IASC 2023

BULLETIN

INTERNATIONAL ARCTIC SCIENCE COMMITTEE

[IASC] · INTERNATIONAL ARCTIC SCIENCE COMMITTEE

The International Arctic Science Committee (IASC) is a non-governmental, international scientific organization. IASC's mission is to encourage and facilitate cooperation in all aspects of Arctic research, in all countries engaged in Arctic research and in all areas of the Arctic. Overall, IASC promotes and supports leading-edge interdisciplinary research in order to foster a greater scientific understanding of the Arctic region and its role in the Earth system.

To achieve this mission IASC:

- Initiates, coordinates, and promotes scientific activities
- at a circumarctic or international level;
- Provides mechanisms and instruments to support science development;
- Provides objective and independent scientific advice on issues of science in the Arctic and communicates scientific information to the public;
- Seeks to ensure that scientific data and information from the
- Arctic are safeguarded, freely exchangeable and accessible;
- Promotes international access to all geographic areas and
- the sharing of knowledge, logistics and other resources;
- Provides for the freedom and ethical conduct of science;
- Promotes and involves the next generation of scientists
- working in the Arctic; and
- Promotes polar cooperation through interaction
- with relevant science organizations.

PHOTO: ILONA METTIÄINEN
Ilulissat 2022

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[IMPRINT]

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COVER PHOTO: MARIA PHILIPPA ROSSI
After a long, but successful, day of lake coring, four students and staff were picked up from Ermannflya on the northern side of Isfjorden, Svalbard. Boat operator Audun Tholfsen manoeuvres the polar cirkel against the sea ice with Joe Buckby stepping off onto the seaice.

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[Preface]

IASC was founded in 1990 at a time of great geopolitical uncertainty, but also of hope. Keeping that at the forefront of our minds is now more important than ever.

We are a non-governmental, international scientific organisation, operating among our now 24 member countries. We work on a consensus basis to encourage and facilitate international cooperation in all aspects of Arctic research, across all countries engaged in Arctic research, and in all areas of the Arctic region.

There can be no doubt that the events of the last year have posed serious challenges to the way that we work and to international Arctic collaboration. So, whilst the problems for Arctic research due to the Covid-19 pandemic in the last two years are thankfully starting to ease in many places, the geopolitical situation that has arisen as a result of Russia's actions in Ukraine has created further uncertainties for research in the Arctic.

As you will know, the situation is seriously affecting international scientific collaboration and the ability to carry out research and observations across vitally important areas of the Arctic. The impact on scientific conferences and events, travel and fieldwork, exchange programs and secondments, funding decisions, and especially international research expeditions has been profound. The consequences are being felt by national and international researchers, and the Indigenous Peoples of the Arctic, many of whose lands, waterways and communities cross national boundaries.

The principles of scientific freedom; of research independence; and of peaceful international cooperation are vital for the researchers, Indigenous Peoples and many others who are working together to understand and respond to ongoing pressing climate, environmental, resource, and social changes across the Arctic.

I am grateful to the members of the IASC Executive Committee, the Council, and the wider community for their patience, support, and encouragement as we turn those principles and our IASC values into practical action in the face of the challenge.

In March 2022 our colleagues in Norway hosted the Arctic Science Summit Week (ASSW) and Arctic Observing Summit (AOS) in Tromsø. This was both the first time that many of us had been able to gather in person since the Covid pandemic and also the first fully hybrid meeting. I am grateful to everyone who participated and to our hosts for making this such a successful and inclusive event. A warm welcome again to Belgium, confirmed as a our newest IASC member at the meeting. Also welcome to Dr João Canário (Portugal) and Dr Matthew Druckenmiller (United States) who joined the Executive Committee.

As you read this, we will be about begin our ASSW2023 meeting in Vienna, Austria and we look forward to the following year in Edinburgh, United Kingdom and then the 2025 meeting in Boulder, United States. Our ASSW meetings are a crucial opportunity for the diverse Arctic research community – researchers, programme managers, Indigenous Peoples, decision-makers, funders – to gather together to share and test new ideas, develop new projects, and build promising partnerships.

The past year has seen the publication of the third version of IASC's State of Arctic Science Report. Through this document we are building up a strong picture of the strengths and gaps in Arctic science. It shows that despite the profound problems of the last three years this community remains vital, active, and engaged.

PHOTO: IASC President Henry Burgess, Photo Courtesy Henry Burgess

IASC is rightly proud of its Fellowships Programme – which has run since 2014 - and the focus that has been developed on supporting early career researchers. This year we have been able to offer a record of eight funded Fellowships. These cover each of the Atmosphere, Cryosphere, Social and Human, Marine and Terrestrial Working Groups, as well as an Indigenous Fellow. For the year 2023 - through the initiative with the Prince Albert II of Monaco Foundation – two additional Fellows will join the Social and Human and the Terrestrial Working Groups. Thank you to Dr Stanislav (Stas) Ksenofontov for his work as the Fellowship Coordinator.

Our IASC Medal 2022 was awarded to Dr Dalee Sambo Dorough (University of Alaska Anchorage) for outstanding achievements in advocacy for the rights of Indigenous Peoples; her service to a wide range of Arctic communities, including the Arctic Council; and her profound influence as a legal scholar. We congratulate her again and thank her for her service to Arctic research.

In 2023, we will celebrate the IASC Medal 2023 recipient, Prof. Paul Wassmann (UiT, the Arctic University of Norway). Paul has been honoured for his dedication and passion in creating pan-Arctic and inter-disciplinary perspectives; his extensive and influential published research; his initiation and leadership of multiple programmes and his role in supporting the next generation of Arctic researchers.

This year the Executive Committee have also recognised Dr Robert (Bob) Corell (Global Environment Technology Foundation) with the IASC Award for Service. We give our heartfelt thanks to Bob for his life-long contribution to Arctic research; to inclusion of diverse Arctic voices; his support for early career researchers; and his influential role in the creation of IASC. Congratulations to Bob, Dalee and Paul on their recent awards. Nominations for the 2024 IASC Medal are now open, and I encourage the whole IASC (or Arctic scientific?) community, from all countries and career stages, to submit their candidate.

The Fourth International Conference on Arctic Research Planning (ICARP IV) is now well underway and will culminate with our ASSW 2025 in Boulder. This is an important decadal event and helps our research community identify the most urgent research needs, as well as enabling Arctic organisations to work together in addressing those challenges and to influence national and international funders. The success and relevance of the whole process rests on effective community engagement, so please do visit ***https://icarp.iasc.info*** on how to get engaged. The results of ICARP IV will influence our own IASC Strategic Plan as we develop it in the years ahead.

It was fantastic to see so much careful work last year culminate successfully in the joint statement with the Scientific Committee on Antarctic Research (SCAR) announcing that the 5th International Polar Year (IPY) will take place in 2032-33. The detailed planning with our partners in the UN, the International Science Council, University of the Arctic, APECS and IASSA and many more will begin this year. We will be working with the to host a joint SCAR-IASC Polar Conference in 2030. I know that IPY will be a regular feature in future Bulletins.

Thank you to the Executive Committee, Secretariat and many others in the Council and Working Groups who have made me so welcome in my first year as IASC President.

Despite the major challenges of the last year, truly open, ambitious and mutually empowering international scientific cooperation and partnership has never been more necessary. This Bulletin shows how much can be achieved and I know that the IASC community will continue to rise to the challenges ahead.

Henry Burgess
President, IASC

BACKGROUND PHOTO: ANDERS DAHLIN
The University Centre in Svalbard. Sunset while sailing out for fieldwork in Isfjorden, Svalbard in late August 2022.

Planning for the 5th International Polar Year (IPY) 2032-33

Following their recently renewed partnership agreement, the International Arctic Science Committee (IASC) and Scientific Committee on Antarctic Research (SCAR) are pleased to confirm that preparatory work has started for a 5th International Polar Year (IPY) in 2032-33. Organizing the 5th IPY 25 years after the last IPY in 2007-08 reflects the urgent need for coordinated international research to tackle the biggest challenges of polar research, for both the Polar Regions themselves and for the world as a whole.

Aside from IASC and SCAR, the initial planning efforts for the 5th IPY are currently supported by the World Meteorological Organization (WMO), International Science Council (ISC), University of the Arctic, International Arctic Social Sciences Association (IASSA), the Association of Polar Early Career Scientists (APECS) and other partners worldwide representing both poles. Together, this initiative aims to build an IPY that reflects the aims, objectives and needs of each organisation, the international research community, as well as Indigenous Peoples and other residents of the Polar Regions and wider stakeholders. Over the coming years, many individuals, stakeholders and rightsholders working on, having an interest in, or residing in the Polar Regions will be encouraged to participate and help shape this large community effort.

In the lead up to the 5th IPY, SCAR and IASC are also pleased to announce a joint SCAR-IASC Polar Conference in 2030.

We look forward to sharing the next steps with you from 2023 onward and encourage organisations that want to get engaged in the initial planning process to contact the IASC Secretariat (info@iasc.info) and the SCAR Secretariat (***info@scar.org***) for more information.

Graphic by Johanna Grabow

PHOTO: Florencia Mazza
Scientists set up their instruments, studying biogeochemical cycling in transitional environments betweenland-aquatic-ocean systems in the Arctic

1. IASC INTERNAL DEVELOPMENT

1. IASC Internal Development

IASC Organization

The International Arctic Science Committee (IASC) is a non-governmental organization that encourages and facilitates cooperation in all aspects of Arctic research, in all countries engaged in Arctic research, and in all areas of the Arctic region. To fulfill its mission, IASC promotes and supports leading-edge interdisciplinary research in order to foster a greater scientific understanding of the Arctic region and its role in the Earth system. IASC was established in 1990 and began operations in 1991. It currently comprises 24 member countries. IASC member organizations are national science organizations that cover all fields of Arctic research.

PHOTO: IASC Council Members attending ASSW2022 in person

COUNTRY	MEMBER ORGANIZATION	IASC COUNCIL MEMBER
Austria	Austrian Polar Research Institute (APRI)	Wolfgang Schöner
Belgium	Belgian National Committee on Antarctic Research (BNCAR)	Philippe Huybrechts
Canada	Polar Knowledge Canada	Wayne Pollard
China	Chinese Arctic and Antarctic Administration	Huigen Yang
Czech Republic	Centre for Polar Ecology	Josef Elster
Denmark	Agency for Science, Technology, and Innovation	Lise Lotte Sørensen
Finland	Council of Finnish Academies	Paula Kankaanpää, Vice-President
France	National Center for Scientific Research (CNRS)	Jérôme Fort
Germany	German Research Foundation	Günther Heinemann
Iceland	The Icelandic Centre for Research (RANNÍS)	Egill Thor Nielsson
India	National Centre for Polar and Ocean Research (NCPOR)	Thamban Meloth
Italy	National Research Council of Italy (CNR)	Carlo Barbante
Japan	Science Council of Japan, National Institute of Polar Research (NiPR)	Hiroyuki Enomoto, Vice-President
Republic of Korea	Korea National Committee on Polar Research (KOPRI)	Sung-Ho Kang
The Netherlands	Dutch Research Council	Dick van der Kroef
Norway	Research Council of Norway	Ingerid Fossum
Poland	Polish Academy of Sciences, Committee on Polar Research	Monika Kędra
Portugal	Portuguese Foundation for Science and Technology	João Canario, Vice-President
Russian Federation	Russian Academy of Sciences	Vladimir Pavlenko
Spain	Spanish Polar Committee (CPE)	Antonio Quesada
Sweden	Swedish Research Council	Ulf Jonsell
Switzerland	Swiss Committee on Polar and High Altitude Research	Gabriela Schaepman-Strub
United Kingdom	Natural Environment Research Council (NERC)	Henry Burgess, President
USA	Polar Research Board	Matthew Druckenmiller, Vice-President

IASC Council

The IASC Council is comprised of representatives from national scientific organizations from all IASC member countries. The IASC Council typically meets once a year during Arctic Science Summit Week (ASSW). Council members provide input regarding a wide range of scientific and technical topics and provide access to a large number of scientists and administrators through their national committees.

The IASC Council is responsible for:

- Developing policies and guidelines for cooperative Arctic research;
- Establishing Working Groups and Action Groups that address and act on timely topics in Arctic science;
- Recommending, in cooperation with the Working Groups, implementation plans for IASC programs and activities;
- Making decisions regarding the participation of national scientific organizations from non-Arctic countries; and,
- Organizing Arctic science conferences.

TABLE
An overview of the IASC countries, organizations, and Council members updated to 18 January 2023.
For contact information, please visit
https://iasc.info/about/organisation/council

IASC Executive Committee

Secretariat

The IASC Executive Committee operates as a board of directors and manages IASC's activities between Council meetings. The Executive Committee consists of five elected officials: the President, four Vice-Presidents, and the Executive Secretary (ex officio).

The current IASC Executive Committee members are:

Henry Burgess, President

João Canario, Vice-President

Matthew Druckenmiller, Vice-President

Hiroyuki Enomoto, Vice-President

Paula Kankaanpää, Vice-President

Gerlis Fugmann, IASC Executive Secretary

The IASC Secretariat is responsible for the daily operations of IASC including:

- Communicating with Council members;
- Implementing the decisions of the IASC Council and Executive Committee;
- Communicating with other organizations including the Arctic Council and its subsidiary bodies and the International Science Council (ISC);
- Providing support for the IASC Working Groups and Action Groups;
- Publishing the IASC Bulletin and IASC communication materials as required;
- Maintaining the IASC website, preparing the IASC newsletter, and facilitating outreach; and,
- Administering IASC finances.

The central IASC Secretariat is supplemented by the dispersed Secretariat, drawing support from individuals and institutions in a range of IASC members countries, especially addressing the support for the growing number of activities undertaken by the IASC Working Groups and early career researcher development.

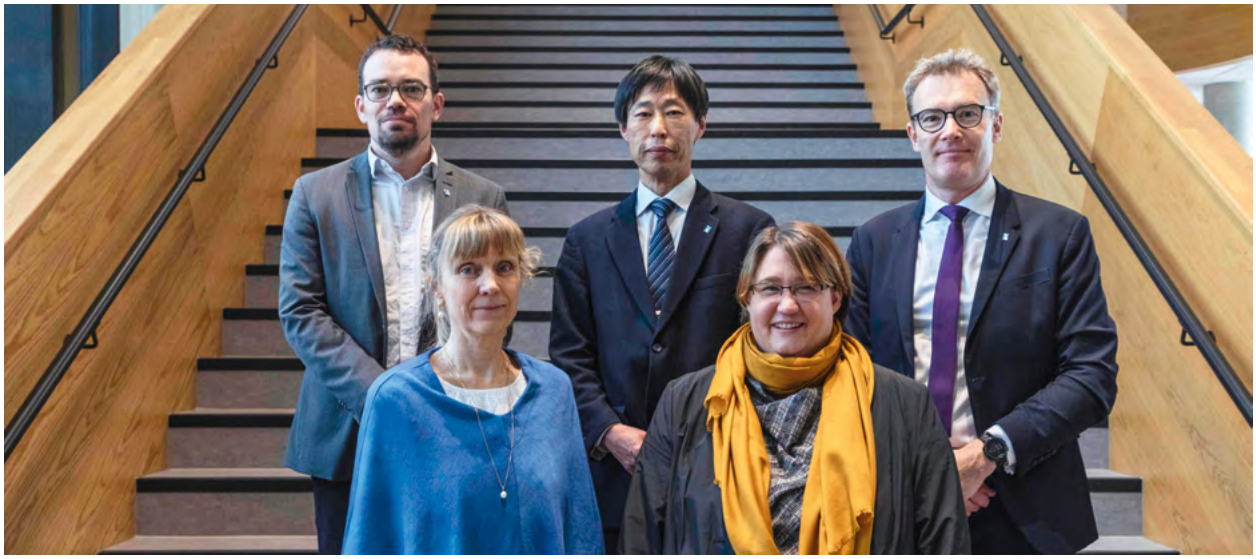

PHOTO: IASC ExCom Members (João Canario not in the picture)

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Wayne Clark
(until March 2023) , Social & Human Working Group Secretary, University of Alberta, Canada
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PHOTOS: courtesy of the Secretaries

IASC Council welcomed Belgium as the 24th IASC Member country at Arctic Science Summit Week 2022 in Tromsø, Norway. Belgium is represented in IASC through the Belgian National Committee on Antarctic Research (BNCAR), with Philippe Huybrechts serving as IASC Council member.

Belgium: IASC's 24th Member Country

IASC Council welcomed Belgium as the 24th IASC Member country at Arctic Science Summit Week 2022 in Tromsø, Norway. Belgium is represented in IASC through the Belgian National Committee on Antarctic Research (BNCAR), with Philippe Huybrechts serving as IASC Council member.

New Member Country: Belgium

For historical reasons, Belgian polar research has traditionally focused on Antarctica. Belgia polar research began at the end of the 19th century with the Belgica expedition of Adrien de Gerlache (1897-1899) and their first overwintering in the pack ice of the Bellinghausen Sea. Belgium was also one of the original signatories of the Antarctic Treaty and operated the King Baudouin Station from 1958 to 1967 and again the Princess Elisabeth Station since 2009 in Dronning Maud Land, East Antarctica. However, during the last few decades this initial focus on Antarctica has gradually shifted to also include the Arctic. For a large part these Arctic activities involve the same groups and often the same approaches than had been successfully applied in the Antarctic for a much longer time.

Today, at least 12 research groups based at almost every Belgian university are active in Arctic research. Their activities cover a wide variety of disciplines and subjects, involving both field and laboratory studies, and including a very significant contribution from geophysical and biogeochemical modelling. Funding largely comes from the National Fund for Scientific Research (FNRS – Fonds National de la Recherche Scientifique), the Research Foundation Flanders (FWO - Fonds voor Wetenschappelijk Onderzoek-Vlaanderen), ERC (European Research Council) and from participation of Belgian research teams in EU FP7 and H2020 funded projects within the EU Polar Cluster such as APPLICATE (Advanced Prediction in Polar regions and beyond: modelling, observing system design and LInkages associated with a Changing Arctic climaTE), PROTECT (PROjecTing sEa-level rise: from iCe sheets to local implicaTions) and Nunataryuk (focusing on permafrost). Many Belgian Arctic researchers are experts with an international reputation in the fields of the atmosphere, the cryosphere, and marine and terrestrial environments.

