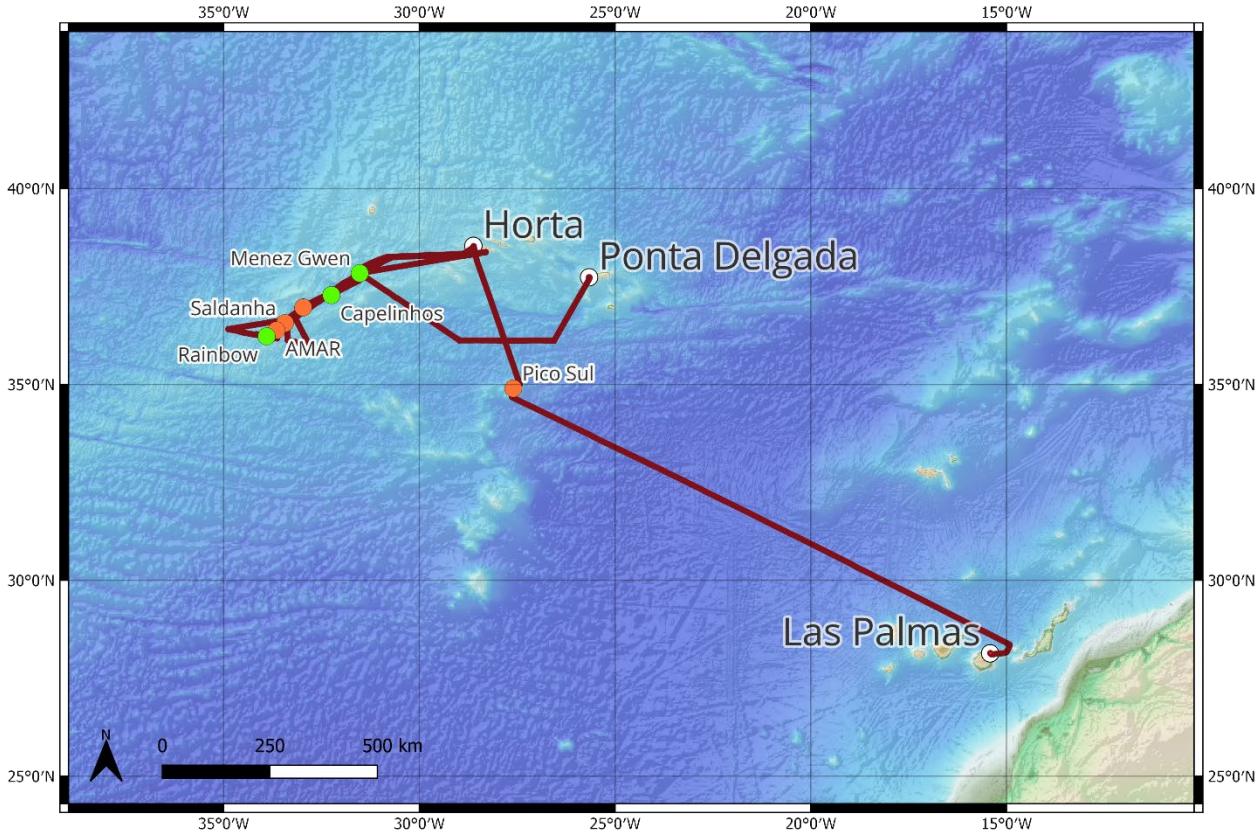
Dr. Christian Borowski
Max Planck Institute for Marine Microbiology
Celsiusstr. 1
D-28359 Bremen, Germany

Tel: +49 421 2028 8230
Fax +49 421 2028 6908
Email: cborowsk@mpi-bremen.de

Short Cruise Report
R/V METEOR cruise M210

Ponta Delgada (Portugal) – Las Palmas (Spain)
29.04. - 26.05.2025
Chief Scientist: Christian Borowski
Captain: Rainer Hammacher



Objectives

M210 was the second of two cruises to the hydrothermal vents southwest of the Azores on the Mid-Atlantic Ridge (MAR) within the REACTOR research area at the MARUM DFG research center/Excellence Cluster 'The Ocean Floor – Earth's Uncharted Interface'. It continued the interdisciplinary oceanographic, geological, chemical and biological studies that began with the R/V METEOR expedition M190 in June/July 2023. The overarching goal of both cruises was to investigate the diversity of hydrothermal fluids at major vent fields and their smaller satellite vents, study the underlying geological processes shaping this diversity, and examine the resulting chemical and microbial diversity at the vents and in the hydrothermal plumes.

