_PS	MB/PS-4	22:28	22:28	07:12	07:12	08:44	37°06.417	021°21.886	37°05.244	021°25.764
13.03.20	19	M162_19-1 GC	GC-7	09:15	10:32	10:34	12:14	02:59	37°08.145	021°16.855	37°08.146	021°16.861
13.03.20	20	M162_20-1 GC	GC-8	13:09	14:26	14:28	15:48	02:39	37°04.431	021°18.772	37°04.446	021°18.743
13.02.20	21	M162_21-1 GC	GC-9	17:24	18:32	18:34	19:49	02:04	36°53.793	021°17.742	36°53.782	021°17.719
13.03.20	22	M162_22-1 HF	HF-5	21:55	23:05	09:18	10:45	12:50	36°59.108	021°18.082	37°04.435	021°18.721
13.03.20	22.1	M162_22-1 HF	HF-5	-	23:05	23:14	-	00:09	36°59.107	021°18.085	36°59.107	021°18.083
14.03.20	22.2	M162_22-1 HF	HF-5	-	00:47	01:04	-	00:17	37°00.146	021°18.221	37°00.146	021°18.220
14.03.20	22.3	M162_22-1 HF	HF-5	-	01:43	01:59	-	00:16	37°00.469	021°18.260	37°00.469	021°18.262
14.03.20	22.4	M162_22-1 HF	HF-5	-	02:41	02:49	-	00:08	37°00.790	021°18.318	37°00.790	021°18.319
14.03.20	22.5	M162_22-1 HF	HF-5	-	03:45	04:01	-	00:16	37°01.337	021°18.391	37°01.338	021°18.390
14.03.20	22.6	M162_22-1 HF	HF-5	-	05:03	05:11	-	00:08	37°01.914	021°18.464	37°01.914	021°18.466
14.03.20	22.7	M162_22-1 HF	HF-5	-	09:02	09:18	-	00:16	37°04.436	021°18.719	37°04.435	021°18.435
14.03.20	23	M162_23-1 GC	GC-10	11:36	12:50	12:52	14:19	02:43	37°04.604	021°20.282	37°04.592	021°20.269
14.03.20	24	M162_24-1 CTD	V-CTD-3	16:27	19:25	23:19	01:59	09:32	37°03.525	021°18.734	37°05.121	021°18.729
15.03.20	25	M162_25-1 HF	HF-6	03:10	04:20	07:46	09:05	05:55	37°09.764	021°19.221	37°11.696	021°19.443
15.03.20	25.1	M162_25-1 HF	HF-6	-	04:20	04:37	-	00:17	37°09.763	021°19.242	37°09.763	021°19.243

				Time (UTC)					Begin / on seafloor		End / off seafloor	
Date UTC	St. No. M162	St. No Meteor	Instrument	Begin	Start Sci. Program	End Sci. Program	End	Duration hh:mm	Latitude N°	Longitude W°	Latitude N°	Longitude W°
15.03.20	25.2	M162_25-1 HF	HF-6	-	05:47	05:55	-	00:08	37°10.568	021°19.332	37°10.566	021°19.332
15.03.20	25.3	M162_25-1 HF	HF-6	-	07:29	07:46	-	00:17	37°11.697	021°19.443	37°11.697	021°19.444
15.03.20	26-1	M162_26-1 CTD	V-CTD-4-1	10:33	-	-	13:38	03:05	37°04.589	021°17.312	37°04.591	021°17.313
15.03.20	26-2	M162_26-2 CTD	V-CTD-4-2	14:43	17:16	21:04	02:25	11:42	37°04.590	021°17.314	37°04.571	021°18.809
16.03.20	27	M162_27-1 MB_PS	MB/PS-5	05:46	05:46	06:25	06:25	00:39	37°02.343	022°00.351	37°01.725	022°04.225
16.03.20	28	M162_28-1 MB_PS	MB/PS-6	09:13	09:13	11:32	11:32	02:19	37°01.201	022°40.491	37°01.325	022°44.197
16.03.20	29	M162_29-1 GC	GC-11	12:25	13:44	13:45	15:14	02:49	36°59.472	022°43.585	36°59.473	022°43.583
16.03.20	30	M162_30-1 MB_PS	MB/PS-7	19:29	19:29	22:12	22:12	02:43	36°52.036	023°34.956	36°54.506	023°39.403
