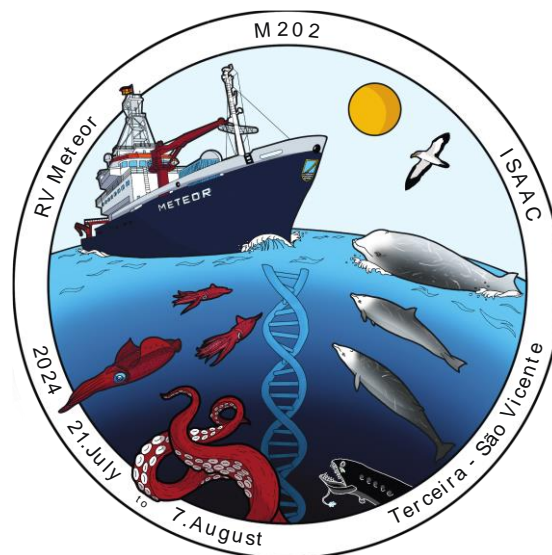


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Short Cruise Report M202



Praia da Vitória (Azores) – Mindelo (Cabo Verde)

21.07.2024 – 07.08.2024

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Co-PI: Dr. Fleur Visser

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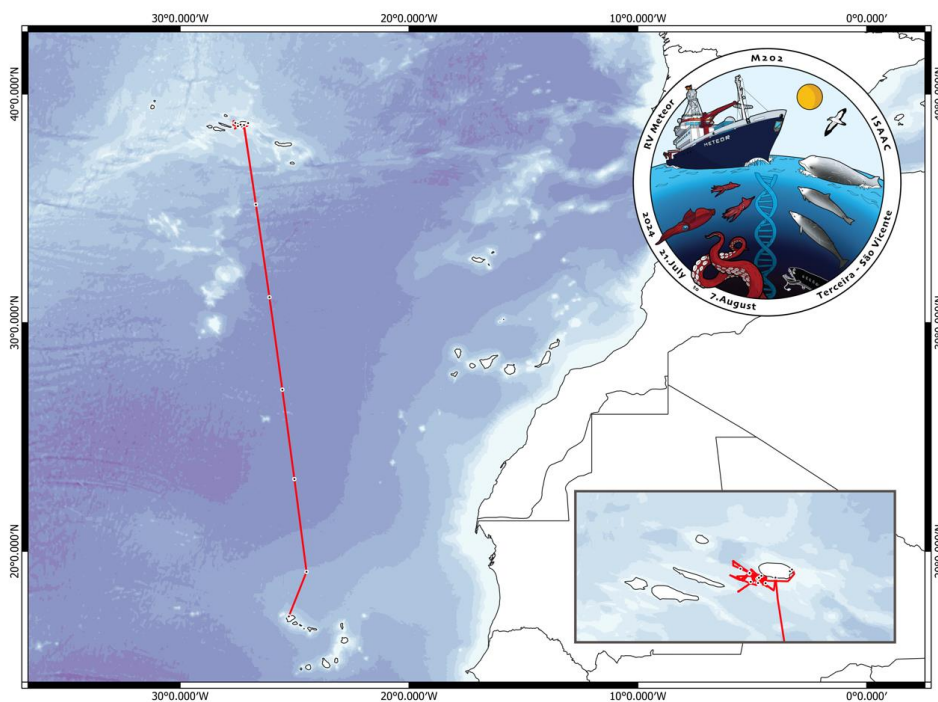


Figure 3.3.1: Track chart of RV METEOR M202 starting on Terceira, Azores and ending in Mindelo, Cabo Verde. Bathymetry provided by GEBCO.

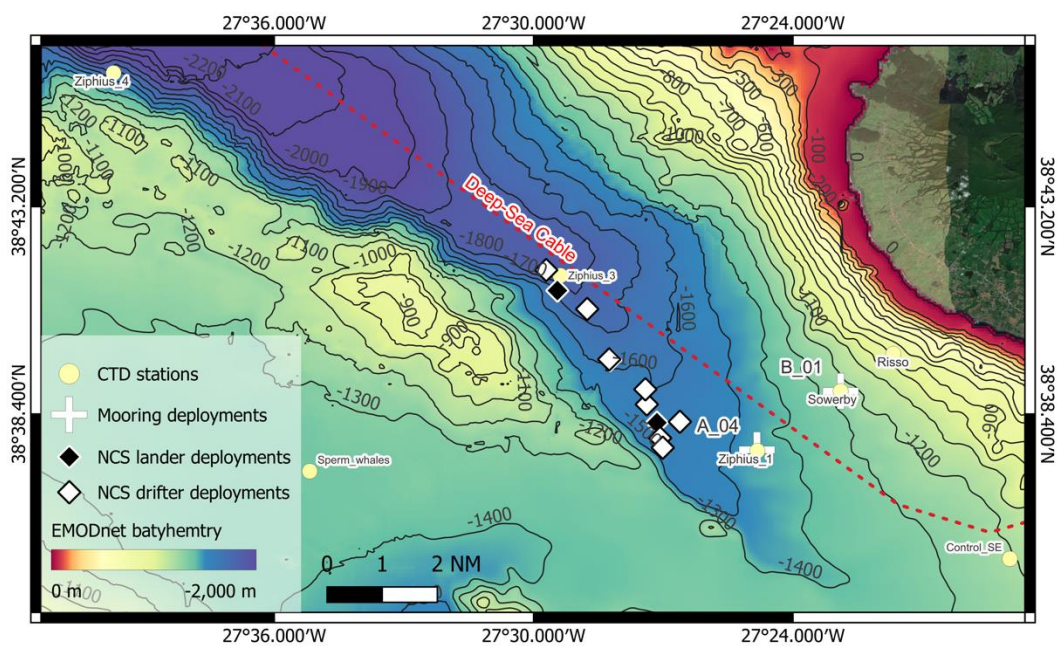


Figure 3.3.2: Station plan of R/V METEOR Cruise M202 off Terceira. The black and white squares represent the lander and drifter deployments, respectively. The white cross shows the mooring deployments and the yellow dots the CTD stations. Bathymetry by EMODnet and satellite imagery by Esri World Imagery.

