



R/V Yokosuka “Cruise Report”
YK25-13

Understanding the distribution and abundance of seafloor
plastic litter in the Sea of Japan

Yamato Basin/Japan Basin

Aug.12,2025-Aug.25,2025

Japan Agency for Marine-Earth Science and Technology
(JAMSTEC)

Acknowledgements

We thank Captain Y. Nakamura and the crew of the R/V YOKOSUKA and the Shinkai 6500 team for organizing the cruise and sampling. We also thank marine technicians from Nippon Marine Enterprises (NME) for research support and ground staff from Japan Agency for Marine-Earth Science and Technology (JAMSTEC) for all the procedures to make this cruise possible.



Group photos of the science party YK25-13

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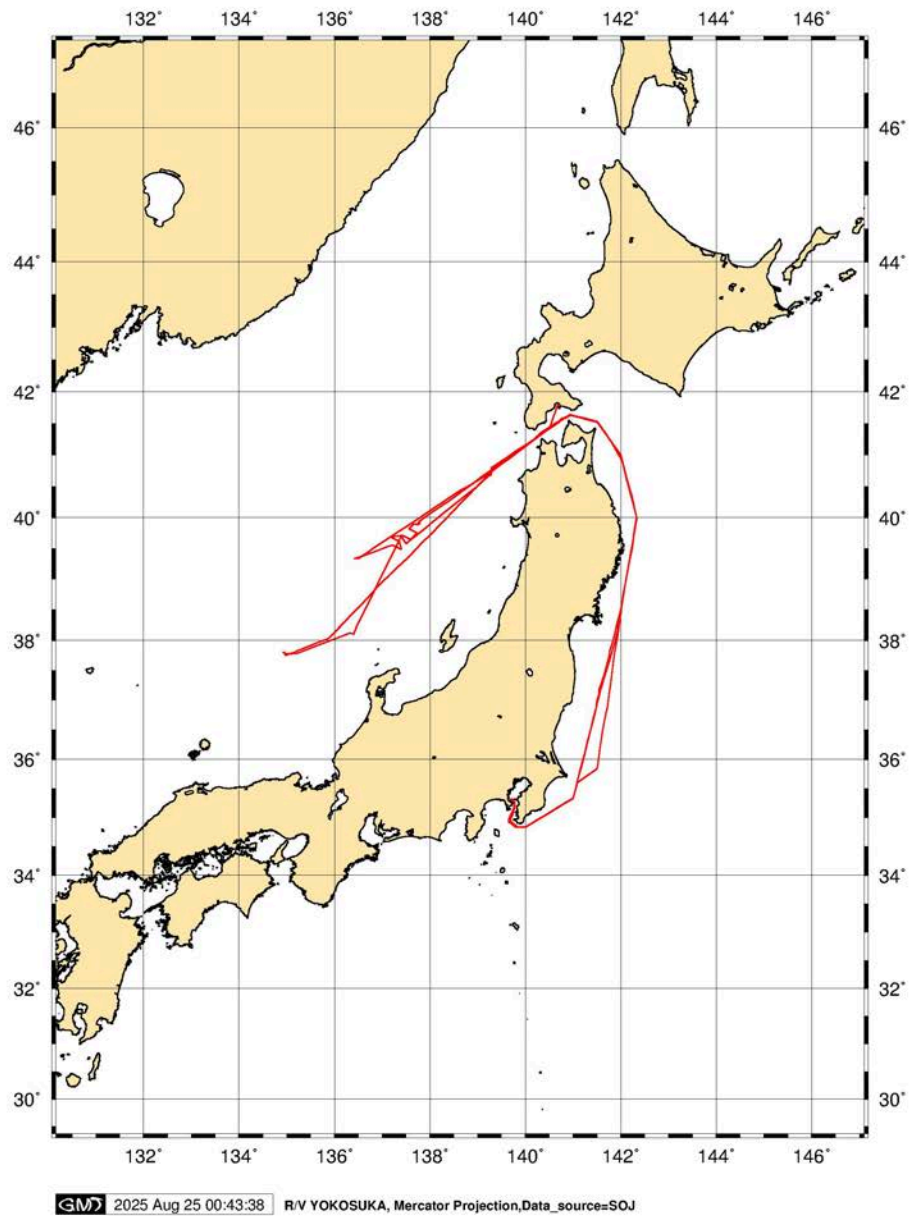
Acknowledgements