16.03.20	31	M162_31-1 HF	HF-7	22:46	00:08	05:49	07:20	08:36	36°53.700	023°40.867	36°55.267	023°41.233
17.03.20	31.1	M162_31-1 HF	HF-7	-	00:08	00:24	-	00:16	36°53.700	023°40.867	36°53.700	023°40.867
17.03.20	31.2	M162_31-1 HF	HF-7	-	01:02	01:10	-	00:08	36°53.938	023°40.925	36°53.938	023°40.925
17.03.20	31.3	M162_31-1 HF	HF-7	-	01:47	02:04	-	00:17	36°54.177	023°40.982	36°54.177	023°40.982
17.03.20	31.4	M162_31-1 HF	HF-7	-	02:49	03:05	-	00:16	36°54.479	023°41.042	36°54.479	023°41.042
17.03.20	31.5	M162_31-1 HF	HF-7	-	03:39	03:56	-	00:17	36°54.727	023°41.133	36°54.727	023°41.133
17.03.20	31.6	M162_31-1 HF	HF-7	-	04:43	04:51	-	00:08	36°55.023	023°41.171	36°55.023	023°41.171
17.03.20	31.7	M162_31-1 HF	HF-7	-	05:33	05:49	-	00:16	36°55.322	023°41.231	36°55.322	023°41.230
17.03.20	32	M162_32-1 GC	GC-12	07:41	09:06	09:07	10:29	02:48	36°54.458	023°41.117	36°54.459	023°41.116
17.03.20	33	M162_33-1 GC	GC-13	19:21	20:32	20:33	22:01	02:40	37°01.749	022°03.178	37°01.749	022°03.169
18.03.20	34	M162_34-1 MB_PS	MB/PS-8	07:53	07:53	11:21	11:21	03:28	37°05.480	020°22.702	37°09.856	020°23.178
18.03.20	35	M162_35-1 GC	GC-14	12:13	13:33	13:34	15:27	03:14	37°09.949	020°21.790	37°09.976	020°21.854

				Time (UTC)					Begin / on seafloor		End / off seafloor	
Date UTC	St. No. M162	St. No Meteor	Instrument	Begin	Start Sci. Program	End Sci. Program	End	Duration hh:mm	Latitude N°	Longitude W°	Latitude N°	Longitude W°
18.03.20	36	M162_36-1 GC	GC-15	16:07	17:28	17:29	18:57	02:50	37°10.566	020°18.494	37°10.547	020°18.503
18.03.20	37	M162_37-1 HF	HF-8	19:40	21:05	06:12	07:43	12:03	37°09.008	020°21.931	37°11.807	020°21.475
18.03.20	37.1	M162_37-1 HF	HF-8	-	21:05	21:21	-	00:16	37°09.025	020°21.934	37°09.025	020°21.934
18.03.20	37.2	M162_37-1 HF	HF-8	-	21:57	22:05	-	00:08	37°09.280	020°21.895	37°09.279	020°21.891
18.03.20	37.3	M162_37-1 HF	HF-8	-	22:40	22:48	-	00:08	37°09.536	020°21.857	37°09.535	020°21.853
18.03.20	37.4	M162_37-1 HF	HF-8	-	23:23	23:41	-	00:18	37°09.774	020°21.812	37°09.773	020°21.813
19.03.20	37.5	M162_37-1 HF	HF-8	-	00:18	00:36	-	00:18	37°10.032	020°21.778	37°10.031	020°21.777
19.03.20	37.6	M162_37-1 HF	HF-8	-	01:10	01:18	-	00:08	37°10.303	020°21.739	37°10.303	020°21.738
19.03.20	37.7	M162_37-1 HF	HF-8	-	01:52	02:10	-	00:18	37°10.549	020°21.703	37°10.549	020°21.706
19.03.20	37.8	M162_37-1 HF	HF-8	-	02:43	02:51	-	00:08	37°10.810	020°21.662	37°10.810	020°21.663
19.03.20	37.9	M162_37-1 HF	HF-8	-	03:28	03:44	-	00:16	37°11.062	020°21.623	37°11.060	020°21.625
19.03.20	37.10	M162_37-1 HF	HF-8	-	04:23	04:31	-	00:08	37°11.323	020°21.578	37°11.322	020°21.578
