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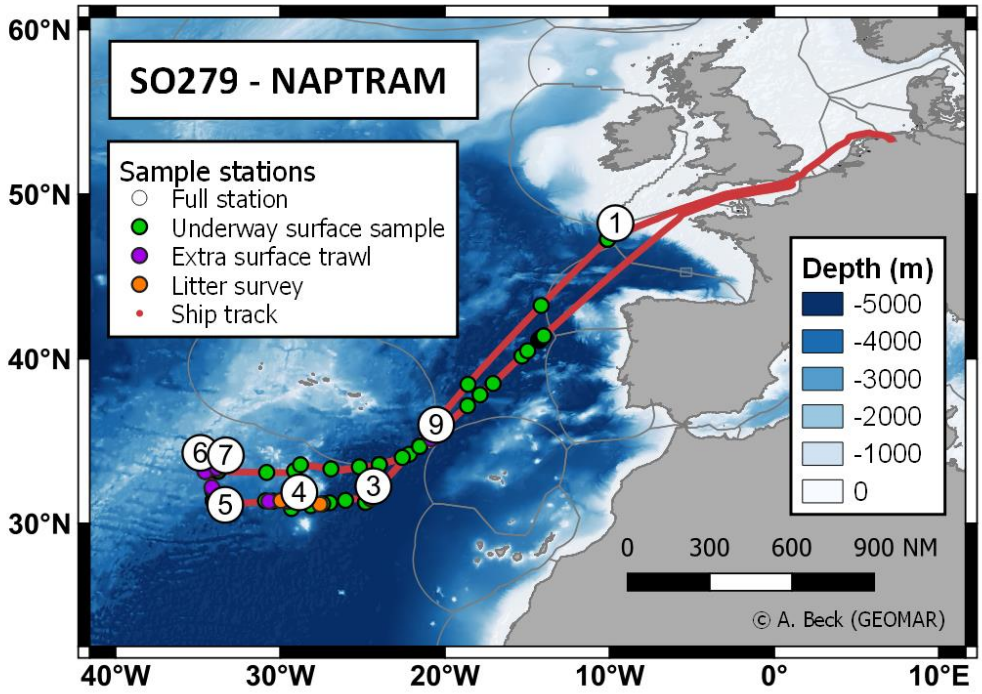
Short Cruise Report

R/V SONNE – SO279 (GPF 20-3_089)
Emden (Germany) – Emden (Germany)
December 04, 2020 – January 05, 2021
Chief Scientist: Aaron Beck
Captain: Lutz Mallon



Cruise track and sampling stations of R/V SONNE expedition SO279, from Emden, Germany, to the North Atlantic gyre, and back to Emden.

Objectives

NAPTRAM is part of connected research cruises to build an understanding of the transport pathways of plastic and microplastic debris in the North Atlantic, from the input through rivers and air across coastal seas into the accumulation spots in the North Atlantic gyre and the vertical export to its final sink at the seabed.

NAPTRAM builds on a preliminary cruise to the study region (RV Poseidon, POS536; Aug-Sep 2019), expanding its smaller study area and extending into deeper waters. NAPTRAM also complements RV Alkor cruise AL534/2 (March 2020) that focused on microplastic inputs from rivers and estuaries to coastal waters.

Specific objectives of NAPTRAM:

- Assessing the abundance, composition, and size distribution of MP particles at the sea surface from European coastal waters to the open North Atlantic
- Assessing the horizontal, long-distance transport of buoyant MP, including the role of eddy-facilitated transport
- Assessing the abundance, composition, and size distribution of MP particles in the water column using *in situ* pumps
- Assessing the abundance, composition, and size distribution of MP particles in the water column and in pelagic meso- and macrofaunal organisms using multi-net and catamaran trawls
- Measuring the depth distribution of additive compounds that commonly leach from plastic materials in the water column
- Assessing the vertical flux of MP from sea surface to seafloor with naturally-occurring radionuclide tracers
- Assessing the abundance, composition, and size distribution of MP particles accumulating in seafloor sediments, and assessing MP burial rates due to bioturbation
- Assessing ingestion, transfer, and alteration of MP particles across various trophic levels from invertebrates to fish in water column and sediments
- Assessing the abundance, composition, and size distribution of MP particles in benthic epi- and infauna organisms
- Identifying the abundance and composition of bacterial biofilms and eukaryotic biofoulers on plastic particles from the sea surface, water column, and seafloor
- Testing methodologies for controlling MP contamination during sample collection, and comparing analytical methods for determination of MP in environmental samples over the entire size range from <10 µm to 5 mm