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1. Cruise Information

- Cruise ID: YK25-13
- Name of vessel: R/V Yokosuka
- Title of project/cruise: Understanding the distribution and abundance of seafloor plastic litter in the Sea of Japan
- Chief Scientist: Ryota Nakajima [JAMSTEC]
- Cruise period: 12th August to 25th August, 2025
- Ports of departure/arrival: JAMSTEC/Hakodate
- Research area: Yamato-basin, Japan-basin
- Research map (YK25-13 Navigation Track)

YK25-13_NavTrack



2. Research Proposal and Science Party

- Title of proposal

Understanding the distribution and abundance of seafloor plastic litter in the Sea of Japan

- Representative of Science Party [Affiliation]

Ryota Nakajima [Japan Agency for Marine-Earth Science and Technology]

- Science Party (List) [Affiliation, assignment etc.]

Takaki Nishio [Japan Agency for Marine-Earth Science and Technology]

Tomoko Takao [Japan Agency for Marine-Earth Science and Technology]

Georg Hanke [European Commission Joint Research Centre]

Christopher K. Pham [University of Azores]

Haodong Xu [The University of Tokyo]

Kaoruko Mizukawa [Tokyo University of Agriculture and Technology]

Shinichi Chee [Tokyo University of Agriculture and Technology]

Makoto Ito [Nippon Marine Enterprise]

Souta Shimura [Nippon Marine Enterprise]

- Crew

Captain Y. Nakamura

Chief Officer R. Yamaguchi

1st Officer Y. Sammori

2nd Officer R. Matsuda

3rd Officer W. Miyai

Jr. 3rd Officer T. Ojima

Chief Engineer T. Abe

1st Engineer D. Gibu

2nd Engineer K. Ono

3rd Engineer K. Shimizu

Jr. 3rd Engineer R. Kurihara

Chief Radio Operator T. Mabara

2nd Radio Operator T. Maeda

3rd Radio Operator Y. Yokoyama

Boat Swain N. Iwasaki

Seaman M. Okada

Seaman S. Kojima

Seaman T. Saga

Seaman T. Matsuda

Seaman N. Ishizuka

Seaman K. Adachi

No.1 Oiler Y. Higashigawa

Oiler A. Dantsuka

Oiler T. Hidaka

Oiler K. Ochiai

Oiler S. Manna

Chief Steward K. Hirayama

Steward M. Kunita

Steward T. Tanaka

Steward Y. Koki

Steward T. Saito

- Shinkai 6500 operating team

Submersible Operation Manager K. Chiba

Deputy Submersible Operation Manager T. Kondo

1st Submersible Tec. Officer
1st Submersible Tec. Officer
1st Submersible Tec. Officer
1st Submersible Tec. Officer
2nd Submersible Tec. Officer
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2st Submersible Tec. Officer
2st Submersible Tec. Officer
3nd Submersible Tec. Officer

A. Ishikawa
M. Ueki
F. Saito
T. Onishi
H. Ueki
K. Suzuki
G. Matsuzaka
R. Saigo
K. Sato
T. Chida
T. Eda

3. Research/Development Activities

3.1. Overall objectives and sampling sites

3.1.1. Objectives

It has become increasingly evident that the abundance of seafloor plastics in the waters surrounding Japan exceeds the global average, rendering the quantification of their distribution, the estimation of transport pathways, and the elucidation of their behaviour pressing scientific priorities.

Approximately half of the plastic litter entering the world's oceans is estimated to originate from China and Southeast Asia, a portion of which is transported northwards to the Japanese coastal regions—both along the Sea of Japan and the Pacific coast—via the Kuroshio and Tsushima Warm Currents. Consequently, the density of microplastics (MPs) in surface waters around Japan has been reported to reach approximately thirty times the global average. Recent studies indicate that similar patterns of accumulation occur on the deep seafloor, suggesting that these areas may constitute significant hotspots for marine litter deposition.