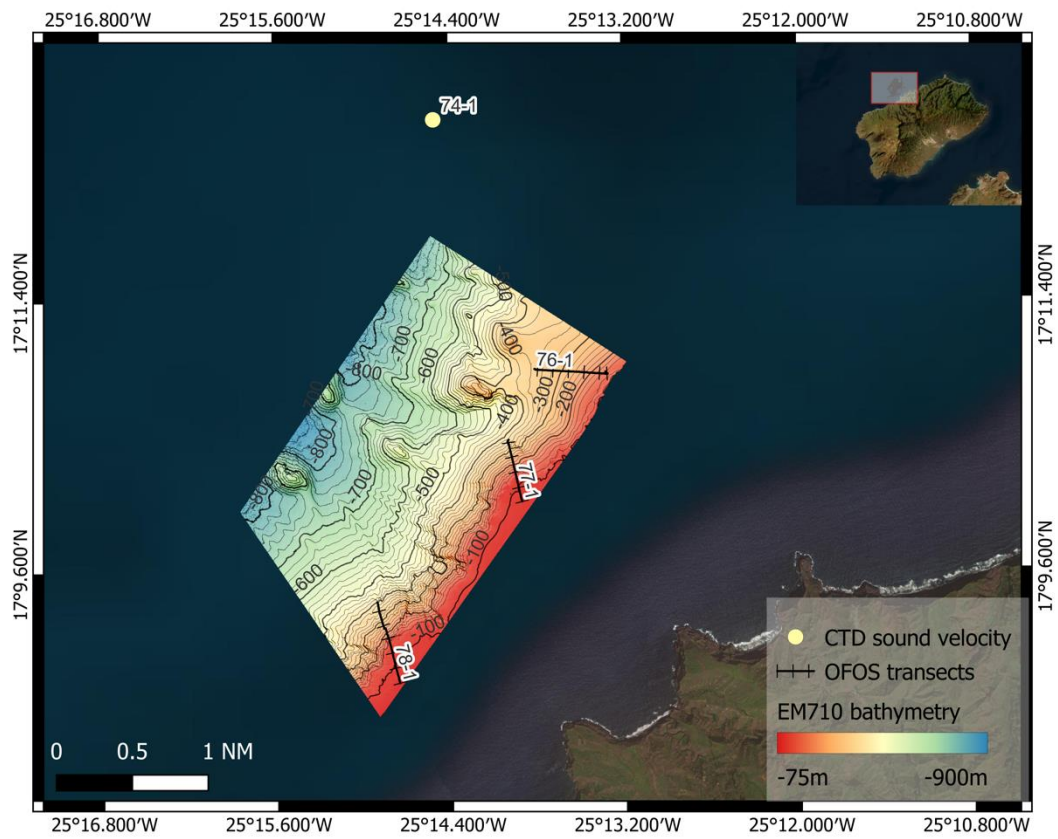


Figure 3.3.3: Map of R/V Meteor Cruise M202 off Cabo Verde. Yellow dots represent the CTD station for sound velocity profiles and the black line the OFOS transect. Background satellite imagery by Esri World Imagery

Objectives

The Atlantic island archipelago of the Azores are a hotspot for biodiversity. Here deep-diving toothed whales hunt relatively close to each other and have adapted to hunt at specific depths and distance from the coast for different prey types, including cephalopods. For conservation measures of cetaceans, understanding diversity and distribution of prey communities is indispensable. This cruise had the overall aim to investigate cetacean niche segregation by analyzing the respective prey species population metrics in foraging habitats of Risso's dolphins (*Grampus griseus*), Sowerby's beaked whales (*Mesoplodon bidens*) and goose-beaked whales (*Ziphius cavirostris*) (Fig. 1,2). We employed high-resolution sampling at six core deep-sea stations off the island of Terceira, Azores. We collected observational transect data via towed and CTD-mounted camera systems, attracted deep-sea squid with autonomous low-light cameras, investigated prey diversity with environmental DNA, and used acoustic surveys, nets, and a mooring to quantify prey biomass. We collected environmental data to correlate prey distribution with oceanographic conditions. Thanks to favorable weather conditions, we were able to complete the six stations earlier than expected and added a 24-hour work program off Cabo Verde (Fig. 3). Our efforts concentrated on the following objectives:

Objective 1: Assess nekton community composition to determine cetacean prey spectra from the surface to the seafloor

Water samples for eDNA analysis were collected using a CTD rosette to detect the presence and distribution of key prey species like cephalopods and fish, which are crucial for deep-diving cetaceans. The Plankton Imager with Scanning Optics (PISCO) collected high-resolution images of meso- and microzooplankton, which are vital for understanding the early life stages of cetacean prey. The newly designed profiling PELAGIOS (proPel) was attached to the CTD rosette and tested to capture images of larger (>1 cm) pelagic organisms during vertical profiles. Pelagic diversity was observed using the Pelagic In Situ Observation System (PELAGIOS), which allowed for detailed imaging of cephalopod species and gelatinous zooplankton across different depths during horizontal transects. Targeted pelagic trawls provided direct quantification and taxonomic identification of nekton and plankton prey. Selected individuals of the net catches were sampled for trophic ecology assessments via stable isotope analysis, microplastic estimations, transcriptomics of fish retinas, and onboard visual experiments of hyperiid amphipods and ostracods. Physical oceanographic environmental data was collected to correlate prey distribution with oceanographic conditions.

Objective 2: Assess biomass and abundance of cetacean nekton prey from the surface to the seafloor

In situ observations from active acoustic surveys provided detailed information on prey aggregations and biomass across various depths. To specifically target deep-diving species like goose-beaked whales, bottom-mounted, upward-transmitting echosounders were deployed, allowing the detection of prey within the whales' foraging depths of 800-1800 meters. These echosounders, already in place from previous years, were recovered during the cruise and re-deployed, ensuring continuous data collection and providing a comprehensive understanding of prey distribution in relation to oceanographic conditions

near the seafloor.

Objective 3: Assess the bathymetry and biomass from the island to the open ocean

For quantification of distribution and biomass of the deep scattering layers in the foraging habitats of toothed whales, echosounder transects were conducted inside the foraging habitats of the respective species. We also conducted several WBAT transects in combination with PELAGIOS deployments along and across depth contours in the goose-beaked whale habitat.

Objective 4: Collect in situ observations of deep-sea cephalopods for diversity, size measurements, and life history

The Nautilus Camera System (NCS), equipped with high-resolution, low-light cameras and an optical lure known as the "e-Jelly," was deployed to attract and document cephalopods. The ACS was deployed in both midwater (Drifter) and benthic (Lander) configurations to observe cephalopods in different habitats, enabling species identification and size estimation. Additionally, a stereo camera system on PELAGIOS was used to obtain faunal observations during video transects, further validating the eDNA data collected and enhancing our understanding of cephalopod diversity and life history in the region.

Objective 5: Calorific content of deep-sea nekton

Specimens collected with the pelagic trawl were preserved for calorific content analysis. This data is crucial for bio-energetic models of marine mammal predators and understanding prey population dynamics, particularly for species that undergo ontogenetic migrations, where calorific content can vary significantly between juveniles and reproducing adults.

Objective 6: Multibeam mapping off Santo Antão, Cabo Verde

We collected habitat information via acoustic and optical mapping of the seafloor between 50-200 m off the island of Santo Antão, Cabo Verde. We focused on the northern part of the island where we performed multibeam mapping lines and OFOS seafloor imaging transects.

Narrative

On July 19, an advance party boarded the RV METEOR to begin unloading the container and setting up equipment for the upcoming research cruise. The following day, July 20, all members of the scientific party arrived on RV Meteor in the morning and started unpacking the containers, setting up the laboratories, testing the instruments, and preparing everything needed for our upcoming cruise.

