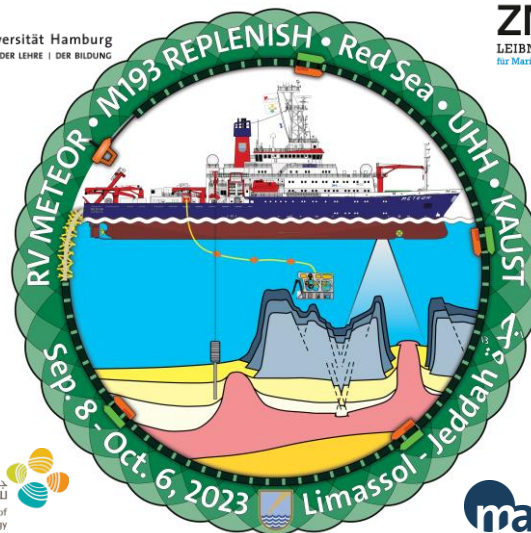


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## Short Cruise Report FS Meteor M193

### *Red Sea Paleoenvironmental Evolution under Monsoon fluctuations in the Pleistocene to Holocene*



**Limassol - Jeddah**  
**08.09.2023 – 06.10.2023**  
**Chief Scientist: Thomas Lüdman**  
**Captain: Rainer Hammacher**

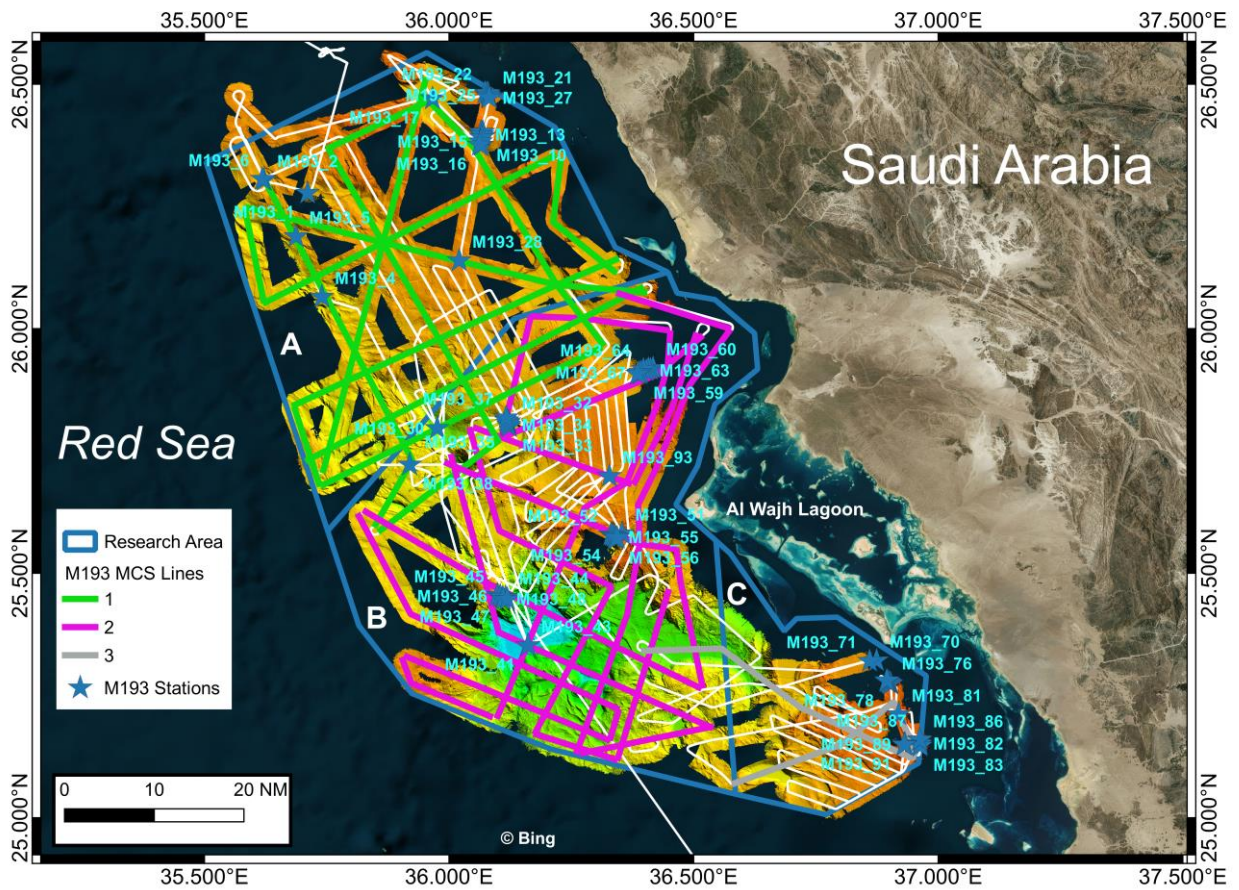


Fig. 1: Map of the M193 study area in front and north of the Al Wajh Lagoon. Underlain is the mapped MBES bathymetry. White line: ship track; A, B and C: subareas.

## Objectives

Although the Red Sea is situated within the Saharo-Arabian desert belt, a key-area for palaeoclimatic and palaeoanthropological research, its marine realm, including climate archives, is only locally and sporadically studied. Therefore, the cruise M193 aims to investigate whether and how Pleistocene humidity-aridity phases are recorded in marine sediments; how these periods affected the development of shallow- and deep-water carbonate systems along offshore western Saudi Arabia; and where unique warm-water (>20°C) high-salinity deep-sea corals assemblages with an unclear taxonomy thrive. Based on recent seafloor mapping and gravity coring, we are investigating the Al Wajh carbonate platform area that hosts a deep-sea fan fed by one of the largest onshore drainage systems on the Arabian Peninsula during Pleistocene pluvial phases, several isolated mini basins related to salt tectonics, and dozens of deep-sea coral habitats and drowned shallow-water reefs. While seismic measurements are planned to investigate the evolution of the Late Pliocene to Pleistocene marginal sediment system under sea-level and climatic change, gravity coring of isolated and communicating sediment basins will allow high-resolution studies of Upper Pleistocene humidity-aridity phases. Mapping and sampling of the largely unstudied deep-water coral habitats via ROV, and taxonomy studies will round up our survey. Expected results will extend our comprehensive understanding of Pleistocene climate development including sea-level change, its influence on the development of shallow- and deep-water carbonates, and will help to predict future climate dynamics. In summary, the three main research topics are:

