

Dr. Helena Herr
Universität Hamburg
Institute of Marine Ecosystem and Fishery Science
Große Elbstraße 133
22767 Hamburg, Germany

Tel.: +49 40 42838 6677
email: helena.herr@uni-hamburg.de



Short Cruise Report RV Maria S. Merian MSM115 FINWAP

Punta Arenas, Chile – Montevideo, Uruguay

25.2.2023 – 30.03.2023

Chief Scientist: Dr. Helena Herr

Captain: Björn Maaß

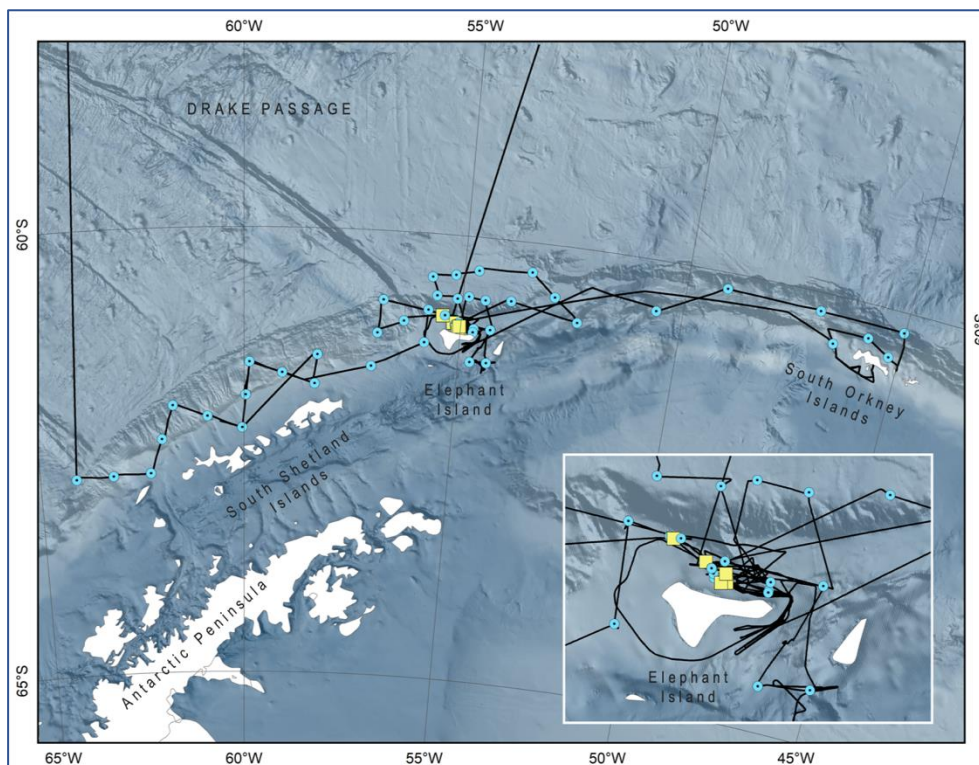


Figure 1: Cruise track of MSM115. Blue circles represent stations, yellow squares areas of small boat work. Insert in the lower right corner is an enlargement of the area around Elephant Island.

Objectives

The cruise MSM115 – FINWAP visited the area of the West Antarctic Peninsula (WAP) for a dedicated fin whale (*Balaenoptera physalus*) study. Fin whales of the Southern Hemisphere were brought to near extinction by commercial whaling of the 20th century and are now showing the first signs of population recovery. They have returned to ancestral feeding grounds in Antarctic waters, gathering in large feeding aggregations at the islands of the WAP during austral summer.

The main objectives of cruise MSM115 – FINWAP were

- 1) a visual cetacean survey for abundance and distribution analyses of fin whales in the wider WAP region,
- 2) a concurrent krill net sampling survey for analysis of prey distribution,
- 3) the deployment of short-term and long-term satellite transmitters on fin whales to track their movements on the feeding grounds and their migration after the feeding season,
- 4) the collection of biopsy samples for genetic, stable isotope, fatty acid and hormone analyses of fin whales, to gain information on population structure and feeding ecology,
- 5) collection of photo identification data for individual fin whale identification and comparison with data from other regions for information on migratory links between regions,
- 6) collection of aerial drone footage for analyses of individual and group behavior during feeding events.