The next day at 07:30 am UTC, the RV METEOR departed from the port of Praia da Vitória, with a team consisting of 29 scientists and technicians, alongside the members of the vessel's permanent crew. Throughout the entire cruise, we were lucky with perfect weather and sea conditions. Our transit to our first station was short and at 11:10 am UTC, we deployed one benthic Nautilus Camera (NCS) lander (Fig. 4). We then transited to a mooring that was deployed in the water for a year and had hydrophones and

echosounders attached to record cetacean sound and echolocation. The mooring retrieval took approximately 2.5 hours, after which the system was safely onboard. We proceeded with a Posidonia test, followed by a 16-hour ADCP transect along the canyon axis overnight with five CTD deployments and PISCO attached. This marked the start of our continuous 24-hour operational schedule, which would be repeated at all six deep-sea stations. On July 22, we deployed two NCS drifters, and then started our station work at *Ziphius 1* with a 5-hour PELAGIOS deployment via the LWL-Winch (Fig. 5). In the evening, we conducted ADCP transects, and the CTD was deployed three times (YoYo-CTD) at the same location. One of the CTD casts was used for seawater collection for nutrient sampling, and chlorophyll analysis. The NCS lander that was deployed the day before accidentally released itself too early and surfaced. It was monitored overnight via its GPS signal, as we were not able to retrieve it during darkness. In the early morning on July 23, a multinet was deployed at *Ziphius 1* to a depth of 700 m, with nine individual nets closing at 75 m intervals. At 8:00 am, the resurfaced NCS lander was retrieved successfully on deck. Interestingly, its bait bag had been torn, raising questions about whether this occurred at depth or at the surface. The two drifting Nautilus systems were retrieved without any issues. We deployed the CTD rosette with water sampler for eDNA collection to a depth of 1400 m at *Ziphius 1*. In the afternoon, we deployed PELAGIOS for a 7-hour dive, capturing various deep-sea species. The day was concluded with a 3-hour RMT net tow, which yielded a variety of deep-sea fish, cephalopods, jellyfish, and other marine organisms.

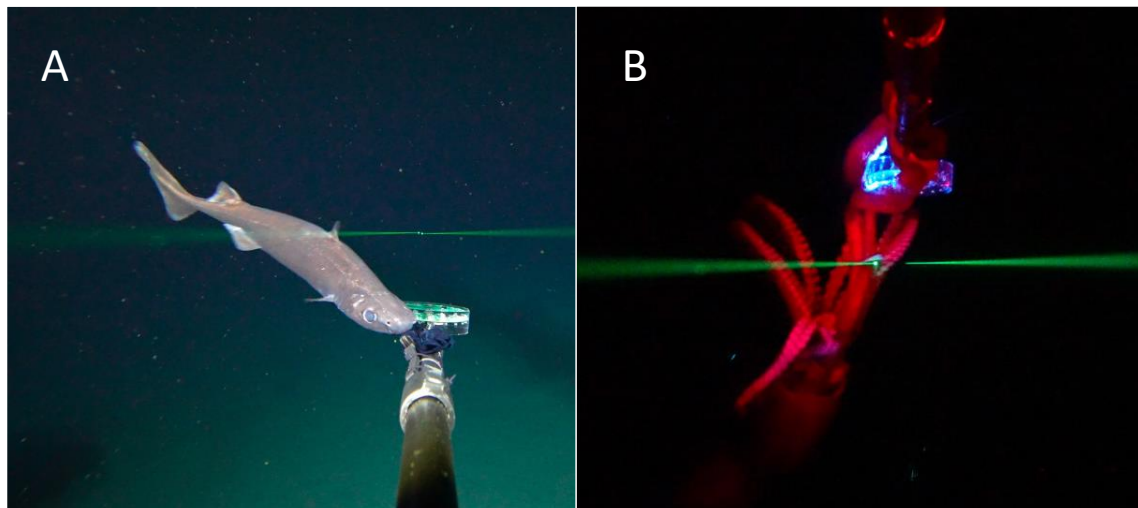


Figure 4: A: Lantern shark filmed under white light during Lander deployment on 24 July 2024 at 1715m. The estimated body length is about 50 cm. B: An unidentified squid attacking the eJelly, filmed under red light during drifter deployment on 28 July at 750 m depth.

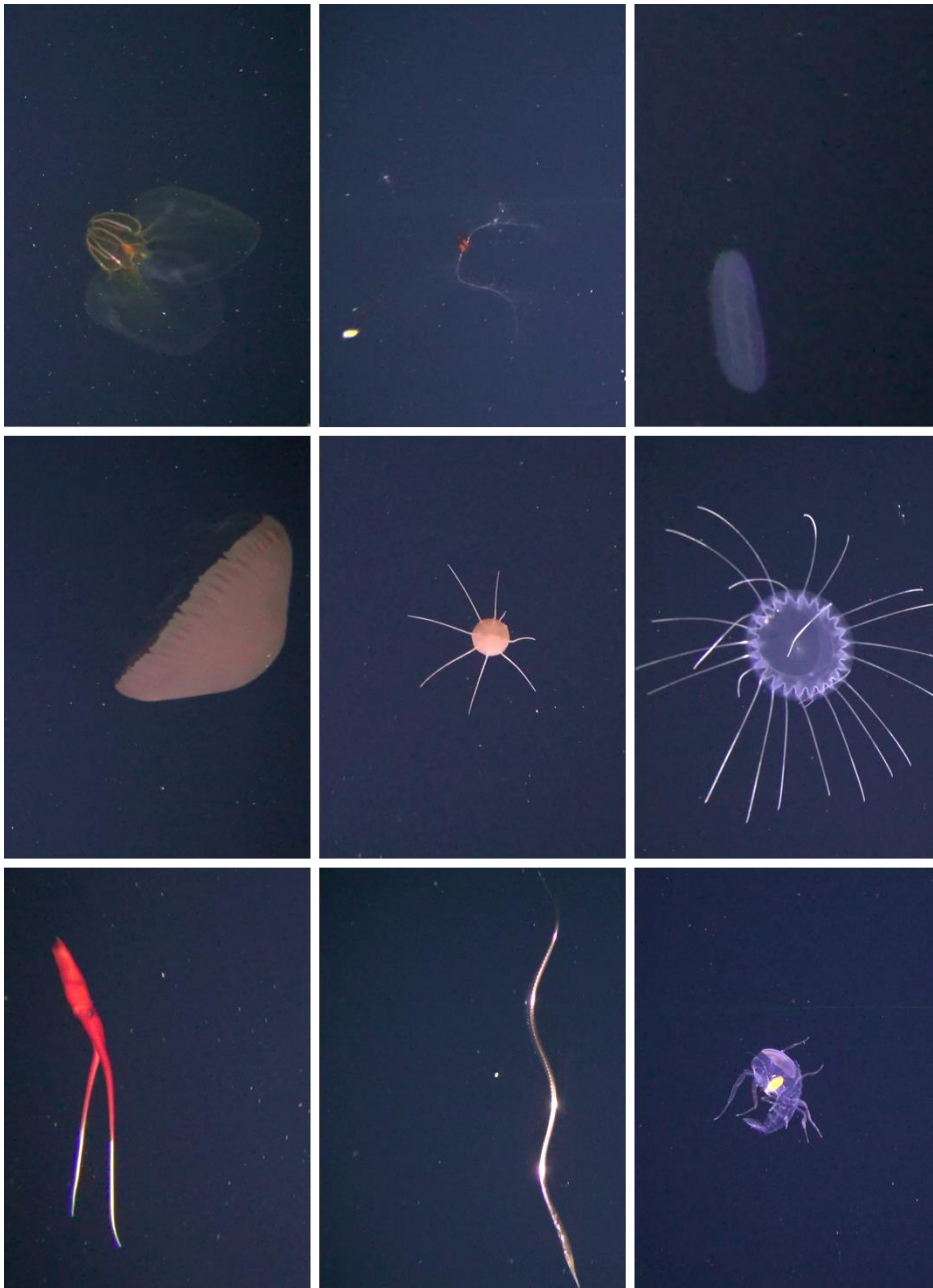


Figure 5: Examples of encountered pelagic fauna during PELAGIOS transects between 75 and 1400 m. First row: ctenophores, Second row: Hydromedusae *Porelia*, unidentified *Solmissus*. Third row, left: mastigoteuthid cephalopod, middle: sawtooth eel, right: *Cystosoma* amphipod.