M210 focused on key study sites between 36°N and 38°N, including the major Rainbow and Menez Gwen vent fields, the recently discovered Pit vents near Rainbow, and Capelinhos (a satellite vent of the Lucky Strike hydrothermal vent complex).

The main research tool was the new ROV MARUM QUEST 5000, which has a higher payload capacity, as well as more powerful data transmission and hydraulic systems, than its predecessor, the QUEST 4000. As the QUEST 5000 was operating on a research vessel for the first time, a major task of the M210 cruise was to develop the onboard operational modes and test the instrument's capabilities.

Our major scientific achievements were:
- We collected hot and diffuse fluids at Menez Gwen, Rainbow, Rainbow Pit and Capelinhos using the remotely controlled inert flow-through fluid sampling system (KIPS) and ROV-mounted Niskins and GoFlo samplers in order to measure trace metals, major and minor elements, and collect microorganisms.
- The remotely controlled in-situ filtration pump system for ROVs (FIPS) was used to collect microorganisms pointedly from diffuse fluids, above mussel beds and from the water adjacent to the vents. Microorganisms were also collected in the water column above the Rainbow vent and Rainbow Big Pit with two in situ pump deployments.
- Geochemistry of vent fluids was measured with an in-situ mass spectrometer (ISMS) during all ROV dives.
- Active and inactive chimney pieces, precipitates, and hydrothermal sediments were collected for mineralogical, microbiological, and cultivation analyses.
- We created a photo-mosaic of the Rainbow Big Pit site and recovered the geophysical instruments deposited with ROV QUEST 4000 during M190 in 2023.
- Mussels from Menez Gwen were collected at all visited dive sites for on-board experiments, population analyses of bacterial mussel symbionts, and for sending live animals to Kiel, Germany, that will be live in aquaria.
- CTD/Rosette casts were performed at all visited vent sites and along an extended CTD/Rosette transect for studying plume dispersal, with stations located 2.5, 12.5, 25, 50, and 100 km east and west of the Rainbow vent field. Casts of a trace metal clean Rosette complemented this work.
- Six towyos with the CTD and attached Miniaturized Autonomous Plume Recorders (MAPR) were used to locate hydrothermal plumes at the Saldanha seamount and Rainbow.
- Bathymetric surveys covered the area around the Saldanha seamount, and sections of the AMAR and FAMOUS segments. An additional bathymetric line was recorded on request of the University of the Azores on the Pico Sul seamount during the transit to Las Palmas.
- Three Argo Floats were deployed at Menez Gwen and in international waters.

Narrative

The M210 operations began on Thursday, 24 April 2025 in Ponta Delgada, with the ROV QUEST 5000 being mobilized aboard the R/V METEOR. Harbor operations were expected to conclude with a harbor test of the brand new ROV on 26 April, after which the cruise was due to begin on Sunday, 27 April. However, it soon became apparent that the ROV launcher, which had been specifically adapted to the A-frame of the R/V METEOR, was not fit for purpose and required modification. This work took until the evening of the 28th in a concerted effort between the ship's crew and the ROV team. We finally left the harbor with a two-day delay on Tuesday afternoon, 29 April, in winds of 7 to 8 Bft and waves of up to 4 meters high.

Before the first ROV dive, the new 5000 m ROV cable required unwinding to remove its torsions. Due to our delayed departure, we had to abandon our initial plan of deploying the full operational cable length at a site with the appropriate water depth. Instead, we chose a 4000-metre-deep site that required less of a detour. However, upon arrival, worsening wind and sea state conditions made working on the open aft deck impossible. We therefore decided to move further west towards better weather and closer to our first working area, Menez Gwen. We performed the cable management on 30 April at a position of 36° 06.987' N, 026° 33.682' W at a depth of 3000 m and began station work at that location with an initial CTD cast to obtain a background sample and to test the trace metal clean Rosette (stations 210_001_CTD and 210_002_CTD-UC).

