

INSTITUTE OF POLAR SCIENCES

UNDER THE SPOTLIGHT

Acting Director's report

[Mauro Sclavo](#)

Dear Colleagues, I accepted the role of acting Director with curiosity, to understand, from a privileged viewpoint, how our Institution has changed since my last experience as a Director in 2018. I found a different CNR, with more complex procedures and increased administrative burdens due also to the Institution's greater ability to win projects and the the PNRR.

And then I found you, a lively and diversified scientific community, united by curiosity, enthusiasm and resilience, which tries every day to reconcile the desire to do research with the rules necessary to implement it. Which, despite a lot of difficulties, is eager to submit new projects and is capable to carry them day by day.

I found an Institute that, paradoxically, suffers from being rich in skills, planning and funding because the administrative department, despite the competence and dedication of individuals, which often goes well beyond office duty, is inadequate for the amount of work required.

In my opinion it is my duty to operate so that each of you can work at your best, and in this sense, I will try, every day, to pave the way for you.

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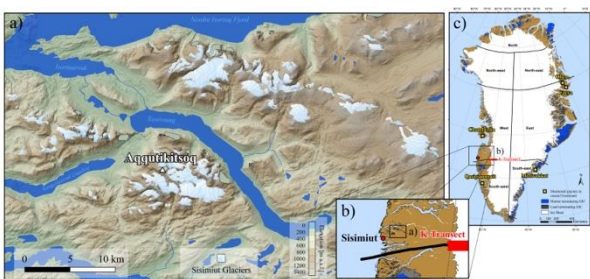
1-Project LOGS studies mountain glaciers independent of the Greenland Ice Sheet

Renato R. Colucci

Greenland-Kalaallit Nunaat is known to host the largest ice sheet in the Northern Hemisphere, second only to the Antarctic ice sheet. The water equivalent stored in this ice mass is estimated to be 7.42 m of sea level rise w.e. This trivially tells us how much sea level would rise on average globally if the entire ice sheet were to melt.

Glaciers not connected to the Greenland Ice Sheet (GrIS) have long been overlooked by the scientific community in favor of the ice sheet. However, because of their geographical location, the so-called Local Glaciers (LGs) are more sensitive to changes in climate because they don't have the thermal inertia offered by the GrIS. Despite their limited size, LGs currently contribute to about 15 % of Greenland's total ice loss.

Their small volume results in significantly shorter response times to climate forcing, and their location closer to the sea makes them more sensitive to the effects of changes in atmospheric patterns and reductions in sea ice, and thus in the precipitation regime. These issues are particularly significant in West Greenland where most of the population lives, concentrated in the major population centers.



The LOGS project study area (a) north of the Sisimiut location and close to the K-Transect (b) in West Greenland (c)

The LOGS-Local Glaciers Sisimiut project aims to initiate detailed monitoring of a mountainous area

north of Sisimiut, Greenland's second largest city by population.



The project logo and one of the glaciers monitored in the Aqqutikitsoq Mountains

The Aqqutikitsoq mountains are in fact home to a hundred mountain glaciers that provide summer runoff for the Sisimiut hydroelectric power plant. Their future development will have a direct impact on the efficiency of the city's energy production, as well as significantly affect local Arctic tundra ecosystems. Secondly, the Aqqutikitsoq Mountains are a popular recreational area, and the municipality has licensed the development of tourist activities such as summer skiing and glacier hiking. LOGS has also initiated a detailed study of all the approximately 4,000 LGs in West Greenland in an ideal transect between the locations of Upernavik - Sigguup Nunaa (Lat. 73 °N) and Qeqertarsuatsiaat - Nuuk in the south (Lat. 63 °N). Changes in area, volume and Equilibrium Line



The weather station installed in late summer 2023 in the Aqqutikitsoq mountains at 840 m altitude as part of the LOGS project

Altitude from the 1980s to the present are considered.

The main objectives of the project are to: a) Develop the basis for a long-term weather and glacier monitoring system at a new site in Greenland by filling a gap that currently exists between Nuuk and Disko Island - Qeqertarsuaq; b) Develop scientific knowledge relevant to local activities and economy, strengthening the link between research and community.

Details of the project and collaborations can be accessed from the [ISP portal](#).

2-Deep drilling mission on Colle Gnifetti; Monte Rosa, June 2024

Fabrizio De Blasi, Giulio Cozzi

An international team led by the Institute of Polar Sciences of CNR, composed of researchers from [CNR-ISP](#), [CNR-ISAC](#), [Ca' Foscari University of Venice](#), and [Cryosphere Research Solution](#), was engaged in a deep drilling mission on the Monte Rosa massif as part of the FISR [Ice Memory](#) project. The objective of the expedition was to retrieve two ice cores from the summit area of the Gorner Glacier on Colle Gnifetti at 4,454 meters, using a new type of electrothermal drill.

