

**APPLICATION FOR THE CONSENT TO CONDUCT MARINE SCIENTIFIC
RESEARCH IN AREAS UNDER ICELANDIC JURISDICTION**

Date: 09 December, 2025

1. General information

1.1 Cruise name and/or number: CE26008 - GO-SHIP AR7E

1.2 Sponsoring institution:

Name: Marine Institute

Address: Rinville
Oranmore
Co. Galway
Ireland

Name of Chief Executive: Dr. Rick Officer

1.3 Scientist in charge of the project:

Name: Yvonne Firing

Address: National Oceanography Centre
European Way
Southampton
SO14 3ZH
United Kingdom

Telephone: +44 3001312470

1.4 Scientist(s) from ICELAND involved in the planning of the project

Name(s):

Address:

1.5 Submitting officer: Amelia Hilley

Name and address:

Rinville
Oranmore
Co. Galway

Country: Ireland

Telephone: 00 353 91 387200

Telefax: 00 353 91 387201

2. Description of project (Attach additional pages as necessary)

CE26008 will complete a full depth hydrographic section across the Rockall, Iceland and Irminger basins as part of the GO-SHIP sustained ocean observations programme, including the core physical and biogeochemical parameters to monitor ocean heat, freshwater, and carbon transports and budgets, as well as additional parameters used to interpret circulation and understand phytoplankton dynamics and interaction between the biological, biogeochemical, and physical components of the ocean system. To do this, measurements will include vertical station profiles with continuous CTDO and lowered ADCP, and a 24-place rosette with 10 litre bottle sampling; and underway measurements including shipboard ADCP and surface thermosalinograph, GO system, and meteorology, imaging flow cytometry, and near-surface sampling. Water samples will be analysed at sea for salinity, dissolved oxygen, inorganic nutrients, carbonate system parameters, and transient tracers, and preserved for shore-based analysis for radionuclide isotopes, pigments, carbonate system parameters, plankton characterisation, and genomics.

This expedition is funded by the UK AtlantiS programme and by EU AQUARIUS, and is a collaboration between researchers from the UK National Oceanography Centre (NOC), Norwegian Research Institute (NORCE), University of Lisbon, Scottish Association for Marine Science (SAMS), Royal Netherlands Institute for Sea Research (NIOZ), ETH Zurich and the Flanders Marine Institute (VLIZ), with researchers from the Greenland Climate Research Centre (GCRC) at the Greenland Institute of Natural Resources (GINR).

It includes 64 CTD stations: 46 on a section from Ireland to Greenland (including the Rockall Trough, Rockall Plateau, Iceland Basin, Reykjanes Ridge, and Irminger Basin), and a total of 18 on three cross-slope sections in Southeast Greenland between 63 N and 66 N (designated Kap Molkte, Tasiilaq, Kap Gustav), with the closely spaced stations over the Greenland continental shelf and slope coinciding with GINR standard hydrographic monitoring program stations. It also includes underway measurements between stations. It complements the Overturning in the Subpolar North Atlantic (OSNAP) moored and ship-based observations, the OVIDE section from Portugal to Greenland, the AR7W GO-SHIP hydrographic section spanning the Labrador basin from Greenland to Canada, and the GreenFeedback and Greenland Ecosystem Monitoring Programmes. Combining these data allows researchers to understand the Subpolar North Atlantic transports and the role of circulation on setting variability in ocean alkalinity, nutrients, and phytoplankton, from basin scale to the highly variable Greenland coastal region.

2.1 Nature of objectives of the project:

- Extend the time series of sustained physical and biogeochemical observations across the eastern Subpolar North Atlantic (SPNA) by delivering GO-SHIP Level 1 and selected Level 2/3 measurements along the section from Ireland to Greenland, comprising both full-depth profiles and underway surface observations of ocean physical and biogeochemical properties
- Enhance the above by initiating a time series of sustained biological observations in this region, delivering surface underway and full-depth measurements of plankton taxa, pigments, size fractionation, and eDNA, enabling improved efforts to data mine existing available plankton composition and genomic data in this region.
- To connect basin-scale and regional properties and dynamics to those along the Greenland coast, make the same physical, biogeochemical, and biological measurements at sustained observation sites over the Greenland shelf and slope

Outputs:

- § Estimates of decadal changes in physical and biogeochemical parameters since the last GO-SHIP occupation in 2014
- § Estimate of updated SPNA budgets and Atlantic Meridional Overturning transports including heat, freshwater, nutrients, and carbon

§ Harmonised dataset of physical, BGC, and plankton parameters across the boundary of the SPNA and particularly the southwestern boundary of the Irminger Sea/East Greenland shelf-slope

