

**APPLICATION FOR CONSENT TO CONDUCT MARINE SCIENTIFIC RESEARCH
IN AREAS UNDER NATIONAL JURISDICTION OF
ICELAND**

Date: 20 January 2026

1 - GENERAL INFORMATION

1.1. Cruise name and/or number:

IMAGE

1.2. Sponsoring institution:

Name: Universidad de Las Palmas de Gran Canaria
Address: Juan de Quesada, 30: 35001, Las Palmas de Gran Canaria (Spain)
Phone: +34 928451030
Vicerrector de I+D+I: Juan Alberto Corbera Sánchez

1.3. Scientist in charge of the project:

Name: Javier Arístegui
Address: Instituto de Oceanografía y Cambio Global, Universidad de Las Palmas de Gran Canaria. Parque Científico Tecnológico Marino de Taliarte, s/n, PC: 35214, Telde (Spain)
Phone: +34 609225722
Email: javier.aristegui@ulpgc.es

1.4. Scientist from Iceland involved in the planning of the project:

None

1.5. Submitting officer:

Name: Javier Arístegui
Address: Instituto de Oceanografía y Cambio Global, Universidad de Las Palmas de Gran Canaria. Parque Científico Tecnológico Marino de Taliarte, s/n, PC: 35214, Telde (Spain)
Phone: +34 609225722
Email: javier.aristegui@ulpgc.es

2 - DESCRIPTION OF THE PROJECT

2.1. Nature and objectives of the project:

IMAGE aims to contribute to disentangling the role of the transient mesoscale (10-100 km) to (sub-)mesoscale (<5-10 km) structures that develop all along the eastern Greenland Sea partly influenced by ice melting, from the Fram (80°N) to the Denmark (66°N) straits during the summer. We aim to evaluate how mesoscale processes modulate the evolution and, consequently, control the fate of the organic carbon transported along the East Greenland Current (EGC). Therefore, IMAGE seeks to establish new scientific foundations for a better understanding and quantification of the Biological Carbon Pump (BCP) in the Nordic Seas, the gateway between the Atlantic and Arctic oceans, and a hub for deep water formation and carbon sequestration. Although a better knowledge of the BCP has undoubted social and economic benefits, these will not be realised in the short-term.

The general objective of IMAGE is to investigate the interplay of mesoscale and (sub-)mesoscale processes with plankton communities and associated carbon fluxes, all along the shelf-break of the Greenland Sea from the Fram (80°N) to the Denmark (66°N) straits during ice melting in the boreal summer. IMAGE will explore the interconnected dynamics between microbial diversity and function, in relation to the physical and chemical conditions, with an emphasis on (sub-)mesoscale processes. We will also investigate the origin, composition and fate of DOM and POM, examining their contribution to remineralization rates in the Greenland Sea interior.

2.2. Relevant previous or future research cruises:

1. FLUXES I cruise, Mauritanian Upwelling Region, July 2017
2. FLUXES II cruise, Mauritanian Upwelling Region, November 2017
3. eIMPACT I cruise, Canary Current Region, July 2021
4. eIMPACT II cruise, Canary Current Region, November 2021
5. OCEANICU cruise, North and South Atlantic, March-April 2025
6. ROVER cruises, Greenland Seas, October 2024, February 2025, July 2026

2.3. Previously published research related to the project:

- Alonso-González IJ, Arístegui J, Vilas JC, Hernández-Guerra A, 2009. Lateral POC transport and consumption in surface and deep waters of the Canary Current region: A box model study. *Global Biogeochem Cy* 23, GB2007. doi: 10.1029/2008GB003185
- Alonso-González IJ, Arístegui, J, Lee C, Sanchez-Vidal A, Calafat A, Fabrès J, Sangrà P, Masqué P, Hernández-Guerra A, Benítez-Barrios V, 2010. Role of slowly settling particles in the ocean carbon cycle. *Geophys Res Lett* 37, L13608. doi:10.1029/2010GL04382
- Álvarez-Salgado XA, Álvarez M, Brea S, Messias MJ, Memery L., 2014. Mineralization of biogenic materials in the water masses of the South Atlantic Ocean. II: stoichiometric ratios and mineralization rates. *Prog Oceanogr* 123, 24-37
- Álvarez-Salgado XA, M. Nieto-Cid, M Álvarez, FF Pérez, P Morin, H Mercier, 2013. New insights on the mineralization of dissolved organic matter in central, intermediate and deep water masses of the northeast North Atlantic. *Limnol Oceanogr* 58, 681-696
- Arístegui, J., Duarte, C.M., Agustí, S., Doval, M., Álvarez-Salgado, X.A., Hansell, D.A., 2002b.