In the night of July 24, we conducted another 6-hour ADCP transect including four CTDs using bottle-nets. In the morning, we deployed a NCS lander and two drifters. An 8-hour PELAGIOS transect, covering depths between 500 and 1,200 meters, was carried out. However, a mechanical issue with the PELAGIOS light cable required a mid-operation repair. The day closed with a return to the station *Sowerby* for a multinet deployment to 700 m and further ADCP transects with three CTD deployments. The last CTD deployment in the morning of July was conducted at the *Control Station*. We then went back to the NCS lander deployment site, to pick it up as well as two NCS drifters. Subsequently, a 4-hour RMT tow was conducted in the afternoon at the station *Sowerby* yielding barrelfish,

followed by a 1.5 h multinet deployment. During the night from July 25 to July 26, a 24-hour ADCP transect with six CTDs was conducted. The last CTD sampled seawater at *Sowerby*, followed by the deployment of a lander and drifter. A following 7h PELAGIOS transect recorded two *Mastigoteuthis* sp. in the water column. During the following RMT tow, we changed the towing speed from 3 knots to 4 knots, to increase the catch yield and the chance to catch cephalopods. However, the RMT struggled with maintaining depth at 4 knots, and we therefore changed back to towing at 3 knots. This 4-hour tow resulted in a very diverse catch, but not many cephalopods.

In the night of July 27, we began with CTD seawater collection at the station *Risso* and then went to *Ziphius* 3, where three Yoyo-CTDs were conducted with the last one also collecting seawater. Two NCS drifters were successfully recovered, though one lander failed to release from the seafloor and remained under surveillance at the seafloor. A 9-hour PELAGIOS transect continued and multinet operations were conducted from *Ziphius* 1 to *Control* SE. However, this tow was only conducted with eight nets, as one got damaged. On July 28, one CTD seawater casts was conducted at *Control* SE, followed by a 4.5-hour echosounder transect (EM122) at *Risso* and *Sowerby*. CTD seawater sampling continued at *Risso*, and we then smoothly deployed a mooring, in under 3 hours despite slight entanglement. At noon on July 28, two NCS drifters were deployed. Another successful 7.5-hour PELAGIOS transect was completed in sperm whale habitat, yielding observations of the squid *Grimalditeuthis bonplandi* and swordfish. After PELAGIOS, we conducted an 8-hour ADCP transect including five CTD deployments alongside testing the profiling PELAGIOS (proPEL) camera system attached to the CTD.

In the night of July 28 to July 29, the lander finally resurfaced and was observed during the night via its GPS signal. In the morning, we recovered the lander and both drifters and conducted a long RMT tow of 6 hours in sperm whale habitat. Subsequently, we conducted a 13-hour ADCP transect including a seawater CTD in sperm whale habitat and three additional YoYo-CTDs. We completed our final CTD at *Ziphius* 4 off Terceira Island and deployed another mooring over the A-Frame. In the afternoon of July 30, we conducted a first test and 5-hour deployment of OFOS (Ocean Floor Observation System), yielding observations of *Mastigoteuthis* squid and a pelagic octopus.

We conducted our last 6-hour ADCP transect including three CTD deployments in the early morning of July 31 and completed our fieldwork off the Azores. Since some of the equipment used during our cruise needed to be transferred to a smaller boat to stay on the Azores, we sailed to the protected bay *Baía de Angra do Heroísmo* where we were met by a fisher boat and our collaborators from NIOZ. The sea conditions were perfect, the transfer of the equipment went smoothly and was completed within 30 minutes.

On our 5.5-day transit to Cabo Verde, we used the time for scientific lectures on cruise results, and packing the equipment that was no longer needed. We arrived in our fieldwork area off Cabo Verde in the early evening on August 5 and started with a CTD deployment at the time series station CVOO (Cape Verde Ocean Observatory). We then sailed closer to Santo Antão and conducted another CTD for a sound velocity profile to prepare for the multibeam mapping survey.

On August 6, we conducted a 10-hour multibeam transect, followed by an 8.5-hour OFOS deployment (Fig. 6). Our fieldwork off Cape Verde ended with a last 30-minute multibeam transect, before we sailed to the port of Mindelo, where we arrived on August 7 at 8 am UTC.

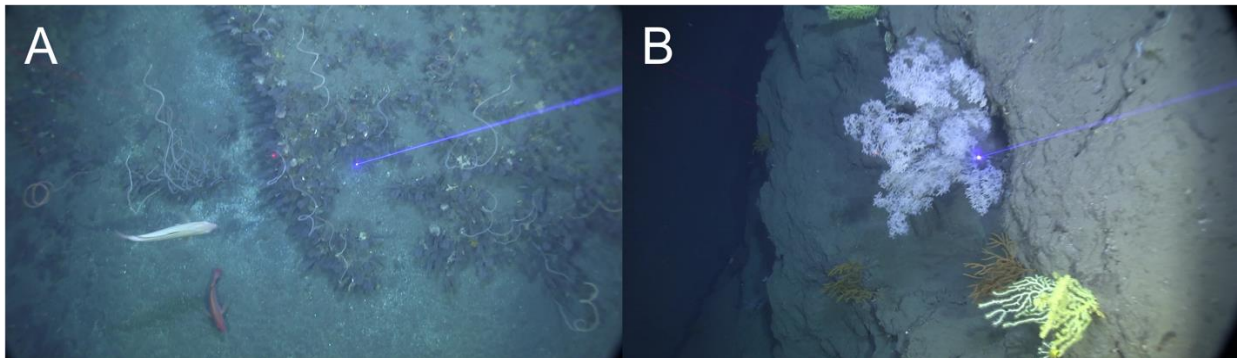


Figure 6: Screenshots of OFOS dives during M202 off the coast of Santo Antão, Cape Verde. A) Black coral forest on the shelf and B) deep-sea corals on a steep slope.

In conclusion, despite minor technical setbacks, the cruise proceeded smoothly, and we successfully completed a comprehensive program of deep-sea research operations, collecting valuable data on oceanographic conditions and deep-sea biodiversity.

Acknowledgements

We thank Captain Detlef Korte and his crew for excellent support and teamwork and for creating a supportive atmosphere throughout the cruise. The great efforts of the R/V METEOR crew were indispensable for the success of the expedition. We also acknowledge the commitment and hard work of the scientists, technical staff, and students, whose contributions were invaluable. We also thank Antje Elsässer from the German National Meteorological Service (DWD) for the daily weather briefings. We thank Dr. Heino Fock (Thünen Institute) for supporting us with the Rectangular Midwater Trawl. Special thanks goes out to our collaborators Dr. Fleur Visser and team (Kelp Marine Research, NIOZ, University of Amsterdam) for helping to organize the cruise. Special thanks go to the Leitstelle METEOR/MERIAN and Briesse Research for their crucial support. We also thank the Begutachtungspanel Forschungsschiffe (GPF) for their evaluation, as well as the GPF Geschäftsstelle for their assistance. We would like to thank the governments of the Azores and Cabo Verde for permitting our research. This cruise was funded by the German Research Foundation (DFG) and the GEOMAR Helmholtz Centre for Ocean Research Kiel.

