UNITED KINGDOM AND JAPAN ARCTIC RESEARCH BURSARIES SCHEME 2024–25



 Note



UK Science & Technology Network



BACKGROUND

This publication shares details of new work from UK-based research teams working with Japan-based researchers, funded by the UK Government from 2024–25.

Researchers in the United Kingdom and Japan are well-placed to develop important new Arctic science partnerships that address pressing research questions. These partnerships can support the development of skill- and knowledgebased networks to strengthen researchers' capability in both communities; generate innovative technical and observational approaches; and create lasting research connections.

The United Kingdom's Department for Science, Innovation and Technology, working closely with the UK Science and Technology Network in the British Embassy Tokyo and the NERC Arctic Office, has funded a bursaries scheme to support new UK-Japan Arctic science connections.

The outcomes of the bursaries programme are expected to support and further develop long-lasting research and collaboration links between UKbased and Japan-based researchers; to provide access opportunities for UK-based researchers to work with new partners in Japan; and develop ideas for future international projects. Eight bursaries have been supported through this scheme and a summary of these are included in this booklet.



Further information about the work of the NERC Arctic Office can be found here: <u>www.arctic.ac.uk</u>



Project Summaries:		
PI Name	PI Institution	Project Title
Dr Arwyn Edwards	Aberystwyth University	Cold shoulders: Understanding the dynamics of glacier surface ecosystems during seasonal transitions
Prof David G. Anderson	University of Aberdeen	Arctic artisanal whaling in the circumpolar north
Dr Victoria Dutch	University of East Anglia	Trial of low-cost sensors for the measurement of Arctic carbon fluxes
Dr Hua Lu	British Antarctic Survey	How do atmospheric rivers get into the Arctic?
Dr Jenna Sutherland	Leeds Beckett University	The transition from marine- to land-terminating glaciers in Qaanaaq, NW Greenland
Dr Michael Thorne	British Antarctic Survey	A joint UK-Japan working group on machine learning methods for ship and sea ice interaction
Dr Maud van Soest	UK Centre for Ecology and Hydrology	Travelling the Arctic regions sustainably: a collaborative journey between the UK and Japan
Dr Gaëlle Veyssière	British Antarctic Survey	Understanding the impact of predicted changes in sea ice within the Sea of Okhotsk



Cold shoulders: Understanding the dynamics of glacier surface ecosystems during seasonal transitions

Principal Investigator: Dr Arwyn Edwards, Aberystwyth University

Email: aye@aber.ac.uk

UK and Japan-based Co-Investigator/Team members:

Dr Tristram Irvine-Fynn (Aberystwyth); Japan Partners: Prof Nozomu Takeuchi (Chiba); Dr Yukihiko Onuma (Japan Aerospace Exploration Agency, JAXA); Dr Jun Uetake (Hokkaido), Kino Kobayashi (Chiba) and Alice Phillips (Aberystwyth).

Research location: Ny-Ålesund, Svalbard

Project overview:

UK and Japanese research has revealed that glaciers are microbial ecosystems affecting the fates of glaciers in our warming world. We also know the Arctic is warming fastest in its coldest months but know little about life at these times. This project unites leading UK and Japanese scientists to study the transition points between the active summer melting season and the frozen conditions typical of autumn and winter in the Arctic. We hypothesize that the meteorological conditions terminating the summer governs the wintertime distribution, activity, and composition of glacier surface microbes. Understanding these changes during the "cold shoulder season" of autumn is essential for understanding ecosystem responses to the rapidly warming winters of the Arctic. To accomplish our goals, we are conducting two deployments of a joint UK and Japanese team to Svalbard, the fastest warming region of the Arctic, to study autumn and winter glacier-microbe interactions. Our long-term goal is to stimulate further UK-Japanese

collaboration so the UK team will travel to Japan to further collaborative plans with the Japanese glacier ecology community.

Project highlights:

- Successful sampling of the autumn to winter transition in September 2024 which provided samples and measurements which detail ice surface albedo, microbial activities, distributions and community biodiversity
- Pending: Sampling of the dark season to light winter transition in February 2025 to partner with highlight 1.
- Ongoing: enhanced collaboration and intellectual exchange with the Japanese glacier ecology community.

Next steps:

A collaborative UKRI bid has just been submitted expanding upon this project's foundations.