In addition, Belgian scientists are deeply involved in science groups related to polar sciences such as BEPSII (Biogeochemical Exchanges Processes at the Sea-Ice Interfaces), cosponsored by SCAR (Scientific Committee on Antarctic Research) and SOLAS (Surface Ocean Lower Atmosphere), with support from SCOR (Scientific Committee of Ocean Research), CliC (Climate and Cryosphere) and IASC, the Polar Prediction Project of the WMO (World Meteorological Organisation), ISMASS (Ice Sheet Mass Balance and Sea Level, co-sponsored by CliC, SCAR, and IASC), and IACS (International Association of Cryospheric Sciences, one of the associations of the International Union of Geodesy and Geophysics - IUGG). Belgian researchers also took up roles as Lead Author and Contributing Author for cryospheric issues in the Arctic for Working Group I of the recently released IPCC AR6 (Intergovernmental Panel on Climate Change Sixth Scientific Assessment Report).

Besides purely scientific activities, Belgian scientists and science administrators also play active roles in organisations and projects on science coordination such as the European Polar Board (EPB) and EU-PolarNet (Connecting Science with Society, funded by the EU), both of which have a strong Arctic component.

Belgium recently launched the new RV Belgica. While this new research vessel is not a fully-fledged icebreaker, it has been designed to be able to also operate in Arctic waters, for instance in the East Greenland Sea. It is our expectation that Belgium´s membership in the International Arctic Science Committee will help to make us more visible at the international scale and foster networking to a much larger extent than is hitherto the case. It is also expected to play a role in consolidating our research within Belgium, and generate interest for a nationally funded research program on the Arctic to be set up by the Belgian Science Policy Office (BELSPO).

PHOTO: ELIE VERLEYEN
The Protistology and Aquatic Ecology group from Ghent University doing fieldwork on Svalbard.

International Science Initiative in the Russian Arctic (ISIRA)

The International Science Initiative in the Russian Arctic (ISIRA) is a Russian and international cooperative initiative to assist Arctic science and sustainable development in the Russian Arctic.

ISIRA´s objectives include:

- Initiating planning of multinational research programs that address specific key scietific problems in the Russian Arctic;
- Providing a forum for linking on-going or planned bilateral projects;
- Facilitating improved scientific access to the Russian Arctic;
- Advising on funding and implementation of projects.

The Activities include:

- Reporting on international science activities and initiatives in the Russian Arctic;
- Providing up-to-date information on policies, regulations and logistics within the Russian Arctic;
- Supporting Russian and international early career scientists.

Deliverables are:

- Comprehensive national inventories of past, ongoing and planned international and bilateral science projects and initiatives in the Russian Arctic;
- Reports of annual ISIRA meetings, including presentations of IASC supported early career scientists;
- Information on scientific access to the Russian Arctic.

More information: *https://iasc.info/our-work/isira*

Members of ISIRA

Chair, Arkady Tyshkov | Russia

Annett Bartsch | Austria

Hanna Lappalainen | Finland

Juha Pekka Lunkka | Finland

Heidemarie Kassens | Germany

Yoshihiro Iijima | Japan

Louise Kiel Jensen | Norway

Tadeusz Pastusiak | Poland

Boris Morgunov | Russia

Sergey Priamikov | Russia

Vladimir Kotlyakov | Russia

Anna-Maria Perttu | Sweden

Gabriela Schaepman-Strub | Switzerland

Gareth Rees | United Kingdom

Lee Cooper | United States

Yulia Zaika | Russia

Международная научная инициатива в Российской Арктике (ИСИРА)

Международная научная инициатива в Российской Арктике (ISIRA / ИСИРА) — это совместная российская и международная инициатива с целью содействия научному сотрудничеству и устойчивому развитию в российской Арктике.

Цели ISIRA включают:

- Инициирование и планирование международных исследовательских программ для решения ключевых задач в российской Арктике;
- Создание форума для обеспечения взаимодействия по текущим или планируемым двусторонним проектам;
- Содействие улучшению доступа научных групп к исследованию российской Арктики;
- Консультирование по вопросам финансирования и организации проектных исследований.

Деятельность включает в себя:

- Освещение международной научной деятельности и инициатив в Российской Арктике;
- Предоставление актуальной информации о политике, правилах и логистике в Российской Арктике;
- Поддержка российских и международных ученых, начинающих карьеру.

Результатами являются:

- Полный национальный перечень прошлых, текущих и планируемых международных и двусторонних научных проектов и инициатив в Российской Арктике;
- Отчеты о ежегодных встречах ISIRA, включая презентации молодых ученых, получивших поддержку IASC;
- Информация о доступе ученых в российскую Арктику.

Более подробная информация:
https://iasc.info/our-work/isira

Члены группы ISIRA

Председатель, Аркадий Тишков | Россия

Аннет Бартш | Австрия

Ханна Лаппалайнен | Финляндия

Юха Пекка Лункка | Финляндия

Хайдемари Кассенс | Германия

Йошихиро Иидзима | Япония

Луиза Киль Йенсен | Норвегия

Тадеуш Пастусяк | Польша

Борис Моргунов | Россия

Сергей Прямиков | Россия

Владимир Котляков | Россия

Анна-Мария Пертту | Швеция

Габриэла Шаепман-Штруб | Швейцария

Гарет Рис | Великобритания

Ли Купер | Соединенные Штаты

Юлия Заика | Россия

IASC Medal 2023

IASC Medal 2023 Awarded to Professor Paul Friedrich Wassmann

The International Arctic Science Committee (IASC) awards the 2023 IASC Medal to Professor Paul Friedrich Wassmann, UiT The Arctic University of Norway, for outstanding long-lasting achievements to improve the knowledge of the ecology of the Arctic Ocean and the ability to combine excellent science and holistic drive to bring together various disciplines.

Professor Paul Wassmann was selected for his scientific expertise and exceptional and sustained contributions to understanding the Arctic Ocean and for his ability to bring together various disciplines and nationalities to tackle scientific issues that are far too vast and complex for investigation by an individual scientist.

Prof. Wassmann has worked and served the Arctic research community for nearly five decades. He is a singular individual who has truly shaped the direction of international Arctic science. His dedication and passion led Arctic science from regional and discipline-oriented studies to a fully pan-Arctic and interdisciplinary perspective. Besides being very active in publishing his research, he has initiated and led multiple programs and projects and has organized numerous science conference sessions, symposia and workshops. His broad topics of interest have been critical to shaping a new generation of scientists. One example for his continuous efforts to educate prospective scientists is the ARCTOS PhD school "Arctic ecosystems, biogeochemical cycles and climatic change in the Anthropocene" of which he was the Director from 2004 to 2014. He also brought scientific knowledge to broad audiences through exceptional interdisciplinary science communication.

His long-term dedication to the Arctic community and exceptional work has provided significant inputs —and will continue to provide, through the multiple generations of students and post-docs he mentored— to a holistic understanding of the Arctic.

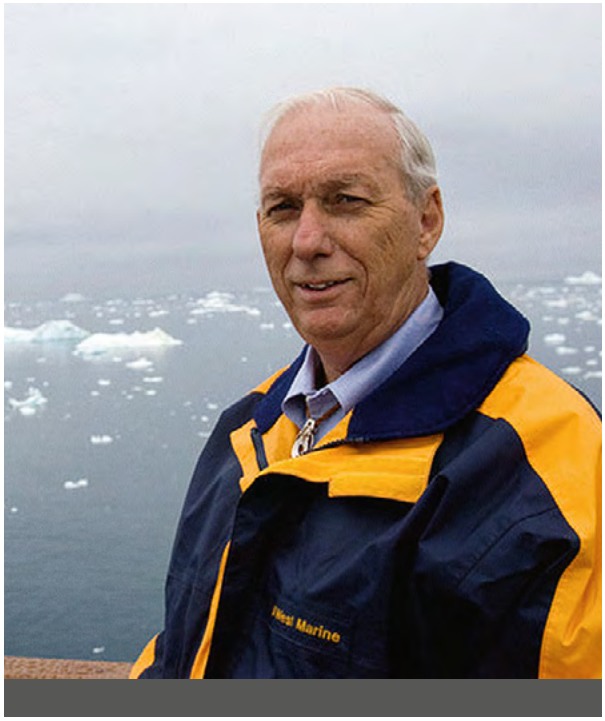
The other shortlisted candidates for the 2023 IASC Medal were:

- **Markus Rex and Matthew Shupe**, for outstanding achievements to plan and execute the unique international Arctic Ocean program MOSAiC which is fundamental for our understanding of the Arctic and which will serve the international community with new data that was not previously possible to access.

Professor Paul Friedrich Wassmann will deliver his IASC Medal Lecture at the ASSW2023 in Vienna (Austria) and online on 23rd February, 14:00-15:30 GMT+1. More info: ***assw.info***

IASC would like to thank the 2023 IASC Medal Committee for their services: Monika Kędra (MWG) (Chair), Margareta Johansson (CWG), Sergi Pla-Rabes (TWG), Muyin Wang (AWG) and Silja Zimmermann (IASC-SDWG Fellow).

Photo courtesy of Professor Paul Friedrich Wassmann



IASC Award for Service 2023

The Executive Committee of the International Arctic Science Committee (IASC) is delighted to present Dr Robert Corell with its Award for Service.

The honour recognises his life-long scientific contributions to the understanding of global change and the interface between science and public policy, particularly those research activities that are focused on the science of global and regional climate change in the Arctic region. As well as for the promotion of Arctic research in general through his dedicated, inspiring and successful mentorship and leadership.

Dr Corell has been visiting and working in the Arctic for more than 50 years. His research is of exceptional quality, depth and relevance and has resulted in an extensive list of publications, awards and wider recognition. He has been one the pioneers of climate change science on global and regional scales and has made great strides in making genuine and impactful connections between science and public policy. He has led important workstreams within the Arctic Council, in particular the influential Arctic Climate Impact Assessment reports, as well as work for UNEP, the IPCC and many others. This leadership has had a long-lasting and positive impact on the understanding of the change in the Arctic and connections with global environmental systems.

This Award especially recognises his close involvement in the preparatory work in the late 1980s to lay the ground for the creation of IASC. That careful work and his subsequent involvement have helped create a long-lasting and successful organisation. As the Chair of the IASC Regional Board and of the ICARP II process Dr Corell introduced new multi-disciplinary approaches and made great strides in ensuring broader consultation and engagement in decision making.

In this Award the Executive Committee also recognise the important leadership role he has played in supporting and inspiring the next generations of researchers. His work as a champion and enabler of early career researchers, of support for the inclusion of diverse Arctic voices and in particular his support in the creation of APECS have all made an enormous contribution. His generous investment of time, skill and enthusiasm in the scientists who come after has been an inspiration to the wider research community.

Dr Corell now joins a very select group of Arctic specialists to receive the IASC Award for Service. Odd Rogne, former IASC Executive Secretary, received the first award in 2015.

The IASC Executive Committee expresses its deep gratitude to Dr Corell for his exceptional and sustained contributions to the understanding of the Arctic, his support to the long-term success of IASC and to better connecting the worlds of science and public policy. At a time when international cooperation in Arctic research has never been more urgent or relevant his life-long service is an example to follow.

Many congratulations to Dr Robert Corell on his IASC Award for Service.

Photo courtesy of Dr Robert Corell

PHOTO: Igor Vasilevich,
Svalbard, Austre Gronfjordbreen.Catching data from weather station.

2. IASC WORKING GROUPS

2. IASC Working Groups

Encouraging and supporting international science-led programs

IASC is engaged in all fields of Arctic research. Its main scientific working bodies consist of five Working Groups (WGs): Atmosphere, Cryosphere, Marine, Social & Human, and Terrestrial. The primary function of the WGs is to encourage and support science-led international programs by offering opportunities for planning and coordination, and by facilitating communication and access to facilities. Each WG is composed of up to two scientists from each IASC member country, appointed by the national adhering bodies.

All five IASC WGs are guided by scientific Work Plans which concisely articulate, with scientifically-driven high-level specifics not programmatic detail, how they will achieve IASC's vision over the coming years. These plans are meant to help Arctic scientists get involved in IASC activities, and it is expected that they will evolve in the coming years as the WGs continue with their work. These scientific foci are included in the WG sections which follow, and the full plans are on the IASC website (*iasc.info*).

The WG members are experts in their field that have an international reputation and are from different scientific disciplines so that the full range of Arctic research

is represented within the WGs. Though the WGs are somewhat disciplinary, they also address crosscutting science questions by initiating activities that involve at least two WGs. To this end, WGs are required to work together to use at least 40% of their funds in collaboration with paired funds from at least one other WG. In particular, IASC encourages projects which bridge the social and natural/physical sciences. IASC hopes that this will lead to closer cooperation, coordination, and teamwork across Arctic science disciplines.

More info: *https://iasc.info/our-work/working-groups*

2022 State of Arctic Science Report

The IASC State of Arctic Science Report 2022 presents a cohesive synthesis of Arctic research activities and priorities with of a large range of input and contributions across all aspects of Arctic research. It is aimed at Arctic science agencies, managers, and users including a wide range of decision-makers and policymakers, to help all Arctic science stakeholders stay up to date on Arctic research.

Published since 2020 by the International Arctic Science Committee (IASC), it has been updated on an annual basis by the members of several IASC or IASC-affiliated committees including the IASC Working Groups (Atmosphere, Cryosphere, Marine, Social and Human, Terrestrial); the International Science Initiative in the Russian Arctic (ISIRA); the former IASC Action Group on Indigenous Involvement, the Arctic Data Committee (ADC), and the Sustaining Arctic Observing Network (SAON). The content of the report is compiled by the researchers themselves and is not exhaustive.

The Arctic – a unique and globally important region – is also a rapidly changing region. More than ever before, we (Arctic, non-Arctic and Indigenous and northern residents) need to continue to build the understanding

PHOTO: SUSAN CHRISTIANEN
Extreme Design Lab

of the Arctic, including systems, and the connections between systems. Bigger than any one discipline or country can hope to address individually, IASC leads by bringing together science disciplines and international collaboration, prioritizing science over nationality.

The State of Arctic Science 2022 is expected to provide benefits by identifying priorities, linkages, and gaps in the current work of the international Arctic research community. For example:

- Arctic research must be truly interdisciplinary, and indeed convergent, in order to meet both Arctic and global challenges.
- The Arctic research community must improve its efforts to respect and implement the priorities, voices, and contributions of Indigenous Peoples and other Arctic residents.
- International and interdisciplinary cooperation are critical to studying Arctic systems and should be encouraged and expanded.
- Arctic data sharing, discoverability, access, and reuse continue to be difficult challenges, but improvements in these areas will be crucial for future success when it comes to long-term monitoring.
- Current levels of Arctic monitoring and research are insufficient to meet the grand challenges facing the Arctic, despite the hard work and investments of both Arctic and non-Arctic countries.

The State of Arctic Science 2022 remains an initial effort to describe the status of the scientific endeavor at high northern latitudes. Building on the foundation of ICARP III, IASC has compiled this report out of broad, bottom-up contributions from the IASC scientific community. Arctic change is accelerating, and Arctic science is vast, and so this report simply summarizes - some of the highlights of Arctic research.

This report adds value and is a useful contribution for researchers, policymakers, and all research stakeholders by setting out the state of Arctic science.

While this report is static, Arctic research is vibrant and evolving. Therefore, IASC will update this report on an annual basis in the future.

Email ***info@iasc.info*** and find out more about IASC at ***iasc.info***.

Full 2022 State of Arctic Science Report and previous years reports available at:

https://iasc.info/about/publications-documents/state-of-arctic-science

IASC Cross-Cutting Activities

Recent Activities

For updated information, please check the IASC website: **iasc.info**

Indigenous Methodologies in Collaborative Arctic Science

When: 2023
Where: Online
Working Groups: AWG, CWG, MWG, SHWG, TWG

A team of early career researchers are guest editors of a special collection to appear in the journal Arctic Science. This collection is being made possible by cross-cutting funding from IASC. and will be published in 2023. The special collection addresses the need for engaged, peer-reviewed discourse on Indigenous and decolonizing perspectives on approaches in the environmental science, and features perspectives from across the circumpolar north.

The journal has agreed to match IASC's funding, providing the publication fees for up to 20 Indigenous and/or early career first-author manuscripts.

- A call for manuscript proposals remains open until Feb 28th, 2023 (see *https://cdnsciencepub.com/topic/as-indigenous-approaches*).
- The guest editors are: Victoria Qutuuq Buschman (University of Alaska Fairbanks, MWG Fellow 2021); Margaret Rudolph (University of Alaska Fairbanks), Megan Sheremata (University of Toronto, SHWG Fellow 2019); Enooyaq Sudlovenick (University of Manitoba, MWG Fellow 2020); Stanislav Saas Ksenofontov (University of Northern Iowa, SHWG Fellow 2018).
- IASC funds have provided author fees for 10 publications submitted by Indigenous and/or ECR researchers first authors, and the journal has waived the fees for an additional 10 manuscripts.
- The collection is aiming for representation from Indigenous homelands across the circumpolar north, especially those least underrepresented in methodological discussions of scientific research.
- The special collection was the theme of a session at ArcticNet in Dec 2023, involving 13 paper presentations.

The related ASSW 2023 session,Transforming Approaches in Arctic Science, will be convened on Feb 21. This session aims to identify additional contributions to the collection. A meeting will also be held during ASSW 2023 to discuss the special collection on Feb 22, and will be open to interested members of the IASC community.

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The Contribution of the Reproductive Health and the Quality of the Arctic Environment

When: February 17 - 18 2022
Where: Apatity, Murmansk region (Russia)
Working Groups: SHWG, ISIRA

As part of the project The Contribution of the Reproductive Health and the Quality of the Arctic Environment to the Well-Being of the Sami People within the Kola Peninsula on February 17 and 18, the Research Centre for Human Adaptation in the Arctic, Branch of

the Federal Research Centre "Kola Science Centre of the Russian Academy of Sciences" held an international interdisciplinary seminar „Well-being of Saami People. The Value of Reproductive Health and Environmental Quality". The seminar and the relevant project activities supported by the International Arctic Science Committee (IASC) and its Advisory Group International Science Initiative in the Russian Arctic (ISIRA) got together more than 100 participants (in-person and online) to discuss health and environmental issues in the context of indigenous cultures, ecosystem change, environmental quality and health impacts, reproductive health and behavior, and the vulnerability and resilience of Arctic social-ecological systems.