Objectives

The coastal and open oceans represent a major, but yet unconstrained, sink for plastics. It is likely that plastic-biota interactions are a key driver for the fragmentation, aggregation, and vertical transport of plastic litter from surface waters to sedimentary sinks. Cruise SO279 conducts sampling to address core questions of microplastic distribution in the open ocean water column, biota, and sediments. Microplastic samples coupled with geochemical tracer analyses will build a mechanistic understanding of MP transport and its biological impact reaching from coastal seas to the central gyre water column and sinks at the seabed. Furthermore, floating plastics are sampled for microbial community and genetic analyses to investigate potential enzymatic degradation pathways. Cruise SO279 serves as the third cruise of a number of connected research cruises to build an understanding of the transport pathways of plastic and microplastic debris in the North Atlantic from the input through rivers and air across coastal seas into the accumulation spots in the North Atlantic gyre and the vertical export to its sink at the seabed. The cruise is an international effort as part of the JPI Oceans project HOTMIC and BMBF project PLASTISEA, and forms a joint effort of HOTMIC and PLASTISEA researchers from a range of countries and institutes.

Cruise Narrative

On Friday, **04 December 2020**, RV SONNE set sail from port in Emden, Germany, heading for the plastic accumulation zone in the North Atlantic gyre south of the Azores. The scientists and crew spent four lonely days in individual quarantine in Leer before boarding the ship, the monotony of isolation broken only by emails, phone calls, and two early-morning visits from COVID testing professionals. It was a relief when everyone tested negative both times, and we were finally able to board the ship on **03 December**.

Most of our equipment was loaded onto SONNE by the ship's crew on **01 December**, while we were in quarantine, so we were able on **03 December** to immediately begin unloading the shipping containers and unpacking equipment. After a slight delay waiting for delivery of some mis-directed equipment pallets, RV SONNE left dock on **04 December** under assistance from a tugboat and entered the North Sea through the lock at Emden. We had smooth sailing over the next days along the Dutch and Belgian coastline, past the cliffs at Dover, and through the Bay of Biscay.

We reached the first station of SO279 outside of national EEZ borders on **08 December** in 3-4 m swell and winds above 8 Beaufort. Nonetheless, the CTD rosette was deployed at 8 a.m., approached the seafloor at 4400 m, and returned with samples from throughout the water column. Five in situ pumps were deployed next on a single line down to 300 m depth. The pumps each collected particles from about 1500 L of water before being retrieved.

The first attempts to collect sediments with the multi-core and box core were unsuccessful, so we switched to towing the multi-net while it was still dark. Net operations were usually scheduled at night to capture zooplankton that migrate vertically. The multi-net has nine nets that can be opened and closed remotely, and it collects samples between the surface and 3000 m depth. Weather conditions were too rough to deploy the surface catamaran trawl.

Net operations finished around daybreak, and two subsequent attempts to collect sediment box cores were both successful. The sediment processing team was occupied for the rest of the day collecting sub-cores and surface samples of the sticky carbonate mud. Sediments and porewater will be processed back in home laboratories for microplastic distribution, various geochemical parameters, and benthic biota. No plastic debris was observed in the samples at this first station.

After the station was successfully completed in the afternoon of **09 December**, SONNE continued transiting southward. Weather conditions steadily worsened, with swell above 4 m and winds around 10 Bft. We decided to postpone the second planned station and travel directly to our primary working area south of the Azores. A high pressure system in that region promised much better weather, and we hoped to take advantage of the good conditions to complete as much work as possible.

We continued transiting southward on **10 and 11 December** with little change in the weather conditions. On **12 December**, we awoke to the relative calm of 2-3 m waves and 6-7 Bft winds and were able to deploy the trace-metal clean towfish. The towfish is a stainless-steel torpedo designed to hold clean tubing so that the inlet samples only water untouched by the ship's hull. The towfish travels alongside the ship while we transit for continuous collection of uncontaminated water.