- Dissolved organic carbon support of respiration in the dark ocean. *Science*, 298, 1967.
- Aristegui, J., C.M. Duarte, J.M. Gasol, L. Alonso-Sáez. 2005. Active mesopelagic prokaryotes support high respiration in the subtropical Northeast Atlantic Ocean. *Geophysical Research Letters*, 32, L03608, doi:10.1029/2004GL021863.
- Aristegui, J., Gasol, J.M., Duarte, C.M., Herndl, G. J., 2009. Microbial oceanography of the dark ocean's pelagic realm. *Limnology and Oceanography* 54, 1501-1529.
- Baltar, F., Aristegui, J., Gasol, J.M., Sintes, E., Herndl, G.J., 2009a. Evidence of prokaryotic metabolism on suspended particulate organic matter in the dark waters of the subtropical North Atlantic. *Limnology and Oceanography* 54, 182-193.
- Baltar, F., Aristegui, J., Sintes, E., van Aken, H., Gasol, J.M., Herndl, G.J., 2009b. Prokaryotic extracellular enzymatic activity in relation to biomass production and respiration in the meso- and bathypelagic waters of the (sub)tropical Atlantic. *Environmental Microbiology* 11 (8), 1998-2014.
- Baltar F, Aristegui J, Gasol JM, Sintes E, van Aken HM, and GJ Herndl., 2010b. High dissolved extracellular enzymatic activity in the deep Central Atlantic Ocean. *Aquatic Microbial Ecology* 58: 287-302.
- Burd, A.B., Hansell, D.A., Steinberg, D.K., Anderson, T.R., Aristegui, J., Baltar, F., Beupré, S.R., Beusseler, K.O., DeHairs, F., Jackson, G.A., Kadko, D., Koppelman, R., Lampitt, R.S., Nagata, T., Reinthaler, T., Robinson, C., Robison, B.H., Tamburini, C., Tanaka, T., 2010. Assessing the apparent imbalance between geochemical and biochemical indicators of meso- and bathypelagic biological activity: What the @\$#! Is wrong with present calculations of carbon budgets? *Deep-Sea Research II*, 57 (16): 1557-1571.
- Fernández-Castro, B., Álvarez, M., Nieto-Cid, M., Zunino, P., Mercier, H., & Alvarez-Salgado, X. A. (2019). Dissolved organic nitrogen production and export by meridional overturning in the eastern subpolar North Atlantic. *Geophysical Research Letters*, 46, 3832-3842. <https://doi.org/10.1029/2018GL080284>
- Lonborg C, XA Álvarez-Salgado, S Martínez-García, AEJ Miller, E Teira, 2010. Stoichiometry of dissolved organic matter and the kinetics of its microbial degradation in a coastal upwelling system. *Aquat Microb Ecol* 58, 117-126
- Nieto-Cid M, XA Álvarez-Salgado, FF Pérez, 2006. Microbial and photochemical reactivity of fluorescent dissolved organic matter in a costal upwelling system. *Limnol Oceanogr* 51, 1391-1400
- Reinthal T, XA Álvarez-Salgado, M Álvarez, HM van Aken, GJ Herndl, 2013. Impact of water mass mixing on mineralization and biogeochemistry in the North Atlantic Deep Water. *Glob Biogeochem Cy*, doi: 10.1002/2013GB004634
- Robinson, C., Steinberg, D.K., Koppelman, R., Robison, B.H., Anderson, T.R., Aristegui, J., Carlson, C.A., Frost, J.R., Ghiglione, J.-F., Hernández-León, S., Jackson, G.A., Queguiner, B., Ragueneau, O., Rassoulzadegan, F., Tamburini, C., Tanaka, T., Wishner, K.F., Zhang, J., 2010. Mesopelagic zone ecology and biogeochemistry— a synthesis. *Deep-Sea Research II*, 57 (16): 1504-1518.