The topics of science sections within the workshop included „General Health and Health Care Challenges in the Arctic Region", „Health Issues of Indigenous Peoples in the Arctic and Extreme North", and „The Contribution of Environmental Quality to Population Well-Being and Health". The speakers shared the data obtained not only in the Kola North, but also in different Arctic regions: in Yamal and the Arctic regions of the Republic of Sakha (Yakutia), as well as in the Republic of Khakassia, Eastern Siberia, Baikal, Finland and Sweden.

The presentations made at the seminar will be published as a collection of abstracts, and the program committee will select some of them for publication in the special issue.

Highlights:

- The comprehensive dialogue among indigenous people, researchers and decision-makers is needed to overcome and resolve health issues.
- The proper education systems regarding the risk factors for diseases of the reproductive system and reproductive health is required including the development of skills for a healthy lifestyle and medical activity.
- The overwhelming and detailed study is needed which will consider and include various specifics such as aspects as migration processes, accessibility of medical services and development of mobile patient transportation system, shortage of doctors and medical personnel in remote areas and birth rate stimulation with the help of regional payments, different ethical issues, the synergy between the closeness of nature and human longevity, the phenomenal resilience of indigenous peoples in the Arctic regions

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ArcticLight Network

When: ASSW 2022
Where: Tromsø, Norway
Working Group: CWG, MWG, TWG

IASC ASSW 2022 hosted the kick-off meeting for the newly founded Arctic Light Network (ALN). The ALN was developed as a cross-cutting initiative to engage researchers from across IASC Working Groups (terrestrial, marine, cryosphere) and to facilitate new, interdisciplinary collaborations. Prior to the meeting, we hosted a short symposium, where 14 invited members of the ALN presented their research in a short format. In the main meeting (30-31st March, during ASSW), a group of around 20 met online for two afternoons.

Our conversations focused on the physical properties and biological significance of light in marine, terrestrial, and cryospheric systems in the Arctic. Key points came up in each of these focus groups: i) light in the Arctic is very difficult to measure, particularly at the low levels present during polar night which sensitive species respond to; ii) there are huge parallels in the role of light for both marine and terrestrial species; iii) the role of artificial light and understanding the role of light in human behaviour is important for a full view.

The key output from the workshop will be a review paper, co-authored by participants of the ALN, and focusing on

the topics we covered during the meeting. In addition, we will host special sessions at conferences (similar to the one we organised at ASSW 2021) on Arctic Light.

Highlights:

- Light is a defining characteristic of the Arctic, with continuous light and dark at different parts of the year and a rapid transition among daylengths.
- Huge parallels in the role of light occur for both marine and terrestrial species.
- Human behaviour is important for a full view of the role of light and the impact of increasing artificial light in the Arctic.

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RATIC meets T-MOSAiC: Sharing Best Practices in Research on Infrastructures in the Arctic (part 2)

When: ASSW2022
Where: Tromsø, Norway
Working Groups: CWG, SHWG, TWG

The Rapid Arctic Transitions due to Infrastructure and Climate (RATIC) initiative has been providing a forum for scientists to share knowledge across disciplines since 2014 on topics related to Arctic infrastructure and climate change. The RATIC/T-MOSAiC workshop at ASSW 2021 was a three-hour online meeting for participants to share progress and insights on RATIC-related research from around the Arctic.

The Arctic Infrastructure Community Meeting at ASSW 2022 in Tromsø featured presentations and panel discussion exploring cross-disciplinary approaches to understanding the impacts of infrastructure and climate change in the Arctic. The RATIC/T-MOSAiC Arctic Infrastructure Action Group organized the meeting as a cross-cutting activity funded by the International Arctic Science Committee. Twenty-four people attended the hybrid meeting in person and at least an equal number attended online.

Highlights:

- The Arctic Infrastructure Community Meeting at ASSW 2022 in Tromsø featured presentations and panel discussion exploring cross-disciplinary approaches to understanding the impacts of infrastructure and climate change in the Arctic.
- Community Perspectives: What constitutes infrastructure can vary depending on viewpoint. From a traditional indigenous perspective, the environment IS infrastructure. However, the "Green transition" should not happen on the backs of indigenous communities. Displacing reindeer herders with overscaled wind farms to export energy to the south is an example of Green colonialism.
- Mapping and modeling: Satellites provide a vast amount of data that can be analyzed with the help of machine learning to map human-built infrastructure and identify potential risks due to permafrost thaw, but a significant amount of human labor is still needed to validate data and classify infrastructure types. How do we prioritize this effort?

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High-latitude Fires, Arctic Climate, Environment, and health (HiFACE)

When: ASSW 2022
Where: Tromsø, Norway
Working Groups: AWG, SHWG, TWG

Warmer and drier conditions have already led to increases in fire activity in many high latitude regions, and fire activity across large regions of the Eurasian and North American high latitudes is projected to increase over the coming century. High latitude fires are a pathway by which extreme heat events may produce Arctic climatic feedbacks and affect Arctic societal health. Understanding how changes in fire activity relate to changes in the climate and terrestrial environment requires interdisciplinary understanding of the complex interactions in the high latitude climate system and ecosystems.

To address these issues, the HiFACE (High latitude fires, Arctic climate, environment, and health) workshop was held on 28th March 2022 in Tromso, Norway, co-sponsored by the Leverhulme Centre for Wildfires, the air Pollution in the Arctic: Climate, Environment and Societies (PACES) initiative, and the Belmont Forum ACRoBEAR project. The aims of the workshop were to share current state-of-the-art understanding on high latitude fire impacts on climate, ecosystems and air quality, and to explore inter-disciplinary linkages that could help drive forward new research on this topic. The hybrid workshop was attended by around 30 participants from across the climate science, air pollution, ecosystem, fire science, health, and social science communities. The workshop featured 12 research presentations and active discussion around four key themes: 1. Measuring and monitoring high-latitude fire and fire impact trends – past and presen, 2.Drivers of high-latitude fires and fire risk, 3. Climate–vegetation-fire interactions, feedback and response and 4.Societal vulnerability, health impacts and responses to high latitude fire.

Highlights:

- Sharing of new understanding to help improve knowledge of poorly understood Earth system feedbacks and interactions associated with high latitude fires and their emissions.
- Recognition that Arctic remoteness presents unique risks, challenges, and impact pathways associated with wildfires.
- Discussion on interdisciplinary challenges and research priorities associated with high latitude fires, and synthesis of priority themes to be addressed in a position paper.

As part of the workshop discussion an outline for position paper was developed interactively, which will aim to map out the key research priorities around high latitude fire and its impacts. The paper is now under development, and will be completed and submitted ahead of the next ASSW in 2023.

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The Synoptic Arctic Survey (SAS) – Update Community Meeting Report

When: ASSW 2022
Where: Tromsø, Norway
Working Groups: AWG, CWG, MWG

The Synoptic Arctic Survey (SAS) is an international, researcher-driven program designed to establish the present states of the Arctic Ocean ecosystem and carbon system and of the foundational physical system that drives them. The ultimate goal of the far-seeing SAS effort is to detect environmental change by establishing decadal benchmarks to provide period comparisons.

The vision is that cooperating national programs of vessel-based oceanic research will together assess the key variables during the same season and same year over a broad region of the Arctic, providing a Pan-Arctic snapshot of system status. The first SAS is ongoing, with cruises taking place in 2020-2022.

The international SAS is coordinated by an international Science Steering Committee (SSC) that includes two representatives from each of the participating countries. The program is based in the coordination office at the Bjerknes Center in Bergen Norway, led by Drs. Øyvind Paasche and Are Olsen who also are the chair and vice-chair of the SSC.

A community meeting was held on March 31, 2022 in conjunction with the Arctic Science Summit Week that was held in Tromsø, Norway. The meeting was hybrid, with some participating in-person at the University of Tromsø and others joining on-line via Zoom. Approximately 40 scientists, program managers, and early career/student investigators joined the meeting. Two early career scientists supported through IASC, Annika Margevich and Savannah Sandy, assisted and served as rapporteurs – and the workshop report is in great part based on their efforts. The goals of the meeting were to provide an update on the program, especially on the recent and planned cruises, to further plans for coordination between 2022 field programs and for syntheses of findings from across the effort, and to identify concrete action items to accomplish these syntheses, maintain forward momentum for the program, and look ahead to planning for the next decadal survey.

The meeting was very successful, with a broad review of recent and upcoming cruises and opportunities for synergies and coordination identified based on that review. Introductory talks were followed by national reports. This information then was discussed during the last hour of the workshop. A list of action items was identified to help move the program forward.

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PHOTO: DANILO PETROCELLI
Maritime Robotics AS. Drone operations in the Greenland sea.

International MOSAiC Science Conference

When: April 25 - 29, 2022
Where: Postdam, Germany
Working Group: AWG, CWG, MWG

The Multidisciplinary Drifting Observatory for the Study of Arctic Climate (MOSAiC) was the largest Arctic expedition in our times and took place from September 2019 until October 2020. After years of planning under the umbrella of IASC and more than 80 institutions from 20 nations involved, the expedition was a big success and scientists collected terabytes of data and thousands of samples during the year of expedition. Now, one year after the expedition ended, MOSAiC has organized a big meeting to present and discuss the scientific results.

In a nutshell, the event:

- Very intensive exchange of participants and projects, especially across teams and different legs
- Formation of new thematic groups working together on topics and issues from different points of view: e.g., an albedo group that links radiation and albedo measurements with other observations (e.g., aerial photos and snow properties); a coordinate system group that tries to process as many measurements as possible from different groups in such a way that the points of the measurements on the always drifting floe can be superimposed (e.g. helicopter measurements with ground and satellite data) - Very intensive exchange on special issues, especially also in hybrid format using small digital meeting points
- Transition to cross-linked and crosscutting data analysis
- There is altogether an impressive amount of data sets, publications, results, which became very obvious and was compiled in Potsdam
- Many practical issues were discussed and implemented: e.g., data archiving, integration of new colleagues into existing MOSAiC groups and teams, planning of further workshops
- Once again, the strong link between observations and numerical simulations became clear and ways to further intensify this in the future were discussed
- It was a very strong social event, as it was the first in-persona meeting for the vast majority of participants since the pandemic began. To some participants and team leaders this is the most important aspect overall for the continued success of the entire projects (even if it is not strictly scientific)

Highlights:

1. Refined and further developed MOSAiC scientific exploitation strategy
2. Discussion of ongoing and future publications
3. Great progress towards crosscutting analysis

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PHOTO: Attendees of the International MOSAIC Science Conference. Photo courtesy of the organizers.

Changing Artic rivers' behavior: what is the Inuit perception?

When: May 2 - 8, 2022
Where: Pond Inlet (Canada)
Working Group: CWG, SHWG, TWG

Changing Arctic landscape: what is the Inuit perception? is a documentary project initiated by three women with completely different backgrounds. Flore studies the impact of permafrost thawing on Arctic water resources, Mathilde studies the impact of snow properties on lemmings and Camille is a film-maker. Though, motivated by the same passion for northern regions, Flore, Mathilde and Camille ended up working and thinking together on how to reach public awareness on the impact of climate change in the Arctic. They co-realised a short documentary on the Inuit perception of their territory in a context of climate change.

The film has been shot in Mittimatalik (Pond Inlet), in Nunavut, with the collaboration of this community. The film gathers images of the changing environment and interviews from knowledgeable youths and elders of the community. These persons share their stories, their traditional knowledge, their observations and their reflections on the future of their environment. These testimonies and images are precious message to help raise the voice of Inuit regarding challenges related to climate change and to increase awareness of the public.

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BEPSII Sea Ice School - Educating a new generation of sea-ice scientists at times of rapid changes in polar regions

When: May 14 - 23, 2022
Where: Cambridge Bay, Nunavut, Canada
Working Groups: AWG, CWG, MWG, SHWG

One of the goals of BEPSII is to educate and support Early Career Scientists (ECS). With the first BEPSII Sea-Ice School we aimed to teach the students different aspects of sea-ice biogeochemistry, from theory to lab work to fieldwork. The school took place in Cambridge Bay, Nunavut, Canada, from May 14th to the 23rd. Organized by BEPSII SSC members Letizia Tedesco of the Finnish Environment Institute SYKE (Finland), Bruno Delille and Odile Crabeck of the University of Liège (Belgium), and with the support of CliC, IASC, NSF, Polar Knowledge, SCAR, SCOR, SOLAS, it was the first initiative of its kind within the BEPSII network. 29 participants from Canada, the U.S., South Africa, Japan, Finland, Germany and the UK, just to mention a few of the represented countries, gathered together at the Canadian High Arctic Research Station (CHARS) for a full immersion into sea ice. CHARS served as the headquarters of the school, providing accommodation for students and lecturers alike, as well as spaces for frontal lectures and presentations, poster sessions, and lab work – all in a unique setting decorated with local ornaments, paintings, and cultural artifacts. Lectures were one of the highlights of the 2022 BEPSII School.

Highlights:

- The BESPII Sea-Ice School was the first initiative of its kind within the BEPSII network.
- The school format included frontal and interactive lectures, lab and field work, poster sessions, and group work final reporting

- The school focused on a wide range of topics, from basic sea-ice physics to gas exchange, nutrients, ice algae, land – sea ice - ocean Interaction, sea-ice optics, ecology, biogeochemical modelling and a target class on effective communication for ECSs.

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16th International Circumpolar Remote Sensing Symposium (16 ICRSS)

When: May 16 - 20, 2022
Where: Fairbanks, Alaska, USA
Working Groups: AWG, CWG, SHWG, TWG

The 16th International Circumpolar Remote Sensing Symposium (ICRSS) provided a platform for the exchange of current applied research and best practices, the presentation of new technology and further innovation, and the advancement of international cooperation in the circumpolar regions of the world. This symposium dealt specifically with remote sensing applications in the polar environments, both Arctic and Antarctic. Earth's Polar Regions feature cold-climate environments characterized by unique landscapes, biota, and processes. Many of these features and dynamics are Cryosphere-driven and either are already subject to or have the potential for fundamental and rapid changes in a warming world. Earth observation technologies provide crucial tools to understand and quantify these changes.

The 16th ICRSS took place at the University of Alaska Fairbanks (UAF) in Fairbanks, Alaska between 16–20 May 2022. The week-long symposium saw 102 registrants from 12 countries, and attendance—with both in-person and virtual options—fluctuated between 50 to over 80 attendees at any one time. The science program included two full days and two half days of scientific presentations, a half day program consisting of a panel discussion, and a poster session. Oral presentation sessions focused on Arctic Land Cover, Sensor Development and Operational Services, Arctic Coasts and Communities, Climate Change and Climate Data Records, Glaciers and Seasonal Snow Cover, Observing Permafrost, Floating Ice, and Microwave Remote Sensing. The 49 oral presentations were given by both in-person and virtual attendees. The poster session was only held in-person; however, poster presenters were given the opportunity to give a flash talk of their poster that was streamed online. This gave virtual attendees the opportunity to ask questions to the 32 poster presenters.

Highlights:

- Remote sensing plays an essential role in detecting and quantifying substantial changes in some of Earth's most remote and inaccessible regions.
- Open-access data policies and data publishing stewardship foster longer and denser time series analysis and a better understanding for short- versus long-term cryosphere dynamics.
- International collaboration—from the level of individual researchers and projects to joint major field or observation campaigns—is essential for synergizing scientific work in polar regions.

More Information: ICRSS Website

https://www.awi.de/en/science/geosciences/permafrost-research/conferences/icrss.html

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Karthaus Summerschool on Ice Sheets and Glaciers in the Climate System

When: May 24 - June 4, 2022
Where: Karthaus (Italy)
Working Groups: AWG, CWG

Finally, after two years of having to cancel the course because of the Covid-19 situation, the 20th Karthaus summer school on Ice Sheets and Glaciers in the Climate System took place from 24 May to 4 June 2022. 36 Students (mainly Ph.D.) affiliated to institutes from 12 countries took part.The students had lectures in various topics within glaciology, including topics like continuum mechanics, kinematics, ice rheology, sliding and hydraulics, numerical modelling, polar meteorology, ice-ocean interaction, ice cores, the interaction of ice sheets with the solid earth, glacier fluctuations, and climate change.

During the first day all students presented their research topics in 3-minute pitches. This is always an important aspect of the start of the course, because students and teachers get to know each other quickly. In addition to lectures and exercises also computer projects, done in groups of three students, were part of the daily Karthaus programme. At the end of the course, the outcomes of these projects were presented in 12 presentations. On Sunday 29 May, there was a well-deserved break from the theory and computer exercises, and an excursion took place. In snowy conditions we made a hike from Kurzras up to the Lazaun rock glacier (see photograph on the left). After sightseeing of the rock glacier, lunch was taken at the Lazaun restaurant. During lunch, the weather cleared and most of the students then hiked down to Vernagt from where they took the bus back to Karthaus, while others took the bus back from Kurzras.

A full list of students and lecturers can be found at the Karthaus-2022 website. This website also contains the full program and more comments on the social aspects of the course.

More information: Karthaus-2022 website:

https://www.projects.science.uu.nl/iceclimate/karthaus/

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Arctic Permafrost Atlas – Maps and Graphics

When: May 30 - June 1, 2022
Where: Arendal, Norway
Working Groups: CWG, SHWG, TWG

From May 30th to June 1st, GRID-Arendal hosted a workshop in Arendal bringing together world-renowned cartographers and designers to work collaboratively on the Arctic Permafrost Atlas. The atlas is a main deliverable of the H2020 Nunataryuk project. The Advisory Board for Cartography and Design was setup to gather expert input into all the visual content of the publication. It consists of 5 members: Alex Tait (National Geographic), Adolofo Arranz (Reuters, formerly South China Morning Post), Lauren Tierney (Washington Post), Margaret Pearce (independent cartographer), Oliver Uberti (independent designer). During the workshop, 3 of the members (Tait, Uberti, and Pearce) were able to travel to Arendal. The workshop was also attended by Paul Overduin (a senior permafrost scientists from AWI).

Each day was divided into two working blocks. Each block was assigned to a specific chapter of the atlas. During the working sessions, all the visuals and content of that chapter will be reviewed, discussed, and annotated for required changes by the cartography and design experts. The sessions were also joined by the editor and designer and writers of the publication at GRID-Arendal. The presence of the writers and Overduin from AWI allowed all the discussions to be grounded in science. In

total, 74 unique visuals were discussed and reviewed. Some visuals only need small adjustments, whereas others will require significant changes. Besides individual spreads in the atlas, the group also discussed the general layout of the publication (chapter dividers, the use of photographs, text layout, printing recommendations, and outreach and audience considerations).