Among potential litter hotspots, the Sea of Japan is particularly noteworthy. Large quantities of plastic litter, carried by the Tsushima Warm Current from high-discharge regions including East Asia, accumulate along the western coastline of Honshu Island, and it is highly probable that comparable accumulations occur on the deep seafloor. The present expedition investigated the abundance and distribution of both microplastics and macroplastics on the deep seafloor of the Sea of Japan, as well as the extent of contamination of macro-benthic organisms by hazardous chemical substances derived from plastics. Given the potential for unprecedented levels of plastic litter deposition, the results are expected to advance the understanding of litter transport processes and to identify priority sites for targeted monitoring.

Additional investigation: *Potential occurrence of turbidity currents and associated sediment supply along the Toyama Deep-Sea Channel triggered by submarine landslides following the Noto Peninsula earthquake.* In the aftermath of the Noto earthquake, incidents of submarine cable damage have been reported near the Toyama Deep-Sea Channel, including within the Yamato Basin of the Sea of Japan. Such damage may be attributable to turbidity currents or sediment remobilisation caused by submarine landslides. To obtain baseline data for determining the cause of cable severance, we will conduct bathymetric mapping and sub-bottom profiling in the northern Yamato Basin—an area where no post-earthquake seafloor surveys have been undertaken—focusing on sites previously mapped by R/V *Kairei*. This survey contributed to elucidate the occurrence of turbidity currents and the associated sediment supply along the Toyama Deep-Sea Channel.

3.1.2. Sampling sites

The observation of benthic plastic litter on the deep seafloor was conducted in the Yamato Basin (St. 2, 4, 11) and the Japan Basin (St. 5). Surface microplastic investigation was conducted at St. 3. Seafloor topographic and subbottom surveys using SBP and MBES were conducted along five survey lines (Not line) (Table 3.1).

Table 3.1. Survey sites in the cruise YK25-13.

Date (yy/mm/dd)	Site	Site name	Depth (m)	Latitude	Longitude	Activities
2025/8/14	Not line (K)	Yamato Basin	2489	39°41.94' N	137°23.99' E	SBP/MBES
2025/8/15	St. 3	Yamato Basin	2498	38°06.72' N	136°20.52' E	Neuston net
2025/8/16	St. 2	Yamato Basin	2940	37° 47.03'N	135° 09.37'E	Dive 1867

2025/8/22	St. 5	Japan Basin	2498	38° 06.72'N	136° 20.52'E	Dive 1868
2025/8/23	St. 4 (Dive#1869)	Yamato Basin	2643	39° 20.33'N	136° 27.53'E	Dive 1869
2025/8/23-24	Not line (5)	Yamato Basin	2405	39°20.99' N	137°24.14' E	SBP/MBES
2025/8/23-24	Not line (6)	Yamato Basin	2431	39°29.31' N	137°23.57' E	SBP/MBES
2025/8/23-24	Not line (7)	Yamato Basin	2526	39°40.81' N	137°11.50' E	SBP/MBES
2025/8/23-24	Not line (8)	Yamato Basin	2525	39°38.83' N	137°35.39' E	SBP/MBES
2025/8/24	St. 11	Japan Basin	3636	40° 53.52'N	138° 03.83'E	Dive 1870

3.2. Distribution of benthic macrolitter and microplastics (Ryota Nakajima, Takaki Nishio, Tomoko Takao)

3.2.1. Objectives

This section particularly focuses on macroplastic litter and microplastics (MP) on the seafloor to understand the distribution, numerical density, and types of plastic litter, as well as the validation of litter identification tests using an AI-based recognition system.

3.2.2. Methods

Seafloor observations were carried out using JAMSTEC's human-occupied vehicle (HOV) *Shinkai 6500*. During HOV operations, video data were recorded with a forward-facing full HD fixed video camera. A downward-looking video camera was also deployed during the dives. During the observations, litter of both natural and man-made origin were collected whenever possible using manipulators. Retrieved plastic litter were photographed on board, and a portion of the litter was sub-sampled for further analysis of polymer type and associated hazardous chemicals (Ryota Nakajima).

A laptop equipped with the litter-recognition AI system “*Deep-Sea Debris AI*” was installed inside the HOV, and demonstration tests of real-time litter recognition from camera footage were conducted (Nishio).