19.03.20	37.11	M162_37-1 HF	HF-8	-	05:08	05:25	-	00:17	37°11.567	020°21.543	37°11.565	020°21.540
19.03.20	37.12	M162_37-1 HF	HF-8	-	06:03	06:12	-	00:09	37°11.824	020°21.502	37°11.822	020°21.500
19.03.20	38	M162_38-1 MB_PS	MB/PS-9	08:58	08:58	12:30	12:30	03:32	37°08.513	020°11.726	37°11.388	020°07.718
19.03.20	39	M162_39-1 GC	GC-16	13:10	14:00	14:01	14:57	01:47	37°09.821	020°04.717	37°09.832	020°04.721
19.03.20	40	M162_40-1 GC	GC-17	15:21	16:13	16:14	17:09	01:48	37°09.844	020°04.558	37°09.845	020°04.561
19.03.20	41	M162_41-1 GC	GC-18	17:53	18:57	18:58	20:05	02:13	37°12.248	020°05.313	37°12.291	020°05.310
20.03.20	42	M162_42-1 MB_PS	MB/PS-10	00:00	00:00	09:21	09:21	09:21	37°35.024	020°04.626	37°34.501	020°27.999
20.03.20	43	M162_43-1 GC	GC-19	10:25	11:34	11:35	12:58	02:33	37°35.378	020°29.070	37°35.381	020°29.068

				Time (UTC)					Begin / on seafloor		End / off seafloor	
Date UTC	St. No. M162	St. No Meteor	Instrument	Begin	Start Sci. Program	End Sci. Program	End	Duration hh:mm	Latitude N°	Longitude W°	Latitude N°	Longitude W°
20.03.20	44	M162_44-1 GC	GC-20	13:25	14:37	14:38	15:53	02:28	37°35.937	020°29.592	37°35.406	020°29.622
20.03.20	45	M162_45-1 GC	GC-21	16:33	17:46	17:47	19:05	02:32	37°36.973	020°27.729	37°36.999	020°27.740
20.03.20	46	M162_46-1 HF	HF-9	19:56	21:09	06:14	07:42	11:46	37°35.158	020°29.600	37°38.403	020°29.556
20.03.20	46.1	M162_46-1 HF	HF-9	-	21:09	21:25	-	00:16	37°35.208	020°29.597	37°35.209	020°29.593
20.03.20	46.2	M162_46-1 HF	HF-9	-	21:56	22:05	-	00:09	37°35.441	020°29.586	37°35.441	020°29.584
20.03.20	46.3	M162_46-1 HF	HF-9	-	22:38	22:53	-	00:15	37°35.670	020°29.584	37°35.669	020°29.587
20.03.20	46.4	M162_46-1 HF	HF-9	-	23:21	23:29	-	00:08	37°35.760	020°29.558	37°35.759	020°29.558
20.03.20	46.5	M162_46-1 HF	HF-9	-	23:52	00:00	-	00:08	37°35.852	020°29.582	37°35.852	020°29.581
21.03.20	46.6	M162_46-1 HF	HF-9	-	00:39	00:56	-	00:17	37°36.111	020°29.576	37°36.112	020°29.575
21.03.20	46.7	M162_46-1 HF	HF-9	-	01:35	01:54	-	00:19	37°36.365	020°29.570	37°36.365	020°29.568
21.03.20	46.8	M162_46-1 HF	HF-9	-	02:34	02:42	-	00:08	37°36.631	020°29.562	37°36.631	020°29.562
21.03.20	46.9	M162_46-1 HF	HF-9	-	03:41	03:59	-	00:18	37°37.137	020°29.551	37°37.137	020°29.547
21.03.20	46.10	M162_46-1 HF	HF-9	-	04:55	05:11	-	00:16	37°37.535	020°29.553	37°37.536	020°29.552
21.03.20	46.11	M162_46-1 HF	HF-9	-	06:06	06:14	-	00:08	37°38.034	020°29.550	37°38.035	020°29.550
21.03.20	47	M162_47-1 GC	GC-22	08:42	09:51	09:52	11:04	02:22	37°34.964	020°33.408	37°34.990	020°33.470
21.03.20	48	M162_48-1 GC	GC-23	11:34	12:55	12:56	14:14	02:40	37°35.766	020°29.531	37°35.726	020°29.454