At lunch, everyday, one of the experts gave a presentation. Alex Tait from National Geographic presented on Monday. Oliver Uberti on Tuesday, and Margaret Pearce on Wednesday. The presentations were 45 minutes long and followed by a Q&A. The talks focused on science outreach, communication, design, mapping and cartography. They were attended by GRID-Arendal staff, but the invitation was also extended through online links to all natural and social scientists from the Nunataryuk project, especially Early Career Researchers (ECRs). Unfortunately due to technical issues the first day, external participants had challenges joining the meeting. This was fixed, and the second and third presentations were well attended!

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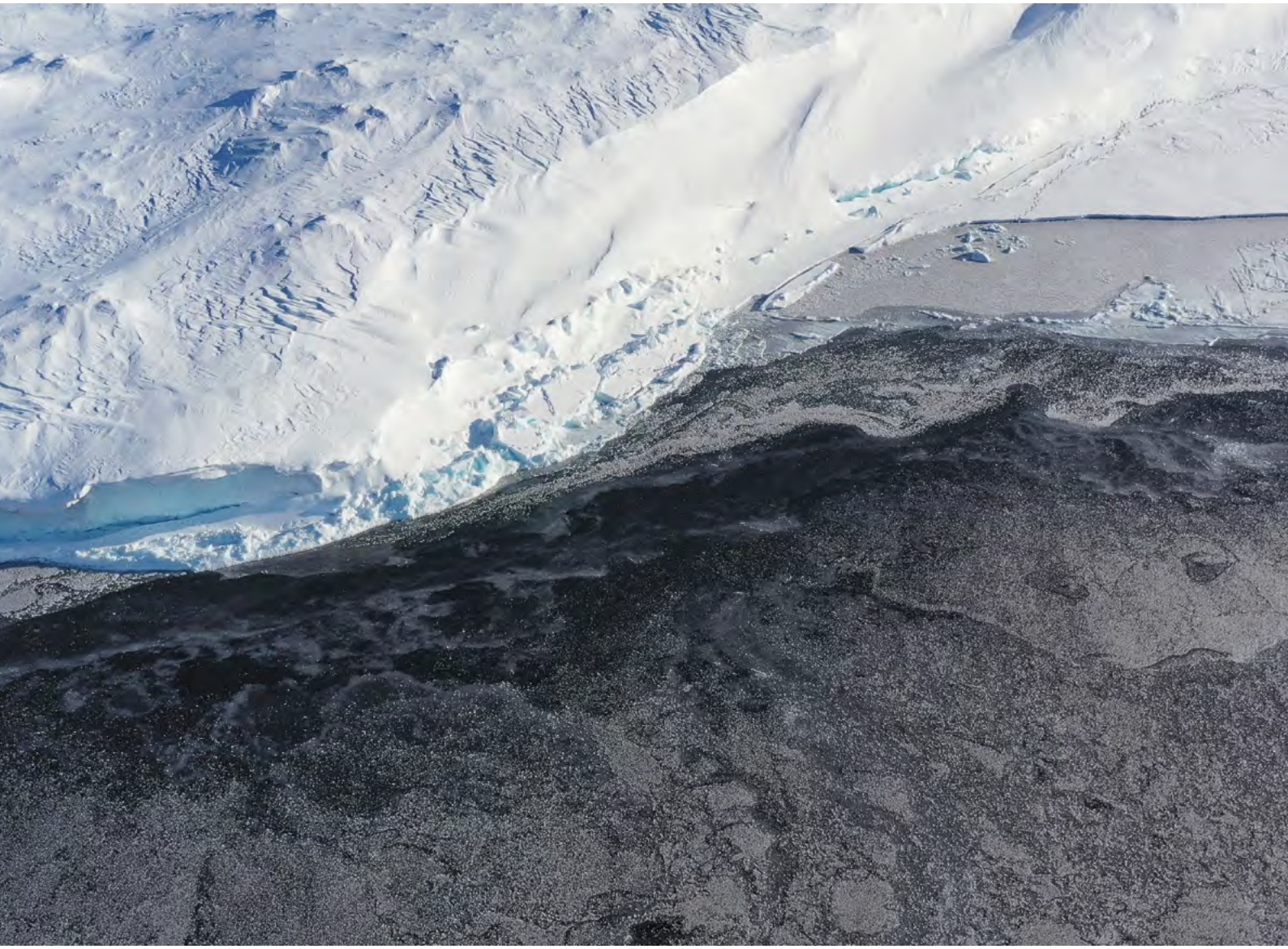

PHOTO: DANILO PETROCELLI
Maritime Robotics AS. Drone operations in the Greenland sea.

Workshop on "Ice Sheets: Weather versus Climate"

When: August 23 - 24, 2022
Where: Reykjavik, Iceland
Working Groups: AWG, CWG, MWG

The 2022 ISMASS Workshop on "Ice Sheets: Weather versus Climate" was held in Reykjavik, Iceland, on 23-24 August 2022, as an affiliated/special session of the CRYOSPHERE 2022 symposium. The workshop explored the degree to which short-term fluctuations and extreme events in the ice sheets (both Greenland and Antarctica) in the last two decades reflect their longer-term evolution and response to ongoing climate change. It considered the interplay of forcings from the atmosphere and ocean and their interactions with ice-sheet changes on timescales of days to centuries. It also included discussion of recent innovations and recommendations for the next few years that are required in observations, process studies and modelling efforts to make further major breakthroughs in understanding how ice sheets change and the resulting local to global impacts: for example in sea-level rise. The workshop consisted of a mix of invited keynote talks and panel/discussion sessions which addressed these crucial issues from a multi-disciplinary perspective.

We had a superb line-up of speakers (an excellent and diverse range of world-leading and emerging researchers) on a very relevant topic that attracted more than 80 participants. We also had a very lively and fruitful discussion session on the final morning. The workshop lead organiser Edward Hanna worked closely with local organiser Thorsteinn Thorsteinsson (the main organiser of the CRYOSPHERE 2022 symposium), which created important synergies with shared infrastructure and speakers.

We note the strong engagement of a diverse group of Early Career Researchers (ECR) contributing to the workshop. With help of our sponsors (IASC, CliC and SCAR),

PHOTO: Workshop on "Ice Sheets: Weather versus Climate" Group Photo. Photo courtesy of the organizers

we supported the travel costs of seven Early Career Researcher participants and one dedicated ECR (Aakriti Srivastava) on the organising committee, all selected in collaboration with APECS. Many other ECRs chose to participate, giving an overall well-balanced and inclusive demographic.

As a key outcome of the workshop, we are currently working on a high-impact paper for the broad community (scientists, educators, early-career researchers, policymakers and funding agencies etc.), which will be centred around the outcomes of the workshop: for example, key uncertainties and priorities for further work in observations, models and process studies that will enable us to significantly improve projections of future ice-sheet mass changes and their contribution to global sea-level rise by 2100. Although the paper's exact contents have yet to be confirmed, it is also envisaged that it should summarise related key elements of what recent and past ice-sheet behaviour tells us about ice-sheet sensitivity to ongoing climate change (ice sheet "weather" versus "climate").

We gratefully acknowledge co-sponsorship from IASC and SCAR as well as CliC, and Edward Hanna would like to thank the other members of the organising committee (Guðfinna Aðalgeirsdóttir, Heiko Goelzer, Frank Pattyn, Catherine Ritz, Aakriti Srivastava, Thorsteinn Thorsteinsson).

More information: ISMASS Workshop website:

https://climate-cryosphere.org/ismass-workshop-ice-sheets-weather-vs-climate/

Contact:
Edward Hanna - *ehanna@lincoln.ac.uk*

PHOTO: LEE COOPER
Clare and Jona were washing sediment samples during the Synoptic Arctic Survey cruise aboard the USCGC Healy in October 2022

Enabling Early Career Scientist and/or Indigenous Participation in Internationally Cross-Platformed Research Cruises

When: September 3 - October 29, 2022
Where: Arctic Ocean
Working Groups: MWG, ISIRA

The participation of an early career scientist on a research cruise operated by an international partner was facilitated in 2022. Our primary project goal is to increase the participation of early career scientists and/or Indigenous knowledge holders on ships conducting oceanographic research in the Arctic on a cross-plat-

form, international basis, e.g. Canadians would be accommodated on a Korean ship or Swedes on a US vessel, or any other international platform that would allow the participation of one country's scientist(s) on another's country's vessel. The object of this program in general is to improve international cooperation and coordination, data sharing, complement observations, and collaboration across international boundaries. This project supported travel to join the ship.

Following approval of the project by the Marine Working Group of IASC in 2020, challenges were posed by the Covid epidemic, but in 2022, we were successful in using funds from this project to support the participation of an early career German scientist, Jona Silberberg, on a US vessel as part of the Synoptic Arctic Survey, which in itself is an internationally coordinated endeavor aligned with the goals and strategy of the Marine Working Group of IASC. Ms. Silberberg undertook independent genomic research on sediment meiofauna while aboard the two-month cruise. Salary support for Ms. Silberberg was provided by the Christian-Albrecht University of Kiel and the berth aboard the USCGC Healy was made available at no cost through US National Science Foundation funding of the Synoptic Arctic Survey.

Based upon the success of this effort, we have proposed that new funding be considered by the Marine Working Group for 2023. In particular in 2023, there is an opportunity to place international early career scientists and/or Indigenous knowledge holders on the Japanese oceanographic vessel, the Mirai. The Japanese Agency for Marine Science and Technology (JAMSTEC) has organized a process for selection of scientists and knowledge holders who will be able to undertake research and observations during the Mirai's 2023 research activities in the Pacific Arctic region.

Contacts:
Lee Cooper - *cooper@umces.edu*
Jacqueline Grebmeier - *jgrebmei@umces.edu*

Atmosphere Working Group (AWG)

The scientific scope of the Atmosphere Working Group (AWG) includes scientific research towards understanding and prediction of Arctic change, and considering the fate of perennial sea ice and the global atmospheric consequences of its disappearance. This includes past climate states, investigation of Arctic processes across data sets and approaches, and climate model projections. The scope includes local and regional impacts of Arctic change.

The geographic scope of the AWG shall be the Arctic but will also include the Arctic´s responses to global change processes (arctic amplification) and impacts of Arctic changes on the northern hemisphere atmospheric circulation.

Scientific Foci

The AWG will address many of the direct large scale and regional climate change issues for IASC. We see our function as promoting science, but not focusing on monitoring or future assessments.

- Cloud, Water Vapour, Aerosols, Fluxes
- Arctic Air Pollution
- Coupled Arctic Climate System
- Arctic Weather Extremes
- Linkages: Role of the Arctic in the Global Climate System

These topics have been put under the three pillars of the AWG:

- MOSAiC (Multidisciplinary drifting Observatory for the Study of Arctic Climate)
- PACES (Air Pollution in the Arctic: Climate, Environment and Societies)
- YOPP/PPP (Year of Polar Predictions / Polar Prediction Project)

More Info:

iasc.info/working-groups/atmosphere

Membership[1]

NAME	COUNTRY	EXPERTISE
Chair Gijs de Boer	USA	Arctic clouds; Autonomous Observing; Aerosol-cloud interactions
Guðrún Nína Petersen	Iceland	Arctic weather; Extreme weather; Numerical weather prediction
Michael Mayer	Austria	climate diagnostics; water and energy cycle; long-range forecasts
Ramiro Checa-Garcia	Austria	Radiative forcing; Aerosols and Atmospheric chemistry; Climate modelling
François Massonnet	Belgium	Arctic sea ice; Prediction and Predictability; Climate model evaluation and forecast verification
Xavier Fettweis	Belgium	regional climate modelling; surface mass balance; general circulation changes
James Drummond	Canada	Remote sounding; Ozone and air quality; Climate change
G.W.K. (Kent) Moore	Canada	High-latitude air-sea-ice interactions; Polar meteorology; Paleoclimatology
DING Minghu	China	Mass balance; Air-sea/ice interaction; Measurement technique
DING Zhuoming	China	Atmospheric boundary layer; Polar lows; Numerical weather rediction
Kamil Laska	Czech Republic	Solar radiation modelling; Boundary layer processes; Glacier-climate interactions
Jacob Klenø Nøjgaard	Denmark	Arctic aerosol; Mass spectrometry; Source apportionment
Jens Hesselbjerg	Denmark	Coupled Arctic climate system; Climate change; Climate prediction

Mikko Sipila	Finland	Secondary aerosol formation; Nucleation; Gas phase chemistry
Tiina Nygård	Finland	Atmospheric thermodynamics; Moisture/clouds; Numerical modelling
Jennie Thomas	France	Arctic atmospheric chemistry, cryosphere-atmosphere interactions, regional and process modeling
Jean-Christophe Raut	France	Arctic aerosols; Aerosol-cloud interactions; Numerical modelling
Astrid Lampert	Germany	Atmospheric boundary layer; Airborne meteorology; In situ measurements
Annette Rinke	Germany	Arctic climate modeling; Arctic atmospheric processes; Surface-atmosphere interactions
Rohit Srivastava	India	Atmospheric aerosols; Black carbon; Climate modeling
Sourav Chatterjee	India	Large-scale atmospheric circulation; Pole-tropics teleconnections; Air-sea-ice interactions
Stefano Decesari	Italy	Atmospheric chemistry; Aerosol-climate interactions; Biogenic & anthropogenic organic aerosols
Yutaka Tobo	Japan	Atmospheric aerosols; Aerosol-cloud interactions; Ice nucleation
Jun Inoue	Japan	Arctic climate change; Air-sea-ice interactions; Arctic weather
Ki-Tae Park	Republic of Korea	Trace gases, Aerosols, Air-sea interactions
Sang-Jong Park	Republic of Korea	Polar meteorology; Atmospheric boundary layer; Surface-atmosphere interactions
Laurens Ganzeveld	The Netherlands	Atmospheric chemistry-climate interactions; Surface exchange processes; Modelling
Maria Sand	Norway	Climate modeling; Black carbon aerosols; Aerosol-radiation interactions
Malte Müller	Norway	Arctic weather, High-latitude atmosphere-surface interactions, Numerical modelling
Ewa Lupikasza	Poland	Climate change; Atmospheric circulation; Synoptic climatology
Marek Kejna	Poland	
Daniele Bortoli	Portugal	Atmospheric physics; Active and passive remote sensing; Spectroscopy
Alexander Makshtas	Russia	Sea ice and permafrost - atmosphere interaction processes; Arctic climate
Boris Vladimirovich Kozelov	Russia	Geliogeophysical impact to Arctic atmosphere; Climate and micro-climate in Arctic region
Ana Cabrerizo	Spain	Persistent organic pollutants; Environmental chemistry; Temporal trends
Carlos Toledano	Spain	Atmospheric aerosols; Remote sensing; Radiometry
Thomas Kuhn	Sweden	In-situ measurements of Arctic clouds; Snowfall; Ice fog
Julia Schmale	Switzerland	Aerosol chemistry and microphysics; Cloud condensation nuclei; In-situ observations
Jo Browse	UK	Aerosols; Clouds; Modelling
Muyin Wang	USA	Arctic climate dynamics; Model-data synthesis; Sea-ice prediction

FELLOWS

Hélène Angot (2021)	Switzerland	Trace gases, atmospheric chemistry, surface-atmosphere exchange
Thomas Webb (2022)	United Kingdom	Coastal Climate, Boundary-Layer Meteorology, Climate Modelling
Rémy Lapere (2023)	France	Chemistry-transport modeling, Aerosols, Air pollution

SECTRETARY

Thomas Webb	United Kingdom	University of York, Contact: bus@thomas-webb.com

Recent Activities

For updated information, please check the IASC website: **iasc.info**

TABLE

[1]Membership as of 4 January 2023. For updated information and contact information for each Working Group Member please visit :

https://iasc.info/our-work/working-groups/atmosphere

Polar Low Workshop

When: December 8 - 9, 2021
Where: Online

The 15th meeting of the Polar Low Working Group (PLWG) was initially scheduled from 13th to 15th of May 2021 in Moscow (to be held at Shirshov Institute of Oceanology, RAS) however due to the COVID19 pandemic the meeting was first rescheduled and then made it online. From 8th to 9th of December 2021 we ran the virtual meeting that brought together more than 30 researches from 9 countries.

We received 29 abstracts that were organized in 5 program sections:

1. Polar lows characteristics from different source-based case studies
2. Polar lows development environments
3. Polar boundary layer events as seen from high-resolution datasets
4. Polar lows as seen in satellite data and possible variations during the climate change
5. Polar lows modeling, forecast and prediction

All presentations were prerecorded by participants and uploaded to the cloud storage, videos were played during the meeting while discussions and questions after presentation were held in live format.

PLWG agreed to formulate a letter of support for the STARS polar low dataset to be stored permanently with DOI. Given that there are several different polar low tracking algorithms, a comparison of these detection and tracking algorithms is recommended to assess the performance between different detections and tracking based on the same data set as well as the same detection and tracking on different reanalysis/model data. Related, it was discussed how to best define a polar low and how to determine its best track. PLWG recommends developing a community-accepted list of polar lows.

Several new data became available, such as Arctic CORDEX, CARRA, NORA3, ASR2, NAAD.

Participants discussed the relative role of baroclinicity and diabatic and agreed that previous symmetric theories such as CISC is not relevant to polar low development due to the asymmetry in initial development and non-availability of CAPE. Regarding the role of Atmosphere-Ocean-Ice interactions for PL development, there is a need for more case studies with coupled models to identify pertinent processes more systematically.

The PLWG also identified satellite data as a useful data source. In particular SAR data and new capabilities related to the distribution of moisture and hydrometeors.