3 - METHODS AND MEANS TO BE USED

3.1. Particular of vessel:

Name RV Odón de Buen

Nationality Spanish



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Owner	CSIC (Consejo Superior de Investigaciones Científicas) / Instituto Español de Oceanografía (IEO-CSIC)
Operator	CSIC / IEO-CSIC
Type of vessel	Oceanographic Research Vessel
Year built and country	2024, Spain (Astilleros Armon, Vigo)
Length / width	84.30 m / 17.80 m
Length p.p.	77.40 m
Design Draught	6.54 m
Scantling Draught	5.2–5.5 m (operational draught)
Depth to main deck	5.60 m
Tonnage (Gross)	4,595 GT
Dead weight (DWT)	~10,700 t
Maximum Speed	14.5 knots
Prop. Power	2 × INDAR 1700 kW electric motors
Fuel	Diesel + LNG dual-fuel generators
Endurance	40 days (diesel), 10 days (LNG)
Accommodation (crew + research)	58 (20 crew + 38 scientists/technicians)
Classification society	Lloyd's Register, notation: 100A1 Oceanographic & Fishing Research, Ice Class PC7

IMO 9962914

Register port Vigo, Spain (home port)

Call code EABT

VSAT +34911930378

Cellular +34 610583701

Email capitan.odb@utm.csic.es

Name of master Adrian Gerpe Olivera
Alejandro Marín Portillo

Number of crew 20

Number of scientists on board 38

3.2. Aircraft or other craft to be used in the project:
None



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3.3. Particulars of methods and scientific instruments:

Types of samples and data	Methods to be used	Instruments to be used
Temperature, salinity, density, particles in the water, fluorescence		CTD+O2+Fluorescence + Transmissometer & Turbidimeter sensors
Nutrients and Organic matter	Chemical	Rosette sampler with CTD Marine SnowCatcher Sediment traps
Phytoplankton and bacteria	Microscopy and flow cytometry	Rosette sampler with CTD
Zooplankton	Microscopy and Image analysis	Zooplankton nets Underwater videocamera
Vertical mixing	microturbulence	Profiler
Temperature, salinity, oxygen, microscale temperature (vertical mixing)	Profiling float	BGC Argo-like floats (NKE)

3.4. Indicates whether harmful substances will be used:

No

3.5. Indicate whether drilling will be carried out:

No

3.6. Indicate whether explosives will be used:

No

4 - INSTALLATIONS AND EQUIPMENTS

Details of installations and equipment (dates of laying, servicing, recovery, exact locations and depth):

No equipment will be installed and deployed in the water column for latter recovery. However, **two profiling floats** will be deployed one in Frame Strait and one at 71N (BGS2) (see map) and will be drifting potentially southwards for several months, eventually reaching other national waters.

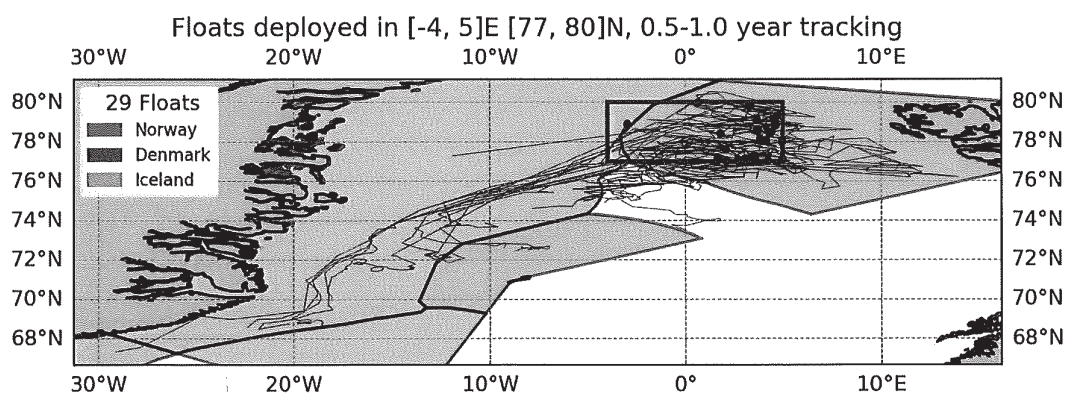
The profiling floats (PROVOR CTS5) are manufactured by NKE Instrumentation. The NKE float is similar to an Argo float, with a weight of ~40 kg and a length of ~2 m.