**Topic 1:** ITCZ shifts and monsoon records in the Red Sea Ocean Basin.

ITCZ shifts and monsoon are recorded in the Red Sea in sapropels similar to the Mediterranean Sea. The absence of most of the Pleistocene sapropels in the Red Sea Ocean basin, identified in the East Mediterranean Sea, lead to the following research questions: How is Pleistocene monsoon run-off recorded in Arabian margin sediments? How is monsoon run-off affecting Red Sea current systems? Why are no sapropels formed in the Red Sea during the Pleistocene pluvial monsoon periods? Since salt tectonic formed a complex seafloor morphology of basins and ridges, were sapropels only locally formed or do they have been eroded by strong bottom currents? Do the reef systems reflect the pluvial events in their ecological and architectural expression? Does the dust record as a complementary record for monsoon runoff complete the picture of arid versus humid phases?

**Topic 2:** Influence of monsoonal run-off on Red Sea siliciclastic-carbonate shelf system development since the Late Pliocene.

How does orbital controlled monsoon run-off (pluvial periods) impact the development of marginal carbonate systems? How are carbonate depositional systems affected by increased nutrient input during pluvial periods? What is the role of potential sediment bypassing? Is sediment bypassing structural and/or oceanographic controlled? How is salt tectonic affecting the development of marginal sedimentary systems, especially carbonate platforms? What are the consequences for standard sequence stratigraphic approaches?

**Topic 3:** Red Sea shallow-water and deep-water reef habitats.

This cruise will be the first to describe the morphology and sediment accumulation of the deep-water coral habitats in the Red Sea, and to relate them to climate change and monsoon intensity (temperature, salinity, dust pulses) through time. With focus on shallow-water coral reefs, open questions to be addressed include (1) the faunal composition and faunal shifts through time and through recolonisation episodes, (2) the species succession of individual recolonization episodes, and (3) the endemism of shallow reef organisms as well as (4) the architectural expression of environmental conditions in the carbonate sedimentary bodies, i.e., the reflection of stressors such as temperature, salinity, nutrients (dust), and sea-level fluctuations.