Arctic artisanal whaling in the circumpolar north

Principal Investigator: Prof David G. Anderson, University of Aberdeen Email: david.anderson@abdn.ac.uk UK and Japan-based Co-Investigator/Team members: Prof David G. Anderson at the University of Aberdeen Prof Jun Akamine at the Institute for Global Issues at Hitotsubashi University Research location: Faroe Islands, Norway, Japan

Project overview:

This network project will support a new collaboration between the University of Aberdeen and Hitotsubashi University to develop ethnographic, practical methods to document and to understand artisanal whaling in the Arctic in a changing environment. Artisanal whaling differs from commercial whaling in that it





supports local cultural traditions, it is non-profit, and involves local communities. It shares much in common with indigenous whaling. Following the global pandemic, there has been a renewed enthusiasm for local food sovereignty in the Arctic defined as the local control over culturally meaningful subsistence resources. Unlike in the Global South, subsistence in an Arctic marine environment often involves taking cetaceans. This one-year project will revolve around three sets of field seminars in the Faroe Islands, Norway and in Japan. Each field seminar will last for approximately ten days and will be organised by a team of three scholars selected form both universities. The seminars will be held on-site at the home harbour of artisanal collectives in Klaksvik, Taiji and Sandefjord involving local whalers, stakeholders, students and local scholars. The traditional seminars will be augmented with pilot fieldwork to document the enabling conditions and barriers to Arctic artisanal whaling.

- Klasvik Field Seminar July 2024 Our UK-Japan team was hosted by the Klasvik city council in the town's whaling museum. We had a round-table meeting with former mayor and sheriff responsible for accounting and redistributing whale meat, and met with whalers and a local master who coordinates the carving and distribution of the food. We spoke about the history and contemporary management of the whale trade and were shown historic documents and equipment used by local subsistence whalers.
- Sandefjord Field Seminar Jan 2025 Our UK-Japan team held a field seminar in the Sandefjord whaling museum. The visit included a visit to the Antarctic whaling ship in the local harbour as well as presentations on indigenous Sami whaling, indigenous participation in

international whaling, and comparisons with whaling in the Faroe Islands. We were joined by researchers from all over Norway, some online, and made new collaborations for a future grant application.

• Taiji Field Seminar Dec 2025 Our UK-Japan team travelled to Osaka, Taiji and Kokura. In each place we met with local whalers and spoke about the problems that they are experiencing in finding new markets for local whale projects. We also visited the national cetacean centre and spoke with officials there as well as visited the local whaling museum.



Trial of low-cost sensors for the measurement of Arctic carbon fluxes

Principal Investigator:

Dr Victoria Dutch, University of East Anglia

Email: v.dutch@uea.ac.uk

UK and Japan-based Co-Investigator/Team members: Daiki Nomura, Hokkaido University, Japan Pl

Taichi Noshiro, Hokkaido University Jan Kaiser, University of East Anglia Paul Mann, Northumbria University Nick Rutter, Northumbria University

International partners:

Bruno Delille, University of Liege (Belgium)

Research location: Roland von Glasow Air:Sea Ice chamber, University of East Anglia, UK

Department of Fisheries, Hokkaido University, Hakodate, Japan

Saroma-Ko Lagoon, Okhotsk Subprefecture, Japan



The team (L to R; Taichi, Daiki, Vicki, Bruno) in the Roland von Glasow air-sea-ice chamber with all the different CO_2 sensors.

Project overview:

The Arctic Ocean plays an important role in the global carbon cycle. This is only expected to increase with the drastic changes caused by climate warming in the polar regions. The magnitude of the Arctic Ocean carbon sink is only known with high levels of uncertainty due to the remote location and difficult access (Yasunaka et al. 2023), with sea-ice acting as both a source and sink of CO_2 (Delille et al. 2014), further contributing to regional flux uncertainty. We take a low-cost instrument developed for use in the Arctic tundra, compare this to other instruments used to measure Arctic CO₂ fluxes, and evaluate its suitability for measurements over sea-ice

Our small team from the University of East Anglia (UEA) and Hokkaido University (with support from others from Northumbria University and Université de Liège) are looking at 5 different instruments for measuring CO_2 fluxes through snow and sea-ice. First, we compared sensors on artificial sea-ice and overlying snow in the Roland von Glasow Air-Sea-Ice Chamber at UEA. We are now comparing the same sensors on some of the world's most equatorial sea ice at Saroma-ko Lagoon, Hokkaido.