Narrative

The cruise started in Punta Arenas, Chile, where we left port in the evening of 25th February, 2023. We crossed the Drake Passage in moderate winds and reached our survey area at the West Antarctic Peninsula (WAP) in the night of 28th February. We commenced our survey straight away, starting at the most westerly station with our first krill trawl. From there, we worked our way along the pre-designed track lines, zig-zagging over the continental shelf edge. Along the track lines, our visual observation team, positioned on the observation deck atop the bridge, continuously collected sighting records of fin whales and other cetaceans, as long as sighting conditions permitted. Every 25nm, i.e., at every mid- and endpoint of our track lines, we halted for a CTD cast and a krill net trawl. Krill net trawls were conducted according to CCAMLR (Convention on the Conservation of Antarctic Marine Living Resources) standards as double oblique tows down to 200m water depth (or 10m above seafloor if shallower), using a rectangular midwater trawl (RMT8+1), allowing for exact measurements of filtered water volume and hence density estimation of krill at the sampled station.

When we reached Elephant Island on 4th March, we encountered our first feeding aggregation of fin whales. The small boats were launched, the drones took off, our hydrophone ('SoundTrap') was deployed in the vicinity of the feeding group, photo identification pictures were collected from the small boats and we managed to obtain our first two biopsy samples of fin whales. At the same time, it became evident that we would require even calmer conditions for the successful deployment of satellite transmitters. Our short-term transmitters are deployed using a crossbow, aiming at the dorsal fin of the fin whale. Our long-term transmitters are implanted into the blubber (sub-dermal fat layer) of the whale by means of an airgun. It is essential that the tag is placed on top of the whale, to ensure regular surfacing of the tag for transmission of data to the ARGOS satellite system. Therefore, both deployment methods require to get very close to the animals for precise placement of the tag. In rough sea conditions, this difficult task becomes a lot more difficult. For the next two days, we covered the krill stations around Elephant Island during the nights, and continued our small boat work with the fin whales during daylight hours as long as sea states permitted small boat work. We regularly encountered fin whale feeding aggregations of groups of up to 50 animals feeding closely together and with even more whales visible in the surroundings. These encounters provided excellent opportunities for drone flights filming the feeding behavior. We were able to collect many hours of valuable footage for analyses of hunting strategies, individual and group behavior as well as analyses of health condition and skin features. Shot at 4k, the resolution of imagery will allow analyses of smallest scars and scratches on the skin, even from high altitudes.

However, sea states and swell were far from ideal for tag deployment, and sometimes did not even allow the launching of the small boats. Nevertheless, we obtained four additional biopsy samples during these first days at Elephant Island and also our first fecal sample. Fecal samples are a valuable resource for analyses of feeding ecology. The collection of fecal samples, however, is mainly opportunistic, as a whale needs to defecate in direct proximity of the boat to allow for collection of the bright orange fecal plume by a hand-held dip net before it quickly dissolves and particles sink. Like our biopsy samples, we froze the fecal samples after collection and will analyse them after the cruise.

When the wind picked up, we searched for fin whale aggregations south of Elephant Island (7th March) in the wind protected lee of the island, but as we had assumed based on previous findings already, fin whales prefer the north coast of Elephant Island. We only encountered scarcely spread out singular animals south of the island.

With weather predictions for Elephant Island worsening, we decided to continue our track towards the South Shetland Islands on 9th March, where we expected similar fin whale numbers as at Elephant Island and a calm weather window approaching. Upon arrival at

Coronation Island on the evening of 10th March, our visual survey team recorded high numbers of fin whales - and a considerable number of large krill fishing vessels in the area. The krill survey also proved the rich abundance of krill in the area. Unfortunately, the weather rapidly changed, and other than predicted, we soon faced 9 Bft and 5m swell in our working area. For two days we had to weather off at the south coast of the island, since none of our work was possible, not even the krill net trawls. After two days, on 13th March, the wind had finally calmed and the long expected calm weather window we had been waiting for was there – alas, accompanied by thick fog throughout the whole day. No visual work or boat operations were possible, despite very good sea states. Quite disappointed, we continued the krill survey covering the northern coast of the South Shetland Islands. Since the weather conditions did not seem to improve any further we decided to return to Elephant Island, covering the krill stations between the Islands on the way back.