## Narrative

The RV Meteor left the port of Limassol (Cyprus) on the 8<sup>th</sup> September at 11:30 LT. The transit to our research area in the Red Sea took ca. 4 days. First destination on the transit was Port Said in front of the Suez Canal. Here we anchored on 9<sup>th</sup> of September at 12:30 LT. During the transit we started to setup our gear and the equipment in the labs. Because there were no international waters on our transit we could not collect hydroacoustic underway-data (DAM). At 2:30 on 10<sup>th</sup> of September, we begun with the passage through the channel in a convoy of several ships. On Tuesday morning the 12<sup>th</sup> September at 02:30 LT the research area was reached. After the research permit arrived at about 14:30 LT the same day, we started in subarea A with a Van Veen grab, box corer and a CTD near the station where we deployed the seismic gear at 21:50 LT. Unfortunately, the seismic survey had to be stopped after 4 hours of operation on the 13<sup>th</sup> September at 10:50 LT, because the compressor had switched off automatically to protect against overheating. Instead, several Van Veen grabs and box cores were obtained at water depths ranging from 960 to 1180 meters. On the 14<sup>th</sup> September at 10:25 LT, the first ROV dive was undertaken to study deep-water coral habitats about 30 km offshore at depths of 748 to 684 m on the steep slope of a submarine ridge (M193\_10). Around midnight on the 14<sup>th</sup> September, two gravity cores were successfully recovered from a 1050 m deep mini-basin located about 13 km northwest of the ROV station (M193\_17). Seismic acquisition was continued on the 15<sup>th</sup> September at 12:30 LT till the 19<sup>th</sup> September at 01:30 LT.

At 8:00 LT on September 19<sup>th</sup>, a second ROV deployment was planned on a steep slope 20 km offshore (M193\_21). Unfortunately, the dive had to be aborted because there was air in the hydraulic system of the ROV. This required time consuming repairs. Therefore, we decided to drop the ROV station and continue with the program instead. Near the ROV station, first a CTD was run and it was completed with van Veen grab and box core sampling. Thereafter, we steamed to the second gravity core station, which we reached at about 20:00 LT on 19<sup>th</sup> September. The location was on a ridge in 780 m water depth (M193\_28). Here, a CTD was first run and a box core. Afterwards, the 12 m gravity core was successful and we recovered almost the full length. After that, hydroacoustic profiles were run for about 17 hours to close the gaps in the bathymetry left after the seismic profile acquisition.

On September 21<sup>st</sup> at 8:00 LT, another ROV mission was scheduled after the damage been successfully repaired. This time the target was a conical submarine mesa with a diameter of 1 km at its base, on which deep water corals were expected to have settled (M193\_32). This location was to be explored with the ROV with the planned dive profile covering the depth of between 1064 to about 584 m, from the base to the top of the mountain. However, shortly before reaching the seafloor at 1064 m, the ROV's power supply suddenly cut out and the unmaneuverable underwater vehicle had to be pulled to the surface by its supply cable. Afterwards, the mesa was sampled with van Veen grab samples, followed by hydroacoustic profiles for another coring station nearby on the well-stratified crest of a ridge. After the collection of a box core the gravity corer was readied. However, a hydraulic failure in the lifter arm caused by an oil leakage prevented the execution of the coring. As it was clear that repairs would take time, we abandoned this station and moved into study area B where we started the acquisition of seismic block 2. Seismic exploration in area B was completed at 15:00 LT on September 26<sup>th</sup>, covering a total of 535 nm. Next target was the Mahabiss Deep where we retrieved a full 6 m gravity core on deck at 20:24 LT (M193\_41). We then decided to extend the core barrel to 18 m. The barrel penetrated nearly 16 m into the sediment but had only about 12 m of core recovery. After sediment sampling was completed, hydroacoustics were run until the next morning to close existing gaps in the bathymetry. On 27<sup>th</sup> September after running a CTD in the Mahabiss Deep the next ROV dive commenced at 09:36 LT. The target of the ROV

deployment was the flank of a submarine volcano located at the NW edge of the basin (M193\_44). The dive started at 1360 m and ended at 1010 m water depth. Our next target was a deeply incised canyon on the northern edge of the Al Wajh platform. At the ROV diving station, the bottom of the canyon is at 1112 m water depth, and the flanks reach up to about 762 m (M193\_51). Here, too, the focus was on the investigation of the deep-water communities. The ROV mission started on September 28<sup>th</sup> at 09:30 LT at 1082 m and ended at 685 m depth around 16:30 LT. Afterwards, Van Venn grab samples were collected along the ROV route. This was followed with a hydroacoustics mapping run until the next morning. A CTD profile preceded the next ROV dive, on the flank of the plateau north of Al Wajh Lagoon (M193\_59). The ROV dive started at 09:10 LT on September 29<sup>th</sup> and included a water depth range from 675 to 125 m. The ROV dive successfully targeted deep-water to deep mesophotic benthic fauna. The observations were substantiated by Van Veen grab samples which were collected along the ROV route and on the shallow plateau.