§ High-resolution surface plankton size structure, taxonomic and genomic data on the southwestern boundary of the Irminger Sea (southern part of the East Greenland shelf-slope)

2.2 Relevant previous or future research cruises:

The AR7E section was last occupied as a continuous hydrographic section with full GO-SHIP measurements in 2014 on RRS James Clark Ross cruise 302. It has also been occupied in 2000 (RV Pelagia cruise 169), 2005 (RV Pelagia), 2007 (RV Pelagia cruise 64PE275), 2008 (RRS Discovery cruise 332), and with limited (physical oceanography only) measurements along the near-Greenland part of the section at least in 2009 (64PE312), 2011 (64PE342), 2014 (R/V Thalassa cruise MSM40), 2015 (64PE400), 2016 (MSM54), 2018 (R/V Neil Armstrong cruise AR30-04), 2020 (PE473), 2022 (AR69-01, AR69-02, AR68-03). Surveys of the southeastern Greenland continental slopes and shelves have been conducted on many cruises including recently AR68-03, MSM129-02, MSM130, HDMS Knud Rasmussen cruise KR_2021 and RV Tarajoc cruise 2024_TA_06.

2.3 Previously published research data relating to the project:

Data from above cruises is available from SeaDataNet; CTD and bottle data for AR7E surveys also at <https://cchdo.ucsd.edu/search?q=AR7E> and selected published data available at Zenodo, or for JR302: <https://doi:10.5285/29ea7e19-d89c-3ab1-e053-6c86abc0284b> and <https://doi:10.5285/22235f1a-b7f3-687f-e053-6c86abc0c8a6>.

3. Methods and means to be used

3.1 Particulars of vessel

Name: Celtic Explorer

Nationality: Irish

Owner: Marine Institute

Overall length: 65.5m

Maximum draught: 5.7m

Net tonnage: 727

Propulsion: 2 x 1530 KW, 1000Rpm, 1 x 1020 KW, 1000 Rpm

Cruising speed: 10 Kts

Call sign: EI GB

Method and capability of communication –

Vsat Satellite Broadband

Imarsat –c

HF

VHF

Mini –M

Name of master: Anthony Hobin/Denis Rowan

Number of crew:

Number of scientists on board: 19

3.2 Aircraft or other craft to be used in the project: N

3.3 Particulars of methods and scientific instruments

Types of samples and data	Methods to be used	Instruments to be used
Temperature, salinity, dissolved oxygen, nitrate, fluorescence, transmittance profiles; full water depth	44 full depth CTD stations will be made close to the stations listed in section 5.1	Continuously recording conductivity, temperature, depth probe (CTD), oxygen sensor, fluorometer, transmissometer, and nitrate sensor
Water velocity profiles; upper ocean	Acoustic Doppler Current Profilers attached to CTD frame	Lowered Acoustic Doppler Current Profilers (RDI Workhorse)
Water velocity underway	Ship-mounted Acoustic Doppler Current Profiler	Vessel-mounted Acoustic Doppler Current Profiler (RDI Ocean Surveyor 75kHz and 150kHz)
Surface meteorology	Continuous underway measurements	Research ship meteorology instruments (air pressure, wet/dry temperature, wind speed/direction, incident radiation)
Near surface ocean temperature, salinity, fluorescence, turbidity, pCO ₂ , alkalinity, methane, nitrous oxide	Continuous underway measurements	Hull-mounted temperature probe and onboard thermosalinograph, fluorometer and GO system; continuous analyser for methane, nitrous oxide, and alkalinity.
Near surface ocean suspended particle images for characterisation of microplankton biodiversity and abundance, and multifrequency acoustic reflectance profiles for qualitative context of images	Continuous underway measurements	Imaging flow cytobot and Kongsberg EK60 multifrequency echosounder
Water depth	Echo sounders, continuous underway measurements	Kongsberg EM302 and EM2040 (multibeam) and EA600 (single-beam)
Seawater sample salinity, dissolved oxygen, dissolved inorganic carbon, total alkalinity, pH, inorganic silicate,	At each CTD station up to 24 x 10 litre seawater samples will be captured over the full water column depth (all parameters). Near-surface seawater samples (salinity, carbon,	Niskin bottles for capturing water samples from depth. Analysis for salinity, dissolved oxygen, carbon, nutrients, and transient