We arrived back at Elephant Island on 16th March and were greeted by fin whale aggregations, and again: fog. However, the next morning, we woke up to calm conditions and the fog had disappeared. We found a suitable aggregation shortly after, and launched the small boats. On this day we deployed the first short-term transmitters on two whales. Furthermore, we collected another 6 biopsy samples and another fecal sample. Our short-term transmitters may transmit for up to 5 months, however, they rarely stay attached on the animal for this duration. The transmitters are fixed to the dorsal fin of the whale by two barbed pins of 5 cm length. The long-term transdermal tags on the other hand are fully implanted into the blubber (sub-dermal fat layer) and are not as easily lost. The short-term tags, however, collect more than position-only data and will provide us with information on small scale movement, dive durations and dive depths.

After another day with rough sea conditions, we launched the boats again on 19th March and successfully deployed another 5 short-term tags and collected another 3 biopsy samples and another fecal sample. After this very successful day we were confident that we would also be able to deploy a long-term tag during the last remaining two science days onboard. The weather was forecasted to be calm and we looked forward to our final days for deployment. The next day (20th) however, turned out to be much too rough. The tension grew immensely, and the uncertainty if we would be given a last chance for deployment was almost unbearable. The very last day of science on board, the 21st March, turned out to be a bright and calm day – the calmest day of the whole cruise! It was this very last day on which we deployed two long-term satellite transmitters on fin whales, which will now provide us with the positions of the animals for one year.

In the end, our cruise was a great success accomplishing all scientific objectives as planned, with a good area coverage by the visual survey (495km of dedicated survey effort), and excellent coverage of the krill survey (53 stations), a great collection of photo identification data (~4500 images of fin whales for photoID purposes), 89 drone flights collecting imagery of feeding aggregations for behavioural analysis, 11.5 hours of acoustic recordings of fin whale vocalisations, collection of 20 biopsy and four fecal samples for genetic and dietary analyses, and ultimately 9 deployed satellite transmitters.

On the very same evening we started our 8-day transit back to Montevideo, Uruguay, enjoying the sudden drop in tension. We cleaned and packed our gear, sorted through data and photos while we left the Southern Ocean and the temperatures slowly increased. We arrived at the Port of Montevideo in the morning of 30th March.



Figure 1: Fin whale feeding aggregation at Elephant Island. Photo: Amy S. Kennedy



Figure 2: Fin whale in front of MARIA S. MERIAN. Photo: Theresa Kirchner



Figure 3: Fin whale equipped with a short-term transmitter at its dorsal fin. Photo: Theresa Kirchner

Acknowledgements

The Scientific Team of MSM115 is very grateful to Captain Björn Maaß and his officers and crew for their excellent support throughout the cruise, the very professional and efficient technical assistance and the exceptionally good working atmosphere on board RV MARIA S. MERIAN. They all contributed substantially to the scientific success of this cruise. We thank the German Research Foundation (DFG) for providing ship time on RV MARIA S. MERIAN, the Southern Ocean Research Partnership (IWC-SORP) for funding of members of the scientific team, and WWF for funding of satellite transmitters. Cruise planning and preparations were conducted as part of the Grant HE 5696/3-1 funded by the German Research Foundation (DFG) within the framework of the priority programme 'SPP 1158: Antarctic Research with comparative investigations in Arctic ice areas'.

Furthermore, we acknowledge the valuable support by the German Research Fleet Coordination Centre and Briese Schifffahrts GmbH & Co. KG.