After finishing the work on the northern edge of the Al Wajh platform, we moved to its southern edge in working area C. The first station there was located on the flank of a platform fragment in front of the platform. After a CTD, the ROV was deployed at 09:00 LT on 30<sup>th</sup> September (M193\_71). The dive range extended from 520 to 125 m water depth. This dive was also successfully completed at 16:30 LT. After a short transit, the streamer and air pulsers were deployed at 18:37 LT and the 12 hours of seismic planned for area C were run. On the 1<sup>st</sup> October, the profiling were completed at 10:00 LT. After that, an intensive sediment sampling program started in the area of the previous ROV station, followed by two more gravity cores. On the 2<sup>nd</sup> October at 08:00 LT another ROV dive was scheduled in a brine pool near the Al Wajh Platform (M193\_85). Thereafter two grab samples were taken along the ROV track. Until the next ROV dive hydroacoustic profiles were obtained. Next day, the 3<sup>rd</sup> October at 08:00 LT following a CTD station at the diving position, the ROV was deployed. Diving depths were about 545 to 93 m (M193\_89). Objective was the exploration of deep and mesophotic benthic communities in a pinnacle off the Al Wajh Platform. Afterwards two grab samples were taken along the ROV track. Starting at 18:00 LT, hydroacoustics profiles were obtained until next day 09:00 LT. The profiling stopped north of Al Wajh Platform in a small basin in front of a suggested lowstand delta. Here, we first had a CTD cast followed by a grab and a 12 m gravity core (M193\_93). Recovery was about 10 m. The objective was to receive a paleoclimate record and the times of delta activity. Until the end of the cruise on the 5<sup>th</sup> of October at 06.00 am, hydroacoustics was obtained to fill the gaps in the MBES coverage. Then the vessel steamed to Jeddah port where it arrived on the 6<sup>th</sup> October at 08:00. Before we were assigned a berth, the FS Meteor had to wait 6 hours. It was not until late in the afternoon that we were able to load our equipment into the containers.

## **Acknowledgements**

We are very grateful to the German Research Foundation (DFG), the German Research Fleet Coordination Centre at the Universität Hamburg, the shipping company BRIESE Research and LPL Projects + Logistics GmbH for their support to both science and ship logistics. The captain, officers and crew of the RV METEOR are thanked for their great support, which has made a significant contribution to the success of the cruise. We also thank the government affairs managers from KAUST for their special efforts to obtain the research permit from the Saudi Arabian government in time.



Fig. 2: M193 Scientific Party.



Fig. 5: Discovery of box corer. Photo: Marleen Stuhr.

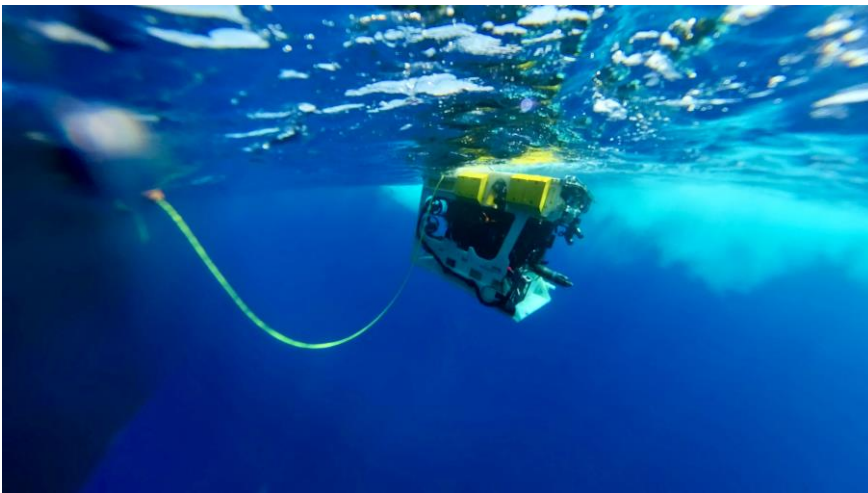


Fig. 3: MARUM ROV Squid. Photo: Oliver Eisermann.