phosphate, and nitrate/nitrite, SF6 and CFC-12	nutrients) will be taken from the ship's underway system every 4-6 hours.	tracers (SF6 and CFC-12) on board. Some samples for carbon and nutrients may be preserved for analysis ashore.
Preserved seawater samples for analysis of dissolved organic carbon, total nitrogen, virus/bacterio/pico/nanoplankton characterisation, and isotope ratios of iodine-129, uranium-236, tritium, carbon-14	At up to half the CTD stations, 6 seawater samples will be collected. Samples will be collected from the ship's underway system up to every 6 hours, or more frequently in the coastal sections.	Niskin bottles for capturing water samples from depth. Analysis ashore.
Filtered seawater samples for analysis of phytoplankton community structure and genomics	Low-vacuum filtration of water samples collected via CTD (up to 5 depths) and from ship's underway surface seawater system (up to every 6 hours or more frequently in the red survey box), stored until analysis ashore	Niskin bottles for capturing water samples from depth. Low-vacuum or pumped filtration. Analysis ashore.

3.4 Indicate whether harmful substances will be used:

Hazardous chemicals will be used in the shipboard laboratory to preserve samples and as reagents. All hazardous/chemical waste (including any seawater samples to which chemicals have been added) and any remaining chemicals will be returned for disposal.

3.5 Indicate whether drilling will be carried out: No

3.6 Indicate whether explosives will be used No

4. Installations and equipment

No installations to be utilised, all shipboard equipment only

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

5. Geographical areas

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

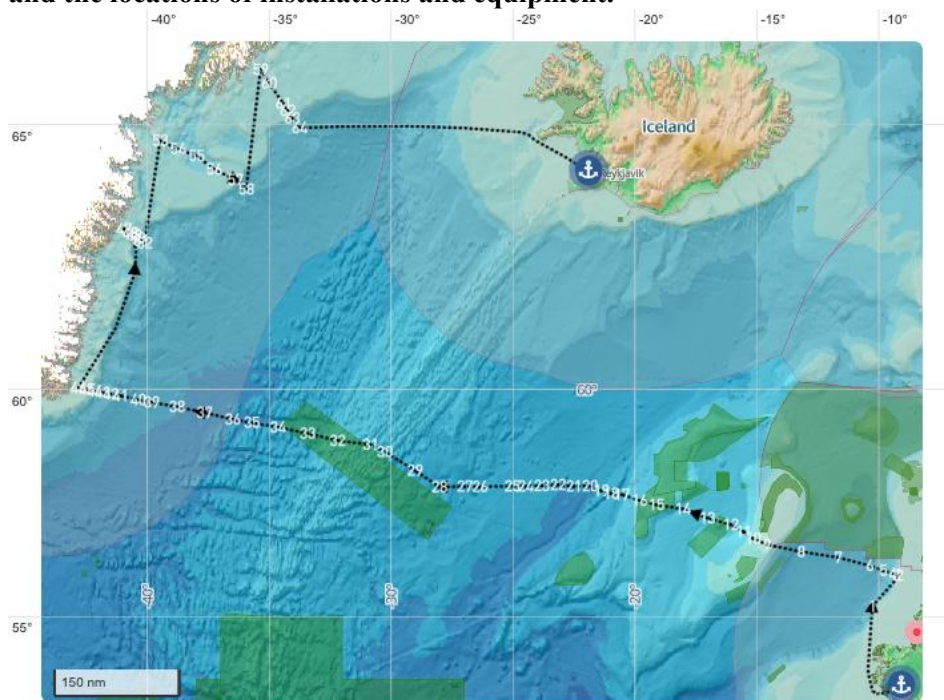
Station	Latitude	Longitude
station 1 (test)	55° 14.24' N	010° 16.02' W
station 2	55° 57.25' N	009° 08.77' W
station 3	55° 58.10' N	009° 15.97' W
station 4	55° 59.85' N	009° 25.64' W
station 5	56° 03.91' N	009° 48.57' W
station 6	56° 10.79' N	010° 21.87' W