Organizing committee:

Thomas Spengler
(Geophysical Institute, University of Bergen)

Natalia Tilinina
(Institut des Géosciences de l'Environnement, UGA and Shirshov Institute of Oceanology, RAS)

Polina Verezemskaya
(Shirshov Institute of Oceanology, RAS)

Support:

Alexander Gavrikov
(Shirshov Institute of Oceanology, RAS)

Mikhail Krinitskiy
(Shirshov Institute of Oceanology, RAS)

Sergey Gulev
(Shirshov Institute of Oceanology, RAS)

Contacts:
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Natalia Tilinina- *tilinina@sail.msk.ru*

Upcoming Activities

For updated information, please check the IASC website: **iasc.info**

Arctic Climate and Weather Extremes: Detection, Attribution, and Future Projection

When: May 15 - 20, 2022
Where: Aspen, Colorado (US)

Arctic climate and weather extremes have more frequently been observed during recent years. They are crucial elements to alter the trajectory of Arctic climate system changes and is a central area of the WCRP Grand Challenge "Melting Ice-Global Consequences". However, climate change studies have predominantly focused on the monthly, seasonal, or annual mean state and their long-term trends. It therefore still remains unclear why these extreme events occur, what their multi-scale driving mechanisms are, and where the source of their predictability exists. The recently completed YOPP and MOSAiC field campaigns and CMIP6 experiments further provide new momentum to timely address these questions.

The workshop aimed to synthesize the state of knowledge and identify key scientific questions for future research priorities about Arctic climate and weather extremes. The workshop was organized to focus on five specific research areas: (1) Perspectives from the changing Arctic climate system; (2) Observed and modeled extreme climate and weather events in the Arctic; (3) Large-scale feedbacks, processes, and teleconnection; (4) Synoptic and meso-scale systems, air-ice-sea interactions, and driving mechanisms; and (5) Attribution, future projection, and impacts. On the last day, a specific session was organized for Discussions and Synthesis: Reviewing state-of knowledge and identifying research gaps and future directions.

The detailed workshop agenda and presentations can be found at:

https://www.agci.org/event/22s2

Scientific Highlights:

- The metrics for detecting extreme events should be defined based on research purposes including PDF/variance-based (e.g., model evaluation) and consequence-based (e.g., assessing impacts) ones. Physically based, integrative metrics need to be developed for evaluating dynamic drivers (e.g., cyclones, polar lows, blockings, AR) to reconcile research discrepancies.
- The large-scale atmospheric internal dynamics (e.g., jet streams, the stratospheric polar vortex) shows responsibility for Arctic extremes along with the Arctic amplification. Poleward ocean heat transport and weakened ocean stratification would also favor the occurrence of extremes. But these processes have not been well observed, modeled, and understood.
- Cyclones, polar lows, blockings, and AR serve as direct drivers in the occurrence of Arctic climate and weather extremes, but underlying physical mechanisms remain unclear. The complete air-ice-sea interactive processes in both dynamics and thermodynamics need to be observed/modeled/analyzed to fully understand the role of these drivers in extreme events.

Contacts:
Xiangdong Zhang - *xzhang9@alaska.edu*
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Timo Vihma - *Timo.Vihma@fmi.fi*

Cryosphere Working Group (CWG)

The Cryosphere Working Group (CWG) supports and promotes all scientific or engineering research related to the Arctic and subarctic cryosphere, including glaciers, sea ice, snow, permafrost, seasonally frozen ground, and lake and river ice. It encompasses cryospheric interactions with the atmosphere, ocean, biosphere, and terrestrial systems in the past, present and future, and the cryosphere's role in climate and human society.

Scientific Foci

- Improve knowledge of the past, current, and future state of the Arctic cryosphere across wide-ranging spatial and temporal scales using innovative methods including in-situ observations, remotely sensed measurements, models, citizen science, and participatory research.
- Advance understanding of melt and thaw processes, ice and snow dynamics, and complex cryospheric interactions with atmosphere, terrestrial, ocean, and biological systems.
- Quantify and project cryospheric change and the frequency and intensity of extreme cryospheric events such as: heavy snowfalls, icing, avalanches and rockfalls, glacial lake outburst floods, glacier surges, abrupt permafrost thaw, permafrost coastal erosion, events resulting from sea ice dynamics, intrusion of warm air masses from outside the Arctic, and seasonal climate anomalies.
- Improve understanding of interactions between the cryosphere and human society, especially impacts of cryospheric change on humans, anthropogenic impacts on the cryosphere, and the contribution of local and indigenous communities to cryospheric knowledge.

Cross-cutting Approach

Achieving the CWG scientific foci requires interdisciplinary research and collaboration with other working groups and local communities, where applicable. Our approach emphasizes open and collaborative science; ethical, sustainable, and responsible science practices; diversity, equity, and inclusion; and using cryospheric knowledge to support society.

iasc.info/working-groups/cryosphere

MEMBERSHIP[2]

NAME	COUNTRY	EXPERTISE
Chair, Shawn Marshall	Canada	Glacier and ice sheet modelling; Cryosphere-climate processes; Glacier mass balance
Vice Chair Marie Šabacká	Czech Republic	Glacier ecology
Vice-Chair LEI Ruibo	China	Sea-ice physics; Climate change; Technology for sea-ice observations
Helena Bergstedt	Austria	Permafrost, Landscape dynamics, Remote Sensing
Jakob Abermann	Austria	Mountain glaciers, ice-climate interaction, Greenland mass balance
Hugues Goosse	Belgium	Sea Ice, feedbacks, climate modelling
François Fripiat	Belgium	Oceanography, Glaciology and Paleoclimatology
XIAO Cunde	China	Cryospheric research
Nanna Karlsson	Denmark	Glaciology; Ice-penetrating radar; Ice-flow modelling; Mass balance
Rasmus Tonboe	Denmark	Sea ice
Arttu Polojärvi	Finland	Ice mechanics; Numerical modeling; Deformed sea ice

Letizia Tedesco	Finland	Marine biogeochemical modelling; sea-ice physical-biogeochemical processes, climate change
Hans-Werner Jacobi	France	Snow physics and chemistry; Snow-atmosphere interactions; Climate
Hugues Lantuit	Germany	Permafrost; Geomorphology and remote sensing; Coastal science
Gunnar Spreen	Germany	Sea ice; Remote sensing; Ocean-sea ice-atmosphere interactions
Þorsteinn Þorsteinsson	Iceland	Glaciology; Ice drilling; Climate history
Guðfinna (Tollý) Aðalgeirsdóttir	Iceland	Climate - glaciers/ice sheets interaction; Evolution of Icelandic glaciers and the Greenland ice sheet
Parmanand Sharma	India	Glaciology; Mass and energy balance; Glacier hydrology; Snow and ice chemistry
AL. Ramanathan	India	Glaciology; Biogeochemistry; Hydrology
Andrea Spolaor	Italy	Paleoclimate; Snow chemistry; Air-snow exchange
Teruo Aoki	Japan	Optical properties of snow; Atmospheric radiation; Greenland Ice Sheet
Nozomu Takeuchi	Japan	Glacier-ecology; Microbiology; Glaciology
Hyun-cheol Kim	Republic of Korea	Remote sensing; Sea ice
Jung-Ho Kang	Republic of Korea	Environmental monitoring; Glaciology; Snow and ice chemistry
Richard Bintanja	The Netherlands	Arctic climate change; Climate variability; Arctic hydrological cycle; Climate modelling
Geir Moholdt	Norway	Glaciology; Remote Sensing; Mass balance
Thomas Vikhamar Schuler	Norway	Arctic glacier mass balance & hydrology; Subglacial processes; Modeling cryosphere: snow, glaciers and permafrost
Dariusz Ignatiuk	Poland	Arctic glacier mass balance and hydrology, Glaciology, Energy mass balance
Ireneusz Sobota	Poland	Cryospheric changes; Mass balance; Snow; Permafrost
Gonçalo Vieira	Portugal	Permafrost; Remote sensing; Geomorphology
Sergei Verkulich	Russia	Glaciers and permafrost; Antarctic and Arctic Quaternary sediments; Terrestrial records
Carolina Gabarro	Spain	Remote sensing; Sea-ice extension; Sea-ice thickness
Jaime Otero	Spain	Glaciers; Numerical Models; Calving
Margareta Johansson	Sweden	Permafrost; Snow; Vegetation
Andreas Vieli	Switzerland	
Poul Christoffersen	United Kingdom	Glacial hydrology; Ice-ocean interactions; Basal processes
Richard Essery	United Kingdom	Snow modelling; Seasonal snow cover; Snow hydrology
Cathy Wilson	USA	Hydrology; Geomorphology; Permafrost
Robert Hawley	USA	Glaciers, ice sheets, snow and firn; Mass balance; Remote sensing

FELLOWS

Greta Wells (2021)	USA	Glaciology; Ice shelves; Sea ice
Wai Yin Cheung (2022)	Canada	Glaciology, Photogrammetry, Cross-culture studies
Armina Soleymani (2023)	Canada	Sea ice, Satellite image processing, Remote sensing

SECRETARY

Rosalie McKay	Norway	UiT, The Arctic University of Norway, Tromsø, NorwayContact: rosalie.d.mckay@uit.no

Recent Activities

For updated information, including dates, please check the IASC website: **iasc.info**

TABLE

[2]Membership as of 4 January 2023. For updated information and contact information for each Working Group Member please visit : https://iasc.info/our-work/working-groups/cryosphere

Cryosphere 2022 Symposium

When: August 21 - 26, 2022
Where: Reykjavík, Iceland

The symposium Cryosphere 2022 in Reykjavík successfully brought together scientists working on all components of Earth´s cryosphere, with a strong focus on changes occurring in the Arctic region. During the Monday plenary sessions, invited presentations were given on North Atlantic climate history, key results from the IPCC AR6 report, mass balance of the Greenland Ice Sheet, Arctic permafrost studies, sea ice monitoring and on hydrological changes occurring in response to global warming. Plenary and special sessions continued throughout the week. Studies of mass loss from glaciers worldwide were presented, with emphasis on the need to increase observation capacity in relation to calving and frontal and basal melting. Examples were given of increased hazards due to permafrost melt in mountains and the formation of proglacial lakes by glacier retreat. A session on Humans in the Cryosphere explored how climate change is currently affecting the resilience of inhabitants in Arctic and high-mountain regions.

More than 300 scientists from 33 countries on 6 continents registered for participation in the symposium. A total of 348 presentations were given (174 talks and 174 posters), nearly 1/3 of them by student researchers. The overall gender balance (in %) was 51F/49M. Several off-venue events were held during the symposium, for participants and the general public. Four excursions were offered during Wednesday afternoon and evening, to areas of glacial and volcanic activity. In addition, two post-symposium excursions took participants to the Langjökull ice cap and to the glaciated and volcanic regions of Southern Iceland.

PHOTO: REGINE HOCK
Glacier Excursion during the International Glaciology Summer School

A grant from the IASC Cryosphere Working Group and other funds allowed the organizers to provide travel grants to 22 early career scientists. The grants covered part of the costs of attending the symposium and were allocated mainly to students traveling long distances to Iceland.

Scientific highlights:

- Reduced uncertainty in estimates of Arctic/ Northern Hemisphere seasonal snow mass
- Arctic Ocean unlikely to become ice-free in summer earlier than 2050
- 50% of all glaciers in the world projected to disappear by 2100

More information: Cryosphere 2022 website:

https://www.cryosphere2022.is

Contact:
Þorsteinn Þorsteinsson - *thor@vedur.is*

International Glaciology Summer School

When: June 10 - 17, 2022
Where: McCarthy, Alaska

Almost 30 graduate students from more than 10 countries gathered in the small Alaskan village of McCarthy, 7-17 June 2022, to participate in the University of Alaska Fairbanks's (UAF) sixth 11-day International Summer School in Glaciology.

High glacierized mountains provided the perfect setting for the event, which aimed to provide early-career Ph.D. students with tools to address the increasing challenges in quantifying and modeling rapid changes in glaciers and ice sheets occurring in response to a warming climate and to foster collaboration among

students as well as established scientists in the field of glaciology. All eight instructors from the glaciology group at UAF and two other US universities stayed for the entire period, thus offering plenty of opportunity for interaction between the instructors and students during and outside the formal instruction period.

Students took part in glaciology lectures, exercises and computer projects with a focus on the Arctic, and presented their own research in an outdoor poster session with posters pinned to the outdoor walls of the Wrangell Mountain Center or to laundry lines. Excursions to nearby glaciers provided hands-on experience in a high-latitude glacier environment, which was a memorable experience, especially for the almost 10 students who (though studying glaciers) had never been on a glacier. A number of evening activities rounded off the program, including a public lecture that attracted >50 locals and tourists.

Overall, the course received extremely positive evaluations. The graduate students left with a stronger background in glaciology, but also with a network of professional contacts from around the world. As in previous years, the course relied heavily on contributions from international organizations and IASC was among one of several professional organizations providing financial support.

Highlights:

- Students enhanced their literacy in glaciology especially gaining a broader foundation beyond their own thesis topic
- The combination of complementary instructions methods including lectures, exercises, research projects and student presentations contributed to an effective learning experience
- Students created a personal and professional network with glaciologists from different countries and all career stages opening opportunities for future collaboration and interactions.

More information:

Summer School Website:

https://glaciers.gi.alaska.edu/courses/summerschool

Contact:
Regine Hock - *rehock@alaska.edu*

Upcoming Activities

For information on CWG upcoming activities, please check the IASC website: **iasc.info**

Marine Working Group

The scientific scope of the Marine Working Group (MWG) shall include but not be limited to any marine natural science or engineering research. The geographic scope of the Marine Working Group shall be the Arctic Ocean and the Subarctic Seas.

Scientific Foci

- Predicting and understanding rapid changes to the Ocean system
- Understanding biological and and ecosystem processes in the Arctic and sub-arctic seas
- Understanding sea ice structure dynamics and the Arctic system
- Understanding geochemical processes in the Arctic and sub-arctic seas
- Enhancing and improving access to the paleo record of the Arctic Ocean through scientific drilling

Cross-cutting

The following three general themes were identified by the Marine WG as important cross-cutting issues which should be addressed by most, if not all, the IASC Working Groups:

- How will the diminishing ice cover affect the carbon cycle in the Arctic and what are the impacts?
- How does the variability of different components of the Arctic system impact the heat and momentum exchanges between ocean, ice, atmosphere and space in a changing climate?
- How will changes in the hydrological cycle impact various components of the Arctic system?

More info:

https://iasc.info/working-groups/marine

Membership[3]

NAME	COUNTRY	EXPERTISE
Chair Heidi Kassens	Germany	Marine Geology; Interdisciplinary polar research projects; Cooperation with Russia
Vice-Chair Karen Frey	USA	Land-ocean linkages; Sea ice; Biogeochemistry
Vice-Chair Takashi Kikuchi	Japan	Physical oceanography; Polar oceanography; Polar climate
Petra Heinz	Austria	Marine ecology; Microbenthos biology; (Paleo-)ecosystems
Thierry Fichefet	Belgium	sea ice-ocean interactions, polar climate, modelling
Bruno Delille	Belgium	
John Fyfe	Canada	Global and regional climate variability; Role of the poles in the global system
Christine Michel	Canada	Role of sea ice in Arctic marine ecosystems; Pelagic and benthic Arctic food webs
LIU Yanguang	China	Marine geology
LI Tao	China	Oceanography
Oleg Ditrich	Czech Republic	Parasitology; Zoology; Polar ecology
Colin Stedmon	Denmark	Chemical oceanography; Environmental spectroscopy; Dissolved organic matter biogeochemistry
Marit-Solveig Seidenkrantz	Denmark	Climate system science; Palaeoclimate; Palaeoceanography; Palaeontology; Marine geology
Jukka Tuhkuri	Finland	Ice mechanics
Hermanni Kaartokallio	Finland	Sea ice ecology; Microbial ecology in cold marine environments

Vincent Le Fouest	France	ocean-sea ice-biogeochemical modeling, coastal oceanography, land-to-sea interface
Marie-Noëlle Houssais	France	Physical oceanography; Ocean-sea ice processes; Large-scale and mesoscale ocean variability
Torsten Kanzow	Germany	Observational physical oceanography; Long-term time series observations
Anna Heiða Ólafsdóttir	Iceland	Geographical distribution, migration, life history traits, and stock assessment of small pelagic fish in the northeast Atlantic
Arnab Mukherjee	India	
Manish Tiwari	India	
Tommaso Tesi	Italy	Paleoclimatology; Geochemistry; Oceanography
Michiyo Yamamoto-Kawai	Japan	Chemical oceanography; Freshwater/carbon/nutrients; Climate change
Eun Jin Yang	Republic of Korea	Polar marine ecology; Microzooplankton biology
Jinyoung Jung	Republic of Korea	
Martine van den Heuvel	The Netherlands	Polar marine biology; Ecotoxicology; Rapid assessment of non-indigenous species using eDNA
Arild Sundfjord	Norway	Ocean – sea ice interaction; Regional & sub-mesoscale ocean modelling; Vertical mixing
Grace Shephard	Norway	Geology and Geophysics; Plate Tectonics; Deep Earth and surface interactions
Agata Zaborska	Poland	
Agnieszka Beszczynska-Möller	Poland	observational physical oceanography, ocean climate, ocean-ice interactions, autonomous observations
Catarina Magalhães	Portugal	Polar Microbial Ecology; Nitrogen Biogeochemistry; Marine Microbiome standards
Sergey Pisarev	Russia	Meso-scale oceanographic processes; Shot-period variations of ocean climate in the Arctic Ocean
Antonio Tovar	Spain	Biogeochemical cycles of trace metals in the ocean; Marine environmental pollution; Global change
Manuel D'Allosto	Spain	Atmospheric science; Marine aerosols and air quality in coastal areas
Adam Ulfsbo	Sweden	Chemical oceanography, marine chemistry, carbonate chemistry
Samuel Jaccard	Switzerland	biogeochemistry, carbon cycle, paleoceanography
Andrew Brierley	United Kingdom	Marine ecology; Scientific echosounding; Zooplankton ecology, predator-prey interactions
Finlo Cottier	United Kingdom	Ice – Ocean processes; Coupled biological-physical interactions; Fjordic systems; Autonomous technologies
Lee Cooper	USA	Marine biogeochemistry, including stable and radioactive isotopes

FELLOWS

Victoria Qutuuq Buschman (2021)	Greenland and USA	Conservation, Biology
Neelu Singh (2021)	Norway	Phytoplankton ecology; Nutrients & stoichiometry; Fjords & coasts
Henrieka Detlef (2022)	Denmark	Paleoceanography, Sea Ice, Geochemistry
Lisa Winberg von Friesen (2023)	Denmark	Marine/sea ice biogeochemistry, Nitrogen fixation, Microbial ecology

SECRETARY

Laura Ghigliotti	Italy	National Research Council of Italy, Contact: laura.ghigliotti@cnr.it

Recent Activities

For updated information please check the IASC website: **iasc.info**

TABLE

[3]Membership as of 4 January 2023. For updated information and contact information for each Working Group Member please visit :

https://iasc.info/our-work/working-groups/marine

The Capelin: The Canary in the Arctic Environment

When: October 10 - 13, 2022
Where: Bergen, Norway.