Sediment samples were collected by the H-type push corers (covering 52.8 cm² seafloor surface area). We used aluminum-made tubes to prevent from plastic contamination.

3.2.3. Onboard results

Film-like fragments and plastic bags were common plastic litter observed during the dives. At every survey site, litter with Japanese, Korean, Chinese, and English writing was found. Most of the litter appearing on the video screen from the dive 1868 was detected in real time and was confirmed to be recognized and classified by the ‘Deep-Sea Debris AI’ system.

In total, 24 sediment cores were collected for MP analysis. The core samples were sliced at 1-cm intervals down to the first 2 cm of the core on board. The samples were then transferred into pre-combusted glass containers and stored frozen.

3.2.4. Future plan

The videos from the full HD camera will be played onshore and all items of litter, both natural and man-made objects, will be identified through video analysis for the entirety of each dive. The obtained data will be submitted to JAMSTEC's Data Management Group (DMG). Verification tests of litter recognition using the Deep-Sea Debris AI will also be conducted on the video footage obtained from Dives 1868–1870.

Sediment samples will be treated according to the procedure described by Tsuchiya et al. (2024) (<https://doi.org/10.1016/j.marpolbul.2023.115466>) and extracted MPs will be analyzed under a μ FTIR.

3.3. Developing approaches for seafloor macrolitter identification, quantification and data reporting (Georg Hanke, Christopher Pham)

3.3.1. Objectives

The management of environmental pollution through plastic and marine litter and the implementation of appropriate countermeasures requires a quantitative understanding of litter abundance, the establishing of baselines and the measurements of pollution trends over time. Plastic and marine litter on the seafloor, including the deep areas, are of interest, as the seafloor is expected to be a major sink and accumulation area.

As observation and quantification of seafloor macrolitter will be made through different systems and platforms, the objective of the study is to perform data collection through direct observation and image acquisition with separate camera systems mounted on the Shinkai 6500 HOV.

While general guidance for seafloor litter monitoring is available (e.g. through GESAMP, EU Marine Strategy Framework Directive), the collection of comparable data will require the availability of more detailed protocols and technical guidance.

Common approaches are required, among other, for

- survey area calculation,
- image resolution requirements (related to camera systems and transect elevation)
- item counting and
- size estimation of litter items
- attribution to litter item categories

Estimating and calculating field-of-view, for direct observation and camera systems, as well as the opportunity to physically collect litter items are needed to enable a verification of the strategies developed for imaging-based monitoring.

3.3.2. Material and Methods

The human-occupied vehicle Shinkai 6500 served as the platform to achieve the objectives outlined above.

Observations and image acquisition was based on the following approach:

- Direct observation was performed by scientific observers and pilots through 3 observation windows, central, left and right, providing a maximum field-of view coverage. Recording of potential and verified objects was done through vocal logging. Occasional documentation were obtained with hand held cameras through the window.
- A central wide-angle continuous video recording (Camera 1) with parallel laser pointers
- A manually directed array of a zoom video camera (Camera 2) and a high resolution still camera (triggered every 10 sec and additionally through manual command). Both equipped with parallel laser pointers as reference. These cameras allowed specific targeting of objects.
- A downward directed camera NADIR, with a line laser provided close-up seafloor continuous video.

Although two dives were specifically dedicated to these tasks, observations and imagery from all

four dives will be incorporated into the analysis.

Debris samples were collected for detailed photographic, checking for information on origin and chemical laboratory characterization. Linear transects were conducted at constant altitudes of 1–3 meters above the seafloor, with all visible litter items systematically recorded in situ. Imagery from different cameras will be analyzed in detail using a harmonized debris classification system. The number of items will then be integrated with transect information including altitude, geographic position, and transect length to litter densities. Finally, outputs observation and cameras will be compared to assess consistency and complementarity in debris detection.

3.3.3. Onboard results

Significant amounts of seafloor macrolitter have been observed on all dives. Litter abundance pattern changed on an east-west transect, with increasing concentrations towards west. First results confirm the necessary acceptance of trade-offs between direct visual, imaging and sample collection. A one-fits-all methodology, provided as a universal protocol must take these into account. The clear identification of policy data requirements is key and provisions for enabling comparable items/km² counts with object identification are the goal.