station 7	56° 21.89' N	011° 39.99' W
station 8	56° 29.68' N	013° 11.06' W
station 9	56° 39.59' N	014° 34.69' W
station 10	56° 47.70' N	015° 09.26' W
station 11	56° 56.97' N	015° 33.22' W
station 12	57° 06.25' N	016° 04.36' W
station 13	57° 15.08' N	017° 02.05' W
station 14	57° 27.21' N	018° 02.48' W
station 15	57° 32.69' N	019° 07.62' W
station 16	57° 38.58' N	019° 49.18' W
station 17	57° 46.14' N	020° 32.93' W
station 18	57° 47.43' N	020° 58.70' W
station 19	57° 51.14' N	021° 23.06' W
station 20	57° 57.30' N	021° 51.24' W
station 21	57° 56.94' N	022° 30.70' W
station 22	57° 58.89' N	023° 10.04' W
station 23	57° 57.61' N	023° 49.90' W
station 24	57° 56.91' N	024° 29.24' W
station 25	57° 57.19' N	025° 02.22' W
station 26	57° 56.49' N	026° 21.78' W
station 27	57° 56.78' N	026° 59.26' W
station 28	57° 56.12' N	028° 01.38' W
station 29	58° 17.46' N	029° 01.58' W
station 30	58° 41.45' N	030° 15.60' W
station 31	58° 50.88' N	030° 50.84' W
station 32	58° 55.89' N	032° 12.06' W
station 33	59° 05.03' N	033° 26.04' W
station 34	59° 12.67' N	034° 38.57' W
station 35	59° 18.60' N	035° 43.09' W
station 36	59° 22.73' N	036° 29.89' W
station 37	59° 31.12' N	037° 39.72' W
station 38	59° 38.44' N	038° 47.26' W
station 39	59° 44.02' N	039° 49.96' W
station 40	59° 47.02' N	040° 22.68' W
station 41	59° 51.99' N	041° 06.26' W
PS5	59° 53.94' N	041° 30.06' W
PS4	59° 55.84' N	041° 50.37' W
PS3	59° 57.95' N	042° 10.54' W
PS2	59° 59.89' N	042° 28.88' W
PS1	60° 01.80' N	042° 50.01' W
KM1	63° 07.74' N	040° 57.87' W
KM2	63° 03.05' N	040° 42.03' W
KM3	63° 00.51' N	040° 32.22' W
KM4	62° 57.98' N	040° 24.84' W
KM5	62° 54.80' N	040° 15.47' W

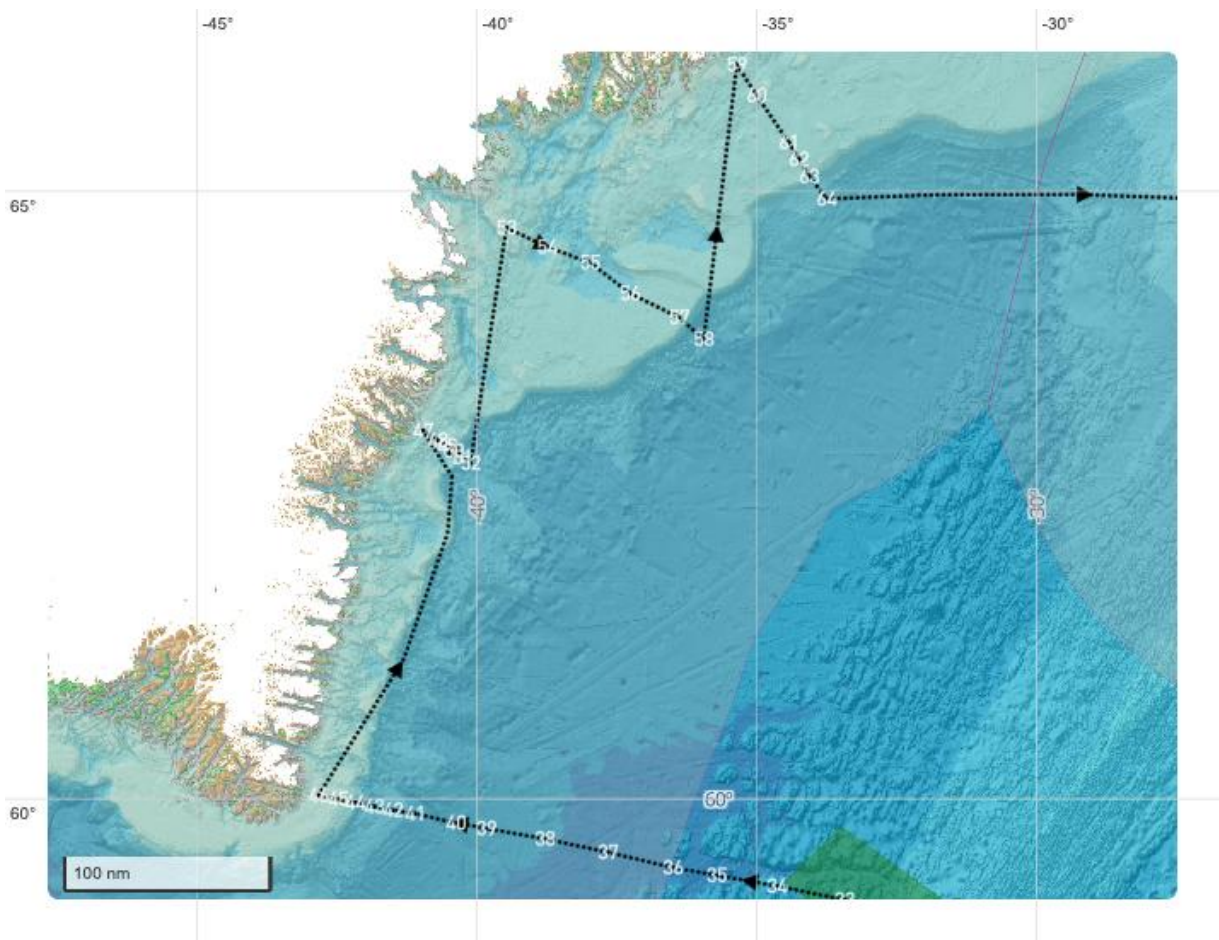
KM6	62° 51.98' N	040° 07.03' W
TA1	64° 43.40' N	039° 28.60' W
TA2	64° 34.60' N	038° 44.90' W
TA3	64° 27.40' N	037° 59.00' W
TA4	64° 13.00' N	037° 16.00' W
TA5	64° 01.80' N	036° 23.50' W
TA6	63° 51.50' N	035° 57.00' W
KGH1	65° 56.39' N	035° 21.50' W
KGH2	65° 42.80' N	035° 00.34' W
KGH3	65° 22.03' N	034° 25.79' W
KGH4	65° 14.52' N	034° 14.94' W
KGH5	65° 06.74' N	034° 03.91' W
KGH6	64° 56.61' N	033° 45.33' W