22.03.20	49	M162_49-1 MB_PS	MB/PS-11	01:33	01:33	02:45	02:45	01:12	36°46.578	019°14.462	36°50.074	019°15.354
23.03.20	50	M162_50-1 MB_PS	MB/PS-12	04:43	04:43	09:11	09:11	04:28	37°09.488	019°03.307	37°36.421	019°02.749
23.03.20	51	M162_51-1 MB_PS	MB/PS-13	10:16	10:16	13:13	13:13	02:57	37°29.988	018°59.030	37°31.669	018°56.699
23.03.20	52	M162_52-1 GC	GC-24	13:59	15:31	15:32	17:11	03:12	37°32.176	018°55.391	37°32.174	018°55.390

				Time (UTC)					Begin / on seafloor		End / off seafloor	
Date UTC	St. No. M162	St. No Meteor	Instrument	Begin	Start Sci. Program	End Sci. Program	End	Duration hh:mm	Latitude N°	Longitude W°	Latitude N°	Longitude W°
23.03.20	53	M162_53-1 GC	GC-25	18:24	19:57	19:58	21:43	03:19	37°30.396	019°08.508	37°30.444	019°08.515
24.03.20	54	M162_54-1 MB_PS	MB/PS-14	01:10	01:10	03:36	03:36	02:26	37°33.772	018°38.080	37°32.229	018°38.159
24.03.20	55	M162_55-1 MB_PS	MB/PS-15	04:14	04:14	05:15	05:15	01:01	37°30.225	018°33.687	37°31.451	018°34.263
24.03.20	56	M162_56-1 MB_PS	MB/PS-16	06:23	06:23	07:20	07:20	00:57	37°31.715	018°25.172	37°26.844	018°25.880
24.03.20	57	M162_57-1 GC	GC-26	08:35	09:56	09:57	11:21	02:46	37°31.462	018°32.801	37°31.498	018°32.948
24.03.20	58	M162_58-1 GC	GC-27	12:09	13:31	13:32	14:58	02:49	37°32.138	018°38.737	37°32.120	018°38.694
24.03.20	59	M162_59-1 CTD	V-CTD-5	17:13	20:04	22:21	02:47	09:34	37°29.207	018°40.285	37°30.310	018°40.040
25.03.20	60	M162_60-1 CTD	V-CTD-6	04:15	07:10	08:48	12:25	08:10	37°27.866	018°24.898	37°27.778	018°25.838
25.03.20	61	M162_61-1 MB_PS	MB/PS-17	13:14	13:14	14:30	14:30	01:16	37°27.736	018°28.029	37°28.511	018°20.153
25.03.20	62	M162_62-1 GC	GC-28	15:39	16:54	16:55	18:14	02:35	37°27.796	018°25.486	37°27.795	018°25.487
25.03.20	63	M162_63-1 HF	HF-10	20:10	21:32	07:06	08:29	12:19	37°32.220	018°38.650	37°29.755	018°40.352
25.03.20	63.1	M162_63-1 HF	HF-10	-	21:32	21:48	-	00:16	37°32.220	018°38.651	37°32.220	018°38.651
25.03.20	63.2	M162_63-1 HF	HF-10	-	22:47	22:56	-	00:09	37°31.912	018°38.698	37°31.914	018°38.697
25.03.20	63.3	M162_63-1 HF	HF-10	-	23:46	00:02	-	00:16	37°31.673	018°38.821	37°31.672	018°38.816
26.03.20	63.4	M162_63-1 HF	HF-10	-	00:53	01:01	-	00:08	37°31.439	018°38.879	37°31.441	018°38.880
26.03.20	63.5	M162_63-1 HF	HF-10	-	01:53	02:10	-	00:17	37°31.201	018°39.010	37°31.200	018°39.009
26.03.20	63.6	M162_63-1 HF	HF-10	-	03:07	03:16	-	00:09	37°30.901	018°39.133	37°30.898	018°39.133
26.03.20	63.7	M162_63-1 HF	HF-10	-	04:03	04:21	-	00:18	37°30.660	018°39.192	37°30.661	018°39.188
26.03.20	63.8	M162_63-1 HF	HF-10	-	05:06	05:14	-	00:08	37°30.414	018°39.308	37°30.415	018°39.306