In the early hours of 2 May, we arrived at our first working area, Menez Gwen, where we performed two CTD casts (M210_003-004_CTD) and prepared for the first ROV QUEST 5000 dive (M210_005_ROV). Although delayed by a few hours, the launch in the early afternoon was successful, and the very first ROV Quest 5000 dive, albeit short, was a success. During recovery aboard the R/V METEOR, however, the cable came loose from its holder. While the ROV could be safely recovered within a few hours, the investigation into the cause of the failure should take seven days, until diving operations could be safely resumed. First, we travelled towards Rainbow that night and added a line to the existing bathymetry data using the EM122 echosounder (M210_006_EM122).

On the afternoon of 3 May, we arrived at the easternmost end of our planned CTD transect across the ridge axis at Rainbow, where we began transect work with two CTD casts (M210_007–008_CTD). Shortly after midnight, after completing this work, we headed to the Saldanha seamount, where we conducted a first bathymetric survey (M210_009_EM122). We then continued with three CTD/MAPR towyos (stations M210_010–012_CTD/Towyo) and added another bathymetric survey (M210_013_EM122).
On the afternoon of 5 May, we returned to the Rainbow area, continuing our CTD program with casts on top of the Rainbow vents and at adjacent transect stations (M210_014–020_CTD). The weather worsened progressively during this time, and winds of up to 11 Bft and wave heights of up to 7 m were forecast for the following days. We therefore left the area in the afternoon of 6 May and sought shelter next to the island of Pico in the Azores.

During our return transit to Rainbow on 8–9 May, we mapped a bathymetric line over an area at the northern end of the FAMOUS segment (M210_021_EM122), and on the night of 9–10 May, we resumed CTD work on the western branch of our CTD transect (M210_022–023_CTD). The second ROV 5000 dive was planned for that day (M210_024_ROV); however, technical issues prevented its launch, so instead we conducted a CTD/MAPR towyo to localize the Rainbow vents' hydrothermal plume (M210_025_CTD/Towyo), as well as CTD casts and trace metal clean rosette deployments to sample the plume (M210_026-

029, CTD or CTD-UC).

On the morning of 11 May, we conducted the first full-length ROV QUEST 5000 dive (M210_030_ROV), during which we successfully collected fluid, microbial and chimney samples from the Rainbow vents. The following night was used for an in-situ pump deployment (M210_031_ISP). Despite the initial cable management, the ROV cable had become twisted and kinked during the recovery of the previous dive. Fortunately, the kink could be removed within a few hours without terminating the cable. Dive 3 therefore began in the afternoon of 12 May and was short, being used to recover geophysical instruments deposited two years earlier during M190 in the Big Rainbow Pit (M210_032_ROV).

On the morning of 13 May, we calibrated the Posidonia underwater navigation system before moving to the AMAR segment and mapping around 36°19' N, where previous water column data had indicated the presence of hydrothermalism (M210_033_EM122). After this survey, we travelled further to Saldanha, where we continued on 14 May with two additional CTD/MAPR towyos (M210_034–035_CTD/Towyo). We then returned to the Rainbow area to resume water column work, carrying out casts of the CTD, the trace metal clean Rosette, and in-situ pump deployment (M210_036–042_CTD, CTD-UC or ISP) until the morning of 16 May. During the following night, we mapped the Saldanha area again to increase the resolution of the bathymetry data (M210_043_EM122), before returning to the central Rainbow area for another dive at the hot vents (M210_044_ROV).

The night after that dive, we conducted two more casts with the CTD and the trace metal clean Rosette along the Rainbow CTD transect (M210_045-046_CTD/CTD-UC). On 18 May, our fifth ROV dive targeted the Big Pit (M210_47_ROV). Increasing wind speed during this dive made it necessary to end the dive prematurely in the early afternoon, and is we continued with finishing the CTD transect work until the morning of the 19th May (M210_048-51_CTD/CTD-UC). During that night, damage occurred to a shaft bearing in one of the R/V METEOR's electric main engines, making it impossible to keep station and requiring repairs before station work could continue. We therefore decided to spend the day doing additional Posidonia calibration and using the evening to run in the new bearing before leaving Rainbow for the Capelinhos vent near Lucky Strike. On the morning of 20 May, we arrived at Capelinhos and worked with the ROV (M210_052_ROV) at full dive length. We also performed a cast each with the CTD (M210_053_CTD) and the trace metal clean Rosette (M210_054_CTD-UC) before heading on to Menez Gwen.