Underway sampling will be conducted on the tracks between stations.

5.2 Attach chart(s) at an appropriate scale showing the geographical areas of the intended work and, as far as practicable, the positions of intended stations, the tracks of survey lines, and the locations of installations and equipment.



Survey track and stations (CTD/LADCP and water sampling, indicated by numbers). Underway shipboard measurements and near-surface sampling will be conducted along and near the track in black.



Track and stations near Greenland showing end of AR7E section and three cross-shelf/slope sections between 63 and 66 N.

6. Dates

6.1 Expected dates of first entry into final departure from research area of the research vessel:

First entry: 23rd July 2026

Final departure: 12th August 2026

6.2 Indicate if multiple entry is expected:

No

7. Port calls

7.1 Dates and names of intended ports of calls in ICELAND: 12 August, Reykjavik

7.2 Any special logistical at ports of call:

7.3 Names/ Address / Telephone of shipping agent (if available)

8. Participation

8.1 Extent to which ICELAND will be enable to participate to be represented in research project:

A berth may be available to an Icelandic scientist or early career researcher to join the science party

8.2 Proposed dates and ports for embarkation / disembarkation:

Killybegs, Ireland, 23 July 2026

Reykjavik, Iceland, 12 August 2026

9. Access to data, samples and research results

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

20 September, 2026 (cruise summary report and report on expected dates of submission of final data)

9.2 Proposed means for access by ICELAND to data and samples:

Data will be submitted to SeaDataNet (quantitative data), EcoTaxa (imaging), NCBI (genomics data), and OBIS (biodiversity data), in addition CTD and bottle data will be available from the international GO-SHIP data centre, <https://cchdo.ucsd.edu>. All data will be publicly and freely available.

9.3 Proposed means to provide ICELAND with assessment of data, samples and research results or provide assistance in their assessment or interpretation:

Cruise report posted at SeaDataNet

Scientific papers published in internationally available scientific journals

9.4 Proposed means of making research results internationally available:

As in 9.2 and 9.3

10. Scientific Equipment

**COMPLETE THE FOLLOWING TABLE-
SEPARATE PAGE FOR EACH COSTAL STATE:**

INDICATE YES OR NO

LIST SCIENTIFIC WORK BY FUNCTION				DISTANCE FROM COAST

ECHO SOUNDING WATER SAMPLING PROFILING INSTRUMENTS	Water column, surface underway, and seabed depth sampling	Physical, biogeochemical and biological oceanography	Research concerning the physical characteristics of the ocean circulation over the continental shelf and slope and offshore; the transport of heat, salt, carbon, nutrients and tracers by the circulation and their sources; the relationships between biogeochemical and physical ocean conditions and phytoplankton biomass and distribution	Within 12nms	Between 12-200nms	(Continental shelf work only)
---	---	--	---	--------------	-------------------	-------------------------------

WATER SAMPLING				No	No	
PROFILING INSTRUMENTS				No	No	
UNDERWAY				No	Yes	
ECHO SOUNDING				No	Yes	



(On behalf of the Principle Scientist)

Dated 09 December, 2025