Participants

1. Helena. Herr	Fahrtleiter / <i>Chief Scientist</i>	UHH/AWI
2. Sacha Viquerat	Visual Survey	AWI
3. Katharina Baumhoefener	Visual Survey	UHH
4. Carola Rackete	Visual Survey	UHH
5. Tobias Naujocks	Student	UHH
6. Hannah Viola Daume	Student	UHH
7. Alexander Rychwalski	Student	UHH
8. Viola Panigada	Student	UAbd
9. Anna Panasiuk	Krill survey / CTD	UGdansk
10. Magdalena Beldowska	Krill survey / CTD	UGdansk
11. Kinga Hoszek	Student	UGdansk
12. Joanna Buch	Student	UGdansk
13. Martina Vortkamp	Technician Krill survey	AWI
14. Insa Kaphegyi	Student	UniHH
15. Theresa Kirchner	PhotoID	UniHH
16. Simone Panigada	Biopsy Sampling	Tethys
17. Leigh Hickmott	Tag deployment	OpOc
18. Amy Kennedy	Tag deployment	UWash
19. Zoe Groenewoud	Acoustics	NTNU
20. Harry Gunning	Drones	BBC
21. Connor Gallagher	Drones	BBC

UHH Universität Hamburg, Institute of Marine Ecosystem and Fishery Science,
Große Elbstraße 133, 22767 Hamburg, Germany

AWI Alfred Wegener Institute Helmholtz Center for Polar and Marine Research,
Am Handelshafen 12, 27570 Bremerhaven, Germany

UAbd University of Aberdeen, School of Biological Sciences, Aberdeen AB243FX,
UK

UGdansk University of Gdansk, Faculty of Oceanography and Geography, Department
of Marine Plankton Research, Institute of Oceanography, Ul. J. Bazynskiego
8, 80-309 Gdańsk, Poland

Tethys Tethys Research Institute, Viale G. B. Gadio 2, 20121 Milano, Italy

UWash University of Washington, Cooperative Institute for Climate, Ocean, and
Ecosystem Studies (CICOES), 3737 Brooklyn Ave NE, Seattle, WA 98105,
United States

OpOc Open Ocean Consulting, 3b Oaklands Road, Petersfield, Hampshire GU32
2EY, UK

NTNU Norwegian University of Science and Technology, Department of Biology,
Trondhjem Biological Station, 7491 Trondheim, Norway

BBC 3BBC Studios, Natural History Unit, Bridgewaterhouse, Counterslip, Bristol,
UK

Station list

RMT = Rectangular Midwater Trawl, SoundTrap = Hydrophone, Net = Surface Hand Net, UAV start = start of a period of multiple drone flights