We reached our primary working area south of the Azores in the afternoon of **13 December**. The weather was better than we hoped, with 2-4 m swell arriving from storms farther north, but low winds and sunny skies. Favorable conditions meant we could begin Station 3 and deploy the catamaran trawl to sample particles floating at the sea surface. Along with seaweed, shrimp, crabs, and small fish, the first tows returned an enormous number of plastic fragments.

Nearly double cable length is required to operate the multi-net at 3000 m depth as planned. To reach these depths, the SONNE crew switched the ca. 6000 m winch cable for an 8000 m cable. With the help of the ship's scientific-technical support personnel (WTD), we unfortunately learned that the resistivity of the longer cable was too much for the net powering unit. The crew then went through the laborious process of switching back to the shorter cable. The following multi-net deployment would be the first of many unsuccessful attempts, as the equipment was apparently too light and unstable to prevent turning at depth.

We postponed further multi-net tests and continued with water column and sediment sampling through **14 December.** Station 3 was our deepest, at 5500 m, and most of our time on station was spent waiting for sampling devices to reach the distant seafloor and return to the surface. Nevertheless, the remaining sampling went smoothly, and we did a first video observation of the seafloor with the SONNE's OFOS (Ocean Floor Observatory System). We saw mostly featureless mud, but occasional red shrimp, purple fish, and sea cucumbers.

After the OFOS profile finished on **15 December**, SONNE transited to Station 4. We arrived on **16 December** at 4:00 in the morning and immediately began our sampling program. The box cores returned with rather strange sediments—fine grained carbonates that behaved somewhat like a non-Newtonian fluid. The sediment was soft when gently pressed or shaken, but much harder when struck suddenly.

Sampling continued into **17 December**, with more multi-net testing. The still unsuccessful multi-net was replaced with a Bongo net to collect particles from the water column down to a depth of 300 m. We then conducted our second OFOS dive, which was similar to the first dive except for a piece of rope or fishing net entangled in Sargassum seaweed. We frequently saw clumps of apparently decaying Sargassum on the seafloor, but this was our first piece of deep-sea litter.

On **18 December**, we transited to Station 5, filling two tanks with about 1500 L of clean water from the towfish while traveling. We arrived on station around 11:00, and completed the full program, again relying on bongo nets for sampling zooplankton and suspended particulates. While on station, we also observed large rafts of Sargassum at the sea surface. The floating seaweed aggregates along wind-driven lines, stretching as far as the eye can see. Floating plastic litter accumulates with the Sargassum, and within one patch we saw large pieces of plastic sheets, crates, buckets, bottle caps, and rope. We finished Station 5 on **19 December.** The OFOS dive revealed several pieces of macro-litter on the seafloor, including a plastic bag in apparently quite good condition.

Sampling activities started at Station 6 before dawn on **20 December**. We finished the station around 8:00 on **21 December**, and SONNE immediately traveled to station 7. These stations were separated by only about 50 nmi, but they were sampled in September 2019 during cruise POS536 on RV POSEIDON, and the current cruise will provide a valuable comparison. Stations 6 and 7 were also located over the mid-Atlantic Ridge, a deep-sea mountain range several kilometers high.

These were our shallowest stations, at only about 3000 m deep, so the sampling went relatively quickly.

The OFOS deployments at stations 6 and 7 were especially successful, as we saw a variety of plastic debris on the seafloor. OFOS provides valuable information about a wider area of seafloor. The box cores sampled an area of approximately 50 x 50 cm, and the sparse distribution of anthropogenic debris, macrofauna, and Sargassum deposits make it unlikely that they would have been captured in the cores. The plastic objects we saw ranged in size from a few cm to nearly a meter long and were generally not very overgrown or biofouled.

Sampling activities at Station 7 continued into **22 December** and finished in the evening. Unfortunately, a low-pressure system developed over the working area, and the weather began to worsen. High winds and waves forced us to cancel the next few catamaran net deployments, and Station 8 was also not possible. From **23 December** to **25 December**, SONNE transited slowly eastward against 4-5 m waves. We monitored conditions throughout the North Atlantic, and hoped to add a final station during a brief calm period forecast for the coming days between two major storm systems.