- Measured CO₂ concentrations and fluxes in the Roland von Glasow Air-Sea-Ice Chamber (UFA RvG-ASIC) using 5 different types of instruments. The RvG-ASIC is a unique laboratory facility at UEA where we produce artificial sea ice and make measurements of atmosphere, ice and ocean. In addition to the flux chambers and low-cost sensors initially proposed, we also borrowed 2 different models of eosense forced diffusion CO₂ sensors. giving us a broader variety of methods to compare and benchmark the lowcost sensor measurements. Analysis of the carbonate chemistry of both the ice and the underlying seawater will further expand our understanding of the processes involved and how well these are captured by each type of CO_2 instrument. We also looked at the impact of snow on the CO₂ fluxes.
- Preliminary measurements to test instrument performance at Hokkaido University in Hakodate revealed CO₂ fluxes of similar magnitude from the low-cost sensors and two different types of flux chamber. We are now undertaking an instrument comparison exercise at Saroma-Ko lagoon, Northen Hokkaido, Saroma-Ko is the one of the closest places to the equator where sea ice forms and provides us with a safe and accessible environment to measure natural sea ice. We undertook a similar instrumental comparison on the sea ice surface at Saroma-Ko, with additional measurements of CO₂ on the snow surface over both land and sea ice.

Next steps:

Publication of field and lab results.



How do atmospheric rivers get into the Arctic?

Principal Investigator: Dr Hua Lu, British Antarctic Survey

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UK and Japan-based Co-Investigator/Team members: Dr Thomas Bracegirdle, British Antarctic Survey

Luisa A. Podgurski, British Antarctic Survey

Dr Patrick Martineau, Japan Agency for Marine Earth Science and Technology (JAMSTEC)

Dr Ayako Yamamoto, J. F. Oberlin University

Research location: Entire Arctic

Project overview:

More than 90% of precipitable water in the Arctic is transported via atmospheric rivers (ARs) - long, narrow corridors of enhanced water vapour in the atmosphere. ARinduced weather extremes can trigger ice melting, slush avalanches, and rain-onsnow events. Despite their socioeconomic relevance, knowledge gaps remain in terms of the processes that cause Arctic ARs. As the planet warms, it's atmosphere can hold more moisture, the Arctic is becoming increasingly vulnerable to AR-related weather hazards. This project aims to provide a process-based understanding of Arctic ARs by uncovering the dynamical drivers and evaluating the



Arctic atmospheric rivers (contoured in red) during the period of 2020-04-13 to 2020-04-21, defined as large integrated water vapor transport anomalies. Dashed/solid contours represent daily mean sea level pressure departure from April-mean state. The first figure indicates progression of surface temperature anomalies while the second figure indicates progression of precipitation anomalies.

relative contributions of physical processes along the AR paths. By uniting the polar capability of the <u>British Antarctic Survey</u> with the climate research expertise at <u>JAMSTEC</u> and Lagrangian air parcel tracking at <u>J. F. Oberlin University</u>, we will co-produce new, quantitative knowledge of how ARs transfer heat and moisture into the Arctic. This new UK-Japan partnership will develop a hybrid diagnostic framework that will allow us to uncover AR genesis, drivers and feedback processes so that we can better assess future changes in the Arctic, e.g. ARinduced ice melting and extremes.

Project highlights:

We have exceeded our project goals. BAS PhD student Luisa had a 6-week placement at the JAMSTEC where she learnt to run Lagrangian air parcel tracking algorithm. The project sponsored the Japanese project partners to visit the UK and attended the annual meeting of the CANARI project. The highlights of the project include:

- PI Lu will give a talk titled "How do atmospheric rivers get into the Arctic?" at ASSW 2025 in March 2025 in Boulder.
- P Martineau will present a poster titled "Moisture Transport Pathways and Synoptic Drivers of Atmospheric Rivers Entering the Arctic: Insights from Case Studies" at CLIVAR Workshop "Weather & Climate Interactions – observations, theory, and modelling" in February 2025 in Lorne, Australia.
- L Podgurski submitted an abstract to EGU 2025 titled "Pathways of Atmospheric Rivers in the Arctic: Dynamics, Moisture Transport, and Impacts on Sea Ice during April 2020" and has presented the results at SENSE CDT annual meeting.