Two decades have passed since the first ICES symposium on capelin in Reykjavik, during which capelin populations have fluctuated considerably and large-scale shifts in the spatial distribution at all life stages has been observed in all Sub-Arctic systems. Central to the Capelin Symposium Bergen (CSB2022), is a modification of the Reykjavik recommendation for "closer cooperation between oceanographers and capelin biologists …" to seeking "closer cooperation among all relevant disciplines – oceanography, biology/ecology, mathematics/statistics, …". With this modification, we sought to bring together multi-institutional and multi-disciplinary expertise with an overarching goal of revising and expanding our knowledge base on the capelin biology, ecology, and roles in the Arctic and Sub-Arctic ecosystems.

The CSB2022 was able to attract capelin researchers from all four main capelin populations/stocks areas: Barents Sea, waters around Iceland, Northwest Atlantic, and North Pacific. The symposiun was attended by about 40 participants, of which 14 were Early Career Scientists (ECS) and provided an excellent opportunity to develop collaborations to further capelin science. It attracted 6 invited keynote talks and 23 (10 by ECS) contributed oral presentations (*https://twitter.com/CSB_2022*).

The symposium consisted of four theme sessions, which included both oral presentations and panel discussions, covering topics ranging from the bottom-up processes that affect the capelin habitat and population dynamics, to the impact of variable capelin production on the larger food web and the challenges that stock assessors and managers face when monitoring, assessing, and setting fisheries quotas for this keystone forage fish in a changing environment (*https://capelin2022.imr.no/en/projects/capelinsymposium2022/home/theme-session*). Scientific papers from the symposium will be published in a special issue of ICES Journal of Marine Science.

Highlights

- This symposium provided an excellent opportunity to develop a (Artic Canary) network for multi-disciplinary collaboration between capelin researchers from all four main capelin populations/stocks areas: Barents Sea, waters around Iceland, Northwest Atlantic, and North Pacific.
- Due to the small size of the symposium and the obvious enthusiasm of the participants, there was a high participation level from all attendees.
- The small size of the symposium allowed for a welcoming and supportive environment for ECS's to ask questions and develop collaboration networks. A ECS mentoring lunch was successfully conducted where the ECS got a chance to engage with mentors outside their current network.

Contact:
Samuel Subbey - *samuel.subbey@hi.no*
Warsha Singh - *warsha.singh@hafogvatn.is*

Role of Freshwater in Polar Ocean Climate Change and Global Linkages

When: September 21, 2022
Where: Online

After three days of comprehensive review presentations, productive discussions, and enthusiastic debate, the online workshop on polar fresh water: Sources, Pathways and ImpaCts of frEshwater in northern and soUthern Polar oceans and seas (SPICE-UP) jointly organized by the Northern and Southern Region Panels (NORP and SORP) of CLIVAR (co-sponsored by CliC and SCAR) concluded successfully on 21 September 2022. This workshop, for the first time brought together scientists with expertise in processes of the northern or southern high latitude oceans to review the role and evolution of polar fresh water and compare and contrast the two polar oceans. The workshop connected different communities: observationalists, modellers, remote sensing experts and those carrying out data assimilation with the aim to provide a holistic overview of the role of polar fresh water and its projected future evolution. Both regional and global ocean communities were included.

The workshop featured three keynotes, each with two speakers with expertise on the Arctic and Southern Oceans. Seven topical discussion sessions consisting of small breakout rooms, three summary discussions and a wrap-up were organized across time zones following the keynotes. The participants and organizers were energized by the exceptionally well-prepared keynote presentations and engaged in wide ranging discussions. More than 140 registrants from several continents were able to participate in this virtual workshop across time zones. The workshop was successful in spreading multidisciplinary knowledge surrounding polar fresh water and global linkages to scientists with a broad range of expertise. Knowledge and observational gaps were identified and unsolved conceptual issues were discussed. The discussions from this workshop.

Contact:
Amy Solomon - *amy.solomon@noaa.gov*

Upcoming Activities

For information on MWG upcoming activities, please check the IASC website: **iasc.info**

PHOTO: VEGARD STÜRZINGER, TRINE LISE SVIGGUM HELGERUD, NORWEGIAN POLAR INSTITUTE.
Drone KPH NPI, Arctic Ocean Cruise 2022.

Social and Human Working Group (SHWG)

The scientific scope of the Social and Human Sciences Working Group (SHWG) shall include all aspects of social sciences and humanities research in the Arctic, as well as their connections with other IASC Working Groups. The actual work of the Social & Human Sciences WG is determined by a dynamic list of scientific focus areas.

The geographic scope of the Social and Human Sciences Working Group shall be the Arctic as defined in the map accompanying the Arctic Human Development Report (AHDR). The geographic scope can be extended south where it is appropriate for an understanding of Arctic social and human processes.

Scientific Foci

Disciplinary foci for the Social & Human Working Group are:

- Arctic residents and change: The Arctic is at the center at various vectors of change, from climate and environmental change to economic and cultural globalization. Arctic residents - whether members of Indigenous communities, long-time settlers or recent immigrants – have long dealt with such change, as active participants in attempts to mitigate them and/or adapt to them, sometimes successfully, sometimes not. Responses to change vary by locale, as well as along axes of age, ethnicity and gender. Through this focus, we seek to contribute to understanding the past and present role of humans in the Arctic environment, including to forecast future states and situations.
- Histories, perceptions and representations of the Arctic: Research within the humanities and social sciences examines historical memories and material remains of Arctic communities, to understand how exploration, exploitation and interventions have influenced natural resource use, local economies, traditional knowledge, health, political systems, gender relations, settlements, cultural heritages, languages, and identities. Through various disciplinary and analytical perspectives on cultural contacts, conflicts and collaborations, on scientific practices and specific modes of constructing knowledge, and on varied representations of the Arctic, we can better understand present-day contexts of local communities and peoples, and better explain the relation between historical memories/material archives and current perceptions, with a goal of addressing issues of participation, representation, human rights and social justice, social and economic development, education and public outreach.
- Securities, governance and law: The Arctic is a peaceful and stable region, not overtly plagued by conflicts. The region has become ever more globalized. Critical topics include 1) how to effect a shift from high (geo)political stability to peaceful change, and make security less mystified and controlled by a nation-state's security-political elite; 2) how to accelerate mitigation and fulfill the Paris Agreement (COP-21); and 3) how to establish the Arctic as a resilient area and structure.
- Natural resource(s)/ use/ exploitation and development: past, present, future
- Human health and well-being
- Cross-cutting scientific foci for the Social & Human Working Group are:
- Human health, well-being and ecosystem change
- Long-term impacts, vulnerability and resilience in Arctic social-ecological systems
- Competing forms of resource use in a changing environment
- Perception and representation of Arctic science

More info:

iasc.info/working-groups/social-human

PHOTO: ILONA METTIÄINEN
Ilulissat 2022

Membership[4]

NAME	COUNTRY	EXPERTISE
Chair Susan Chatwood	Canada	Health systems; Population health; Community engagement
Vice-Chair Catherine Chambers	Iceland	Coastal communities; Fisheries and aquaculture governance; Fishermen's knowledge
Vice-Chair Barbora Halašková	Czech Republic	Arctic geopolitics and security; International relations; Foreign policy
Past Chair Andrey Petrov		Arctic regional/economic development; Sustainability; Urbanization
Alexandra Meyer	Austria	Anthropology, Climate change, Svalbard
Olga Povoroznyuk	Austria	Anthropology of infrastructure; social and environmental transformations; indigenous and local communities of the Arctic and Siberia
Nathalie Pattyn	Belgium	
Frédéric Laugrand	Belgium	Anthropology, hunting and Inuit knowledge systems, mobility, history, religion, Canada
David Natcher	Canada	Environmental livelihoods; Culture and economy; Maintenance of local food systems
SU Ping	China	Global Governance; International Political Sociology; International Organization
DENG Beixi	China	Polar Geopolitics & Security; Polar Policy; Arctic Shipping
Zdenka Sokolíčková	Czech Republic	Svalbard, Climate/environmental change, Globalisation
Carina Ren	Denmark	Tourism development and entrepreneurship; Cultural innovation, co-creation, and capacity building; Collaborative research methods
Brooks Kaiser	Denmark	Arctic economic development; Bioeconomy; Marine resource governance
Mervi Heikkinen	Finland	Women's and gender studies; Intersectionality; Ethics; Higher education
Florian Stammler	Finland	Indigenous and local livelihoods, development impact assessments, Arctic Eurasia
Béatrice Collignon	France	Inuit geographic knowledge; Geographies of the Inuit; Inuit culture and contemporary societies
Virginie Vaté	France	Anthropology of religion; Shamanism and Christianity; Conversion; Chukotka and Alaska
Frigga Kruse	Germany	Archaeology; History; Past human-environment interactions
Alexander Proelss	Germany	International law; International law of the Sea; International environmental law
Swati Nagar	India	Science outreach; Polar outreach
Akiho Shibata	Japan	International law; Polar law and policy
Nobuhiro Kishigami	Japan	Cultural Anthropology; Subsistence activities; Food sharing; Indigenous whaling
Seung Woo Han	Republic of Korea	Polar policy; Polar sociology; International law
Hyunkyo Seo	Republic of Korea	Polar policy
Annette Scheepstra	The Netherlands	Transdisciplinary; Stakeholder engagement
Britt Kramvig	Norway	Indigenous peoples ontologies, politics, and art; Creativity, tourism, and innovation in Arctic and Indigenous communities
Maiken Bjørkan	Norway	Coastal communities; Co-production of knowledge; Fisheries and aquaculture governance
Agnieszka Skorupa	Poland	Psychology; Human behavior in extreme situations; Group and individual adaptation to Polar region
Monika Szkarłat	Poland	
Sandra Maria Rodrigues Balão	Portugal	Geopolitics & (Geo)Strategy; Security & Securitization Diplomacy
Andrei Golovnev	Russia	Social psychology in the Arctic; Circumpolar states; Policy of scientific researches
Andrey Podoplekin	Russia	Social psychology in the Arctic, Circumpolar states, Policy and programs of scientific researches
Ana Maria Manero Salvador	Spain	International Law of the Sea, International Environmental Law, Indigenous Peoples' Human Rights
Ragnhild Nilsson	Sweden	Indigenous politics; Indigenous representation and self-determination

TABLE

[4]Membership as of 4 January 2023. For updated information and contact information for each Working Group Member please visit :
https://iasc.info/our-work/working-groups/social-human

Laine Chanteloup	Switzerland	
Ingrid A Medby	United Kingdom	Arctic Identity; Political Geography; Critical Geopolitics
Klaus Dodds	United Kingdom	Geopolitics; Security; Diplomacy
Victoria Herrmann	USA	climate change, community adaptation, cultural heritage, storytelling
Lawrence Hamilton	USA	Sociology; Demography; Survey research

FELLOWS

Wayne Clark (2021)	Canada	Inuit research methodology, Inuit health education, cultural safety
Seira Duncan (2022)	Finland	Anthropology, Indigeneity, Eurasia
Daria Burnasheva (Indigenous Fellow) (2022)	Russia	Arctic, Indigeneity, Gender, Identity, Social and cultural dimensions of climate change
Alison Perrin (2023)	Canada	Science policy; Climate change adaptation; Human-environment relationships
Naja Carina Steenholdt (2023)	Denmark/ Greenland	Quality of life, Living conditions, Greenland
Eda Ayaydin (2023)	France	Arctic geopolitics, Indigenous politics, Sovereignty, Governance

SECRETARY

Anna Varfolomeeva (on maternity leave until March 2023)		Contact: anna.varfolomeeva@helsinki.fi
Wayne Clark (until March 2023)		Contact : waynevoiseyclark@gmail.com

Recent Activities

For updated information, please check the IASC website: **iasc.info**

Converging Science, Art & Indigenous Knowledge Systems

When: ASSW 2022
Where: Tromsø, Norway

Convergence of diverse sources of knowledge is becoming the major requirement for understanding global and local changes and finding the pathways for possible future collaboration between different rights-, knowledge- and stakeholders. Vera Kuklina and Olga Zaslavskaya organized the two-part session on Converging Science, Art, and Indigenous Knowledge Systems for Understanding Change and Sustainability in the Arctic during the Arctic Science Summit Week, on March 26-April 1, 2022 in Tromso, Norway. The session gathered social and biophysical scholars, artists, and representatives of Indigenous communities.

Andrey Petrov, Vera Kuklina, and Olga Zaslavskaya presented the ArtSLInK platform with its theoretical implications and some practical outcomes. ArtSLInK

further develops ArtScience initiatives as a new form of research that has multi- and transdisciplinary multiscale, multitemporal and multi-modal character. It engages with diverse ways of knowing, including subjective, sensory, and emotional dimensions as well as local and Indigenous perspectives on the frozen matter. Implementation of such an approach requires an iterative process of collaborative knowledge production at all stages, starting from question formulation, through gathering, analyzing, curating, interpreting and presenting data and ideas situated in a specific context of study areas and partnering communities. One of the preliminary results of such collaborations was a digital multimedia presentation "Remote Roadscapes and Beyond" supplemented by the artistic exposition Martian Taiga by Stanislav Podusenko.

During the session, all participants had an opportunity to share experiences and learn about projects where different sources of knowledge are combined. Presenters reflected on their projects where science, arts and local and Indigenous collaboration were accomplished in different formats. In particular, Olga Povoroznyuk (University of Vienna) shared the results of the efforts on disseminating research on Arctic Infrastructure in the projects CoRe and InfraNorth. Nikolay Shiklomanov (George Washington University) discussed the physical science perspective on collaboration with artists and local and Indigenous communities. The presentation by Anna Gossman-Stammler (University of Lapland) was dedicated to anthropological and Indigenous perspectives on human and more-than-human relationships based on her case study from Sakha Yakutia. James Temte joined us online with a video on using art for positive change.

Finally, Olga Kisseleva (University of Sorbonne) gave a master class followed by heated debates on the ethical and practical issues of engagement with Indigenous knowledge.

This session demonstrated the need to develop ArtSLInK collaborations that enhance understanding of interacting processes in the social, cultural, technological, environmental, and governance domains for framing sustainable Arctic futures. In particular, an exhibition of the results of several projects implementing ArtSLInK will be presented at the ASSW-2023.

Contact:
Vera Kuklina - *kuklina@gwu.edu*
Andrey Petrov - *andrey.petrov@uni.edu*
Olga Zaslavskaya - *zaslavsk@gmail.com*

Upcoming Activities

For updated information on SHWG activities, please check the IASC website: **iasc.info**

PHOTO: ILONA METTIÄINEN
Ilulissat 2022.

Terrestrial Working Group (TWG)

The scientific scope of the Terrestrial Working Group (TWG) shall include any scientific research on Arctic terrestrial and freshwater environments, landscapes and biota, and their responses to, and interactions with, other components of the Earth system. The remit encompasses the dynamics of the Arctic system; past, present and future.

Geographically, the main area of interest of the IASC Terrestrial Working Group encompasses lands and fresh water within the area north of the latitudinal treeline with Arctic climate and Arctic vegetation. Several adjacent areas are included where highly relevant for certain disciplines and projects (a) boreal oceanic tundra (e.g. the Aleutian Islands, North Atlantic islands), (b) alpine tundra that is continuous with the Arctic tundra (e.g. the central highlands of Iceland, the Scandes Mountains, the Polar Urals), (c) the forest tundra, and (d) drainage basins to the south that connect with freshwater and marine areas of the Arctic.