Station MSM115	Date / Time	Device	Action	Position	Position
No.	[UTC]			Lat	Lon
MSM115_1-1	01.03.23 01:32	CTD	max depth	62° 46,669' S	064° 06,724' W
MSM115_1-2	01.03.23 02:12	RMT	max depth	62° 46,114' S	064° 05,739' W
MSM115_2-1	01.03.23 05:32	CTD	max depth	62° 45,730' S	063° 11,801' W
MSM115_2-2	01.03.23 06:14	RMT	max depth	62° 45,201' S	063° 10,648' W
MSM115_3-1	01.03.23 09:27	CTD	max depth	62° 44,712' S	062° 16,637' W
MSM115_3-2	01.03.23 10:03	RMT	max depth	62° 44,289' S	062° 15,715' W
MSM115_4-1	01.03.23 13:00	CTD	max depth	62° 21,934' S	061° 59,203' W
MSM115_4-2	01.03.23 13:39	RMT	max depth	62° 21,693' S	061° 57,664' W
MSM115_5-1	01.03.23 16:46	CTD	max depth	61° 59,273' S	061° 41,620' W
MSM115_5-2	01.03.23 17:30	RMT	max depth	61° 58,809' S	061° 42,795' W
MSM115_6-1	01.03.23 21:07	CTD	max depth	62° 07,035' S	060° 51,924' W
MSM115_6-2	01.03.23 21:46	RMT	max depth	62° 06,368' S	060° 53,000' W
MSM115_7-1	02.03.23 01:14	CTD	max depth	62° 14,783' S	060° 02,220' W
MSM115_7-2	02.03.23 01:42	RMT	max depth	62° 14,484' S	060° 02,452' W
MSM115_8-1	02.03.23 04:32	CTD	max depth	61° 52,627' S	059° 57,168' W
MSM115_8-2	02.03.23 05:13	RMT	max depth	61° 51,950' S	059° 58,291' W
MSM115_9-1	02.03.23 08:22	CTD	max depth	61° 30,433' S	059° 52,019' W
MSM115_9-2	02.03.23 09:03	RMT	max depth	61° 29,921' S	059° 53,207' W
MSM115_10-1	02.03.23 12:22	CTD	max depth	61° 37,405' S	059° 05,585' W
MSM115_10-2	02.03.23 13:06	RMT	max depth	61° 36,954' S	059° 07,104' W
MSM115_11-1	02.03.23 16:20	CTD	max depth	61° 44,453' S	058° 19,289' W
MSM115_11-2	02.03.23 17:07	RMT	max depth	61° 44,206' S	058° 20,793' W
MSM115_12-1	02.03.23 20:09	CTD	max depth	61° 24,935' S	058° 16,410' W
MSM115_12-2	02.03.23 20:45	RMT	max depth	61° 24,557' S	058° 17,541' W
MSM115_13-1	04.03.23 03:38	CTD	max depth	61° 31,116' S	057° 00,416' W
MSM115_13-2	04.03.23 04:19	RMT	max depth	61° 31,034' S	057° 02,567' W
MSM115_14-1	04.03.23 09:27	CTD	max depth	61° 13,245' S	055° 48,757' W
MSM115_14-2	04.03.23 09:55	RMT	max depth	61° 13,501' S	055° 48,213' W
MSM115_15-1	04.03.23 12:46	CTD	max depth	60° 51,132' S	055° 45,773' W
MSM115_15-2	04.03.23 13:22	RMT	max depth	60° 51,785' S	055° 46,261' W
MSM115_16-1	04.03.23 15:15	CTD	max depth	60° 53,645' S	055° 27,421' W
MSM115_16-2	04.03.23 15:44	RMT	max depth	60° 53,805' S	055° 27,449' W
MSM115_17-1	04.03.23 17:31	Boat 1	in water	60° 58,523' S	055° 10,709' W
MSM115_17-1	04.03.23 17:31	Boat 2	in water	60° 58,523' S	055° 10,709' W
MSM115_17-1	04.03.23 17:33	SoundTrap	in water	60° 58,523' S	055° 10,709' W
MSM115_17-2	04.03.23 17:33	UAV	start	60° 58,523' S	055° 10,709' W
MSM115_17-1	04.03.23 20:27	SoundTrap	recovered	60° 58,788' S	055° 09,725' W
MSM115_17-1	04.03.23 20:31	Boat 1	on deck	60° 58,788' S	055° 09,725' W