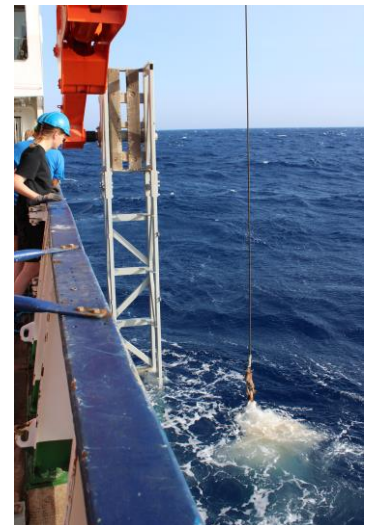


Fig. 6: Gravity core with landing rack. Photo: Yannis Kappelmann.

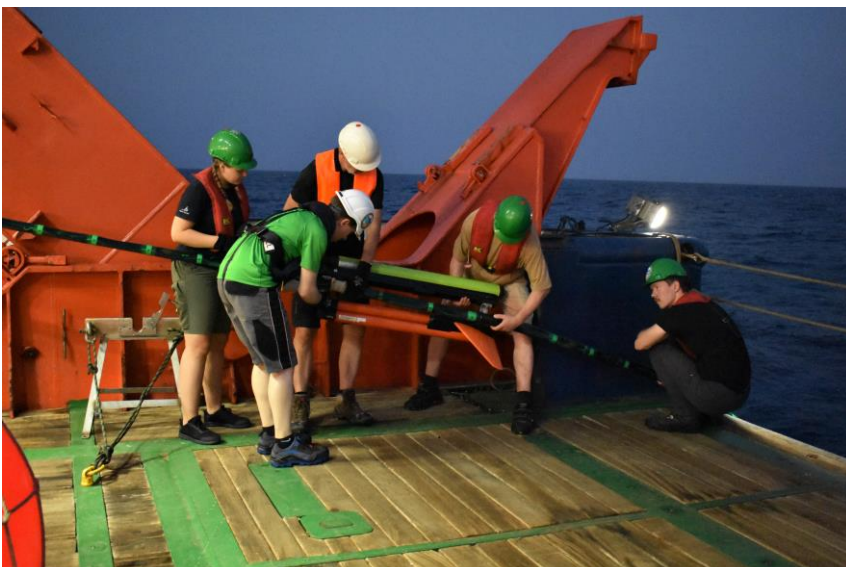


Fig. 4: Seismic team assembles bird at 144-channel streamer. Photo: Vanessa Ehliès.

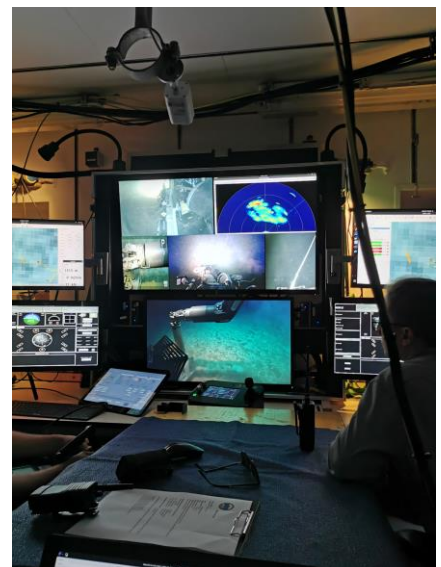


Fig. 7: ROV control room. Photo: Marco Taviani.

## Participants

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## Station List

ADCP= shipboard Acoustic Doppler Current Profiler 38 kHz; CTD= shipboard; MBES= shipboard multibeam echosounder EM710+EM122; MCS: multi-channel seismic University of Hamburg; ROV= remote operating vehicle MARUM.