Because the floats will drift with the main currents, it is likely that they will enter the Greenlandic and/or Icelandic Exclusive Economic Zone during its lifetime.

The floats will measure profiles of Argo-approved parameters (temperature, salinity, pressure, oxygen) alongside centimetre-scale temperature measurements for turbulence estimations. The floats will profile between the ocean surface and 2000 m depth, with profile intervals ranging from 1 to 10 days.

Between profiles, the floats will drift with the current at a depth of 1000 m. The expected lifetime of the floats is less than 1 year, and the tracks of the floats will be presumably along the Greenland Current (see map below)

The floats can be programmed via Iridium satellite to change the sampling rates, parking depths, intervals between profiles or turn off the sensors, and send the data in near real-time.





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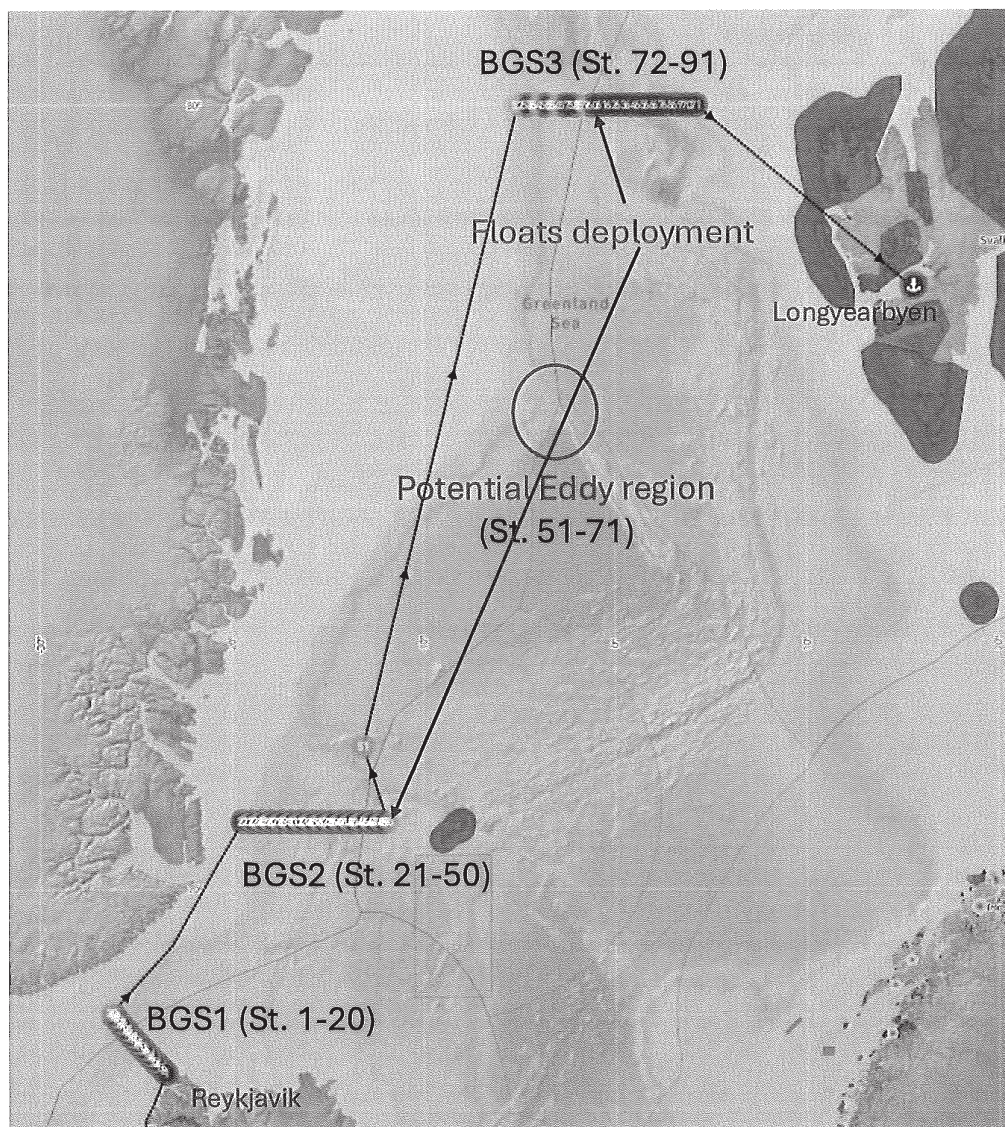
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5 - GEOGRAPHICAL AREAS