26.03.20	63.9	M162_63-1 HF	HF-10	-	06:02	06:09	-	00:07	37°30.117	018°39.434	37°30.117	018°39.429

				Time (UTC)					Begin / on seafloor		End / off seafloor	
Date UTC	St. No. M162	St. No Meteor	Instrument	Begin	Start Sci. Program	End Sci. Program	End	Duration hh:mm	Latitude N°	Longitude W°	Latitude N°	Longitude W°
26.03.20	63.10	M162_63-1 HF	HF-10	-	06:47	07:06	-	00:19	37°29.996	018°39.490	37°29.995	018°39.491
26.03.20	64	M162_64-1 GC	GC-29	10:53	12:12	12:13	13:36	02:43	37°27.804	018°25.437	37°27.765	018°25.650
27.03.20	65	M162_65-1 GC	GC-30	06:59	08:19	08:20	09:41	02:42	37°04.758	021°18.743	37°04.758	021°18.745
27.03.20	66	M162_66-1 GC	GC-31	10:48	11:55	11:56	13:08	02:20	36°59.253	021°18.182	36°59.244	021°18.104
27.03.20	67	M162_67-1 GC	GC-32	13:33	14:40	14:41	15:55	02:22	37°00.520	021°18.260	37°00.479	021°18.267
27.03.20	68	M162_68-1 HF	HF-11	17:19	18:32	05:04	06:20	13:01	36°52.554	021°17.202	36°55.789	021°17.626
27.03.20	68.1	M162_68-1 HF	HF-11	-	18:32	18:48	-	00:16	36°52.553	021°17.192	36°52.553	021°17.192
27.03.20	68.2	M162_68-1 HF	HF-11	-	19:23	19:31	-	00:08	36°52.798	021°17.223	36°52.798	021°17.222
27.03.20	68.3	M162_68-1 HF	HF-11	-	20:10	20:25	-	00:15	36°53.044	021°17.257	36°53.045	021°17.255
27.03.20	68.4	M162_68-1 HF	HF-11	-	21:04	21:12	-	00:08	36°53.317	021°17.292	36°53.317	021°17.293
27.03.20	68.5	M162_68-1 HF	HF-11	-	21:50	21:57	-	00:07	36°53.558	021°17.323	36°53.559	021°17.323
27.03.20	68.6	M162_68-1 HF	HF-11	-	22:36	22:53	-	00:17	36°53.814	021°17.357	36°53.814	021°17.357
27.03.20	68.7	M162_68-1 HF	HF-11	-	23:33	23:51	-	00:18	36°54.052	021°17.393	36°54.052	021°17.392
28.03.20	68.8	M162_68-1 HF	HF-11	-	00:26	00:42	-	00:16	36°54.303	021°17.425	36°54.302	021°17.425
28.03.20	68.9	M162_68-1 HF	HF-11	-	01:18	01:25	-	00:07	36°54.544	021°17.457	36°54.544	021°17.458
28.03.20	68.10	M162_68-1 HF	HF-11	-	01:59	02:06	-	00:07	36°54.785	021°17.495	36°54.785	021°17.494
28.03.20	68.11	M162_68-1 HF	HF-11	-	02:44	03:00	-	00:16	36°55.022	021°17.525	36°55.022	021°17.526
28.03.20	68.12	M162_68-1 HF	HF-11	-	03:54	04:12	-	00:18	36°55.516	021°17.590	36°55.515	021°17.591
28.03.20	68.13	M162_68-1 HF	HF-11	-	04:56	05:04	-	00:08	36°55.789	021°17.627	36°55.789	021°17.627
28.03.20	69	M162_69-1 GC	GC-33	08:20	09:30	09:31	10:43	02:23	37°11.478	021°19.411	37°11.479	021°19.411

				Time (UTC)					Begin / on seafloor		End / off seafloor	
Date UTC	St. No. M162	St. No Meteor	Instrument	Begin	Start Sci. Program	End Sci. Program	End	Duration hh:mm	Latitude N°	Longitude W°	Latitude N°	Longitude W°
28.03.20	70	M162_70-1 GC	GC-34	12:21	13:37	13:38	14:59	02:38	37°04.286	021°18.703	37°04.286	021°18.702