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Scripps Institution of Oceanography, USA
Smithsonian Natural Museum of Natural History, USA
U of A University of the Azores, Azores
IMAR Instituto do Mar, Azores
Charles University, Czech Republic

Station list

Station No.	Gear	Time	Latitude	Longitude	Depth	Remarks
		(UTC)	[°N]	[°W]	[m]	
M202_79-1	MB_PS	2024-08-07 01:10:26	17° 08,549'	025° 14,991'	80	Multibeam
M202_79-1	MB_PS	2024-08-07 00:35:11	17° 10,765'	025° 13,449'	153	
M202_78-1	OFOS	2024-08-06 23:42:00	17° 09,415'	025° 14,899'	421	
M202_78-1	OFOS	2024-08-06 23:31:09	17° 09,372'	025° 14,890'	365	
M202_78-1	OFOS	2024-08-06 23:30:48	17° 09,371'	025° 14,889'	363	
M202_78-1	OFOS	2024-08-06 21:36:45	17° 08,877'	025° 14,759'	89	
M202_78-1	OFOS	2024-08-06 21:24:35	17° 08,877'	025° 14,759'	89	
M202_77-1	OFOS	2024-08-06 19:48:51	17° 10,483'	025° 13,999'	386	
M202_77-1	OFOS	2024-08-06 19:36:47	17° 10,483'	025° 14,000'	385	
M202_77-1	OFOS	2024-08-06 18:16:48	17° 10,104'	025° 13,916'	98	
M202_77-1	OFOS	2024-08-06 18:01:43	17° 10,063'	025° 13,907'	96	
M202_76-1	OFOS	2024-08-06 16:25:44	17° 10,931'	025° 13,798'	352	
M202_76-1	OFOS	2024-08-06 16:15:11	17° 10,934'	025° 13,823'	358	
M202_76-1	OFOS	2024-08-06 14:42:57	17° 10,901'	025° 13,343'	160	
M202_76-1	OFOS	2024-08-06 14:39:45	17° 10,901'	025° 13,331'	158	
M202_76-1	OFOS	2024-08-06 14:14:50	17° 10,901'	025° 13,333'	158	
M202_75-1	MB_PS	2024-08-06	17°	025°	216	Multibeam

		12:52:49	11,055'	13,287'		
M202_75-1	MB_PS	2024-08-06 02:51:03	17° 12,061'	025° 14,223'	729	
M202_74-1	CTD	2024-08-06 02:31:29	17° 12,595'	025° 14,500'	891	
M202_74-1	CTD	2024-08-06 02:12:20	17° 12,596'	025° 14,500'	892	
M202_74-1	CTD	2024-08-06 01:49:04	17° 12,608'	025° 14,496'	1001	
M202_73-1	CTD	2024-08-05 19:50:25	17° 34,986'	024° 17,042'	3583	
M202_73-1	CTD	2024-08-05 18:36:29	17° 34,989'	024° 17,042'	3584	
M202_73-1	CTD	2024-08-05 17:26:49	17° 34,989'	024° 17,042'	3584	
M202_72-1	CTD	2024-07-31 01:43:23	38° 34,004'	027° 18,908'	0	
M202_72-1	CTD	2024-07-31 01:20:16	38° 34,006'	027° 18,908'	0	
M202_72-1	CTD	2024-07-31 00:52:16	38° 33,992'	027° 18,944'	0	
M202_71-1	CTD	2024-07-30 23:57:55	38° 30,199'	027° 13,372'	0	
M202_71-1	CTD	2024-07-30 23:33:39	38° 30,197'	027° 13,366'	0	
M202_71-1	CTD	2024-07-30 23:09:34	38° 30,201'	027° 13,314'	0	
M202_70-1	CTD	2024-07-30 21:37:00	38° 37,766'	027° 24,185'	0	
M202_70-1	CTD	2024-07-30 21:09:31	38° 37,783'	027° 24,186'	0	
M202_70-1	CTD	2024-07-30 20:37:41	38° 37,781'	027° 24,187'	0	
M202_69-1	OFOS	2024-07-30 20:09:43	38° 36,957'	027° 24,417'	0	
M202_69-1	OFOS	2024-07-30 17:57:45	38° 37,010'	027° 24,436'	0	
M202_69-1	OFOS	2024-07-30 16:02:28	38° 36,726'	027° 23,280'	0	
M202_69-1	OFOS	2024-07-30 15:09:55	38° 36,727'	027° 23,287'	0	
M202_68-1	MOOR	2024-07-30 14:27:33	38° 37,345'	027° 26,090'	0	Mooring
M202_68-1	MOOR	2024-07-30 12:30:34	38° 36,889'	027° 24,519'	0	deployment

M202_68-1	MOOR	2024-07-30 12:10:13				
2	2,2					
M202_68-1	MOOR	2024-07-30 12:05:36	38° 37,653'	027° 24,943'	1441	
M202_68-1	MOOR	2024-07-30 10:14:20	38° 36,056'	027° 23,224'	1364	
M202_67-1	CTD	2024-07-30 07:18:34	38° 46,314'	027° 39,655'	0	eDNA CTD
M202_67-1	CTD	2024-07-30 06:36:56	38° 46,309'	027° 39,677'	0	Ziphius 4
M202_67-1	CTD	2024-07-30 06:01:38	38° 46,277'	027° 39,777'	0	
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M202_66-2	CTD	2024-07-30 02:55:54	38° 49,487'	027° 40,195'	0	
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M202_65-1	CTD	2024-07-29 21:19:55	38° 37,076'	027° 35,180'	0	eDNA CTD
M202_65-1	CTD	2024-07-29 20:39:35	38° 37,234'	027° 35,257'	0	Spermwhale
M202_65-1	CTD	2024-07-29 20:10:36	38° 37,231'	027° 35,242'	0	
M202_64-1	RMT8	2024-07-29 18:30:45	38° 40,324'	027° 42,332'	0	
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		11:03:15	37,609'	24,535'		
M202_63-1	DRIFT	2024-07-29 10:44:43	38° 37,449'	027° 24,459'	0	
M202_62-1	DRIFT	2024-07-29 10:12:12	38° 38,121'	027° 24,897'	0	NCS Drifter
M202_62-1	DRIFT	2024-07-29 09:49:56	38° 38,210'	027° 24,719'	0	
M202_61-1	AULCS	2024-07-29 08:32:57	38° 35,162'	027° 30,014'	0	NCS Lander
M202_60-1	CTD	2024-07-29 07:14:33	38° 39,690'	027° 27,052'	0	
M202_60-1	CTD	2024-07-29 06:44:09	38° 39,700'	027° 27,048'	0	
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M202_59-2	CTD	2024-07-29 03:30:38	38° 41,490'	027° 29,430'	0	
M202_59-2	CTD	2024-07-29 02:54:14	38° 41,495'	027° 29,434'	0	
M202_59-1	CTD	2024-07-29 02:46:20	38° 41,490'	027° 29,428'	0	
M202_59-1	CTD	2024-07-29 02:12:32	38° 41,491'	027° 29,436'	0	
M202_59-1	CTD	2024-07-29 01:35:06	38° 41,501'	027° 29,403'	0	
M202_58-1	CTD	2024-07-29 00:24:17	38° 36,482'	027° 33,618'	0	
M202_58-1	CTD	2024-07-28 23:59:02	38° 36,486'	027° 33,623'	0	
M202_58-1	CTD	2024-07-28 23:29:37	38° 36,474'	027° 33,624'	0	
M202_57-1	PELAGIOS	2024-07-28 23:06:35	38° 36,520'	027° 33,792'	0	
M202_57-1	PELAGIOS	2024-07-28 15:30:13	38° 39,171'	027° 37,451'	0	
M202_57-1	PELAGIOS	2024-07-28 15:26:28	38° 39,223'	027° 37,524'	0	