On the morning of 21 May, we performed a CTD cast (M210_055_CTD) at Menez Gwen, after which we finished the ROV work with a full-length dive. During this dive, we once again collected hot and diffuse fluids, chimneys, sediments, microorganisms and mussels dedicated to live shipment to Germany. At the end of the dive, we video-mapped an area containing deep-water corals located a few tens of meters from the Menez Gwen vents. Our work at Menez Gwen finished with a trace metal clean Rosette cast (M210_057_CTD-UC) and the deployment of an Argo Float (M210_058_FLOAT) for the BSH in Germany.

We departed from Menez Gwen at around 22:00, arriving on the roads of Horta on Fayal Island at around 13:00 on 22 May, where we transferred the mussels to land for air transport to Germany. We started the transit towards Las Palmas at around 16:00. During the transit, we completed the scientific work by conducting a final bathymetric survey of the Pico Sul seamount on behalf of the University of the Azores (M210_059_EM122), and we also deployed two additional Argo Floats (M210_060–061). We reached the port of Las Palmas at around 15:00 on 26 May.

Acknowledgements

We would like to thank Captain Rainer Hammacher and the entire crew for their excellent support throughout the expedition, particularly with regard to all scientific operations and technical challenges. We would also like to thank the “Leitstelle” for their varied advice and organizational support. Funding was provided by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) under Germany´s Excellence Strategy – EXC-2077 – The Ocean Floor. Earth’s Uncharted Interface – 390741603.

Participants

1.	Borowski, Christian, Dr.	Chief Scientist	MPIMM
2.	Munteanu, Ana-Maria	Fluid geochemistry	Constructor University
3.	Anagnostou, Eirini	Fluid geochemistry	MARUM/Univ-Bremen
4.	Meckel, Eva-Maria	Plume chemistry	Constructor University
5.	Kumawat, Palash	Fluid chemistry/biomarkers	MARUM/Uni-Bremen
6.	Wetzel, Silke	Symbiosis	MPIMM
7.	Janke, Rebekka, Dr.	Symbiosis	MPIMM
8.	Cifuentes, Jeronimo	Symbiosis	MPIMM
9.	Cera, Guillermo	Symbiosis	MPIMM
10.	Gallucci, Luigi	Microbiology/metagenomics	MPIMM
11.	Wang, Yueqing	Microbiology/metagenomics	MPIMM
12.	Mette, Jonathan	CTD/ADCP/helium sampling	MARUM
13.	Sorge, Yves	CTD/ADCP/helium sampling	MARUM
14.	Volker Meyer	ISMS, KIPS, FIPS	MPIMM
15.	Coltat, Rémi, Dr.	Petrology, photogrammetry	Univ. Orléans
16.	Gyomlai, Thomas, Dr.	Petrology	Univ. Lyon
17.	Daniel, Isabelle, Dr.	Mar. geol., seafloor observatory	Univ. Lyon
18.	Almeida Colaço, M. Ana. Dr.	Biology	IMAR
19.	Bach, Alissa	Bathymetry, renav	MARUM
20.	Büttner, Hauke	ROV QUEST 5000	MARUM
21.	Reuter, Christian	ROV QUEST 5000	MARUM
22.	Spiesecke, Uli	ROV QUEST 5000	MARUM
23.	Ralf Rehage	ROV QUEST 5000	MARUM
24.	Schröder, Marcel	ROV QUEST 5000	MARUM
25.	Schade, Tobias	ROV QUEST 5000	MARUM
26.	Schillai, Sophia	ROV QUEST 5000	MARUM
27.	Wali, Schiwan	ROV QUEST 5000	MARUM
28.	Engemann, Greg	ROV QUEST 5000	EGI LLC