28.03.20	71	M162_71-1 HF	HF-12	15:38	17:02	19:57	21:23	05:45	37°04.752	021°18.345	37°04.678	021°17.267
28.03.20	71.1	M162_71-1 HF	HF-12	-	17:02	17:18	-	00:16	37°04.752	021°18.345	37°04.752	021°18.347
28.03.20	71.2	M162_71-1 HF	HF-12	-	17:58	18:06	-	00:08	37°04.606	021°17.988	37°04.606	021°17.987
28.03.20	71.3	M162_71-1 HF	HF-12	-	18:50	19:06	-	00:16	37°04.678	021°17.626	37°04.680	021°17.630
28.03.20	71.4	M162_71-1 HF	HF-12	-	19:49	19:57	-	00:08	37°04.680	021°17.271	37°04.678	021°17.267
29.03.20	72	M162_72-1 GC	GC-35	09:54	11:17	11:18	12:45	02:51	37°30.418	018°39.282	37°30.420	018°39.293
29.03.20	73	M162_73-1 HF	HF-13	14:14	15:35	17:50	19:22	05:08	37°27.802	018°25.649	37°27.815	018°25.015
29.03.20	73.1	M162_73-1 HF	HF-13	-	15:35	15:52	-	00:17	37°28.793	018°25.671	37°28.793	018°25.671
29.03.20	73.2	M162_73-1 HF	HF-13	-	16:39	16:55	-	00:16	37°27.813	018°25.345	37°27.814	018°25.348
29.03.20	73.3	M162_73-1 HF	HF-13	-	17:33	17:50	-	00:17	37°27.812	018°25.015	37°27.812	018°25.017
30.03.20	74	M162_74-1 MB_PS	MB/PS-18	06:04	06:04	07:38	07:38	01:34	37°28.306	016°04.775	37°27.346	016°00.848
30.03.20	75	M162_75-1 MB_PS	MB/PS-19	08:13	08:13	09:53	09:53	01:40	37°27.085	015°56.115	37°27.174	015°54.459
30.03.20	76	M162_76-1 GC	GC-36	10:53	12:12	12:13	13:35	02:42	37°26.365	015°54.463	37°26.360	015°54.467
30.03.20	77	M162_77-1 GC	GC-37	13:51	15:10	15:11	16:32	02:41	37°26.182	015°53.518	37°26.312	015°53.496
30.03.20	78	M162_78-1 GC	GC-38	17:28	18:44	18:45	20:05	02:37	37°27.993	016°00.397	37°28.072	016°00.395
31.03.20	79	M162_79-1 HF	HF-14	19:03	20:19	23:07	00:35	05:32	37°28.189	016°00.453	37°28.316	016°01.242
31.03.20	79.1	M162_79-1 HF	HF-14	-	20:19	20:36	-	00:17	37°28.186	016°00.450	37°28.188	016°00.452
31.03.20	79.2	M162_79-1 HF	HF-14	-	21:34	21:49	-	00:15	37°28.248	016°00.844	37°28.248	016°00.842
31.03.20	79.3	M162_79-1 HF	HF-14	-	22:51	23:07	-	00:16	37°28.316	016°01.242	37°28.316	016°01.241

				Time (UTC)					Begin / on seafloor		End / off seafloor	
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01.04.20	80	M162_80-1 GC	GC-39	05:58	07:18	07:19	08:43	02:45	37°26.226	015°53.515	37°26.206	015°53.491
01.04.20	81	M162_81-1 MB_PS	MB/PS-20	10:12	10:12	12:23	12:23	02:11	37°24.178	015°41.282	37°22.224	015°35.909
01.04.20	82	M162_82-1 GC	GC-40	12:46	14:14	14:15	15:45	02:59	37°23.140	015°35.754	37°23.172	015°35.813
01.04.20	83	M162_83-1 MB_PS	MB/PS-21	16:14	16:14	17:49	17:49	01:35	37°24.480	015°35.553	37°22.538	015°30.724
01.04.20	84	M162_84-1 HF	HF-15	18:55	20:25	23:45	01:42	06:47	37°22.742	015°35.887	37°23.169	015°35.810