M202_56-1	DRIFT	2024-07-28 13:14:02	38° 38,225'	027° 26,620'	0	NCS Drifter
M202_56-1	DRIFT	2024-07-28 12:56:51	38° 38,556'	027° 26,944'	0	
M202_55-1	DRIFT	2024-07-28 12:29:13	38° 37,620'	027° 27,017'	0	NCS Drifter
M202_55-1	DRIFT	2024-07-28 12:11:31	38° 37,864'	027° 27,026'	0	
M202_54-1	MOOR	2024-07-28 11:32:10	38° 38,908'	027° 24,233'	0	Mooring
M202_54-1	MOOR	2024-07-28 10:52:00	38° 38,081'	027° 22,187'	0	deployment
M202_54-1	MOOR	2024-07-28 10:20:11	38° 39,833'	027° 22,298'	0	
M202_54-1	MOOR	2024-07-28 09:54:32	38° 38,957'	027° 22,943'	1221	
M202_54-1	MOOR	2024-07-28 09:53:34	38° 38,948'	027° 22,924'	1216	
M202_54-1	MOOR	2024-07-28 08:44:02	38° 38,359'	027° 21,620'	1162	
M202_53-1	CTD	2024-07-28 07:49:41	38° 39,835'	027° 21,742'	0	eDNA CTD
M202_53-1	CTD	2024-07-28 07:22:43	38° 39,752'	027° 21,767'	896	Risso
M202_53-1	CTD	2024-07-28 07:00:53	38° 39,760'	027° 21,762'	0	
M202_52-1	EM122	2024-07-28 06:37:49	38° 39,692'	027° 21,520'	0	
M202_52-1	EM122	2024-07-28 01:58:02	38° 34,604'	027° 19,578'	0	
M202_51-1	CTD	2024-07-28 01:39:13	38° 34,617'	027° 19,178'	0	eDNA CTD
M202_51-1	CTD	2024-07-28 01:11:58	38° 34,616'	027° 19,149'	0	Control SE
M202_51-1	CTD	2024-07-28 00:45:12	38° 34,615'	027° 19,154'	0	
M202_50-1	MN_B9	2024-07-28 00:13:57	38° 35,250'	027° 20,401'	0	Multinet
M202_50-1	MN_B9	2024-07-27 23:39:36	38° 36,271'	027° 22,359'	0	
M202_50-1	MN_B9	2024-07-27 23:00:52	38° 37,333'	027° 24,359'	0	
M202_50-1	MN_B9	2024-07-27 22:53:28	38° 37,520'	027° 24,747'	0	
M202_49-1	PELAGIOS	2024-07-27	38°	027°	0	

		22:06:44	39,637'	25,435'		
M202_49-1	PELAGIOS	2024-07-27 14:21:54	38° 39,970'	027° 21,380'	0	
M202_49-1	PELAGIOS	2024-07-27 13:52:39	38° 40,101'	027° 21,197'	0	
M202_48-1	DRIFT	2024-07-27 13:07:36	38° 38,041'	027° 23,160'	0	NCS Drifter
M202_48-1	DRIFT	2024-07-27 12:33:49	38° 37,959'	027° 23,121'	0	
M202_47-1	DRIFT	2024-07-27 11:57:09	38° 38,935'	027° 25,172'	0	NCS Drifter
M202_47-1	DRIFT	2024-07-27 11:12:07	38° 38,952'	027° 24,961'	0	
M202_46-3	CTD	2024-07-27 08:55:57	38° 41,605'	027° 29,389'	1809	eDNA CTD
M202_46-3	CTD	2024-07-27 08:03:28	38° 41,605'	027° 29,390'	1810	Ziphius 3
M202_46-3	CTD	2024-07-27 06:29:28	38° 41,606'	027° 29,389'	1809	
M202_46-2	CTD	2024-07-27 06:24:11	38° 41,606'	027° 29,389'	1809	
M202_46-2	CTD	2024-07-27 05:38:24	38° 41,605'	027° 29,387'	1810	
M202_46-2	CTD	2024-07-27 05:00:53	38° 41,605'	027° 29,388'	1810	
M202_46-1	CTD	2024-07-27 04:46:11	38° 41,605'	027° 29,388'	1812	
M202_46-1	CTD	2024-07-27 04:13:07	38° 41,605'	027° 29,388'	1810	
M202_46-1	CTD	2024-07-27 03:36:53	38° 41,576'	027° 29,395'	1808	
M202_45-1	CTD	2024-07-27 02:24:40	38° 39,780'	027° 21,685'	0	
M202_45-1	CTD	2024-07-27 02:01:58	38° 39,765'	027° 21,665'	0	
M202_45-1	CTD	2024-07-27 01:41:55	38° 39,751'	027° 21,662'	0	
M202_44-1	RMT8	2024-07-27 00:13:13	38° 32,839'	027° 18,168'	1197	
M202_44-1	RMT8	2024-07-26 22:21:22	38° 36,286'	027° 22,697'	1337	
M202_44-1	RMT8	2024-07-26 21:11:45	38° 38,808'	027° 25,978'	0	
M202_44-1	RMT8	2024-07-26 20:31:07	38° 40,065'	027° 27,697'	0	

M202_43-1	PELAGIOS	2024-07-26 20:06:58	38° 40,193'	027° 27,963'	0	
M202_43-1	PELAGIOS	2024-07-26 13:07:45	38° 37,425'	027° 24,092'	0	
M202_42-1	DRIFT	2024-07-26 12:14:15	38° 38,971'	027° 27,415'	0	NCS Drifter
M202_42-1	DRIFT	2024-07-26 11:54:54	38° 39,292'	027° 27,757'	0	
M202_41-1	DRIFT	2024-07-26 11:31:20	38° 39,664'	027° 28,251'	0	NCS Drifter
M202_41-1	DRIFT	2024-07-26 11:03:09	38° 40,213'	027° 28,516'	0	
M202_40-1	AULCS	2024-07-26 10:31:16	38° 39,651'	027° 28,231'	0	NCS Lander
M202_39-1	CTD	2024-07-26 09:22:35	38° 38,955'	027° 22,828'	1202	eDNA CTD
M202_39-1	CTD	2024-07-26 08:44:53	38° 38,957'	027° 22,831'	1202	Sowerby
M202_39-1	CTD	2024-07-26 08:18:23	38° 38,952'	027° 22,828'	1203	
M202_38-1	CTD	2024-07-26 06:00:54	38° 29,411'	027° 36,916'	1148	
M202_38-1	CTD	2024-07-26 05:38:48	38° 29,411'	027° 36,914'	1149	
M202_38-1	CTD	2024-07-26 05:13:01				
M202_37-1	CTD	2024-07-26 04:04:50	38° 32,631'	027° 32,070'	1398	
M202_37-1	CTD	2024-07-26 03:36:45	38° 32,674'	027° 32,028'	1392	
M202_37-1	CTD	2024-07-26 03:04:40	38° 32,630'	027° 32,078'	1409	
M202_36-1	CTD	2024-07-26 02:09:42	38° 35,917'	027° 27,148'	1349	
M202_36-1	CTD	2024-07-26 01:44:01	38° 35,898'	027° 27,138'	1350	
M202_36-1	CTD	2024-07-26 01:15:39	38° 35,851'	027° 27,148'	1351	
M202_35-1	CTD	2024-07-25 23:58:32	38° 40,270'	027° 20,642'	2873	
M202_35-1	CTD	2024-07-25 23:48:06	38° 40,284'	027° 20,659'	0	
M202_35-1	CTD	2024-07-25 23:40:14	38° 40,292'	027° 20,674'	0	
M202_34-1	CTD	2024-07-25	38°	027°	1250	eDNA CTD