The transition from marine- to land-terminating glaciers in Qaanaaq, Northwest Greenland

Principal Investigator: Dr Jenna Sutherland, Leeds Beckett University Email: j.l.sutherland@leedsbeckett.ac.uk

UK and Japan-based Co-Investigator/Team members: Prof Shin Sugiyama (Hokkaido University, Japan). Mentor to ECR

Research location: Qaanaaq, northwest Greenland

Project overview:

Sutherland

With ongoing climate change many marine-terminating glaciers will transition to become land-terminating in the future. Transitions in glacier terminus environments have important implications for glacier behaviour, by removing ocean-induced melting and calving as important sources of ice loss. This leads to a general deceleration of ice flow, and therefore, a reduction of ice flux to the ocean. A transition to a land-terminating



environment is also expected to change fjord circulation with direct consequences for the local ecosystem. Our project aimed to develop a new collaboration between a UK-based Early Career Researcher (Sutherland) and an established Japanbased glaciologist (Sugiyama) to interpret the geomorphological record, using novel analytical techniques, of glaciers in Arctic Greenland that have transitioned from marine- to land-terminating. In July 2024 we undertook fieldwork in Qaanaag, a small town in northwest Greenland with ~600 inhabitants, to detect past terminus environments from submerged landforms on the seabed. We deployed a side-scan sonar over the seabed directly in front of selected land-terminating glaciers to reveal coastline geometry and to map and interpret moraines and other glacial landforms that are preserved on the sea floor.

Project highlights:

- 3 weeks of fieldwork in Qaanaaq, collaborating with local hunters who supported our logistics. We held a workshop with the community to share our study results and to discuss future research directions. Engaging the residents in the way helps contribute towards sustainable development of the region by transferring scientific knowledge and empowering local decision making. The workshop was translated from English into Danish by a local translator and we shared Japanese delicacies with the residents. We also had a Japanese television crew (NHK) documenting our science activities
- Sugiyama will visit the UK (Leeds Beckett University) in May to foster partnerbuilding relationships with Sutherland and spark new collaborations with other colleagues.

Next steps:

We will use the same technology (sidescan sonar) in a glacial lake in Norway and write up these results as an additional project.

Publications:

Changes in the coastal environments and their impact on society in the Qaanaaq region, northwestern Greenland. Under Review in Polar Science. Manuscript Number: POLAR-D-24-00084

S. Sugiyama, A., Yamaguchi; T. Watanabe; Y. Tojo; N. Hayashi; JB. Thiebot; M. Tomiyasu; K. Hasegawa; Y. Mitani; M. Otsuki; Y. Sakuragi; M. Ogawa; K. Tanaka; K. Sakurai; N. Kanna; E. Podoliskiy; R. Kusaka; T. Imazu; Y. Wang; K. Watanabe; K. Sato; S. Ukai; S. Yamada; K. Kondo; S. Yamasaki; K. Tateyama; K. Sato; J. Inoue; T. Mori; T. Fukazawa; A. Rosing-Asvid; K. Langley; A. Gierisch; J. Sutherland; T. Oshima.





A joint UK-Japan working group on machine learning methods for ship and sea ice interaction

Principal Investigator:

Dr Michael Thorne, British Antarctic Survey (BAS)

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UK and Japan-based Co-Investigator/Team members:

Andreas Cziferszky, BAS, Andrew Fleming, BAS, Dougal Goodman, BAS, Takashi Kikuchi, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan, Tsubasa Kodaira, University of Tokyo, Kohei Mikami, University of Tokyo, Hideaki Murayama, University of Tokyo, Junji Sawamura, University of Osaka, Alex J. Tate, BAS, Peter Wadhams, University of Cambridge, Takuji Waseda, University of Tokyo, Jeremy Wilkinson, BAS

All participants involved were part of the working group exploring best practice for shipborne sensors and external data for increasing situational awareness in ice. This included contribution to the paper and symposium proceedings as outlined below. Certain of the participants (Hideaki Muryama and Takuji Waseda) will be project partners on a grant that has been developed during and as a result of the bursary. Jeremy Wilkinson and Dougal Goodman have been involved in the development of the grant.

International partners: Franz von Bock und Polach, Hamberg University of Technology, Germany Mikko Suominen and Jukka Thukuri.

Aalto University, Espoo, Finland

Research location: University of Tokyo/ JAMSTEC/Mombetsu/JMU Shipyards (Nagoya)/Aalto University/Antarctic/ Cambridge



The Japanese group came through Aalto on the way to Cambridge to visit the ice tank, the largest in Europe, as well as meet our Finnish collaborators.