Scientific Foci

- Improving knowledge at multiple spatial scales of the current state of Arctic terrestrial geosystems and ecosystems
- Determining the net effect of the terrestrial and freshwater environmental and biosphere's processes that amplify or moderate climate warming
- Developing unifying concepts, fundamental theories and computer models of the interactions among species, interactions between species and their environment, and the biology of life in extreme environments
- Estimating past changes in arctic geo- and biodiversity, measuring current change and predicting future changes
- Developing high spatial resolution models of terrestrial geosystem and ecosystem change, and other tools that can be used by arctic stakeholders for adaptation strategies and sustainable management of natural resources and ecosystem services
- Determining the role of connectivity in the functioning of arctic terrestrial systems, including connections within the arctic and the global system

Cross-cutting

Understanding the major issues within the wide disciplinary and geographical scope of the Terrestrial Working Group requires interaction with other Working Groups. The initial priority activities developed by the Terrestrial Working Group would benefit form interactions with all the Working Groups

Membership[5]

NAME	COUNTRY	EXPERTISE
Chair Ulrike Herzschuh	Germany	Ecosystem change on decadal to glacial time-scales; Ancient DNA and pollen analysis
Vice Chair YANG Xiaofan	China	Subsurface hydrology; Alpine hydrology; Computational hydrology
Vice Chair João Canário	Portugal	Biogeochemistry; Permafrost; Trace-elements
Josef Elster	Czech Republic	Microbial ecology; Stress ecophysiology of cyanobacteria and microalgae
Annett Bartsch	Austria	permafrost, snow, remote sensing
Leopold Füreder	Austria	
Elie Verleyen	Belgium	microbial (paleo)ecology, lakes, soils
Sophie Opfergelt	Belgium	permafrost, organo-mineral interactions, biogeochemistry
Philip Marsh	Canada	Hydrology; Snow; Permafrost; Hydrologic-Terrestrial System Interactions

TABLE

[5]Membership as of 4 January 2023. For updated information and contact information for each Working Group Member please visit : https://iasc.info/our-work/working-groups/terrestrial

Emily Jenkins	Canada	Wildlife; Parasites; Vectors
LI Guangwei	China	Tectono-geomorphology; Low temperature thermochronology; Structural geology
Milos Bartak	Czech Republic	
Thomas Friborg	Denmark	Climatic feedbacks; Carbon budgets; Terrestrial ecosystems
Torben R. Christensen	Denmark	Biogeochemistry; Carbon cycling; Terrestrial ecosystem functioning
Otso Suominen	Finland	Animal ecology; Ecological interactions; Herbivory; Biodiversity
Miska Luoto	Finland	Data mining; Remote sensing; Biogeography
Christelle Marlin	France	
Emilie Gauthier	France	Past ecosystems; Interactions between societies and environment; Pollen analysis
Nikola Koglin	Germany	Petrology; Geochemistry; Geochronology
Bjarni Kristófer Kristjánsson	Iceland	Evolutionary Ecology, Limnology, Fish
Archana Singh	India	Aquatic chemistry
Santonu Goswami	India	Permafrost
Antonello Provenzale	Italy	Geosphere-biosphere interactions; Climate change impacts; Terrestrial ecosystems
Tetsuya Hiyama	Japan	Hydrology; Climate Change; Hydrologic-Terrestrial System Interactions
Masaki Uchida	Japan	Microbial ecology; Ecosystem ecology
Ji Young Jung	Republic of Korea	Biogeochemistry; Soil carbon dynamics; Tundra ecosystems
Tae-Yoon Park	Republic of Korea	Palaeontology; Evolutionary Biology; Polar Geology
Rien Aerts	The Netherlands	Global Change effects on polar ecosystem functioning; Biodiversity; Biogeochemistry
Rolf Anker Ims	Norway	Biodiversity; Tundra ecosystems; Climate change impacts
Kristine Bakke Westergaard	Norway	Arctic vascular plant biosystematics, conservation genetics, alien species
Piotr Owczarek	Poland	Dendrogeomorphology; Modern slope and glaciofluvial processes; Climate - landscape interaction
Zbigniew Zwoliński	Poland	Geomorphology; Geodiversity; Geoinformation
Alexander Makarov	Russia	Carbon cycle
Olga L'vovna Makarova	Russia	Tundra invertebrates; Mites; Insects; Earthworms; Taxonomy; Community structure
Sergi Pla-Rabes	Spain	Paleoecology; Remote ecosystems; Biodiversity; Biogeochemistry
Hans Linderholm	Sweden	Arctic climate change; Paleoclimate; Glacier variability
Christian Rixen	Switzerland	Arctic and alpine plant ecology; Biodiversity and ecosystem functioning
Gabriela Schaepman-Strub	Switzerland	Biodiversity; Ecosystem functioning; Energy budget; Remote sensing
Robert Baxter	UK	Cryosphere-biosphere interactions; carbon cycling; soil-plant atmosphere interactions
Mary Edwards	UK	Vegetation ecology and palaeoecology; Quaternary biogeography; Long-term climate history
Michelle Mack	USA	Plant and ecosystem ecology; Disturbance ecology; Nitrogen cycling
Vladimir Romanovsky	USA	Permafrost; Geographic areas: Beringia (Alaska and NE Siberia), Norway and Svalbard

FELLOWS

Ivan Alekseev (2021)	Russia	Permafrost soils, Organic matter, Environmental contamination
Kabir Rasouli (2022)	Canada	Cold Regions Hydrology, Landcover Change, Snow, Mountain Hydrometeorology
Megan Wilcots (2023)	Germany	Terrestrial ecosystem ecology, Carbon cycling, Nitrogen cycling

SECRETARY

Clay Prater	USA	Oklahoma State University, Contact: prater.clay@gmail.com

Recent Activities

For updated information, please check the IASC website: **iasc.info**

PHOTO: IREK SOBOTA

Arctic Underground II

When: ASSW 2022
Where: Online

Root and rhizosphere properties are likely one of the most important drivers of Arctic ecosystem response to climate change. On Monday, March 28th, we held the third community meeting of the Arctic Underground Network associated with ASSW2022. The Arctic Underground Network brings together an interdisciplinary team of ecologists to synthesize what is known about root traits and rhizosphere processes in cold ecosystems with soil profiles dominated by thick organic horizons - tundra, boreal forest, and peatlands. This network includes belowground ecologists spanning molecular biologists investigating rhizosphere processes, to plant ecologists and evolutionary biologists that use a trait framework to understand vegetation patterns and function, to ecosystem ecologists measuring the interplay between terrestrial ecosystem function and the climate system, to ethnobotanists and social scientists interested in human uses of plants. We have four thematic areas that served as the foci for our meeting and provide the framework for upcoming products of the Network:

1. Synthesize mechanisms by examining the effects of soil warming experiments on root and rhizosphere processes.
2. Explore linkages between leaf and root traits for extrapolation and scaling of ecological processes in cold ecosystems.
3. Add cold soil roots and their symbionts to a "worldwide root economic spectrum," filling in a data gap in global plant traits databases and model parameters.
4. Integrate traditional ecological knowledge (TEK) of plants and belowground properties into our understanding of Arctic ecosystem change and educate scientists on indigenous perspectives.

At ASSW2022 we hosted an open community meeting. The session included nine participants from five countries. At our open community meeting we provided updates on Network activities during 2021-22, made introductions, and discussed synergies between research agendas that may serve as future international research collaborations. We also made steps towards the planning of an in-person or hybrid meeting in fall 2022. Our workshop was supported by the IASC Terrestrial Working Group and fostered the participation of early career researchers.

In the last year, the main focus of Network has been the development of a manuscript. This product provides a synthesis of the state of knowledge on root and rhizosphere processes in the Arctic and our perspective on the importance of incorporating and furthering this field in the context of understanding the 'greening' and 'permafrost-climate' feedbacks from the terrestrial Arctic to the climate system.

Our plan coming out of the community meeting is to meet again in May to select the next synthesis theme to address. We are in dialogue about two future synthesis products addressing themes one and three above.

Highlights

1. Our open community meeting included nine participants from five countries (Finland, Sweden, Switzerland, UK, USA).
2. Our meeting fostered the participant of graduate students and early career faculty.
3. We outlined our plan for moving forward with two potential collaborative products in the next year and to hold an in-person or hybrid meeting to facilitate progress on these products in the fall of 2022.

Upcoming Activities

For updated information on TWG activities, please check the IASC website: **iasc.info**

PHOTO: WENKAI GUO
Centre for Integrated Remote Sensing and Forecasting for Arctic Operations (CIRFA)
CIRFA`s expedition in 2022

3. ICARP IV - FOURTH INTERNATIONAL CONFERENCE FOR ARCTIC RESEARCH PLANNING

3. ICARP IV - Fourth International Conference for Arctic Research Planning

In the lead up to its 35th anniversary in 2025, the International Arctic Science Committee (IASC) is coordinating a multi-year planning process for the Fourth International Conference on Arctic Research Planning (ICARP IV) lasting from 2022 until 2026 that will engage Arctic researchers, policy makers, residents and stakeholders from around the world to collegially discuss the state of Arctic science, the place the Arctic occupies in global affairs and systems, to

- consider the most urgent knowledge gaps and Arctic research priorities and needs for the next decade, and
- explore avenues to address these research needs.

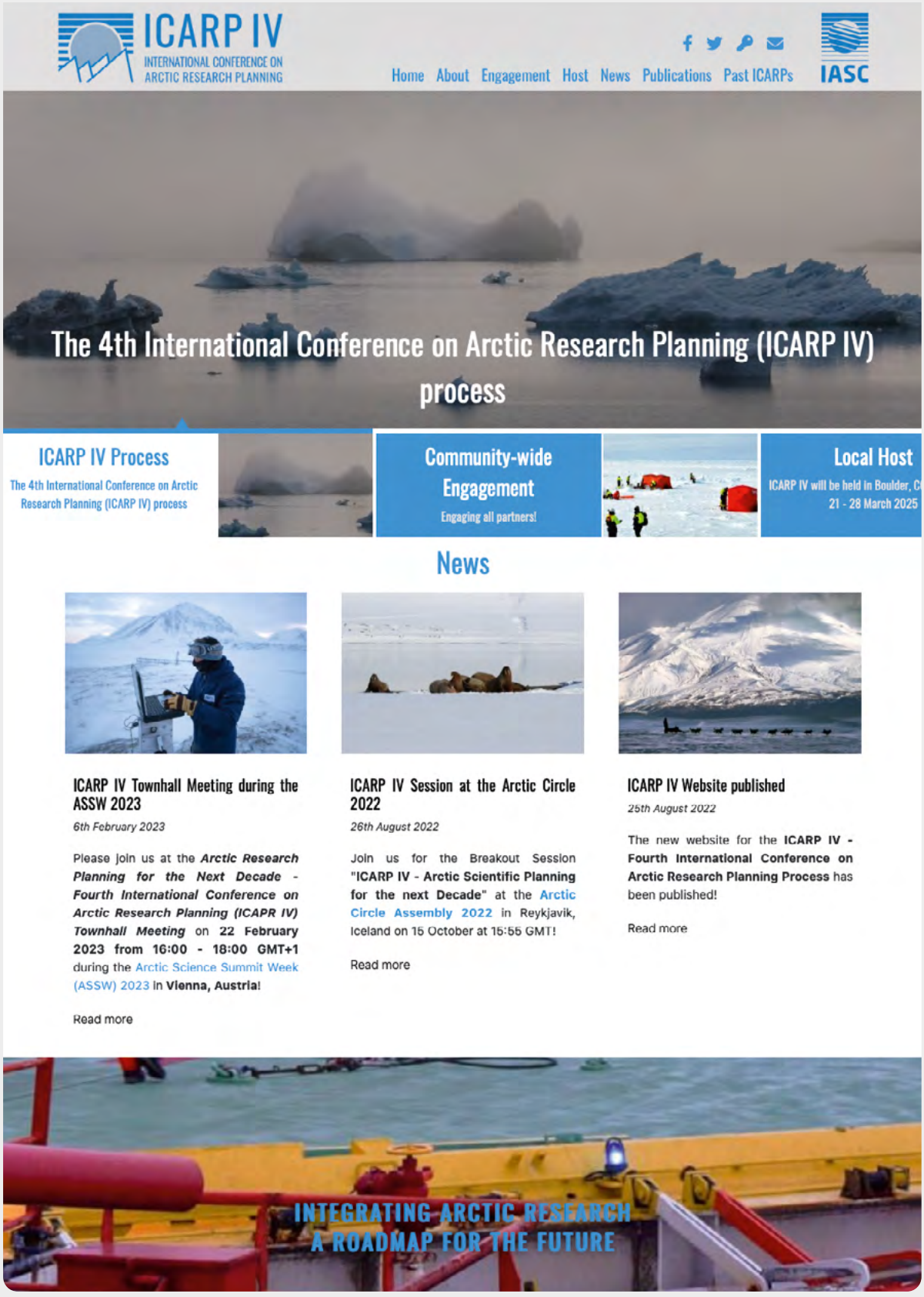
The ICARP IV process will culminate at the ICARP IV / ASSW 2025 conference to be convened in Boulder Colorado, USA in March 2025, hosted by a consortium of US institutions, including the University of Colorado Boulder, University of Northern Iowa, University of Alaska Fairbanks, and Alaska Pacific University.

Community-Wide Engagement

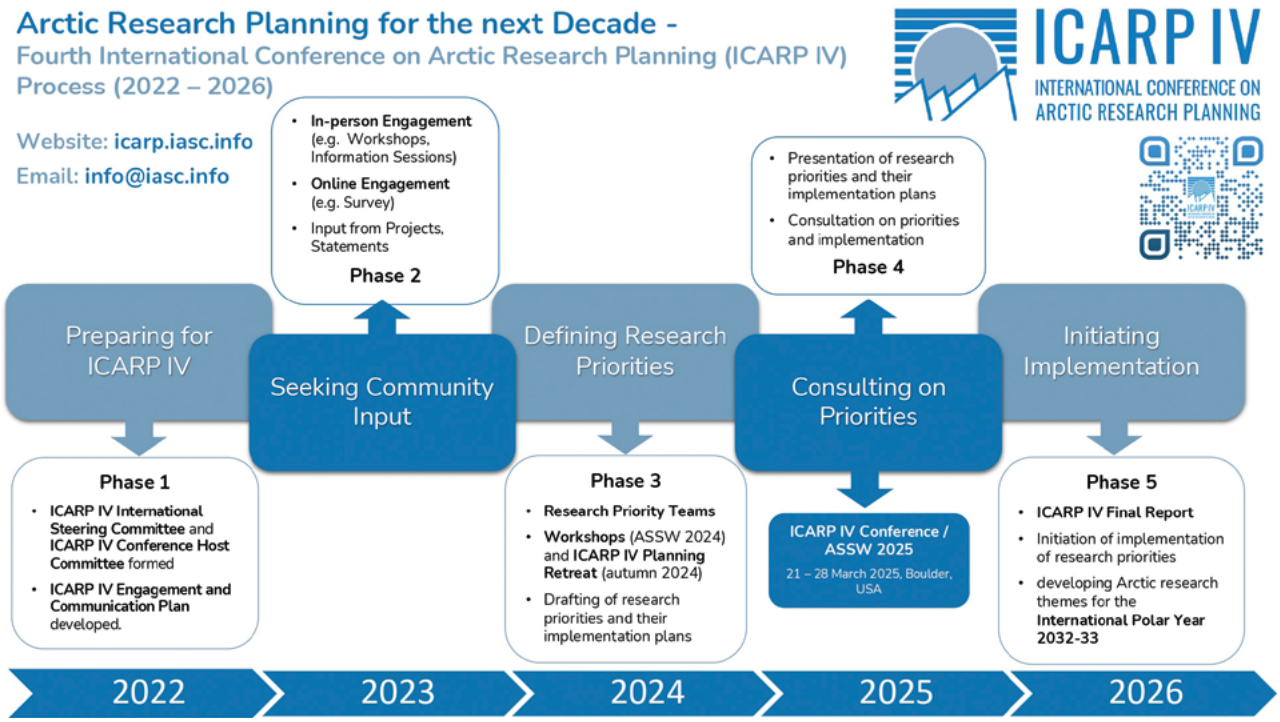
The ICARP IV process is a community-wide undertaking that will engage Arctic researchers, policy makers, residents and stakeholders from around the world to collegially discuss the state of Arctic science, the place the Arctic occupies in global affairs and systems, to

- consider the most urgent knowledge gaps and Arctic research priorities and needs for the next decade, and
- explore avenues to address these research needs.

One of the main goals for the ICARP IV engagement process is a truly inclusive, diverse, and engaging process. This process shall ensure that the scientific goals for the next decade are firmly grounded on the advice and needs of Arctic scientists and science organisations, indigenous people and Arctic residents, stakeholders, and rights-holders. An important aspect will be the development and implementation of a bottom-up approach complementing and advising the work of the ICARP IV International Steering Committee.



ICARP IV homepage
https://icarp.iasc.info/



The ICARP IV process will focus on seeking community input throughout 2023 with a diverse set of engagement activities (in-person and online). Individuals, groups, networks, institutions and organisations are encouraged to organise projects and events as part of this ICARP IV engagement process and report their outcomes back to us to ensure they are included in the development of the ICARP IV research priorities and implementation plans.

All upcoming activities will be posted in the Event calendar on the ICARP website (*https://icarp.iasc.info/engagement/events*). IASC also encourages organisations that want to participate in the ICARP IV process as partner to contact the IASC Secretariat at *info@iasc.info*. More information on ICARP IV partners are available on the website (*https://icarp.iasc.info/about/partners*).

How can you contribute to the ICARP IV process?

Individuals, groups, networks, institutions and organisations are encouraged to organise projects and events as part of the ICARP IV engagement process and seek endorsement for their activity from the ICARP IV International Steering Committee

ICARP IV International Steering Committee

The ICARP IV International Steering Committee (ISC) consists of appointees from all ICARP IV partner organisations and is tasked to oversee and coordinate the ICARP IV process from 2022 to 2026, identify and develop an overall process goal, theme and agenda, sub-theme research questions, and mechanisms for action and implementation of the ICARP IV outcomes.

PHOTO: ICARP IV Process Overview Version October 2022

CHAIR	**Henry Burgess**, International Arctic Science Committee (IASC) - IASC President
MEMBER	**Sourav Chatterjee**, International Arctic Science Committee (IASC) - Atmosphere Working Group
MEMBER	**Margareta Johansson**, International Arctic Science Committee (IASC) - Cryosphere Working Group
MEMBER	**Heidemarie Kassens**, International Arctic Science Committee (IASC) - Marine Working Group
MEMBER	**Catherine Chambers**, International Arctic Science Committee (IASC) - Social and Human Working Group
MEMBER	**Hans Linderholm**, International Arctic Science Committee (IASC) - Terrestrial Working Group
MEMBER	**Yulia Zaika**, International Arctic Science Committee (IASC) - International Science Initiative in the Russian Arctic (ISIRA)
MEMBER	**Matthew Druckenmiller**, International Arctic Science Committee (IASC) - ICARP IV / ASSW 2025 host
MEMBER	**Gerlis Fugmann**, International Arctic Science Committee (IASC) - IASC Secretariat
MEMBER	**David Hik**, International Arctic Science Committee (IASC) - Past ICARP III Chair
MEMBER	**Lauren Divine**, Aleut International Association (AIA)
MEMBER	**Rolf Rødven**, Arctic Monitoring and Assessment Programme (AMAP)
MEMBER	**Peter Pulsifer**, Arctic Data Committee (ADC)
MEMBER	**Hyoung Chul Shin**, Asian Forum for Polar Science (AFOPS)
MEMBER	**Harmony Jade Sugaq Wayner**, Association of Polar Early Career Scientists (APECS)
MEMBER	**Svein Mathiesen**, Association of World Reindeer Herders (AWRH)
MEMBER	**Amy Lauren Lovecraft**, Climate and Cryosphere (CliC)
MEMBER	**Tom Barry**, Conservation of Arctic Flora and Fauna (CAFF)
MEMBER	**Renuka Badhe**, European Polar Board (EPB)
MEMBER	**Jennifer Mercer**, Forum of Arctic Research Operators (FARO)
MEMBER	**Tatiana Degai**, International Arctic Social Sciences Association (IASSA
MEMBER	**Richard Essery**, International Association of Cryospheric Sciences (IACS)
MEMBER	**Jörn Schmidt**, International Council for the Exploration of the Sea (ICES)
MEMBER	**Goncalo Vieira**, International Permafrost Association (IPA)
MEMBER	**Melody Burkins**, International Science Council (ISC)
MEMBER	**Maribeth Murray**, International Study of Arctic Change (ISAC)
MEMBER	**John Crump**, Inuit Circumpolar Council Canada (ICC Canada)
MEMBER	**Radovan Krejci**, Ny-Ålesund Science Managers Committee (NySMAC)
MEMBER	**Maria Pia Casarini**, Polar Educators International (PEI)
MEMBER	**Paula Kankaanpää**, Protection of the Arctic Marine Environment (PAME)
MEMBER	**Elle Merete Omma**, Saami Council
MEMBER	**Seong-Joong Kim**, Scientific Committee on Antarctic Research (SCAR)
MEMBER	**Jennifer Spence**, Sustainable Development Working Group (SDWG)
MEMBER	**Sandy Starkweather**, Sustaining Arctic Observing Network (SAON)
MEMBER	**Kirsi Latola**, University of the Arctic (UArctic)
Alternate	**Muyin Wang**, International Arctic Science Committee (IASC) - Atmosphere Working Group
Alternate	**Andrey Petrov**, International Arctic Science Committee (IASC) - ICARP IV / ASSW 2025 host
Alternate	**Sarah Strand**, Association of Polar Early Career Scientists (APECS)
Alternate	**Inga Beck**, Polar Educators International (PEI)

More info: *https://icarp.iasc.info*

PHOTO: FABIENNE MANNHERZ
UNIS Safety Center Students returning from an accident site visit out in Isfjorden.