The weather improved noticeably during the evening of **26 December**, and everyone welcomed the relative calm. We arrived at an improvised station between the Azores and Madeira around 6:00 on **27 December**. We completed this last full station without any complications in the afternoon of **28 December**, and began the long transit toward home. RV SONNE transited along a stormy Iberian coast on **29, 30, and 31 December** We celebrated the turn of the clock from 2020 to 2021 in the Bay of Biscay, together, with handshakes and hugs, acutely aware of our privileged situation in comparison with our families and colleagues at home under COVID-lockdowns.

We passed through the English Channel from **01 to 03 January**. RV SONNE arrived in port in Emden in the afternoon of **04 January**, and the scientists disembarked in the morning of **05 January 2021**.

Acknowledgements

Cruise SO279 was planned, coordinated, and conducted by GEOMAR Helmholtz Centre for Ocean Research Kiel, with participation of colleagues from seven additional institutes from Germany and the European Union. The cruise was funded by the Deutsche Forschungsgemeinschaft (DFG) through the GPF review process (GPF 20-3_089). Additional support was provided by the GEOMAR Helmholtz Centre for Ocean Research Kiel and the Bundesministerium für Bildung und Forschung (BMBF) through projects HOTMIC (project number 03F0851A) and PLASTISEA (project number 031B0867A). We especially thank Captain Lutz Mallon and the crew of RV SONNE for their expertise and support to make SO279 a successful and enjoyable expedition. We also want to acknowledge the work and logistical support of the shipping company and German Research Fleet Coordination Centre to make such expeditions possible despite COVID-pandemic challenges. Finally, we gratefully acknowledge logistical support from our colleagues at the GEOMAR Technik- und Logistik Zentrum (TLZ).

Participant list

	Participant name	Role/Primary tasks	Institute
1	Beck, Aaron	Fahrtleiter / Chief Scientist	GEOMAR
2	Borchert, Erik	Catamaran trawl and Multi-Net	GEOMAR
3	Delaigue, Louise	pH, nutrient, and carbon chemistry	NIOZ
4	Deng, Feifei	CTD and sediments	HZG
5	Fey, Vincent	CTD and in situ pumps	GEOMAR
6	Gueroun, Sonia	Catamaran trawl and Multi-Net	MARE
7	Hamisch, Stephan	CTD and in situ pumps	GEOMAR
8	Hamm, Thea	Catamaran trawl and Multi-Net	GEOMAR
9	Hoffmann, Jannes	Multi-core and box core	GEOMAR
10	Jacob, Oliver	CTD and sediments	IWC-TUM
11	Kaandorp, Mikael	Hyperspectral NIR plastics analysis	Utrecht
12	Kossel, Elke	Multi-core and box core	GEOMAR
13	Kröger, Sarah-Marie	Multi-core and box core	GEOMAR
14	Molitor, Rebecka	Catamaran trawl and Multi-Net	IMET - FZJ
15	Mutzberg, André	CTD and in situ pumps	GEOMAR
16	Panknin, Ulrike	Catamaran trawl and Multi-Net	GEOMAR
17	Pantó, Gabriella	Multi-core and box core	UGent
18	Reiner, Birgit	Data management and logistics support	GEOMAR
19	Sambolino, Annalisa	Catamaran trawl and Multi-Net	MARE
20	Schulz, Isabelle	Media and outreach coordination	GEOMAR
21	Shen, Rui	Per- and poly-fluorinated compounds	HZG
22	Zimmermann, Tristan	Underway microplastic sampling	HZG

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IWC - TUM Institute of Hydrochemistry (IWC), Technical University of Munich (TUM) Marchoninistr. 17, D-81377 Munich

IMET - FZJ Molekulare Enzymtechnologie (IMET), Heinrich Heine Universität Düsseldorf Forschungszentrum Juelich GmbH, Wilhelm-Johnen-Straße, D-52425 Juelich

UGent Ghent University, Krijgslaan 281 – S8, 9000 Gent, Belgium

MARE Marine and Environmental Sciences Centre (MARE), Agência Regional para o Desenvolvimento da Investigação Tecnologia e Inovação (ARDITI), Caminho da Penteada, 9020-105 Funchal, Portugal