MSM115_17-1	04.03.23 20:37	Boat 2	on deck	60° 58,788' S	055° 09,726' W
MSM115_18-1	04.03.23 21:33	CTD	max depth	60° 58,100' S	055° 02,412' W
MSM115_18-2	04.03.23 22:08	RMT	max depth	60° 58,213' S	055° 03,731' W
MSM115_19-1	05.03.23 01:24	CTD	max depth	61° 01,472' S	054° 18,535' W
MSM115_19-2	05.03.23 02:09	RMT	max depth	61° 01,558' S	054° 16,749' W
MSM115_20-1	05.03.23 05:33	CTD	max depth	60° 41,975' S	054° 29,040' W
MSM115_20-2	05.03.23 06:05	RMT	max depth	60° 42,016' S	054° 29,119' W
MSM115_21-1	05.03.23 08:08	CTD	max depth	60° 40,340' S	054° 51,501' W
MSM115_21-2	05.03.23 08:48	RMT	max depth	60° 40,471' S	054° 53,004' W
MSM115_22-1	05.03.23 12:45	UAV	start	60° 58,932' S	055° 11,759' W
MSM115_23-1	05.03.23 13:45	UAV	start	60° 54,144' S	055° 25,736' W
MSM115_23-2	05.03.23 14:04	Boat 1	in water	60° 54,155' S	055° 25,657' W
MSM115_23-2	05.03.23 14:07	Boat 2	in water	60° 54,155' S	055° 25,657' W
MSM115_23-2	05.03.23 14:12	Soundtrap	deployed	60° 54,155' S	055° 25,657' W
MSM115_23-2	05.03.23 17:34	Boat 1	on deck	60° 54,669' S	055° 26,444' W
MSM115_23-2	05.03.23 17:58	SoundTrap	recovered	60° 54,059' S	055° 22,677' W
MSM115_23-2	05.03.23 18:04	Boat 2	on deck	60° 54,041' S	055° 22,601' W
MSM115_23-3	05.03.23 16:17	Net	in the water	60° 54,392' S	055° 25,567' W
MSM115_23-3	05.03.23 17:30	Net	on deck	60° 54,669' S	055° 26,446' W
MSM115_24-1	05.03.23 18:38	CTD	max depth	60° 54,040' S	055° 22,591' W
MSM115_24-2	05.03.23 19:18	RMT	max depth	60° 54,036' S	055° 21,144' W
MSM115_25-1	06.03.23 00:12	CTD	max depth	60° 46,243' S	056° 47,825' W
MSM115_25-2	06.03.23 00:46	RMT	max depth	60° 46,150' S	056° 48,919' W
MSM115_26-1	06.03.23 03:49	CTD	max depth	61° 08,648' S	056° 54,114' W
MSM115_26-2	06.03.23 04:29	RMT	max depth	61° 07,871' S	056° 54,114' W
MSM115_27-1	06.03.23 07:11	CTD	max depth	60° 59,762' S	056° 18,358' W
MSM115_27-2	06.03.23 07:50	RMT	max depth	60° 59,020' S	056° 18,200' W
MSM115_28-1	06.03.23 12:16	UAV	start	61° 01,490' S	055° 02,423' W
MSM115_28-2	06.03.23 13:07	Boat	in water	61° 01,490' S	055° 02,423' W
MSM115_28-2	06.03.23 13:12	Boat	in water	61° 01,490' S	055° 02,424' W
MSM115_28-2	06.03.23 13:17	SoundTrap	deployed	61° 01,490' S	055° 02,424' W
MSM115_28-1	06.03.23 13:42	UAV	start	61° 01,358' S	055° 02,557' W
MSM115_28-2	06.03.23 15:32	Boat 1	on deck	61° 01,344' S	055° 02,957' W
MSM115_28-2	06.03.23 16:00	SoundTrap	recovered	61° 01,836' S	055° 06,743' W
MSM115_28-2	06.03.23 16:06	Boat 2	on deck	61° 01,835' S	055° 06,784' W
MSM115_29-1	06.03.23 16:37	RMT	max depth	61° 01,715' S	055° 06,097' W
MSM115_30-1	06.03.23 20:24	SoundTrap	deployed	61° 13,457' S	054° 29,459' W
MSM115_30-1	06.03.23 22:26	SoundTrap	recovered	61° 13,796' S	054° 32,832' W
MSM115_31-1	06.03.23 23:50	CTD	max depth	61° 23,971' S	054° 43,505' W
MSM115_31-2	07.03.23 00:22	RMT	max depth	61° 23,784' S	054° 41,922' W
MSM115_32-1	07.03.23 02:10	CTD	max depth	61° 23,751' S	054° 20,182' W
MSM115_32-2	07.03.23 02:46	RMT	max depth	61° 23,573' S	054° 18,797' W
MSM115_33-1	07.03.23 12:48	UAV	start	61° 03,282' S	054° 33,114' W
MSM115_34-1	07.03.23 23:03	CTD	max depth	60° 42,326' S	055° 07,091' W
MSM115_34-2	07.03.23 23:42	RMT	max depth	60° 41,817' S	055° 05,714' W
MSM115_35-1	08.03.23 02:13	CTD	max depth	60° 41,256' S	055° 34,968' W