4. Arctic Science Summit Week 2022

4. Arctic Science Summit Week 2022

The ASSW 2022 was hosted by UiT The Arctic University of Norway (*https://en.uit.no/*), the Norwegian Polar Institute (*https://www.npolar.no/en/*) , and the Research Council of Norway (*https://www.forskningsradet.no/en/*) from March 26 to April 1, 2022 in Tromsø, Norway in a hybrid format, offering both opportunities for in-person and online attendance.

The ASSW 2022 included the following components:

1. Business and Community Meetings: This included 59 meetings/workshops/lectures from IASC and other Arctic research organizations, teams, and projects spread over all seven conference days.
2. ASSW Science Day: A one-day conference focussing on Arctic remote sensing and remote sensing techniques with seven keynotes, a panel debate, and a poster session.
3. Arctic Observing Summit: A three-day summit held biennially as part of the ASSW, gathering the Arctic observing community to exchange ideas and develop ways to collaborate, share resources, and improve Arctic observing.

The total number of actual participants was 1114 from 47 countries, with 355 in-person participants from 26 different countries, and 759 online participants from 47 different countries.

More information:

assw.info

Upcoming ASSWs

ASSW 2023

Vienna, Austria
17 - 24 February

ASSW 2023 will be held in Vienna, Austria from 17 – 24 February 2023. Austria has been an IASC member country since 2014, and 2023 is a very special year for polar research in Austria - it is the 150th anniversary of the Austro-Hungarian expedition to Franz Josef Land!

Website: www.assw.info

ASSW 2024

Edinburgh, United Kingdom
21 - 29 March 2024

The United Kingdom has been an IASC member country since 1991, and this will be the second time that the UK will host the ASSW, with the first one being in 2000, in Cambridge.

ASSW 2025 & ICARP IV

Boulder, Colorado, United States
21 - 28 March 2025

Boulder, Colorado (USA) will host the ICARP IV conference, which will be held concurrently with Arctic Science Summit Week (ASSW) 2025 from 21 - 28 March 2025.

PHOTO: Uit - THE ARCTIC UNIVERSITY OF NORWAY.
Session during ASSW2022 in Tromsø, Norway.

PHOTO: TRINE LISE SVIGGUM HELGERUD, NORWEGIAN POLAR INSTITUTE.
BREATHE PHOTA PROJECT NPI ARCTIC OCEAN CRUISE 2022

5. Data and Observations

5. Data and Observations

SAON – Sustaining Arctic Observing Networks

Background

The Sustaining Arctic Observing Network (SAON) is a joint initiative of the Arctic Council and the International Arctic Science Committee (IASC) that was established at the Nuuk Declaration 2011 with the aim to strengthen multi-national engagement in and coordination of pan-Arctic observing.

In 2018, SAON approved a new Strategy and Implementation Plan (*https://www.arcticobserving.org/strategy*). In the plan, SAON identified the need for a Roadmap for Arctic Observing and Data Systems (ROADS, (*https://journalhosting.ucalgary.ca/index.php/arctic/article/view/74330*) and set forth a vision to develop a ROADS process. This marks a transition in SAON's focus from community-building and partnership development towards a more active vision for the systematic design and implementation of the Arctic Observing System.

SAON ROADS Process

The lack of a consistent and holistic mechanism to assess observing system priorities and link independently funded efforts across the Arctic is a shortcoming that has hindered adaptation strategies and hampered funding responses for an improved observing system. SAON ROADS proposes to address this shortcoming by generating a systems-level view of observing requirements and implementation strategies, across SAON's partners. It is recognized that a critical success factor for ROADS is the equitable inclusion of Arctic Indigenous Peoples in the design and development process. The ROADS process will build on the societal benefit-based approach of the International Arctic Observing Assessment Framework and will proceed step-wise so that the most imperative Arctic observations (Shared Arctic Variables (SAVs), *https://journalhosting.ucalgary.ca/index.php/arctic/article/view/76429*) can be rapidly improved.

Activities in 2022

As a response to the European Commission call for Supporting the implementation of GEOSS in the Arctic in collaboration with Copernicus, the Arctic PASSION

programme has been established. Through the AMAP Secretariat, the SAON Secretariat is engaged in several work packages and is responsible for several deliverables in Arctic PASSION. In one of the work packages, work is ongoing to develop a series of SAVs (including permafrost and wildfires) and the framework necessary to document these. This work includes collaboration with Canadian partners (on sea ice as a SAV) and a USA partner on food security in the Pacific Arctic region. Through another Arctic PASSION work package an application to the Group on Earth Observations (GEO) for an Arctic GEO System-of-Systems (ArcticGEOSS).

SAON and the Arctic Council

The Arctic Council and its subsidiary bodies have been in a pause situation since February 2022. This includes SAON, and its Board and Committees have had no formal meetings since February 2022. Through external partnerships, it has been possible to progress especially the ROADS process, as described above. There is uncertainty when SAON can formally resume activities, but the Secretariat continues to operate at a minimum level.

For more information, please see:
https://www.arcticobserving.org/

PHOTO: IGOR VASILEVICH

Arctic Data Committee (ADC)

The ADC was formed by IASC and SAON in late 2014. The overarching purpose of the ADC is to promote and facilitate international collaboration towards the goal of free, ethically open, sustained, and timely access to Arctic data through useful, usable, and interoperable systems. Since its formation, the ADC has convened, co-convened, or contributed to a number of activities and events including meetings and implementation workshops in partnership with many other Arctic and polar bodies (e.g., SCAR Standing Committee on Antarctic Data Management (SCADM), Southern Ocean Observing System (SOOS), and the WMO Global Cryosphere Watch. Since February of 2022 the official activities of the ADC have been on hold due to the suspension of cooperation with the Russian government by the Arctic Council and related bodies (i.e. SAON) follow the invasion of Ukraine. However, the members of the ADC have continued to make progress as individuals.

In response to the COVID-19 pandemic, in June of 2020, the ADC took a leadership role in convening the bi-monthly Polar to Global Online Interoperability and Data Sharing Workshop/Hackathon, now known as P2G. POLDER (Polar Data Discovery Enhancement Research) (*https://polder.info/*) is a working group co-convened by the ADC, Southern Ocean Observing System, and Standing Committee on Antarctic Data Management. In 2022 the group launched the POLDER Federated Search Tool to provide single window search of many

PHOTO: WITEK KASZKIN / POLISH POLAR STATION
The ruins of a wooden shack on Svalbard.

polar data catalogues (see ***https://search.polder.info/***). The system was developed as a contribution from the World Data System International Technology Office and is a major milestone for the polar data and science community.

In late 2022, following the well-attended and successful Fourth Polar Data Forum (PDF IV) hosted by the European Polar Board and the Belgian Museum of Natural Sciences online from 20-24 September 2021 (see ***https://polar-data-forum.org/***), members of the polar data management community started planning the Fifth Polar Data Forum (PDF V) to be held in the fall of 2023. More information will be made available soon.

A process is underway to bring a new Executive committee to the Arctic Data Committee to continue its work following the suspension of activities. The new Exectuive will be appointed in February of 2022.

Contacts:

Peter L. Pulsifer, Chair - *peter.pulsifer@carleton.ca*

Stein Tronstad, Vice-Chair - *Stein.Tronstad@npolar.no*

Marten Tacoma, Vice-Chair - *Marten.Tacoma@nioz.nl*

Website:

https://arcticdc.org/

https://arcticdc.org/meetings/conference-calls-webinars/polar-to-global-online-interoperability-and-data-sharing-workshop-hackathon

PHOTO: FABIENNE MANNHERZ
UNIS Safety Center Students board the Offshore supply vessel M/S Polarsyssel to learn about maritime preparedness and response around Svalbard.

6. Capacity Building

6. Capacity Building

IASC Fellowship Program

IASC recognizes that the next generation of Arctic researchers are faced with emerging scientific and societal challenges due to the growing impacts of Arctic and global climate change. IASC therefore believes that it is of great importance to foster, promote, and involve early career researchers (ECRs) working in the Arctic by:

- Striving to represent ECRs within IASC;
- Providing support, endorsement, and dissemination of information on activities, projects and requests for participation;
- Supporting travel grants to ECRs for participation in Arctic conferences.

Using these instruments, IASC aims to promote ECRs within the organization by providing career development activities such as planning international and interdisciplinary research activities and programs, organizing scientific workshops, and developing professional networks.

Every year since 2014, the IASC Fellowship Program has provided five excellent Arctic ECRs (incl. graduate students, postdocs and junior research group leaders) with the opportunity to get engaged in the IASC Working Group.

As of 2022, a total of 60 ECRs have participated in the IASC Fellowship Program. Fellows have the opportunity to participate as WG members for three years and are provided with funding to attend two consecutive ASSW meetings during their initial fellowship year. This unique opportunity allows ECRs to become active members of their WGs, hence, to develop research collaborations and professional networks with senior researchers from various disciplines. Five fellows for each WG have been selected in 2023 and they are Rémy Lapere (AWG), Armina Soleymani (CWG), Lisa Winberg von Friesen (MWG), Alison Perrin (SHWG), Megan Wilcots (TWG).

Starting in 2020, an additional Indigenous Fellowship was added to the IASC Fellowship Program. The appointment of Indigenous Fellows comes at the recommendation of the Action Group on Indigenous Involvement. IASC has had Indigenous Fellows before, but this new recommendation (and line in the IASC budget) means that there will be at least one offered to an Indigenous ECR every year. The Indigenous Fellow can choose whichever IASC Working Group is most of interest and relevance to them. Naja Carina Steenholdt has been announced as an Indigenous Fellow in 2023 and has joined SHWG.

In 2022, IASC was also offering special joint Fellowships in cooperation with the Polar Initiative of Prince Albert II of Monaco Foundation. The recipients of this Fellowship

are Eda Ayaydin and Archana Dayal. Congratulations! All the 2023 Fellows will be introduced at ASSW 2023 in Vienna, Austria.

2022 Fellows were introduced during the joint WG meeting at the ASSW2022 in Tromsø, Norway. The 2022 Fellows were actively involved in both the WG and Council meetings as well as in the ASSW science symposium.

IASC is excited to witness the contributions of all our current and past Fellows brought to the IASC's scientific activities and Arctic research as a whole. IASC would like to acknowledge all that have supported the idea of the IASC Fellowship Program and outstanding ECRs, who have functioned as Fellows. Now in its ninth year, the benefits of the IASC Fellowship Program are clearly evident for the Fellows, IASC, and Arctic research.

Dr. Stanislav Ksenofontov,
IASC Fellows Coordinator

IASC Fellows 2023

Rémy Lapere
Atmosphere WG
Chemistry-transport modeling, Aerosols, Air pollution

Armina Soleymani
Cryosphere WG
Sea ice, Satellite image processing, Remote sensing

Lisa Winberg von Friesen
Marine WG
Marine/sea ice biogeochemistry, Nitrogen fixation, Microbial ecology

Alison Perrin
Social and Human WG
Science policy; Climate change adaptation; Human-environment relationships

Naja Carina Steenholdt
Social and Human WG - Indigenous Fellow
Quality of life, Living conditions, Greenland

Megan Wilcots
Terrestrial WG
Terrestrial ecosystem ecology, Carbon cycling, Nitrogen cycling

IASC - Prince Albert II of Monaco Foundation Fellows 2023

Eda Ayaydin
Social and Human WG
Arctic geopolitics, Indigenous politics, Sovereignty, Governance.

Archana Dayal
Terrestrial WG
Glacial ecosystem, Biogeochemistry, Microbial ecology

IASC Fellows 2022

Thomas Webb
Atmosphere WG
Coastal Climate, Boundary-Layer Meteorology, Climate Modelling

Wai Yin Cheung
Cryosphere WG
Glaciology, Photogrammetry, Cross-culture studies

Henrieka Detlef
Marine WG
Paleoceanography, Sea Ice, Geochemistry

Seira Duncan
Social and Human WG
Anthropology, Indigeneity, Eurasia

Daria Burnasheva
Social and Human WG - Indigenous Fellow
Arctic, Indigeneity, Gender, Identity, Social and cultural dimensions of climate change

Kabir Raouli
Terrestrial WG
Cold Regions Hydrology, Landcover Change, Snow, Mountain Hydrometeorology

SDWG-IASSA-IASC Fellow

Silja Zimmermann
SDWG - IASSA
Arctic Indigenous food systems, co-production of knowledge, sustainability transformations

SAON-IASC Fellow 2021

Christina Goethel
SAON
Benthic ecology, Sediment oxygen respiration, Benthic-pelagic

Fellows' Voices

As an IASC fellow I was given the opportunity to network within the Arctic sciences at an international level and have discussions with the leaders in their respective fields at ASSW22 in Tromso. This created the basis for several interdisciplinary mini-projects which I subsequently undertook. Additionally, I got involved within the structure and organization of the AWG - behind the scenes as part of the secretariat. As a consequence, I contributed to the selection process of interesting and worthwhile projects for funding. I was also able to promote my scientific ideas more widely and collaborated with IASC linked bodies to create teaching materials for high schools based on my research.

Thomas Webb
2022 Atmosphere Working Group Fellow
Coastal Climate, Boundary-Layer Meteorology, Climate Modelling
Contact info: *tom.webb@york.ac.uk*

The IASC fellowship offers a unique opportunity to gain insight into Arctic science and engage in international

collaboration. I am particularly excited to take part in the Cryosphere Working Group Proposal Evaluations, which will help me gain a greater understanding of polar science. Additionally, I am hoping to use this opportunity to contribute to the International Polar Year in 2032 and raise awareness of the Arctic region. It is inspiring to think that my participation could help create a positive legacy for the region. Through the fellowship program, I have the opportunity to learn from leading experts in the field and collaborate with researchers from around the world. This is a unique and exciting opportunity, and I am delighted to have been selected for it.

Wai Yin Cheung
2022 Cryosphere Working Group Fellow
Glaciology, Photogrammetry, Cross-culture studies
Contact info: *w.cheung@queensu.ca*

The IASC fellowship has been a unique opportunity to gain valuable insights into the Arctic science community and to discuss pressing issues in the Arctic across disciplines and with people at all career stages. Participating in the Arctic Science Summit Week 2022 was a great opportunity to expand my network, learn about ongoing scientific efforts, and discuss my research. Since then, I have participated in a workshop on strategic research planning for the Marine Working Group in alignment with the Arctic Action Plan for the UN Decade of Ocean Science for Sustainable Development. I have been nominated as the Marine Working Group representative on the ICARP IV Steering Committee and I am involved in the IASC Carbon footprint and Environmental Impact Reduction group. So far, I would describe my IASC fellowship as insightful, exciting, and a true learning experience.

Henrieka Detlef
2022 Marine Working Group Fellow
Paleoceanography, Sea Ice, Geochemistry
Contact info: *henrieka.detlef@geo.au.dk*

As part of my PhD research pertaining to northern indigenous communities I sometimes read articles by academics in the SHWG. It is a privilege to work alongside them through the fellowship which also financed my participation in ASSW 2022. I made new connections and strengthened existing ones at the event. I look forward to attending the upcoming one in Austria as well as work on projects with other fellows over the next years.

Seira Duncan
2022 Social and Human WG
Anthropology, Indigeneity, Eurasia
Contact: *s.duncan_@hotmail.com*

IASC Fellowship has already provided me with vast opportunities for dialogue with international colleagues. I am currently involved not only in Terrestrial Working Group discussions, but also in some cross-cutting projects (such as T-MOSAiC), which gave me a unique chance to share my research, ideas with a professional Arctic community and get involved in numerous scientific initiatives. I anticipate to get even more from a Fellowship Program in the coming years and hope to make important contributions for a propsperous development of IASC and Arctic science in general.

Ivan Alexeev
2021 Terrestrial Working Group Fellow
Permafrost soils; organic matter; environmental contamination
Contact info: *alekseevivan95@gmail.com*

When I started my SDWG-IASSA-IASC Fellowship, I was enthusiastic about the coming year and working with IASC and the other Fellows. At that time, I had no idea that a terrible war of Russia in Ukraine would soon unfold. The war has affected the work of many scientists working in Russia - so my fellowship was also paused for the time being. However, I am motivated to resume this exciting work one day, and my thoughts are with those affected by the war who could use all our support. In the near future, I am also looking forward to the exciting exchange at this year's ASSW 2023 in Vienna, Austria, and I hope to meet some of my Fellows there.

Silja Zimmermann
2022 Sustainable Development Working Group – International Arctic Social Sciences Association Fellow
Arctic Indigenous food systems, co-production of knowledge, sustainability transformations
Contact info: *s.zimmermann@uu.nl*

The SAON-IASC Fellowship has provided me great opportunities this last year to be involved first hand early on in the ROADS process. I was able to help draft first versions of documents including guidance to the expert panels. It has introduced me to an expanded international community interested in Arctic observing that I will be able to engage with moving forward. The fellowship has been a very valuable experience and I look forward to being able to continue both with SAON and IASC throughout my career.

Christina Goethel
2022 Sustaining Arctic Observing Network – IASC Fellow
Benthic ecology, Sediment oxygen respiration, Benthic-pelagic
Contact info: *cgoethel@umces.edu*

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