HZG Helmholtz-Zentrum Geesthacht, Max-Planck Straße 1, D-21502 Geesthacht

NIOZ Royal Netherlands Institute for Sea Research Texel, Landsdiep 4, 1797 SZ 't Horntje (Texel), The Netherlands

Utrecht Utrecht University, Princetonplein 5, 3584 CC Utrecht, The Netherlands

Station List

Station SO279_	Date/Time (UTC)	Device	Code	Depth (m)	Latitude (N)	Longitude (W)
_0_UW-1	08.12.2020 06:10	KONGSBERG EM122	EM122	4408.38	47° 21.532'	009° 50.988'
_1-1	08.12.2020 08:00	CTD	CTD	4425.55	47° 15.005'	010° 06.275'
_2-1	08.12.2020 09:30	PUMP	PUMP	4425.48	47° 15.010'	010° 06.293'
_3-1	08.12.2020 11:28	In Situ Pump	ISP	4424.64	47° 15.016'	010° 06.279'
_4-1	08.12.2020 15:33	Multi Corer	MUC	4419.93	47° 15.008'	010° 06.283'
_5-1	08.12.2020 19:09	Box Corer	BC	4420.99	47° 15.006'	010° 06.283'
_6-1	08.12.2020 22:54	Multiple Opening/Closing Net	MSN	4425.71	47° 15.026'	010° 06.318'
_7-1	09.12.2020 08:53	Underway Water Sampling	UWS	4450.44	47° 14.826'	010° 07.768'
_8-1	09.12.2020 09:16	Box Corer	BC	4426.29	47° 15.035'	010° 06.211'
_9-1	09.12.2020 12:21	Box Corer	BC	4426.27	47° 15.012'	010° 06.281'
_10-1	09.12.2020 14:55	Underway Water Sampling	UWS	4422.77	47° 15.021'	010° 06.293'
_11-1	10.12.2020 16:00	Underway Water Sampling	UWS	5358.65	43° 13.835'	014° 08.776'
_12-1	11.12.2020 22:29	Underway Water Sampling	UWS	5061.69	38° 26.323'	018° 35.371'
_13-1	12.12.2020 09:35	Underway Water Sampling	UWS	5171.24	36° 28.560'	020° 14.853'
_14-1	12.12.2020 15:17	Trace Metal Fish	TMF	5296.82	35° 32.147'	021° 01.576'
_15-1	12.12.2020 19:41	Underway Water Sampling	UWS	5260.43	34° 43.961'	021° 41.062'
_16-1	12.12.2020 22:42	Underway Water Sampling	UWS	5197.6	34° 11.276'	022° 09.470'
_0_UW-2	13.12.2020 09:49	Acoustic Doppler Current Profiler	ADCP	5487.23	32° 14.166'	023° 56.477'
_17-1	13.12.2020 10:35	Underway Water Sampling	UWS	5495.3	32° 06.023'	024° 03.818'
_14-1	13.12.2020 11:00	Trace Metal Fish	TMF	5498.91	32° 01.595'	024° 07.817'
_18-1	13.12.2020 13:19	Neuston Microplastics Catamaran	NEMICAT	5502.29	31° 39.920'	024° 27.287'
_20-1	13.12.2020 17:28	Litter Survey	LITTER	5505.35	31° 29.989'	024° 29.572'
_19-1	13.12.2020 21:41	Multiple Opening/Closing Net	MSN	5507.08	31° 25.745'	024° 35.582'
_21-1	13.12.2020 22:16	Underway Water Sampling	UWS	5498.38	31° 24.968'	024° 36.583'
_22-1	14.12.2020 00:24	CTD	CTD	5503.08	31° 16.050'	024° 48.730'
_23-1	14.12.2020 04:39	In Situ Pump	ISP	5493.29	31° 16.054'	024° 48.709'
_24-1	14.12.2020 07:28	Underway Water Sampling	UWS	5501.04	31° 16.057'	024° 48.714'
_25-1	14.12.2020 08:49	Box Corer	BC	5502.25	31° 16.049'	024° 48.705'
_26-1	14.12.2020 09:18	PUMP	PUMP	5493.05	31° 16.046'	024° 48.710'
_27-1	14.12.2020 12:39	Box Corer	BC	5492.39	31° 16.057'	024° 48.710'
_28-1	14.12.2020 16:31	OFOS	OFOS	5491.74	31° 16.059'	024° 48.709'
_29-1	14.12.2020 22:32	Multiple Opening/Closing Net	MSN	5510.49	31° 17.030'	024° 49.526'
_30-1	15.12.2020 10:09	Trace Metal Fish	TMF	5506.75	31° 23.149'	026° 02.009'
_31-1	15.12.2020 14:58	Underway Water Sampling	UWS	4772.41	31° 14.466'	026° 59.821'
_32-1	15.12.2020 17:10	Litter Survey	LITTER	4446.44	31° 10.814'	027° 24.116'
_33-1	15.12.2020 17:17	Underway Water Sampling	UWS	4451.15	31° 10.636'	027° 25.179'
_34-1	15.12.2020 21:42	Underway Water Sampling	UWS	3130.19	31° 04.101'	028° 08.739'
_35-1	15.12.2020 21:43	Underway Water Sampling	UWS	3090.29	31° 04.076'	028° 08.921'
_36-1	16.12.2020 05:17	CTD	CTD	4332.46	30° 53.532'	029° 18.839'
_37-1	16.12.2020 09:04	In Situ Pump	ISP	4330.35	30° 53.549'	029° 18.837'