01.04.20	84.1	M162_84-1 HF	HF-15	-	20:25	20:42	-	00:17	37°22.741	015°35.883	37°22.742	015°35.885
01.04.20	84.2	M162_84-1 HF	HF-15	-	22:19	22:37	-	00:18	37°23.004	015°35.860	37°23.003	015°35.861
01.04.20	84.3	M162_84-1 HF	HF-15	-	23:26	23:45	-	00:19	37°23.169	015°35.808	37°23.168	015°35.807
02.04.20	85	M162_85-1 CTD	V-CTD-7	05:45	07:54	09:06	11:14	05:29	37°14.477	014°54.947	37°14.765	014°55.658
02.04.20	86	M162_86-1 TVMUC	V-MUC-3	11:48	13:03	13:05	14:22	02:34	37°14.765	014°55.655	37°14.764	014°55.656
02.04.20	87	M162_87-1 MB_PS	MB/PS-22	15:10	15:10	16:28	16:28	01:18	37°12.665	014°51.046	37°15.545	014°58.201
02.04.20	88	M162_88-1 GC	GC-41	17:12	18:14	18:15	19:15	02:03	37°15.262	014°57.488	37°15.273	014°57.463
02.04.20	89	M162_89-1 HF	HF-16	20:10	21:14	01:20	02:35	06:25	37°14.551	014°55.346	37°15.170	014°57.138
02.04.20	89.1	M162_89-1 HF	HF-16	-	21:14	21:29	-	00:15	37°14.552	014°55.345	37°14.552	014°55.345
02.04.20	89.2	M162_89-1 HF	HF-16	-	22:35	22:42	-	00:07	37°14.747	014°55.893	37°14.746	014°55.893
02.04.20	89.3	M162_89-1 HF	HF-16	-	23:50	23:57	-	00:07	37°14.952	014°56.499	37°14.952	014°56.498
03.04.20	89.4	M162_89-1 HF	HF-16	-	01:04	01:20	-	00:16	37°15.169	014°57.136	37°15.169	014°57.138
03.04.20	90	M162_90-1 GC	GC-42	05:58	07:01	07:02	08:15	02:17	37°14.755	014°55.966	37°14.754	014°55.967
03.04.20	91	M162_91-1 GC	GC-43	08:25	09:27	09:28	10:38	02:13	37°14.754	014°55.968	37°14.755	014°55.967
03.04.20	92	M162_92-1 GC	GC-44	10:47	11:48	11:49	12:55	02:08	37°14.753	014°55.967	37°14.755	014°55.964

				Time (UTC)					Begin / on seafloor		End / off seafloor	
Date UTC	St. No. M162	St. No Meteor	Instrument	Begin	Start Sci. Program	End Sci. Program	End	Duration hh:mm	Latitude N°	Longitude W°	Latitude N°	Longitude W°
03.04.20	93	M162_93-1 MB_PS	MB/PS-23	14:02	14:02	15:46	15:46	01:44	37°21.745	014°56.318	37°30.465	014°55.065
03.04.20	94	M162_94-1 GC	GC-45	17:03	18:14	18:15	19:35	02:32	37°30.358	014°55.108	37°30.312	014°55.092
03.04.20	95	M162_95-1 HF	HF-17	20:05	21:24	01:17	02:40	06:35	37°30.308	014°55.094	37°29.751	014°55.178
03.04.20	95.1	M162_95-1 HF	HF-17	-	21:24	21:40	-	00:16	37°30.310	014°55.092	37°30.309	014°55.094
03.04.20	95.2	M162_95-1 HF	HF-17	-	22:14	22:21	-	00:07	37°30.210	014°55.113	37°30.210	014°55.115
03.04.20	95.3	M162_95-1 HF	HF-17	-	23:00	23:16	-	00:16	37°30.098	014°55.131	37°30.097	014°55.130
03.04.20	95.4	M162_95-1 HF	HF-17	-	23:49	23:56	-	00:07	37°29.977	014°55.142	37°29.974	014°55.144
04.04.20	95.5	M162_95-1 HF	HF-17	-	00:24	00:32	-	00:08	37°29.864	014°55.159	37°29.865	014°55.153
04.04.20	95.6	M162_95-1 HF	HF-17	-	01:01	01:17	-	00:16	37°29.747	014°55.176	37°29.746	014°55.179