The situational awareness through direct observation and multi-camera deployment with Shinkai 6500 provides a unique set-up for the holistic understanding of the environmental setting, including the distribution of debris.

3.3.4. Future plan

JAMSTEC, EC JRC and the University of the Azores are among the leads of a global expert community on seafloor macrolitter. This expert community, comprising institutions at global level with experience in the monitoring and data management of seafloor macrolitter, discusses and provides knowledge on the issue of seafloor macrolitter. After an initial review and a dedicated workshop, the community published a paper to analyse and pinpoint critical issues in quantifying seafloor macrolitter (“The Quest for seafloor litter”: <https://iopscience.iop.org/article/10.1088/1748-9326/abc6d4>). Then, very recently, following other workshops, a paper “Out of sight, but not out of mind: Key issues regarding seafloor macrolitter monitoring” (<https://www.sciencedirect.com/science/article/pii/S0025326X25009750>) was published, highlighting the need for a harmonized global system to quantify seafloor macrolitter.

Results of this cruise are aiming at directly contributing to identified technical issues that need to be resolved. The results on survey area calculation, object identification and size estimation will then be taken up in the collaborative work to provide global protocols for seafloor macrolitter monitoring. These are expected to be an integral part of the UN level efforts, already significantly supported by the Japanese Ministry of Environment and the European Union, to set-up a global system for plastic and marine litter monitoring in different environmental matrices. Furthermore, the technical development of harmonized methodologies may also contribute to other deep sea research objectives, as related to the High Seas Treaty (“BBNJ”).

Cruise results are planned to be provided as scientific publication. Further collaboration between the participating institutions is envisaged and expected to be fruitful and scientifically impacting!

3.4. Plastic additives in the deep-sea sediment (Kaoruko Mizukawa, Shinichi Chee)

3.4.1. Objectives

Plastics contain various additives, and even after they fragment into microplastics, settle, and accumulate in sediments, some of these additives are expected to remain. The objectives of this study are (1) To compare the long-term changes in additive concentrations within sediment cores collected from the Sea of Japan with those from Tokyo Bay, which is more directly influenced by

human activities, and (2) To analyze the types and concentrations of additives present in microplastics within sediment cores to clarify the contribution of microplastics to the total additive content in sediments.

3.4.2. Material and Methods

Sampling was conducted using push corers deployed by the *Shinkai 6500*. At each site, a total of five cores were obtained: one polycarbonate corer and four aluminum corers. The core collected with the polycarbonate corer was discarded after visual examination of the sediment stratigraphy. Of the four cores collected with aluminum corers, three were sectioned at 1-cm intervals down to 2 cm depth, whereas the remaining core was sliced at 0.5-cm intervals from the surface to 2 cm depth and at 2-cm intervals from 2 to 10 cm depth.

At Tokyo University of Agriculture and Technology, a portion of the sliced cores was freeze-dried, homogenized, and subsequently subjected to pretreatment prior to gas chromatography–mass spectrometry (GC–MS) analysis to determine the concentrations of various plastic additives. Sediments that were not freeze-dried were processed by density separation to isolate and quantify microplastics, and contamination by additives derived from plastics and other artificial materials was further analyzed using GC–MS.

3.4.3. Onboard results

Push corer sampling with the *Shinkai 6500* was conducted at the following sites: Yamato Basin St.2 on 16 August 2025, Japan Basin St.5 on 22 August, Yamato Basin St.4 on 23 August, and Yamato Basin St.11 on 24 August. At each site, a total of five cores were obtained, consisting of one polycarbonate corer and four aluminum corers. The collected cores were sliced in accordance with Section 3.4.2 and subsequently stored at -30°C .