_38-1	16.12.2020 11:10	Underway Water Sampling	UWS	4331.37	30° 53.545'	029° 18.837'
_39-1	16.12.2020 12:30	Box Corer	BC	4332.35	30° 53.548'	029° 18.838'
_40-1	16.12.2020 15:43	Box Corer	BC	4332.26	30° 53.545'	029° 18.838'
_41-1	16.12.2020 19:04	Multiple Opening/Closing Net	MSN	4330.31	30° 54.072'	029° 19.159'
_42-1	17.12.2020 05:53	Bongo Net	BONGO	4265.88	31° 17.718'	029° 33.157'
_43-1	17.12.2020 08:11	Neuston Microplastics Catamaran	NEMICAT	4260.76	31° 21.472'	029° 35.958'
_44-1	17.12.2020 09:00	OFOS	OFOS	4266.77	31° 22.465'	029° 36.764'
_45-1	17.12.2020 13:49	Underway Water Sampling	UWS	4275.37	31° 23.130'	029° 37.980'
_46-1	17.12.2020 17:59	Litter Survey	LITTER	4298.18	31° 23.708'	029° 41.304'
_47-1	17.12.2020 20:52	Underway Water Sampling	UWS	3991.65	31° 20.550'	030° 26.361'
_48-1	17.12.2020 21:56	Neuston Microplastics Catamaran	NEMICAT	4292.07	31° 19.897'	030° 41.026'
_48-1	17.12.2020 22:00	Neuston Microplastics Catamaran	NEMICAT	4279.34	31° 19.939'	030° 41.100'
_49-1	17.12.2020 23:37	Trace Metal Fish	TMF	4002.55	31° 22.525'	030° 44.457'
_50-1	18.12.2020 09:50	Underway Water Sampling	UWS	4597.51	31° 08.788'	033° 22.939'
_51-1	18.12.2020 09:55	Litter Survey	LITTER	4492.08	31° 08.694'	033° 24.265'
_49-1	18.12.2020 10:21	Trace Metal Fish	TMF	4457.8	31° 08.253'	033° 30.894'
_52-1	18.12.2020 10:52	Underway Water Sampling	UWS	4427.96	31° 07.843'	033° 36.892'
_53-1	18.12.2020 11:50	CTD	CTD	4414.16	31° 07.081'	033° 48.975'
_54-1	18.12.2020 15:22	In Situ Pump	ISP	4412.93	31° 07.050'	033° 48.969'
_55-1	18.12.2020 19:04	Neuston Microplastics Catamaran	NEMICAT	4414.52	31° 07.051'	033° 48.969'
_56-1	18.12.2020 20:34	Multiple Opening/Closing Net	MSN	4272.12	31° 09.810'	033° 51.106'
_57-1	18.12.2020 22:32	Underway Water Sampling	UWS	4314.77	31° 13.594'	033° 54.724'
_58-1	18.12.2020 23:25	Bongo Net	BONGO	4369.81	31° 14.422'	033° 55.515'
_59-1	19.12.2020 05:41	Box Corer	BC	4401	31° 21.398'	034° 02.278'
_60-1	19.12.2020 09:12	Box Corer	BC	4397.21	31° 21.402'	034° 02.268'
_61-1	19.12.2020 10:22	Underway Water Sampling	UWS	4398.98	31° 21.400'	034° 02.274'
_62-1	19.12.2020 12:24	OFOS	OFOS	4398.95	31° 21.398'	034° 02.272'
_63-1	19.12.2020 16:22	Underway Water Sampling	UWS	4396	31° 22.224'	034° 03.153'
_64-1	19.12.2020 16:52	Underway Water Sampling	UWS	4387.31	31° 22.412'	034° 03.341'
_65-1	19.12.2020 17:20	Underway Water Sampling	UWS	4252.67	31° 22.596'	034° 03.524'
_66-1	19.12.2020 17:52	Underway Water Sampling	UWS	4195.53	31° 22.712'	034° 03.623'
_67-1	19.12.2020 22:01	Underway Water Sampling	UWS	4099.88	31° 57.489'	034° 05.995'
_68-1	19.12.2020 23:10	Neuston Microplastics Catamaran	NEMICAT	4121.32	32° 10.424'	034° 09.152'
_69-1	20.12.2020 06:36	CTD	CTD	3594.05	33° 17.589'	034° 29.494'
_70-1	20.12.2020 09:04	Underway Water Sampling	UWS	3593.38	33° 17.607'	034° 29.493'
_71-1	20.12.2020 09:47	In Situ Pump	ISP	3591.91	33° 17.609'	034° 29.483'
_72-1	20.12.2020 13:29	Box Corer	BC	3591.73	33° 17.643'	034° 29.499'
_73-1	20.12.2020 16:03	Box Corer	BC	3592.8	33° 17.607'	034° 29.483'
_74-1	20.12.2020 16:50	Underway Water Sampling	UWS	3593.53	33° 17.603'	034° 29.486'
_75-1	20.12.2020 18:58	Bongo Net	BONGO	0	33° 17.535'	034° 29.571'
_76-1	20.12.2020 22:08	Underway Water Sampling	UWS	0	33° 13.439'	034° 28.291'
_75-1	20.12.2020 22:48	Bongo Net	BONGO	0	33° 12.471'	034° 28.260'
_77-1	21.12.2020 02:28	OFOS	OFOS	0	33° 08.279'	034° 31.114'
_78-1	21.12.2020 09:20	Neuston Microplastics	NEMICAT	3412.55	33° 08.520'	034° 33.673'