		22:35:36	38,816'	22,821'		
M202_34-1	CTD	2024-07-25 22:04:12	38° 38,837'	027° 22,887'	1254	Sowerby
M202_34-1	CTD	2024-07-25 21:25:16	38° 38,912'	027° 22,860'	0	
M202_33-1	MN_B9	2024-07-25 20:27:06	38° 40,159'	027° 22,240'	0	Multinet
M202_33-1	MN_B9	2024-07-25 18:58:15	38° 37,969'	027° 18,985'	0	
M202_32-1	RMT8	2024-07-25 18:10:11	38° 37,256'	027° 21,234'	0	
M202_32-1	RMT8	2024-07-25 15:18:21	38° 41,900'	027° 26,088'	0	
M202_32-1	RMT8	2024-07-25 14:12:09	38° 43,845'	027° 28,015'	0	
M202_31-1	AULCS	2024-07-25 13:03:51	38° 40,244'	027° 27,981'	0	NCS Lander
M202_31-1	AULCS	2024-07-25 10:20:54	38° 40,587'	027° 27,587'	0	
M202_30-1	DRIFT	2024-07-25 11:59:01	38° 39,938'	027° 25,974'	0	NCS Drifter
M202_30-1	DRIFT	2024-07-25 09:56:27	38° 40,448'	027° 27,278'	0	
M202_29-1	DRIFT	2024-07-25 09:56:02	38° 40,451'	027° 27,278'	0	NCS Drifter
M202_29-1	DRIFT	2024-07-25 09:25:01	38° 40,689'	027° 27,218'	0	
M202_28-3	CTD	2024-07-25 07:42:55	38° 35,049'	027° 18,980'	0	eDNA CTD
M202_28-3	CTD	2024-07-25 07:10:31	38° 34,995'	027° 18,922'	0	Control SE
M202_28-3	CTD	2024-07-25 06:44:38	38° 34,993'	027° 18,922'	0	
M202_28-2	CTD	2024-07-25 06:27:32	38° 35,004'	027° 18,933'	0	
M202_28-2	CTD	2024-07-25 06:05:18	38° 35,003'	027° 18,929'	0	
M202_28-2	CTD	2024-07-25 05:38:22	38° 35,042'	027° 18,920'	0	
M202_28-1	CTD	2024-07-25 05:22:34	38° 35,038'	027° 18,953'	0	
M202_28-1	CTD	2024-07-25 04:57:45	38° 35,013'	027° 18,942'	0	
M202_28-1	CTD	2024-07-25 04:31:58	38° 34,988'	027° 18,930'	0	

M202_27-1	MN_B9	2024-07-25 03:24:27	38° 33,825'	027° 20,599'	0	Multinet
M202_27-1	MN_B9	2024-07-25 02:14:43	38° 37,182'	027° 21,562'	0	
M202_27-1	MN_B9	2024-07-25 01:08:48	38° 40,417'	027° 24,021'	0	
M202_26-1	PELAGIOS	2024-07-25 00:16:15	38° 36,649'	027° 26,075'	0	
M202_26-1	PELAGIOS	2024-07-24 23:39:22	38° 36,899'	027° 25,795'	0	
M202_26-1	PELAGIOS	2024-07-24 20:02:05	38° 37,840'	027° 24,384'	0	
M202_26-1	PELAGIOS	2024-07-24 17:14:53	38° 37,423'	027° 24,941'	0	
M202_26-1	PELAGIOS	2024-07-24 15:53:13	38° 37,344'	027° 25,124'	0	
M202_26-1	PELAGIOS	2024-07-24 15:30:58	38° 37,482'	027° 24,907'	0	
M202_26-1	PELAGIOS	2024-07-24 12:09:46	38° 39,767'	027° 21,718'	0	
M202_26-1	PELAGIOS	2024-07-24 11:44:39	38° 39,882'	027° 21,503'	0	
M202_25-1	DRIFT	2024-07-24 10:11:27	38° 40,829'	027° 28,761'	0	NCS drifter
M202_25-1	DRIFT	2024-07-24 09:37:04	38° 40,809'	027° 28,887'	0	
M202_24-1	DRIFT	2024-07-24 09:06:16	38° 41,717'	027° 29,851'	0	NCS drifter
M202_24-1	DRIFT	2024-07-24 08:35:02	38° 41,733'	027° 29,710'	0	
M202_23-1	AULCS	2024-07-24 07:57:27	38° 41,256'	027° 29,450'	3988	NCS Lander
M202_22-4	CTD	2024-07-24 07:20:36	38° 41,241'	027° 29,455'	1692	
M202_22-4	CTD	2024-07-24 06:49:52	38° 41,256'	027° 29,430'	1709	
M202_22-4	CTD	2024-07-24 06:03:43	38° 41,247'	027° 29,446'	1709	
M202_22-3	CTD	2024-07-24 05:39:39	38° 41,239'	027° 29,459'	1699	
M202_22-3	CTD	2024-07-24 05:09:26	38° 41,223'	027° 29,487'	1681	
M202_22-3	CTD	2024-07-24 04:35:03	38° 41,244'	027° 29,449'	1697	
M202_22-2	CTD	2024-07-24	38°	027°	1698	

		04:26:54	41,245'	29,452'		
M202_22-2	CTD	2024-07-24 03:56:56	38° 41,224'	027° 29,481'	1682	
M202_22-2	CTD	2024-07-24 03:22:44	38° 41,226'	027° 29,482'	1684	
M202_22-1	CTD	2024-07-24 03:04:13	38° 41,234'	027° 29,466'	1690	
M202_22-1	CTD	2024-07-24 02:35:25	38° 41,234'	027° 29,466'	1690	
M202_22-1	CTD	2024-07-24 01:57:20	38° 41,231'	027° 29,464'	1687	
M202_21-1	RMT8	2024-07-24 01:23:22	38° 40,150'	027° 27,597'	1660	
M202_21-1	RMT8	2024-07-23 23:58:08	38° 37,911'	027° 25,128'	1464	
M202_21-1	RMT8	2024-07-23 23:13:05	38° 36,533'	027° 24,451'	1440	
M202_21-1	RMT8	2024-07-23 22:40:42	38° 35,593'	027° 24,140'	1409	
M202_21-1	RMT8	2024-07-23 22:01:24	38° 34,738'	027° 24,077'	1351	
M202_20-1	PELAGIOS	2024-07-23 20:39:40	38° 38,789'	027° 25,956'	0	
M202_20-1	PELAGIOS	2024-07-23 20:30:52	38° 38,683'	027° 25,992'	0	
M202_20-1	PELAGIOS	2024-07-23 19:08:20	38° 37,705'	027° 24,912'	0	
M202_20-1	PELAGIOS	2024-07-23 17:54:16	38° 37,589'	027° 24,858'	0	
M202_20-1	PELAGIOS	2024-07-23 16:10:35	38° 39,012'	027° 26,357'	0	
M202_20-1	PELAGIOS	2024-07-23 15:35:52	38° 38,626'	027° 25,969'	0	
M202_20-1	PELAGIOS	2024-07-23 14:17:54	38° 37,267'	027° 24,519'	0	
M202_20-1	PELAGIOS	2024-07-23 13:39:13	38° 36,922'	027° 24,199'	1395	
M202_19-1	CTD	2024-07-23 13:03:57	38° 37,434'	027° 24,855'	1434	eDNA CTD
M202_19-1	CTD	2024-07-23 11:59:31	38° 37,512'	027° 24,807'	1435	Ziphius 1
M202_19-1	CTD	2024-07-23 11:28:59	38° 37,516'	027° 24,806'	1431	
M202_18-1	DRIFT	2024-07-23 10:36:09	38° 36,172'	027° 22,466'	0	NCS drifter