MARUM
Zentrum für Marine Umweltwissenschaften / Universität Bremen
Leobener Str. 8
28359 Bremen / Germany
https://www.marum.de

MPIMM
Max-Planck-Institut für Marine Mikrobiologie
Celsiusstr. 1
28359 Bremen / Germany
https://www.mpi-bremen.de

Constructor University
Campus Ring 1
28759 Bremen / Germany
https://constructor-university

IMAR
Institute of Marine Research
Okeanos – Univ. dos Azores
Rua Prof. Frederico Machado
9901-862 Horta / Portugal
https://www.okeanos.uac.pt/

Univ. Lyon
Universitée de Lyon 1
Laboratoire de Géologie de Lyon
2 rue Raphael Dubois
69622 Villeurbanne Cedex / France
https://lgltpe.ens-lyon.fr/

Univ. Orléans
Universitée d'Orléans
Institut des Sciences de la Terre
d'Orléans 45071 Orléans, France
https://www.isto-orleans.fr/

EGI LLC
EGI LLC Offshore service
11734 Wolf Rd. grass Valley
CA 95949 USA

Station list

Station No. D-Ship	Dive@MAR #	ROV #	Date 2025	Gear	Time (UTC)	Latitude N	Longitude W	Water Depth (m)	Remarks
M210_1-1	M210_001 CTD		30.04.	CTD/Rosette	14:31	36° 06.987’	026° 33.682’	3779	Max depth
M210_2-1	M210_002 CTD-UC		30.04.	Trace Metal Clean Rosette	19:05	36° 06.988’	026° 33.677’	3789	Max depth
M210_3-1	M210_003 CTD		02.05.	CTD/Rosette	09:44	37° 50.221’	031° 31.208’	1014	Max depth
M210_4-1	M210_004 CTD		02.05.	CTD/Rosette	11:44	37° 50.772’	031° 31.179’	868	Max depth
M210_5-1	M210_005 ROV	D001	02.05.	ROV QUEST 5000	14:31	37° 50.634’	031° 31.142’	830	In the water
M210_5-1	M210_005 ROV	D001	02.05.	ROV QUEST 5000	23:57	37° 50.767’	031° 31.167’	830	On deck
M210_6-1	M210_006 EM122		03.05.	EM122	00:00	37° 50.785’	031° 31.191’	855	Profile start
M210_6-1	M210_006 EM122		03.05.	EM122	15:50	36° 01.290’	032° 49.214’	2354	Profile end
M210_7-1	M210_007 CTD		03.05.	CTD/Rosette	16:40	36° 01.295’	032° 49.221’	2351	Max depth
M210_8-1	M210_008 CTD		03.05.	CTD/Rosette	21:09	36° 07.542’	033° 21.594’	1817	Max depth
M210_9-1	M210_009 EM122		04.05.	EM122	00:30	36° 30.329’	033° 23.365’	2685	Profile start
M210_9-1	M210_009 EM122		04.05.	EM122	07:56	36° 31.087’	033° 28.902’	2221	Profile end
M21010-1	M210_010 CTD/Towyo		04.05.	CTD/MAPR Towyo	10:44	36° 35.491’	033° 20.012’	3104	Profile start
M210_10-1	M210_010 CTD/Towyo		04.05.	CTD/MAPR Towyo	17:08	36° 32.673’	033° 31.224’	1888	On deck
M210_11-1	M210_011 CTD/Towyo		04.05.	CTD/MAPR Towyo	18:08	36° 37.916’	033° 26.997’	1803	In the water
M210_11-1	M210_011 CTD/Towyo		04.05.	CTD/MAPR Towyo	20:20	36° 37.131’	033° 26.712’	2104	On deck
M210_12-1	M210_012 CTD/Towyo		04.05.	CTD/MAPR Towyo	21:18	36° 30.431’	033° 24.015’	2954	In the water
M210_12-1	M210_012 CTD/Towyo		05.05.	CTD/MAPR Towyo	02:06	36° 37.982’	033° 26.993’	1803	Tow-Yo end Profile
M210_13-1	M210_013 EM122		05.05.	EM122	03:40	36° 38.035’	033° 27.203’	1816	Profile start