5.1. Indicate geographical areas in which the project is to be conducted (with reference in latitude and longitude):

The research vessel is expected to enter Icelandic waters on **26 July 2026** and to make its final departure from the research area on **29 July 2026**, conducting work at 15 stations (St01–St15) along BGS1 (see map below and Annex 2 with coordinates).



6 - DATES

6.1 Expected dates of first entry into and final departure from the research area of the research vessel (dates of entry in Icelandic waters):

entry date: 26 July, 2026

departure date: 29 July, 2026

6.2 Indicate if multiple entry is expected:

No

7 - PORTS CALLS

7.1. Dates and names of intended ports of call in IMAGE:

Reykjavik (Iceland)– 24/07/2026 to 25/07/2026

Longyearbyen (Svalbard, Norway) – 25/08/2026

7.2. Any special logistical requirements at ports of call:

No

7.3. Name/Address/Telephone of shipping agent (if available):

No

8 - PARTICIPATION

8.1. Extent of which Iceland will be enabled to participate or to be represented in the research project:

None. All berths are compromised

8.2. Proposed dates and ports for embarkation/disembarkation:

start date: None

end date: None

9 - ACCESS TO DATA, SAMPLES AND RESEARCH RESULTS

9.1. Expected dates of submission to Iceland of preliminary reports which should include the expected dates of submission of the final results:

Maximum 6 months after the end of the cruise we will provide the cruise report

9.2. Proposed means for access by Iceland to data and samples:

Through international data repositories (e.g., Pangaea or DigitalCSIC repository)

9.3. Proposed means of making research internationally available:

Through international data repositories (e.g., Pangaea or DigitalCSIC repository). We will provide the links to these repositories when available. Probably some data after one year and other no more than 3 years after the cruise.

ANNEX -1 _LIST OF THE SCIENTIFIC TEAM

Institution	Country	Name
ULPGC	Spain	Javier Arístegui
ULPGC	Spain	Nauzet Hernandez
ULPGC	Spain	María Montero
ULPGC	Spain	Jana Piñel
ULPGC	Spain	Adriana Socorro
ULPGC	Spain	Antonio Martínez
ULPGC	Spain	Manel Soria
ULPGC	Spain	María Gelado
IIM-CSIC	Spain	Xosé Alvarez-Salgado
IIM-CSIC	Spain	Markel Gomez
IIM-CSIC	Spain	Vanesa Biéitez
IIM-CSIC	Spain	Esther Barber
IIM-CSIC	Spain	Severino Pino
IEO-CSIC	Spain	Mar Nieto
IEO-CSIC	Spain	NN
IACI-CSIC	Spain	Antonio Delgado
IACI-CSIC	Spain	Arsenio Granados
IACI-CSIC	Spain	Nerea Ruiz
ICM-CSIC	Spain	Pep Gasol
ICM-CSIC	Spain	Cristina Romera
MARE	Portugal	Catarina Guerreiro
MIO	France	Melilotus Thyssen
DTU	Denmark	Marja Koski
NOC	England	Espe Broullón
PLYMOUTH	England	NN
GEOMAR	Germany	NN
AWI	Germany	NN
SHOU	China	Federico Baltar
SHOU	China	Eva Breyer

The list will be updated 2 months prior the cruise.