MSM115_35-2	08.03.23 02:51	RMT	max depth	60° 40,459' S	055° 34,739' W
MSM115_36-1	08.03.23 04:55	CTD	max depth	60° 28,973' S	055° 42,617' W
MSM115_36-2	08.03.23 05:37	RMT	max depth	60° 28,278' S	055° 43,408' W
MSM115_37-1	08.03.23 08:13	CTD	max depth	60° 26,511' S	055° 11,756' W
MSM115_37-2	08.03.23 08:50	RMT	max depth	60° 26,038' S	055° 10,756' W
MSM115_38-1	08.03.23 11:01	CTD	max depth	60° 22,577' S	054° 40,552' W
MSM115_38-2	08.03.23 11:43	RMT	max depth	60° 21,826' S	054° 41,421' W
MSM115_39-1	08.03.23 16:03	CTD	max depth	60° 19,949' S	053° 29,044' W
MSM115_39-2	08.03.23 16:44	RMT	max depth	60° 19,626' S	053° 30,174' W
MSM115_40-1	08.03.23 19:59	CTD	max depth	60° 34,923' S	052° 54,936' W
MSM115_40-2	08.03.23 20:37	RMT	max depth	60° 34,503' S	052° 56,159' W
MSM115_41-1	09.03.23 00:03	CTD	max depth	60° 49,868' S	052° 20,778' W
MSM115_41-2	09.03.23 00:43	RMT	max depth	60° 49,525' S	052° 22,214' W
MSM115_42-1	09.03.23 06:30	CTD	max depth	60° 40,785' S	053° 53,637' W
MSM115_42-2	09.03.23 07:10	RMT	max depth	60° 40,418' S	053° 54,978' W
MSM115_43-1	11.03.23 15:57	Net	in the water	60° 42,739' S	045° 32,110' W
MSM115_43-1	11.03.23 16:25	Net	on deck	60° 42,731' S	045° 32,080' W
MSM115_44-1	12.03.23 15:44	Net	in the water	60° 42,660' S	045° 32,010' W
MSM115_45-1	13.03.23 07:09	CTD	max depth	60° 32,078' S	046° 31,653' W
MSM115_45-2	13.03.23 07:49	RMT	max depth	60° 31,357' S	046° 32,184' W
MSM115_46-1	13.03.23 13:55	CTD	max depth	60° 22,900' S	045° 46,619' W
MSM115_46-2	13.03.23 14:34	RMT	max depth	60° 22,558' S	045° 48,074' W
MSM115_47-1	13.03.23 18:33	CTD	max depth	60° 31,814' S	045° 14,264' W
MSM115_47-2	13.03.23 18:51	RMT	max depth	60° 31,783' S	045° 14,546' W
MSM115_48-1	14.03.23 14:20	CTD	max depth	60° 13,666' S	045° 01,568' W
MSM115_48-2	14.03.23 15:03	RMT	max depth	60° 13,508' S	045° 03,393' W
MSM115_49-1	14.03.23 21:31	CTD	max depth	60° 12,736' S	046° 57,267' W
MSM115_49-2	14.03.23 22:06	RMT	max depth	60° 12,444' S	046° 58,532' W
MSM115_50-1	15.03.23 04:42	CTD	max depth	60° 11,038' S	049° 05,972' W
MSM115_50-2	15.03.23 05:45	RMT	max depth	60° 10,253' S	049° 05,026' W
MSM115_51-1	15.03.23 11:53	CTD	max depth	60° 34,254' S	050° 36,121' W
MSM115_51-2	15.03.23 12:36	RMT	max depth	60° 33,525' S	050° 36,661' W
MSM115_52-1	16.03.23 15:40	CTD	max depth	61° 00,978' S	055° 06,948' W
MSM115_52-2	16.03.23 16:04	RMT	max depth	61° 00,601' S	055° 07,231' W
MSM115_52-3	16.03.23 16:36	RMT	max depth	60° 59,691' S	055° 07,913' W
MSM115_52-4	17.03.23 00:05	CTD	max depth	60° 59,839' S	055° 08,006' W
MSM115_52-5	17.03.23 00:38	RMT	max depth	60° 59,256' S	055° 08,849' W
MSM115_52-6	17.03.23 01:56	RMT	max depth	60° 59,988' S	055° 08,079' W
MSM115_53-1	17.03.23 04:05	CTD	max depth	61° 03,415' S	054° 42,103' W
MSM115_53-2	17.03.23 04:35	RMT	max depth	61° 03,778' S	054° 42,322' W
MSM115_53-3	17.03.23 06:09	RMT	max depth	61° 03,520' S	054° 42,257' W
MSM115_53-4	17.03.23 10:02	CTD	max depth	61° 01,647' S	054° 41,690' W
MSM115_53-5	17.03.23 10:34	RMT	max depth	61° 02,148' S	054° 41,870' W
MSM115_53-6	17.03.23 11:45	RMT	max depth	61° 03,723' S	054° 42,444' W
MSM115_54-1	17.03.23 13:29	UAV	start	61° 01,989' S	055° 01,694' W
MSM115_54-2	17.03.23 13:42	Boat 1	in water	61° 02,038' S	055° 01,686' W