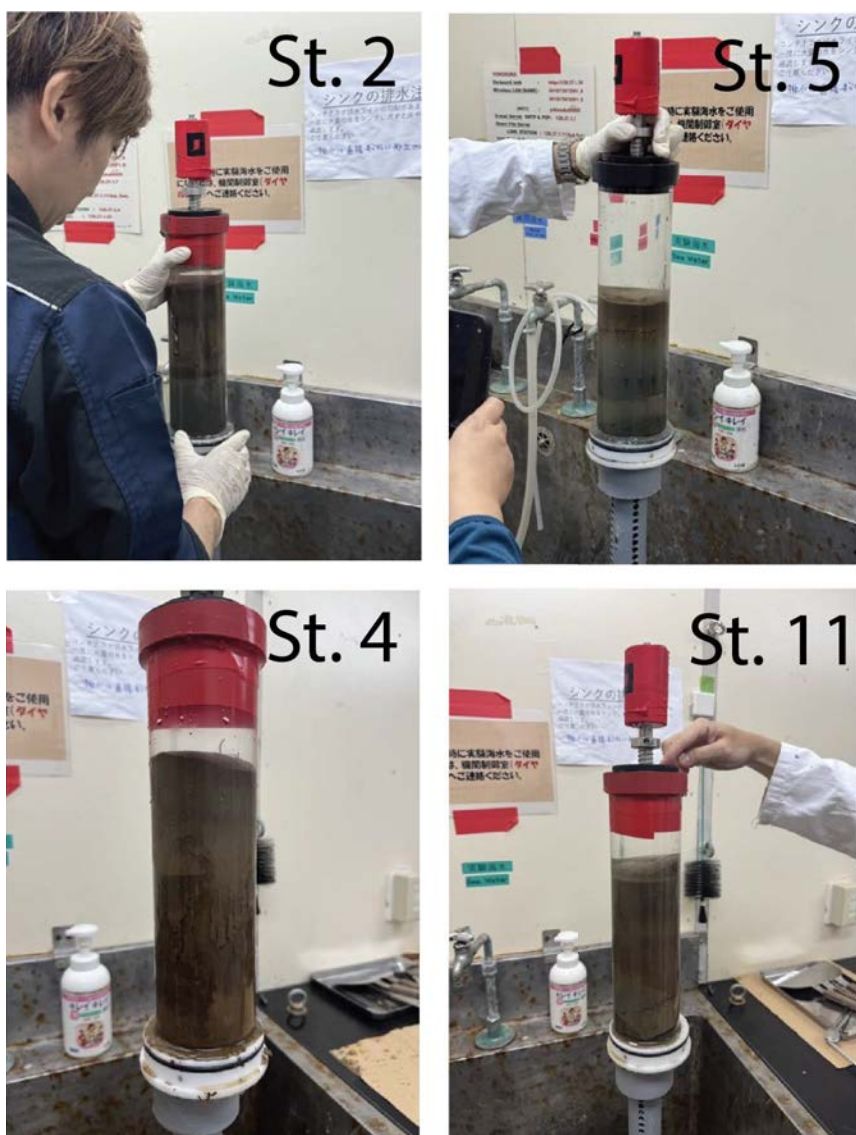


Fig. 3.4.3 Cores collected from the surveyed sites.

3.4.4. Future plan

The samples will be returned to Tokyo University of Agriculture and Technology, where the analysis of plastic additives in the sediments is scheduled to be conducted by around December 2027.

3.5. Distribution of microplastics in the surface water (Haodong Xu)

3.5.1. Objectives

Through the collection and analysis of samples using a neuston net, this study aimed to clarify the long-term distribution and transport of macro- and microplastics in the surface waters of the North Pacific.

3.5.2. Materials and Methods

Floating MPs were collected from the surface water in the Yamato Basin (St. 3). Samples were collected using a neuston net with a perpendicular mouth opening of 75 cm height and 100 cm width, equipped with a 333 μ m mesh opening net. The net, without cod-end, was rinsed from the outside with running seawater prior to use. At the station, the net was towed two times at ca. 2 knots for 20 min from the starboard side. A flow meter was installed at the net mouth to estimate the volume of water filtered during each tow. Selected floating MPs samples were picked up and provided for environmental DNA analysis (Ryota Nakajima).

3.5.3. Onboard results

Two samples were obtained. A large number of plastic particles, presumed to be derived from northern polystyrene, were collected.