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ANNEX -2_ SAMPLING STATIONS WITH DATES AND LOCATIONS

Station Type	Name	Latitude	Longitude	Day	Country
Sampling Station	BGS1: St01	66° 30.60' N	023° 30.60' W	26/7/25	Iceland
Sampling Station	BGS1: St02	66° 34.19' N	023° 39.60' W	26/7/25	Iceland
Sampling Station	BGS1: St03	66° 37.80' N	023° 48.80' W	26/7/25	Iceland
Sampling Station	BGS1: St04	66° 41.44' N	023° 57.51' W	27/7/25	Iceland
Sampling Station	BGS1: St05	66° 45.00' N	024° 06.54' W	27/7/25	Iceland
Sampling Station	BGS1: St06	66° 48.70' N	024° 15.34' W	27/7/25	Iceland
Sampling Station	BGS1: St07	66° 52.26' N	024° 24.61' W	27/7/25	Iceland
Sampling Station	BGS1: St08	66° 55.95' N	024° 33.28' W	28/7/25	Iceland
Sampling Station	BGS1: St09	66° 59.70' N	024° 42.28' W	28/7/25	Iceland
Sampling Station	BGS1: St10	67° 03.36' N	024° 51.63' W	28/7/25	Iceland
Sampling Station	BGS1: St11	67° 07.35' N	025° 00.97' W	28/7/25	Iceland
Sampling Station	BGS1: St12	67° 11.15' N	025° 09.90' W	29/7/25	Iceland
Sampling Station	BGS1: St13	67° 15.05' N	025° 18.97' W	29/7/25	Iceland
Sampling Station	BGS1: St14	67° 19.05' N	025° 27.10' W	29/7/25	Iceland
Sampling Station	BGS1: St15	67° 22.95' N	025° 35.98' W	29/7/25	Iceland
Sampling Station	BGS1: St16	67° 26.91' N	025° 44.77' W	30/7/25	Denmark
Sampling Station	BGS1: St17	67° 31.02' N	025° 53.56' W	30/7/25	Denmark
Sampling Station	BGS1: St18	67° 35.03' N	026° 02.04' W	30/7/25	Denmark
Sampling Station	BGS1: St19	67° 38.80' N	026° 10.75' W	30/7/25	Denmark
Sampling Station	BGS1: St20	67° 43.06' N	026° 18.47' W	31/7/25	Denmark
Sampling Station	BGS2: St21	71° 09.00' N	019° 28.00' W	1/8/25	Denmark
Sampling Station	BGS2: St22	71° 09.00' N	019° 12.85' W	1/8/25	Denmark
Sampling Station	BGS2: St23	71° 09.07' N	018° 57.26' W	1/8/25	Denmark
Sampling Station	BGS2: St24	71° 09.07' N	018° 41.64' W	2/8/25	Denmark
Sampling Station	BGS2: St25	71° 09.00' N	018° 25.64' W	2/8/25	Denmark
Sampling Station	BGS2: St26	71° 08.93' N	018° 10.21' W	2/8/25	Denmark
Sampling Station	BGS2: St27	71° 08.84' N	017° 55.05' W	2/8/25	Denmark
Sampling Station	BGS2: St28	71° 08.82' N	017° 38.82' W	3/8/25	Denmark
Sampling Station	BGS2: St29	71° 09.04' N	017° 23.49' W	3/8/25	Denmark
Sampling Station	BGS2: St30	71° 08.92' N	017° 07.50' W	3/8/25	Denmark
Sampling Station	BGS2: St31	71° 08.83' N	016° 51.47' W	3/8/25	Denmark
Sampling Station	BGS2: St32	71° 08.79' N	016° 36.04' W	4/8/25	Denmark
Sampling Station	BGS2: St33	71° 08.83' N	016° 20.71' W	4/8/25	Denmark
Sampling Station	BGS2: St34	71° 08.79' N	016° 04.75' W	4/8/25	Denmark