Project overview:

This proposal is for the creation of a joint UK-Japan working group whose aim will be the development of common best practice methodologies for harnessing ship sensor data in order to understand ice-ship interaction. While linked in terms of methodologies, the proposal would address two vital areas of distinct research. The first would be a more complete understanding of the environmental conditions that increases a ship's situational awareness when transiting the sea ice zone. The second aim will be to understand the characteristics of the sea ice itself based upon continuous ship-based measurements, which can ground truth machine learnt sea ice classification of satellite imagery. Our published best practice document will detail the datastreams needed to deliver these research aims, the data acquisition system, and the synthesis and analysis of the wide array of information. As a research vessel's lifetime is measured in years (or decades), a key component of our strategy is for the working group to continue beyond the lifetime of the bursary, as well as using the knowledge gained for a submission for a large grant.

There are a few different highlights from the bursary.

- One day workshop in Cambridge.
- One day workshop in Aalto and visit of largest European ice tank (joint with Finnish collaborators, who will be involved in the ensuing grant and publication).
- Symposium in Mombetsu and visit to University of Tokyo and JMU Shipyards near Nagoya. Work was presented by myself, Jeremy Wilkinson, and Andreas Czifersky (for MAGIC).
- Symposium proceedings papers (one related to the theme of the grant ("A Polar Oceans Shipping Information System"), in addition to two other proceedings papers submitted by Jeremy Wilkinson, and Andreas Czifersky and Andrew Fleming).
- Upcoming submission of a paper "Towards Ice Navigable Maritime Autonomous Surface Ships"
- Detailed field work during the English Coast logistics cruise for capturing validation date to align with the Ice Load Monitoring system on the SDA for initial validation of the system which will be the focus of the grant that is being developed out of the bursary. This had the unexpected consequence of highlighting some issues with the system that are now being looked at by the contractors to the SDA build for the system.

Next steps:

One of the main intentions of the bursary was to form collaborations moving forward. While the bursary has already been constructive in allowing for some conference papers (3), and workshops in Tokyo, Aalto and Cambridge, in addition to fieldwork, the idea was to use the funding for developing a grant. This grant is currently in the process of being drafted.



Validation of the Ice Load Monitoring System of the SDA during the logistics cruise to the English Coast.

Publications:

To date a conference paper and presentation (in addition to facilitating two other papers and presentations - Jeremy Wilkinson and Andreas Czifersky) at the 39th International Symposium on the Okhotsk Sea and Polar Oceans. Work is currently underway on a paper to be submitted for peer review.



A presentation at the 39th International Symposium on the Okhotsk Sea and Polar Oceans in Mombetsu, exploring the capabilities of the new Japanese icebreaker, the "Mirai II".

Travelling the Arctic regions sustainably: a collaborative journey between the UK and Japan

Principal Investigator: Dr Maud van Soest, UK Centre for Ecology & Hydrology

Email: mausoe@ceh.ac.uk

UK and Japan-based Co-Investigator/Team members: Japan-based Cols: Dr Tetsuo Sueyoshi, National Institute of Polar Research (NIPR), initial research design

Dr Keiko Konya, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), initial research design

Team members added to the project at a later stage: Zoe Wright, UK Centre for Ecology & Hydrology, project delivery Ningning Sun, Scott Polar Research Institute, University of Cambridge, Co-producing codes of ethics for visitors to indigenous communities

UK Polar Network, help with workshop organisation

Research location: Arctic regions, Japan, UK

Project overview:

Researchers bear a profound responsibility to minimise the negative environmental and social impact of their work and maximise positive contributions, particularly in sensitive regions like the Arctic. Sustainable travel practices - such as minimising the frequency of field trips, adopting low-emission transport, and employing remote sensing technologies - are critical. However, not all data can be collected remotely, and field expeditions provide social and scientific benefits. Early Career Researchers (ECRs), often balancing the pressures of career growth and small budgets with ethical considerations, face unique challenges. Institutions can play a pivotal role by evaluating fieldwork through carbon audits,

local impact assessments, and funding structures that prioritise sustainability.

In a unique partnership, Japan and the UK have joined forces to explore and promote sustainable travel in the Arctic region. Japanese people are known for their interest in and passion for traveling. They generally have a deep appreciation for their own culture as well as desire to experience and learn about other cultures. The British also have a long history of exploration and travel, including polar expeditions. Both countries have a well-developed travel infrastructure and industry, making them significant and influential players in the global tourism landscape.