Station	Date / Time UTC	Device	Latitude	Longitude	Water Depth (m)	Recovery (m)
M193_0	12.09.2023 13:30	ADCP	26° 23,282' N	035° 44,917' E	672	
M193_1-1	12.09.2023 14:52	Grab	26° 16,648' N	035° 42,650' E	936	
M193_1-2	12.09.2023 16:25	Box Corer	26° 16,649' N	035° 42,650' E	936	
M193_2-1	12.09.2023 18:25	CTD	26° 18,233' N	035° 37,302' E	947	
M193_3-1	13.09.2023 03:41	MCS	26° 18,161' N	035° 37,427' E	968	
M193_4-2	13.09.2023 16:16	Grab	26° 03,903' N	035° 44,392' E	1107	
M193_5-1	13.09.2023 18:22	Grab	26° 11,313' N	035° 41,234' E	959	
M193_6-1	13.09.2023 20:31	Grab	26° 18,359' N	035° 37,103' E	974	
M193_7-1	14.09.2023 00:05	Parasound	26° 26,710' N	035° 55,271' E	683	
M193_8-1	14.09.2023 02:04	Parasound	26° 31,304' N	035° 56,152' E	648	
M193_9-1	14.09.2023 04:41	CTD	26° 22,521' N	036° 03,962' E	935	
M193_10-1	14.09.2023 08:17	ROV	26° 23,621' N	036° 04,205' E	0	
M193_11-1	14.09.2023 16:06	Box Corer	26° 24,137' N	036° 03,923' E	697	
M193_12-1	14.09.2023 17:15	Box Corer	26° 24,125' N	036° 04,150' E	684	
M193_13-1	14.09.2023 18:20	Grab	26° 23,813' N	036° 04,050' E	721	
M193_14-1	14.09.2023 19:06	Grab	26° 23,432' N	036° 03,988' E	764	
M193_15-1	14.09.2023 20:01	Grab	26° 22,960' N	036° 03,875' E	868	
M193_16-1	14.09.2023 21:12	Box Corer	26° 22,553' N	036° 03,742' E	938	
M193_17-1	14.09.2023 23:13	Box Corer	26° 28,237' N	035° 57,981' E	1054	
M193_17-2	15.09.2023 01:03	Gravity Corer	26° 28,240' N	035° 57,995' E	1053	5.73
M193_17-3	15.09.2023 03:55	Gravity Corer	26° 28,245' N	035° 57,988' E	1054	11.5
M193_17-4	15.09.2023 05:14	CTD	26° 28,294' N	035° 57,998' E	1052	
M193_18-1	15.09.2023 12:30	MCS	26° 23,888' N	035° 34,478' E	816	
M193_19-1	19.09.2023 03:45	MBES	26° 28,404' N	036° 03,232' E	703	
M193_20-1	19.09.2023 05:03	CTD	26° 28,474' N	036° 04,963' E	695	
M193_22-1	19.09.2023 10:11	Grab	26° 28,945' N	036° 04,413' E	74	
M193_22-1	19.09.2023 10:19	Grab	26° 28,945' N	036° 04,415' E	74	
M193_23-1	19.09.2023 10:38	Grab	26° 28,890' N	036° 04,629' E	76	
M193_23-1	19.09.2023 10:46	Grab	26° 28,888' N	036° 04,628' E	76	
M193_24-1	19.09.2023 11:04	Grab	26° 28,891' N	036° 04,819' E	74	
M193_25-1	19.09.2023 11:40	Grab	26° 28,666' N	036° 04,864' E	481	
M193_26-1	19.09.2023 12:23	Grab	26° 28,455' N	036° 04,902' E	709	
M193_27-1	19.09.2023 13:05	Grab	26° 28,324' N	036° 04,945' E	721	
M193_28-1	19.09.2023 16:45	CTD	26° 08,349' N	036° 01,252' E	777	
M193_28-2	19.09.2023 17:47	Box Corer	26° 08,349' N	036° 01,251' E	777	
M193_28-3	19.09.2023 18:57	Gravity Corer	26° 08,349' N	036° 01,251' E	775	11.4
M193_29-1	19.09.2023 23:14	Parasound	25° 42,144' N	036° 00,766' E	1437	
M193_30-1	20.09.2023 02:26	CTD	25° 47,765' N	035° 58,559' E	1624	
M193_30-2	20.09.2023 03:52	Box Corer	25° 47,777' N	035° 58,556' E	1623	
M193_30-3	20.09.2023 05:47	Gravity Corer	25° 47,777' N	035° 58,555' E	1646	11.37