Fig. 3.5.3. Neuston net samples collected at St. 3

3.5.4. Future plan

Microplastic samples will be subjected to enumeration and identification of plastic types using a microscope and FT-IR. The concentration of microplastics will be studied and compared with the previously reported values in the seas around Japan. DNA analysis of the biofilm on the MPs will be conducted to determine the microflora on the MPs and their function.

3.6 Potential occurrence of turbidity currents and associated sediment supply along the Toyama Deep-Sea Channel triggered by submarine landslides following the Noto Peninsula earthquake (Tetsuo No)

3.6.1. Objectives

Following the Noto earthquake, incidents of damage to submarine cables installed near the Toyama Deep-Sea Channel, including within the Yamato Basin of the Sea of Japan, have occurred. To obtain fundamental information for clarifying the causes of the cable breakage, seafloor topographic

surveys and SBP (sub-bottom profiler) investigations was conducted.

3.6.2. Material and Methods

Seafloor topographic and sub-bottom surveys using SBP and MBES were conducted along a total of five survey lines, including areas previously surveyed by the R/V *Kairei* (Table 3.1).

3.6.3. Onboard results and future plan

The obtained data will be brought back onshore and compared with seafloor survey data from the Toyama Bay area, with the aim of advancing the investigation into the causes of the submarine cable breakage.

4. Cruise Log

R/V "YOKOSUKA" YK25-13 Cruise Log		
Date & Time	Description	Weather / Wind / Sea Condition
2025/08/12 Tue.	Noon Position: 34-52.7N,139-44.4E (Off southwest of SUNOSAKI)	c / SW-7 / 4
8:00	Onboard "YOKOSUKA" at YOKOSUKA	
9:00	Let go all shore lines & left YOKOSUKA for research area	
9:30-10:20	Carried out education and training for scientists.	
10:20-10:55	SHINKAI 6500 team and Scientists meeting.	
11:00-11:30	Research meeting	
2025/08/13 Wed.	Noon Position: 39-04.7N,142-07.7E (Off southeast of KAMAISHI)	bc / NE-4/ 2
	Transit to research area.	
13:00-15:00	SHINKAI 6500 team and Scientists meeting.	
18:00-18:45	Research meeting	
2025/08/14 Thu.	Noon Position: 40-41.4N,139-16.8E (Japan Basin)	c/ South-3 / 2
9:30	Arrived at research area (Japan Basin)	
9:39	Released XCTD at 40-49.1N,139-19.9E (St.5)	
10:28-11:11	MBES mapping survey (St.5).	
17:50-18:05	Research meeting	
19:45	Released XBT at 39-36.4N,137-32.6E	
20:15-21:16	MBES and SBP survey (Line NotK).	
2025/08/15 Fri.	Noon Position:37-56.9N,135-45.1E (Yamato Basin)	bc/ NE-2 / 1
6:50	Arrived at research area (Yamato Basin St.3)	
6:53	Released XCTD at 38-06.7N,136-24.2E (St.3)	
7:25-8:00	MBES mapping survey (St.3).	
8:33-9:28	Carried out Neustone net sampling (St.3)	
13:51	Released XBT at 37-47.9N,135-15.6E (St.2)	
14:18-14:54	MBES mapping survey (St.2).	
14:57-15:18	Carried out figure eight turn measurement (St.2).	
	Research meeting	
2025/08/16 Sat.	Noon Position: 37-47.1N,135-09.4E (Yamato Basin)	bc/ SSE-2 / 1
9:46	Hoisted up SHINKAI6500	
9:55	Launched SHINKAI6500	
10:01	SHINKAI6500 dove and started her operation #1867 St.2	
11:31	SHINKAI6500 landed on the sea bottom (D=2,924m)	
15:50	SHINKAI6500 left the sea bottom (D=2,924m)	
16:56	SHINKAI6500 floated	
17:16	Hoisted up SHINKAI6500	
17:24	Recovered SHINKAI6500 and finished the operation	
18:00	Left research area St.2, then proceeded to research area St.5.	
18:00-18:15	Research meeting	
2025/08/17 Sun.	Noon Position: 40-32.2N,139-02.1E (Japan Basin)	bc/ SW-6 / 3
	Transit to St.5	
	Suspended SHINKAI6500 submergence due to Sabmarne trouble.	
13:15	Change the destion to YOKOSUKA due to SHINKAI6500 battery replacement.	