Station No. D-Ship	Dive@MAR #	ROV #	Date 2025	Gear	Time (UTC)	Latitude N	Longitude W	Water Depth (m)	Remarks
M210_13-1	M210_013 EM122		05.05.	EM122	14:41	36° 36.936’	033° 29.097’	2137	Profile end
M210_14-1	M210_014 CTD		05.05.	CTD/Rosette	19:13	36° 13.812’	033° 54.147’	2298	Max depth
M210_15-1	M210_015 CTD		05.05.	CTD/Rosette	22:31	36° 16.694’	033° 50.444’	2734	Max depth
M210_16-1	M210_016 CTD		06.05.	CTD/Rosette	01:55	36° 10.620’	033° 37.918’	1721	Max depth
M210_17-1	M210_017 CTD		06.05.	CTD/Rosette	04:19	36° 12.230’	033° 46.010’	2393	Max depth
M210_18-1	M210_018 CTD		06.05.	CTD/Rosette	08:44	36° 16.949’	034° 10.368’	2246	Max depth
M210_19-1	M210_019 CTD		06.05.	CTD/Rosette	11:48	36° 15.391’	034° 02.249’	2524	Max depth
M210_20-1	M210_020 CTD		06.05.	CTD/Rosette	15:05	36° 12.565’	033° 56.518’	3311	Max depth
M210_21-1	M210_021 EM122		09.05.	EM122	09:18	36° 59.792’	032° 53.546’	2561	Profile start
M210_21-1	M210_021 EM122		09.05.	EM122	10:48	36° 55.551’	033° 01.445’	2847	Profile end
M210_22-1	M210_022 CTD		09.05.	CTD/Rosette	21:55	36° 24.899’	034° 52.729’	2707	Max depth
M210_23-1	M210_023 CTD		10.05.	CTD/Rosette	02:30	36° 18.657’	034° 26.419’	1994	Max depth
M210_24-1	M210_024 ROV	--	10.05.	ROV QUEST 5000	11:50	36° 13.727’	033° 54.211’	--	no dive
M210_25-1	M210_025 CTD/Towyo		10.05.	CTD/MAPR Towyo	14:32	36° 17.490’	033° 50.737’	3158	In the water
M210_25-1	M210_025 CTD/Towyo		10.05.	CTD/MAPR Towyo	20:15	36° 11.787’	033° 55.977’	3185	On deck
M210_26-1	M210_026 CTD		10.05.	CTD/Rosette	22:29	36° 14.636’	033° 53.255’	2222	Max depth
M210_27-1	M210_027 CTD-UC		11.05.	Trace Metal Clean Rosette	01:05	36° 14.640’	033° 53.259’	2242	Max depth
M210_28-1	M210_028 CTD-UC		11.05.	Trace Metal Clean Rosette	02:45	36° 14.640’	033° 53.259’	2240	In the water
M210_29-1	M210_029 CTD		11.05.	CTD/Rosette	04:26	36° 14.120’	033° 53.749’	2283	Max depth
M210_30-1	M210_030 ROV	D002	11.05.	ROV QUEST 5000	08:26	36° 13.730’	033° 54.206’	2327	In the water
M210_30-1	M210_030 ROV	D002	11.05.	ROV QUEST 5000	21:09	36° 13.832’	033° 54.094’	2307	On deck
M210_31-1	M210_031 ISP		11.05.	ISP	21:43	36° 13.756’	033° 54.162’	2328	In the water
M210_31-1	M210_031 ISP		12.05.	ISP	08:21	36° 13.837’	033° 54.191’	2328	On deck