Sampling Station	BGS2: St35	71° 08.70' N	015° 49.30' W	4/8/25	Denmark
Sampling Station	BGS2: St36	71° 08.70' N	015° 33.78' W	5/8/25	Denmark
Sampling Station	BGS2: St37	71° 08.66' N	015° 17.90' W	5/8/25	Denmark
Sampling Station	BGS2: St38	71° 08.62' N	015° 01.80' W	5/8/25	Denmark
Sampling Station	BGS2: St39	71° 08.56' N	014° 45.61' W	5/8/25	Denmark
Sampling Station	BGS2: St40	71° 08.48' N	014° 30.03' W	6/8/25	Denmark
Sampling Station	BGS2: St41	71° 08.56' N	014° 14.72' W	6/8/25	Denmark
Sampling Station	BGS2: St42	71° 08.48' N	013° 59.12' W	6/8/25	Denmark
Sampling Station	BGS2: St43	71° 08.48' N	013° 43.33' W	6/8/25	Denmark
Sampling Station	BGS2: St44	71° 08.56' N	013° 27.36' W	7/8/25	Denmark
Sampling Station	BGS2: St45	71° 08.48' N	013° 10.86' W	7/8/25	Denmark
Sampling Station	BGS2: St46	71° 08.52' N	012° 55.45' W	7/8/25	Norway
Sampling Station	BGS2: St47	71° 08.52' N	012° 40.25' W	7/8/25	Norway
Sampling Station	BGS2: St48	71° 08.56' N	012° 23.39' W	8/8/25	Norway
Sampling Station	BGS2: St49	71° 08.52' N	012° 07.88' W	8/8/25	Norway
Sampling Station	BGS2: St50	71° 08.52' N	011° 52.46' W	8/8/25	Norway
Sampling Stations	Eddy: 51-71	72° 21.12' N	013° 08.96' W	16-22/8/2025	Denmark/Norway
Sampling Station	BGS3: St72	79° 59.59' N	005° 01.27' W	24/8/25	Denmark
Sampling Station	BGS3: St73	79° 59.82' N	004° 32.21' W	25/8/25	Denmark
Sampling Station	BGS3: St74	79° 59.76' N	004° 02.65' W	25/8/25	Denmark
Sampling Station	BGS3: St75	79° 59.70' N	003° 32.87' W	25/8/25	Denmark
Sampling Station	BGS3: St76	79° 59.66' N	003° 03.37' W	25/8/25	Denmark
Sampling Station	BGS3: St77	79° 59.69' N	002° 34.18' W	26/8/25	Denmark
Sampling Station	BGS3: St78	79° 59.66' N	002° 04.68' W	26/8/25	Denmark
Sampling Station	BGS3: St79	79° 59.60' N	001° 35.25' W	26/8/25	Denmark
Sampling Station	BGS3: St80	79° 59.59' N	001° 06.76' W	26/8/25	Norway
Sampling Station	BGS3: St81	79° 59.91' N	000° 38.01' W	27/8/25	Norway
Sampling Station	BGS3: St82	79° 59.91' N	000° 07.82' W	27/8/25	Norway
Sampling Station	BGS3: St83	79° 59.91' N	000° 20.83' E	27/8/25	Norway
Sampling Station	BGS3: St84	79° 59.78' N	000° 51.28' E	27/8/25	Norway
Sampling Station	BGS3: St85	79° 59.87' N	001° 21.22' E	28/8/25	Norway
Sampling Station	BGS3: St86	79° 59.91' N	001° 49.86' E	28/8/25	Norway
Sampling Station	BGS3: St87	79° 59.96' N	002° 18.26' E	28/8/25	Norway
Sampling Station	BGS3: St88	79° 59.91' N	002° 47.92' E	28/8/25	Norway
Sampling Station	BGS3: St89	79° 59.82' N	003° 18.37' E	29/8/25	Norway
Sampling Station	BGS3: St90	79° 59.69' N	003° 48.31' E	29/8/25	Norway
Sampling Station	BGS3: St91	79° 59.78' N	004° 17.73' E	29/8/25	Norway