		Catamaran				
_79-1	21.12.2020 09:25	Underway Water Sampling	UWS	3373.4	33° 08.689'	034° 33.832'
_80-1	21.12.2020 11:31	Underway Water Sampling	UWS	3083.13	33° 11.404'	034° 26.349'
_81-1	21.12.2020 14:07	CTD	CTD	3675.36	33° 08.608'	033° 46.670'
_82-1	21.12.2020 17:14	In Situ Pump	ISP	3676.83	33° 08.606'	033° 46.719'
_83-1	21.12.2020 21:27	Box Corer	BC	3675.62	33° 08.612'	033° 46.713'
_84-1	21.12.2020 21:40	Underway Water Sampling	UWS	3674.73	33° 08.604'	033° 46.718'
_85-1	22.12.2020 00:03	Box Corer	BC	3673.18	33° 08.606'	033° 46.715'
_86-1	22.12.2020 02:59	Bongo Net	BONGO	3677.48	33° 08.635'	033° 46.720'
_87-1	22.12.2020 09:48	Neuston Microplastics Catamaran	NEMICAT	3485.56	33° 20.447'	033° 49.999'
_88-1	22.12.2020 10:47	Underway Water Sampling	UWS	3374.2	33° 22.915'	033° 49.047'
_89-1	22.12.2020 12:56	Box Corer	BC	3677.74	33° 08.597'	033° 46.716'
_90-1	22.12.2020 15:38	OFOS	OFOS	3674.85	33° 08.609'	033° 46.708'
_91-1	22.12.2020 21:17	Underway Water Sampling	UWS	3570.05	33° 11.075'	033° 45.900'
_92-1	23.12.2020 11:33	Underway Water Sampling	UWS	3551.28	33° 05.052'	030° 49.229'
_93-1	23.12.2020 21:52	Underway Water Sampling	UWS	1323.03	33° 11.395'	029° 07.605'
_94-1	24.12.2020 10:19	Underway Water Sampling	UWS	3056.43	33° 33.037'	028° 45.909'
_95-1	24.12.2020 23:05	Underway Water Sampling	UWS	4241.21	33° 17.926'	026° 55.054'
_96-1	25.12.2020 11:15	Underway Water Sampling	UWS	0	33° 25.366'	025° 11.337'
_97-1	25.12.2020 21:39	Underway Water Sampling	UWS	0	33° 33.664'	023° 58.812'
_98-1	25.12.2020 21:40	Underway Water Sampling	UWS	0	33° 33.676'	023° 58.733'
_99-1	26.12.2020 10:55	Underway Water Sampling	UWS	5378.09	33° 59.635'	022° 34.858'
_100-1	26.12.2020 22:42	Underway Water Sampling	UWS	5210.2	34° 39.806'	021° 31.804'
_101-1	26.12.2020 22:43	Underway Water Sampling	UWS	5213.95	34° 39.838'	021° 31.762'