MSM115_54-2	17.03.23 13:45	Boat 2	in water	61° 02,038' S	055° 01,687' W
MSM115_54-2	17.03.23 15:32	Boat 2	on deck	61° 01,528' S	055° 02,791' W
MSM115_54-2	17.03.23 15:43	Boat 2	in water	61° 01,528' S	055° 02,790' W
MSM115_54-2	17.03.23 18:53	Boat 1	on deck	61° 00,966' S	055° 02,091' W
MSM115_54-3	17.03.23 14:09	Net	in the water	61° 01,947' S	055° 01,880' W
MSM115_55-1	19.03.23 12:57	UAV	start	61° 02,599' S	055° 00,614' W
MSM115_55-2	19.03.23 13:20	Boat 1	in water	61° 02,556' S	055° 00,899' W
MSM115_55-2	19.03.23 13:27	Boat 2	in water	61° 02,556' S	055° 00,898' W
MSM115_55-1	19.03.23 15:21	UAV	start	61° 02,826' S	054° 59,944' W
MSM115_55-2	19.03.23 15:21	Boat 1	on deck	61° 02,826' S	054° 59,945' W
MSM115_55-2	19.03.23 15:25	Boat 2	on deck	61° 02,826' S	054° 59,946' W
MSM115_55-3	19.03.23 13:33	Net	in the water	61° 02,556' S	055° 00,899' W
MSM115_55-4	19.03.23 16:15	Boat 1	in water	61° 02,745' S	055° 03,296' W
MSM115_55-4	19.03.23 16:16	Boat 2	in water	61° 02,746' S	055° 03,301' W
MSM115_55-1	19.03.23 17:54	UAV	start	61° 02,222' S	055° 04,231' W
MSM115_55-4	19.03.23 18:45	Boat 1	on deck	61° 01,990' S	055° 05,263' W
MSM115_55-4	19.03.23 18:48	Boat 2	on deck	61° 01,991' S	055° 05,283' W
MSM115_55-4	19.03.23 19:43	Boat 1	in water	61° 01,992' S	055° 05,283' W
MSM115_55-4	19.03.23 19:45	Boat 2	in water	61° 01,992' S	055° 05,285' W
MSM115_55-4	19.03.23 21:16	Boat 1	on deck	61° 01,623' S	055° 06,194' W
MSM115_55-4	19.03.23 21:20	Boat 2	on deck	61° 01,627' S	055° 06,216' W
MSM115_56-1	21.03.23 10:35	UAV	start	61° 00,698' S	055° 01,483' W
MSM115_56-2	21.03.23 10:48	Boat 1	in water	61° 00,699' S	055° 01,483' W
MSM115_56-2	21.03.23 10:55	Boat 2	in water	61° 00,699' S	055° 01,483' W
MSM115_56-3	21.03.23 11:31	Net	in the water	61° 00,862' S	055° 00,543' W
MSM115_56-2	21.03.23 14:35	Boat 1	on deck	61° 00,851' S	055° 04,203' W
MSM115_56-2	21.03.23 14:38	Boat 2	on deck	61° 00,852' S	055° 04,205' W
MSM115_56-2	21.03.23 15:05	Boat 1	in water	61° 01,076' S	055° 03,278' W
MSM115_56-2	21.03.23 15:08	Boat 2	in water	61° 01,076' S	055° 03,278' W
MSM115_56-1	21.03.23 16:53	UAV	start	61° 01,323' S	055° 02,716' W
MSM115_56-2	21.03.23 18:33	Boat 2	on deck	61° 01,732' S	055° 03,203' W
MSM115_57-1	21.03.23 21:01	Net	in water	60° 59,380' S	055° 14,664' W