M193_31-1	20.09.2023 07:23	MBES	25° 52,675' N	035° 59,782' E	1046	
M193_33-1	21.09.2023 09:57	Grab	25° 48,009' N	036° 07,387' E	1261	
M193_33-2	21.09.2023 11:04	Box Corer	25° 48,009' N	036° 07,386' E	1259	
M193_34-1	21.09.2023 12:15	Grab	25° 48,201' N	036° 07,316' E	1210	
M193_35-1	21.09.2023 13:20	Grab	25° 48,429' N	036° 07,223' E	1109	
M193_36-1	21.09.2023 14:23	Grab	25° 48,734' N	036° 07,064' E	935	
M193_37-1	21.09.2023 15:27	Grab	25° 49,086' N	036° 07,012' E	584	
M193_37-2	21.09.2023 16:09	Box Corer	25° 49,086' N	036° 07,010' E	585	
M193_38-1	21.09.2023 21:12	Box Corer	25° 43,308' N	035° 55,177' E	1199	
M193_39-1	22.09.2023 05:45	MCS	26° 06,171' N	036° 14,993' E	782	
M193_41-1	26.09.2023 14:46	Box Corer	25° 21,136' N	036° 09,685' E	2254	
M193_41-2	26.09.2023 17:23	Gravity Corer	25° 21,136' N	036° 09,685' E	2253	5.37
M193_41-3	26.09.2023 19:49	Gravity Corer	25° 21,136' N	036° 09,684' E	2252	10.26
M193_42-1	26.09.2023 20:52	MBES	25° 21,557' N	036° 09,508' E	2253	
M193_43-1	27.09.2023 02:59	CTD	25° 21,137' N	036° 09,696' E	2258	
M193_44-1	27.09.2023 06:36	ROV	25° 27,052' N	036° 06,940' E	0	
M193_44-1	27.09.2023 07:36	ROV	25° 27,131' N	036° 06,838' E	0	
M193_45-1	27.09.2023 14:57	Grab	25° 27,290' N	036° 05,922' E	1178	
M193_46-1	27.09.2023 16:06	Grab	25° 27,189' N	036° 06,290' E	1230	
M193_47-1	27.09.2023 17:30	Grab	25° 27,019' N	036° 06,593' E	1296	
M193_48-1	27.09.2023 18:47	Grab	25° 26,829' N	036° 06,649' E	1354	
M193_49-1	27.09.2023 20:10	Grab	25° 26,816' N	036° 07,159' E	1459	
M193_50-1	27.09.2023 20:47	MBES	25° 26,882' N	036° 07,284' E	1506	
M193_51-1	28.09.2023 04:46	CTD	25° 34,863' N	036° 21,220' E	1079	
M193_51-2	28.09.2023 06:30	ROV	25° 34,835' N	036° 21,164' E	0	
M193_51-2	28.09.2023 06:44	ROV	25° 34,844' N	036° 21,164' E	0	
M193_52-1	28.09.2023 14:55	Grab	25° 34,713' N	036° 19,845' E	762	
M193_53-1	28.09.2023 15:52	Grab	25° 34,620' N	036° 20,008' E	778	
M193_54-1	28.09.2023 16:44	Grab	25° 34,536' N	036° 20,219' E	913	
M193_55-1	28.09.2023 17:45	Grab	25° 34,426' N	036° 20,380' E	971	
M193_56-1	28.09.2023 18:46	Grab	25° 34,221' N	036° 20,440' E	1002	
M193_57-1	28.09.2023 19:51	Grab	25° 34,318' N	036° 20,626' E	1107	
M193_58-1	28.09.2023 20:31	MBES	25° 35,600' N	036° 20,242' E	808	
M193_59-1	29.09.2023 04:34	CTD	25° 54,452' N	036° 23,448' E	659	
M193_59-2	29.09.2023 06:09	ROV	25° 54,453' N	036° 23,391' E	681	
M193_60-1	29.09.2023 14:37	Grab	25° 55,177' N	036° 25,032' E	138	
M193_61-1	29.09.2023 15:10	Grab	25° 55,018' N	036° 24,706' E	77	
M193_61-2	29.09.2023 15:17	Grab	25° 55,010' N	036° 24,717' E	78	
M193_62-1	29.09.2023 15:38	Grab	25° 55,103' N	036° 24,463' E	60	
M193_63-1	29.09.2023 16:03	Grab	25° 54,877' N	036° 24,205' E	85	
M193_63-2	29.09.2023 16:11	Grab	25° 54,893' N	036° 24,195' E	84	
M193_64-1	29.09.2023 17:02	Grab	25° 55,010' N	036° 23,842' E	51	
M193_64-2	29.09.2023 17:07	Grab	25° 55,010' N	036° 23,843' E	50	
M193_66-1	29.09.2023 18:07	Grab	25° 54,663' N	036° 23,517' E	359	
M193_67-1	29.09.2023 18:46	Grab	25° 54,586' N	036° 23,286' E	772	
M193_68-1	29.09.2023 19:37	Grab	25° 54,449' N	036° 23,131' E	904	
M193_69-1	29.09.2023 20:30	MBES	25° 52,251' N	036° 20,515' E	890	
M193_70-1	30.09.2023 04:26	CTD	25° 19,283' N	036° 52,445' E	0	
M193_71-1	30.09.2023 06:00	ROV	25° 19,218' N	036° 51,593' E	0	
M193_72-1	30.09.2023 17:11	MCS	25° 20,510' N	036° 24,304' E	1753	
M193_73-1	01.10.2023 11:07	Grab	25° 16,426' N	036° 54,198' E	429	
M193_74-1	01.10.2023 11:38	Grab	25° 16,474' N	036° 54,109' E	333	
M193_75-1	01.10.2023 11:59	Grab	25° 16,550' N	036° 54,005' E	49	