Station No. D-Ship	Dive@MAR #	ROV #	Date 2025	Gear	Time (UTC)	Latitude N	Longitude W	Water Depth (m)	Remarks
M210_32-1	M210_032 ROV	D003	12.05.	ROV QUEST 5000	14:49	36° 13.571’	033° 53.121’	1979	In the water
M210_32-1	M210_032 ROV	D003	12.05.	ROV QUEST 5000	21:35	36° 13.569’	033° 53.045’	1943	On deck
M210_33-1	M210_033 EM122		13.05.	EM122	12:33	36° 19.708’	033° 37.231’	2174	Profile start
M210_33-1	M210_033 EM122		14.05.	EM122	00:51	36° 19.857’	033° 34.626’	1968	Profile end
M210_34-1	M210_034 CTD/Towyo		14.05.	CTD/MAPR Towyo	03:16	36° 35.767’	033° 23.981’	2531	In the water
M210_34-1	M210_034 CTD/Towyo		14.05.	CTD/MAPR Towyo	07:50	36° 36.741’	033° 31.684’	2309	On deck
M210_35-1	M210_035 CTD/Towyo		14.05.	CTD/MAPR Towyo	08:48	36° 38.072’	033° 24.099’	2621	In the water
M210_35-1	M210_035 CTD/Towyo		14.05.	CTD/MAPR Towyo	14:27	36° 32.237’	033° 30.407’	2017	On deck
M210_36-1	M210_036 CTD-UC		14.05.	Trace Metal Clean Rosette	17:55	36° 13.591’	033° 52.913’	1953	Max depth
M210_37-1	M210_037 ISP		14.05.	ISP	18:34	36° 13.505’	033° 53.087’	1943	In the water
M210_37-1	M210_037 ISP		15.05.	ISP	17:24	36° 13.510’	033° 53.085’	1943	On deck
M210_38-1	M210_038 CTD		15.05.	CTD/Rosette	19:42	36° 15.374’	034° 02.246’	2364	Max depth
M210_39-1	M210_039 CTD-UC		15.05.	Trace Metal Clean Rosette	21:50	36° 15.372’	034° 02.249’	2430	Max depth
M210_40-1	M210_040 CTD		16.05.	CTD/Rosette	01:01	36° 14.137’	033° 55.732’	2990	Max depth
M210_41-1	M210_041 CTD-UC		16.05.	Trace Metal Clean Rosette	03:29	36° 14.134’	033° 55.731’	2884	Max depth
M210_42-1	M210_042 CTD		16.05.	CTD/Rosette	06:10	36° 13.807’	033° 54.124’	2285	Max depth
M210_43-1	M210_043 EM122		16.05.	EM122	20:11	36° 29.713’	033° 25.335’	2698	Profile start
M210_43-1	M210_043 EM122		17.05.	EM122	04:41	36° 34.534’	033° 18.899’	3018	Profile end
M210_44-1	M210_044 ROV	D004	17.05.	ROV QUEST 5000	09:27	36° 13.732’	033° 54.202’	2303	In the water
M210_44-1	M210_044 ROV	D004	17.05.	ROV QUEST 5000	20:36	36° 13.870’	033° 54.139’	2292	On deck