M202_18-1	DRIFT	2024-07-23 10:10:42	38° 36,259'	027° 22,656'	0	
M202_17-1	DRIFT	2024-07-23 09:30:04	38° 37,232'	027° 23,566'	0	NCS drifter
M202_17-1	DRIFT	2024-07-23 08:53:53	38° 37,217'	027° 24,104'	0	
M202_16-1	AULCS	2024-07-23 08:12:12	38° 35,341'	027° 23,663'	0	NCS lander
M202_15-1	MN_B9	2024-07-23 07:07:32	38° 36,483'	027° 23,613'	0	Multinet
M202_15-1	MN_B9	2024-07-23 06:20:55	38° 38,103'	027° 25,342'	0	
M202_15-1	MN_B9	2024-07-23 05:31:12	38° 39,596'	027° 26,941'	0	
M202_14-1	CTD	2024-07-23 03:24:15	38° 49,386'	027° 40,054'	0	
M202_14-1	CTD	2024-07-23 02:43:31	38° 49,480'	027° 39,909'	0	
M202_14-1	CTD	2024-07-23 02:00:32	38° 49,518'	027° 40,149'	0	
M202_13-1	CTD	2024-07-23 01:07:51	38° 45,360'	027° 34,632'	0	
M202_13-1	CTD	2024-07-23 00:30:39	38° 45,508'	027° 34,746'	0	
M202_13-1	CTD	2024-07-22 23:45:45	38° 45,509'	027° 34,744'	0	
M202_12-1	CTD	2024-07-22 21:58:45	38° 37,524'	027° 24,713'	0	eDNA CTD
M202_12-1	CTD	2024-07-22 21:22:37	38° 37,523'	027° 24,711'	0	Ziphius 1
M202_12-1	CTD	2024-07-22 20:52:52	38° 37,544'	027° 24,784'	0	
M202_11-1	PELAGIOS	2024-07-22 20:06:18	38° 37,022'	027° 23,249'	0	
M202_11-1	PELAGIOS	2024-07-22 15:50:42	38° 38,391'	027° 26,642'	1554	
M202_11-1	PELAGIOS	2024-07-22 15:38:45	38° 38,391'	027° 26,639'	1553	
M202_11-1	PELAGIOS	2024-07-22 14:50:02	38° 38,610'	027° 27,104'	1566	
M202_10-1	DRIFT	2024-07-22 13:10:00	38° 38,618'	027° 27,378'	1566	NCS drifter
M202_10-1	DRIFT	2024-07-22 12:45:51	38° 38,539'	027° 27,485'	1560	
M202_9-1	DRIFT	2024-07-22	38°	027°	1543	NCS drifter

		12:16:57	37,850'	27,098'		
M202_9-1	DRIFT	2024-07-22 11:45:29	38° 37,792'	027° 26,812'	3968	
M202_8-1	CTD	2024-07-22 10:19:38	38° 34,021'	027° 18,896'	1219	
M202_8-1	CTD	2024-07-22 09:56:08	38° 34,023'	027° 18,893'	1219	
M202_8-1	CTD	2024-07-22 09:28:24	38° 34,018'	027° 18,892'	1218	
M202_7-1	CTD	2024-07-22 08:35:26	38° 37,862'	027° 24,183'	1373	
M202_7-1	CTD	2024-07-22 08:10:15	38° 37,862'	027° 24,182'	1371	
M202_7-1	CTD	2024-07-22 07:42:04	38° 37,862'	027° 24,185'	1370	
M202_6-1	CTD	2024-07-22 06:35:26	38° 41,638'	027° 29,708'	1811	eDNA CTD
M202_6-1	CTD	2024-07-22 05:52:22	38° 41,709'	027° 29,423'	1815	Ziphius 3
M202_6-1	CTD	2024-07-22 05:14:14	38° 41,703'	027° 29,460'	948	
M202_5-1	CTD	2024-07-22 04:22:17	38° 45,497'	027° 34,777'	940	
M202_5-1	CTD	2024-07-22 03:43:20	38° 45,518'	027° 34,800'	0	
M202_5-1	CTD	2024-07-22 03:02:40	38° 45,518'	027° 34,790'	0	
M202_4-1	CTD	2024-07-22 02:07:26	38° 49,508'	027° 40,195'	910	
M202_4-1	CTD	2024-07-22 01:25:54	38° 49,503'	027° 40,190'	2287	
M202_4-1	CTD	2024-07-22 00:36:24	38° 49,536'	027° 40,189'	0	
M202_3-2	SVP	2024-07-21 18:38:29	38° 38,513'	027° 25,752'	1518	
M202_3-2	SVP	2024-07-21 18:12:05	38° 38,516'	027° 25,766'	1519	
M202_3-2	SVP	2024-07-21 17:42:41	38° 38,517'	027° 25,769'	1519	
M202_3-3	XSV	2024-07-21 17:15:02	38° 37,844'	027° 25,733'	0	
M202_3-3	XSV	2024-07-21 17:08:40	38° 37,628'	027° 25,241'	0	
M202_3-1	SVP	2024-07-21 22:12:30	38° 37,548'	027° 25,454'	0	

M202_3-1	SVP	2024-07-21 16:18:44	38° 37,822'	027° 25,595'	0	
M202_2-1	MOOR	2024-07-21 15:28:44	38° 37,499'	027° 24,872'	0	Mooring
M202_2-1	MOOR	2024-07-21 15:05:32	38° 37,534'	027° 24,829'	0	recovery
M202_2-1	MOOR	2024-07-21 14:43:37	38° 37,123'	027° 24,493'	0	
M202_2-1	MOOR	2024-07-21 14:30:55	38° 37,126'	027° 24,493'	0	
M202_2-1	MOOR	2024-07-21 13:57:04	38° 38,149'	027° 24,884'	0	
M202_2-1	MOOR	2024-07-21 13:30:58	38° 37,862'	027° 26,090'	0	
M202_2-1	MOOR	2024-07-21 13:04:14	38° 37,402'	027° 25,068'	0	
M202_1-1	AULCS	2024-07-21 12:15:53	38° 38,199'	027° 27,149'	1551	NCS lander
M202_1-1	AULCS	2024-07-21 11:10:15	38° 38,200'	027° 27,147'	0	
M202_0_Underway-3	EM710	2024-07-21 08:01:39	38° 43,851'	027° 01,434'	0	
M202_0_Underway-2	TSG	2024-07-21 08:01:03	38° 43,883'	027° 01,552'	0	