M193_76-1	01.10.2023 12:13	Grab	25° 16,617' N	036° 53,928' E	44	
M193_77-1	01.10.2023 12:26	Grab	25° 16,692' N	036° 53,817' E	37	
M193_77-2	01.10.2023 12:31	Grab	25° 16,695' N	036° 53,814' E	36	
M193_78-1	01.10.2023 12:43	Grab	25° 16,726' N	036° 53,747' E	40	
M193_79-1	01.10.2023 12:53	Grab	25° 16,743' N	036° 53,702' E	38	
M193_79-2	01.10.2023 12:58	Grab	25° 16,744' N	036° 53,708' E	38	
M193_80-1	01.10.2023 13:11	Grab	25° 16,839' N	036° 53,697' E	46	
M193_80-2	01.10.2023 13:18	Grab	25° 16,836' N	036° 53,694' E	46	
M193_80-3	01.10.2023 13:24	Grab	25° 16,836' N	036° 53,694' E	46	
M193_81-1	01.10.2023 14:40	Grab	25° 12,673' N	036° 55,149' E	450	
M193_81-2	01.10.2023 15:30	Gravity Corer	25° 12,677' N	036° 55,146' E	450	10.42
M193_82-1	01.10.2023 17:41	CTD	25° 09,089' N	036° 57,800' E	668	
M193_82-2	01.10.2023 18:39	Box Corer	25° 09,088' N	036° 57,800' E	668	
M193_83-1	01.10.2023 20:26	Gravity Corer	25° 08,809' N	036° 57,798' E	659	6.45
M193_84-1	01.10.2023 20:57	MBES	25° 09,057' N	036° 57,535' E	620	
M193_86-1	02.10.2023 14:03	Grab	25° 09,503' N	036° 57,762' E	640	
M193_87-1	02.10.2023 15:02	Grab	25° 09,596' N	036° 57,737' E	632	
M193_88-1	02.10.2023 16:08	MBES	25° 05,465' N	036° 55,377' E	642	
M193_89-1	03.10.2023 04:35	CTD	25° 09,030' N	036° 55,851' E	458	
M193_89-2	03.10.2023 06:08	ROV	25° 08,852' N	036° 55,542' E	418	
M193_90-1	03.10.2023 12:50	Grab	25° 08,984' N	036° 55,950' E	464	
M193_91-1	03.10.2023 13:26	Grab	25° 08,940' N	036° 55,818' E	401	
M193_91-2	03.10.2023 13:46	Grab	25° 08,940' N	036° 55,818' E	395	
M193_91-3	03.10.2023 14:05	Grab	25° 08,940' N	036° 55,817' E	399	
M193_92-1	03.10.2023 14:20	MBES	25° 08,832' N	036° 55,732' E	239	
M193_93-1	04.10.2023 06:16	CTD	25° 41,906' N	036° 19,670' E	835	
M193_93-2	04.10.2023 07:02	Grab	25° 41,906' N	036° 19,671' E	834	
M193_93-3	04.10.2023 08:09	Gravity Corer	25° 41,906' N	036° 19,670' E	834	
M193_94-1	04.10.2023 08:52	MBES	25° 42,034' N	036° 19,230' E	821	