This new collaboration aims to address the challenges of travelling in the fragile and rapidly changing Arctic region. The research will first foster a better understanding of the current Arctic tourism industry in both countries and globally. Additionally, we will consider the benefits of tourism for local communities, whilst also keeping in mind the impact on the ecosystem and the community itself. The underlying question will be what role and responsibility Arctic researchers have with regards to the access and sustainability of travel in the Arctic.

The project not only promotes responsible tourism in the Arctic but also strengthens collaboration between Japan and the UK in the face of climate change.

Project highlights:

We are hosting a networking event with the aim to bring together ECRs working in Arctic regions to collate the current drivers behind fieldwork planning (e.g. small research budgets, limited networks, lack of time, guidance on, and interest in monitoring and evaluation processes), share experience and practices, and to explore initiatives of enhanced collaboration amongst ECRs, local and indigenous communities, and the tourism industry.

Expected output(s) of the event:

- Enhanced collaboration amongst UK ECR that work in the Arctic/ Polar region
- Increased awareness of environmental impact of polar scientists
- Increased insight into drivers of fieldwork planning by ECRs (e.g. small research budgets, limited networks, lack of time, guidance on, and interest in monitoring and evaluation processes)

 Something that can be presented at e.g. the Arctic Science Summit Week, feed into conversation around IPY, published in a peer reviewed journal/ The Conversation/ Blogs

Next steps:

Outcomes of a literature review will be presented at the European Indigenous Tourism Conference that will be held in Finland in May 2025.

The team would also like to contribute to the POLARIN training material.



Understanding the impact of predicted changes in sea ice within the Sea of Okhotsk

Principal Investigator: Dr Gaëlle Veyssière, British Antarctic Survey/ University College London

Email: gaevey@bas.ac.uk

UK and Japan-based Co-Investigator/Team members:

Daiki Nomura, Field Science Center for Northern Biosphere, Hokkaido University, Role: collaborator

Takenobu Toyota, Institute of Low Temperature Science, Hokkaido University, Role: collaborator

Tomonori Tanikawa, Meteorological Research Institute, Japan Meteorological Agency, Role: collaborator

Takahiro Toyoda, Meteorological Research Institute, Japan Meteorological Agency, Role: collaborator

Hiroyuki Enomoto, National Institute of Polar Research, collaborator and Advisory Board member

Jeremy Wilkinson, British Antarctic Survey, Advisory Board member

Research location: Sea of Okhotsk and Saroma-ko, Japan

Project overview:

Output from the latest IPCC climate models reveal that under different Shared Socioeconomic Pathways (SSPs) there are very diverse future outcomes for sea ice within the Sea of Okhotsk: from near total loss under high emissions, to a substantial recovery under low emissions. As sea ice controls the upper-ocean light field, which in turn significantly influences marine ecosystem function, these contrasting outcomes will have a range of possible environmental and social-economic impacts. Better knowledge on the temporal and spatial effects of these SSP scenarios on the sea ice within the Sea of Okhotsk is needed if we are to understand and develop meaningful climate mitigation and adaptation strategies for the region. We propose to address these concerns via three interconnected objectives.



Photos: Gaëlle Veyssière



- 1. To understand the impact of current and future sea ice variability on the upper-ocean light field through a combination of *in situ* irradiance observations, remote sensing data and sea ice model outputs. Our analysis will provide the first estimate of the light availability at the bottom of the sea ice from leading CMIP6 models.
- 2. Submit co-produced findings to peer-reviewed, high-impact journal.
- 3. Develop long-lasting research and collaboration links between the UK researcher, GV, and Japanese colleagues.

• Preparation and publication of a scientific paper on the impacts of past, present and future sea ice changes on the light transmitted into the Sea of Okhotsk.

- Fieldwork campaign 9-14 February on sea ice in Saroma-ko, Hokkaido, Japan. Includes measurements of snow and sea ice physical and optical properties and deployment of an autonomous light station coupled to an ice mass balance chain to be recovered on the 24th of February.
- Build long lasting collaborations between UK and Japanese scientific community.

Next steps:

The work engaged through the bursary will continue after its planned deadline and we have plans to collaborate further with our Japanese colleagues to attend the annual fieldwork campaigns in Saroma.

Publications:

Paper not published yet but in preparation by G Veyssière *et al.*, Impacts of past, present and future sea ice changes on the light transmitted into the Sea of Okhotsk (in prep).



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