Station No. D-Ship	Dive@MAR #	ROV #	Date 2025	Gear	Time (UTC)	Latitude N	Longitude W	Water Depth (m)	Remarks
M210_45-1	M210_045 CTD		17.05.	CTD/Rosette	23:44	36° 13.865’	033° 54.142’	2322	Max depth
M210_46-1	M210_046 CTD-UC		18.05.	Trace Metal Clean Rosette	04:42	36° 13.928’	033° 54.066’	2300	Max depth
M210_47-1	M210_047 ROV	D005	18.05.	ROV QUEST 5000	08:20	36° 13.550’	033° 53.105’	1953	In the water
M210_47-1	M210_047 ROV	D005	18.05.	ROV QUEST 5000	17:04	36° 13.576’	033° 53.094’	1945	On deck
M210_48-1	M210_048 CTD		18.05.	CTD/Rosette	19:22	36° 13.503’	033° 52.203’	2006	Max depth
M210_49-1	M210_049 CTD-UC		18.05.	Trace Metal Clean Rosette	21:31	36° 13.504’	033° 52.202’	2021	Max depth
M210_50-1	M210_050 CTD		19.05.	CTD/Rosette	01:43	36° 12.253’	033° 46.001’	2387	Max depth
M210_51-1	M210_051 CTD-UC		19.05.	Trace Metal Clean Rosette	04:17	36° 12.254’	033° 46.016’	2409	Max depth
M210_52-1	M210_052 ROV	D006	20.05.	ROV QUEST 5000	09:39	37° 17.368’	032° 15.771’	1680	In the water
M210_52-1	M210_052 ROV	D006	20.05.	ROV QUEST 5000	21:30	37° 17.367’	032° 15.908’	1680	On deck
M210_53-1	M210_053 CTD		20.05.	CTD/Rosette	22:41	37° 17.371’	032° 15.862’	1685	Max depth
M210_54-1	M210_054 CTD-UC		21.05.	Trace Metal Clean Rosette	00:13	37° 17.369’	032° 15.862’	1685	Max depth
M210_55-1	M210_055 CTD		21.05.	CTD/Rosette	07:08	37° 50.678’	031° 31.144’	833	Max depth
M210_56-1	M210_056 ROV	D007	21.05.	ROV QUEST 5000	09:17	37° 50.654’	031° 31.141’	842	In the water
M210_56-1	M210_056 ROV	D007	21.05.	ROV QUEST 5000	21:02	37° 50.659’	031° 31.298’	811	On deck
M210_57-1	M210_057 CTD-UC		21.05.	Trace Metal Clean Rosette	21:39	37° 50.661’	031° 31.163’	833	Max depth
M210_58-1	M210_058 FLOAT		21.05.	Argo Float	22:17	37° 50.527’	031° 31.206’	863	In the water
M210_59-1	M210_059 EM122		23.05.	EM122	11:50	34° 59.823’	027° 26.018’	2695	Profile start
M210_59-1	M210_059 EM122		23.05.	EM122	14:58	34° 40.660’	027° 38.458’	1652	Profile end
M210_60-1	M210_060 FLOAT		24.05.	Argo Float	08:05	33° 03.639’	024° 18.031’	5416	In the water
M210_61-1	M210_061 FLOAT		24.05.	Argo Float	14:06	32° 31.155’	023° 11.578’	5376	In the water

Profile List Underway Data

D-Ship	Date	Gear	Time (UTC)	Latitude N	Latitude W	Water depth (m)	Remarks
M210_0_Underway-1	30.04.2025	EM122	21:16	36° 07.395'	026° 34.406'	3829	Profile start
M210_0_Underway-1	07.05.2025	EM122	22:46	38° 19.873'	028° 50.554'	1230	Profile end
M210_0_Underway-1	08.05.2025	EM122	11:24	38° 18.062'	028° 45.397'	511	Profile start
M210_0_Underway-1	22.05.2025	EM122	11:07	38° 20.622'	028° 52.250'	1219	Profile end
M210_0_Underway-1	22.05.2025	EM122	18:18	38° 14.026'	028° 32.903'	1202	Profile start
M210_0_Underway-2	30.04.2025	VMADCP_38 kHz	21:16	36° 07.404'	026° 34.548'	3829	Profile start
M210_0_Underway-2	07.05.2025	VMADCP_38 kHz	22:46	38° 19.879'	028° 50.425'	1228	Profile end
M210_0_Underway-2	08.05.2025	VMADCP_38 kHz	11:25	38° 18.052'	028° 45.449'	533	Profile start
M210_0_Underway-2	22.05.2025	VMADCP_38 kHz	11:07	38° 20.701'	028° 52.130'	1214	Profile end
M210_0_Underway-2	22.05.2025	VMADCP_38 kHz	18:18	38° 14.064'	028° 32.912'	1198	Profile start
M210_0_Underway-4	30.04.2025	TSG	21:18	36° 07.415'	026° 34.894'	3833	Profile start
M210_0_Underway-4	07.05.2025	TSG	22:46	38° 19.880'	028° 50.414'	1228	Profile end
M210_0_Underway-4	08.05.2025	TSG	11:25	38° 18.043'	028° 45.511'	567	Profile start
M210_0_Underway-4	22.05.2025	TSG	11:07	38° 20.607'	028° 52.272'	1219	Profile end
M210_0_Underway-4	22.05.2025	TSG	18:18	38° 14.175'	028° 32.931'	1238	Profile start

EM122 = Kongsberg Multibeam Echosounder EM122

VMADCP = Vessel-Mounted Acoustic Doppler Current Profiler

TSG = Thermosalinograph