2025/08/18 Mon.	Noon Position:37-46.7N,141-48.1E (Off southeast of KINKAZAN) Transit to YOKOSUKA	bc/ NNW-3 / 1
2025/08/19 Tue.	Noon Position:35-19.1N,139-39.0E (YOKOSUKA KO)	bc/ South-2
9:20	Arrived at JAMSTEC.	
10:30	Unloaded SHINKAI6500.	
	SHINKAI6500 battery replacement.(No.8 to No.7)	
14:58	Loaded SHINKAI6500.	
2025/08/20 Wed.	Noon Position: 34-50.3N,140-00.5E (Off southeast of NOZIMAZAKI)	bc/ SSW-6 / 1
8:30	Let go all shore lines & left YOKOSUKA for research area.	
2025/08/21 Thu.	Noon Position: 40-22.4N,142-12.5E(Off the East of HACHINOHE) Transit to research area (Japan Basin St.5)	c/ WNW-5 / 1
2025/08/22 Fri.	Noon Position: 40-44.6N,139-16.0E(Japan Basin)	c/ SSE-3 / 1
9:51	Hoisted up SHINKAI6500	
9:59	Launched SHINKAI6500	
10:07	SHINKAI6500 dove and started her operation #1868 St.5	
11:36	SHINKAI6500 landed on the sea bottom (D=3095m)	
15:52	SHINKAI6500 left the sea bottom (D=3055m)	
17:05	SHINKAI6500 floated	
17:25	Hoisted up SHINKAI6500	
17:36	Recovered SHINKAI6500 and finished the operation	
18:00	Left research area St.5, then proceeded to research area St.4	
18:00-18:10	Reserch meeting	
2025/08/23 Sat.	Noon Position: 39-20.3N,136-27.8E(Yamato Basin)	bc/ SW-4 /2
9:55	Hoisted up SHINKAI6500	
10:01	Launched SHINKAI6500	
10:09	SHINKAI6500 dove and started her operation #1869 St.4	
11:25	SHINKAI6500 landed on the sea bottom (D=2634m)	
15:56	SHINKAI6500 left the sea bottom (D=2633m)	
16:56	SHINKAI6500 floated	
17:17	Hoisted up SHINKAI6500	
17:27	Recovered SHINKAI6500 and finished the operation	
18:00	Left research area St.4, then proceeded to research area St.11	
18:00-18:10	Reserch meeting	
20:41-21:40	MBES and SBP survey (Line Not6)	
22:45-23:45	MBES and SBP survey (Line Not7)	
2025/08/24 Sun.	Noon Position: 39-53.9N,137-45.3E(Yamato Basin)	bc/ E-3 /2
1:16-2:18	MBES and SBP survey (Line Not8)	
3:31-4:32	MBES and SBP survey (Line Not9)	
5:28-6:02	MBES mapping survey (St.11).	
9:48	Hoisted up SHINKAI6500	
9:55	Launched SHINKAI6500	
10:03	SHINKAI6500 dove and started her operation #1870 St.11	
11:28	SHINKAI6500 landed on the sea bottom (D=2924m)	
15:47	SHINKAI6500 left the sea bottom (D=2061m)	
16:47	SHINKAI6500 floated	
17:04	Hoisted up SHINKAI6500	
17:14	Recovered SHINKAI6500 and finished the operation	
17:50-18:00	Reserch meeting	
18:00	Left research area St.4, then proceeded to HAKODATE	
2025/08/25 Mon.		
9:30	Sent out 1st shore line, arrived at HAKODATE, then completed voy. No.YK25-13	

5. Notice on Using

This cruise report is a preliminary documentation as of the end of cruise.

This report is not necessarily corrected even if there is any inaccurate description (i.e. taxonomic classifications). This report is subject to be revised without notice. Some data on this report may be raw or unprocessed. If you are going to use or refer the data on this report, it is recommended to ask the Chief Scientist for latest status.

Users of information on this report are requested to submit Publication Report to JAMSTEC.

<https://www.godac.jamstec.go.jp/darwin/en/note.html#report>

E-mail: submit-rv-cruise@jamstec.go.jp