_102-1	27.12.2020 07:51	CTD	CTD	5190.75	35° 00.002'	020° 59.996'
_103-1	27.12.2020 12:15	In Situ Pump	ISP	5193.33	35° 00.000'	020° 59.985'
_104-1	27.12.2020 15:58	Box Corer	BC	5189.47	34° 59.998'	020° 59.989'
_105-1	27.12.2020 19:38	Box Corer	BC	5190.52	35° 00.006'	020° 59.998'
_106-1	27.12.2020 23:26	Bongo Net	BONGO	5192.34	35° 00.064'	020° 59.906'
_107-1	28.12.2020 06:18	Neuston Microplastics Catamaran	NEMICAT	5245.09	35° 08.367'	020° 49.280'
_108-1	28.12.2020 10:02	OFOS	OFOS	5254.73	35° 14.110'	020° 42.845'
_109-1	28.12.2020 15:16	Underway Water Sampling	UWS	5253.01	35° 15.492'	020° 41.893'
_110-1	28.12.2020 21:39	Underway Water Sampling	UWS	5134.39	35° 32.486'	020° 24.091'
_111-1	29.12.2020 10:58	Underway Water Sampling	UWS	4984.75	37° 08.291'	018° 36.721'
_112-1	29.12.2020 16:40	Underway Water Sampling	UWS	5118.74	37° 48.030'	017° 51.511'
_113-1	29.12.2020 22:44	Underway Water Sampling	UWS	5485.88	38° 29.568'	017° 03.838'
_114-1	30.12.2020 12:04	Underway Water Sampling	UWS	4296.95	40° 09.355'	015° 18.733'
_115-1	30.12.2020 14:37	Underway Water Sampling	UWS	5031.63	40° 28.656'	014° 58.124'
_116-1	30.12.2020 19:26	Underway Water Sampling	UWS	5359.08	41° 06.173'	014° 17.797'
_117-1	30.12.2020 19:48	Underway Water Sampling	UWS	5356.86	41° 08.956'	014° 14.772'
_118-1	30.12.2020 20:01	Underway Water Sampling	UWS	5354.7	41° 10.706'	014° 12.893'
_119-1	30.12.2020 20:14	Underway Water Sampling	UWS	5357.38	41° 12.402'	014° 11.050'
_120-1	30.12.2020 20:30	Underway Water Sampling	UWS	5603.24	41° 14.515'	014° 08.774'
_121-1	30.12.2020 20:47	Underway Water Sampling	UWS	5354.84	41° 16.697'	014° 06.401'
_122-1	30.12.2020 21:05	Underway Water Sampling	UWS	5352.46	41° 19.098'	014° 03.810'

_123-1	30.12.2020 21:23	Underway Water Sampling	UWS	5352.44	41° 21.434'	014° 01.260'
_124-1	30.12.2020 21:36	Underway Water Sampling	UWS	5348.44	41° 23.080'	013° 59.488'