Unlike previous Ice Memory missions, the drilling on Colle Gnifetti did not use the electromechanical (EM) drill, as it had encountered various challenges on previous occasions due to the physical characteristics of the glaciers drilled. The electrothermal (ET) drill used does not exert a cutting force on the glacier matrix (snow, firn, and ice) like the EM system. Therefore, it is not affected by the density changes in the material encountered during drilling or by the presence of liquid water. The ET system advances through the ice by melting it with an electric resistance that reaches high temperatures and is positioned at the drill head. In the current context of climate change, the physical conditions of temperate glaciers are increasingly influenced by the presence of water, even in the deeper layers, due

to high rate melting on the surface. The use of the ET system in deep drilling on alpine glaciers, especially those in Italy with predominantly southern exposure, is becoming increasingly strategic to ensure the quality of the cores collected.



Electrothermal drill being tested in Alagna Valsesia (credits: Fabrizio De Blasi)

The mission began on June 12, 2024, and during the first week, the researchers focused on assembling and conducting preliminary tests of the ET drill in the town of [Alagna Valsesia](#) (VC). On



Electrothermal drill assembly (credits: Fabrizio De Blasi)

June 18, they proceeded with setting up the drilling tent and preparing the equipment (about 2,000 kg) for transfer by helicopter from Alagna to the drilling site (Figures 3 and 4). Unfortunately, due to adverse weather conditions, only the personnel could be transferred to the [Capanna Gnifetti refuge](#) at 3,647 meters, where they underwent the necessary acclimatization period at altitude. On June 20, the transfer of both materials and personnel to Colle Gnifetti was planned for the beginning drilling activities, but the continuing unfavorable weather forced the entire team to extend their stay until June 22 at Capanna Gnifetti.



Drilling tent frame assembly (credits: Fabrizio De Blasi)

During four days at high altitude, snowstorms, severe thunderstorms with heavy lightning, and wind gusts exceeding 120 km/h occurred. After a thorough assessment of the possible weather

evolution, and after consulting with the mountain guide, the manager of [Capanna Margherita refuge](#) (the planned accommodation during field activities), as well as the helicopter pilot, it was determined that for at least the next 5-7 days, the minimum safety conditions for starting drilling activities, would not be met. Given these considerations and the lack of necessary safety guarantees, the mission was definitively canceled. On June 22, the only weather window available was used to bring personnel and the equipment back to the valley. The following day was dedicated to reorganizing the equipment for its final transfer to our headquarters in Venice on June 24 together with the personnel.

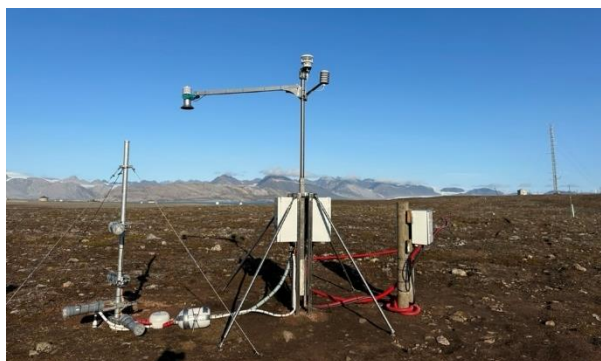


Preparing loads (credits: Fabrizio De Blasi)

NEWS FROM DIRIGIBILE ITALIA

Mauro Mazzola

The Arctic Station Dirigibile Italia is about to conclude its intensive field activities for the year. September is dedicated to instrument maintenance and control, particularly for the [Amundsen-Nobile Climate Change Tower](#) and the [instrumented moorings](#) in the fjord. For the latter, this operation is primarily the download of data recorded by the instruments, collection of samples, and replacement of batteries before returning them to the sea. As mentioned, after these activities, the station will enter a phase of pure monitoring, with our permanent staff handling aerosol and snow sampling throughout the winter. But let's take a step back and return to where we left off with the [May newsletter](#). We had reported on the PHOTOPLANT and SEDNA-Pp projects, which proceeded smoothly despite the logistical difficulties that can sometimes be encountered when operating in such remote locations. The installation of the new air, soil, and snow monitoring station for the WinterCZ project, not far from the CCT and funded by the PRA and led by the CNR-IGG institute, has also begun.



The new measuring station of the WinterCZ project

This year, local support from the Mountain Rescue Service of the Guardia di Finanza has been invaluable, as testified by the researchers themselves, and has covered the period of July and August, during which field activities reach their peak in terms of projects and personnel engaged in the field. For 2025, we plan to extend their support to the spring as well.



A researcher accompanied in the field by the Guardia di Finanza mountain rescue personnel

There have also been numerous outreach activities with newspapers and television. In addition, our base leader, Veronica Coppolaro, sent greetings from Ny-Ålesund to the Association of Descendants of the Dirigibile Italia on the occasion of their third gathering.

As mentioned at the beginning, we are preparing to face the winter, during which activity is less hectic, but which still poses challenges for the personnel present at the base. The total lack of light does not help in alternating the different phases of the day, while outdoor work requires even greater attention and organization. However, our staff is well-prepared and we are confident that it will be another peaceful winter.

RESEARCH HIGHLIGHTS

1-Antibiotic resistance at the edge of the Arctic Circle

Angelina Lo Giudice, Carmen Rizzo

The field activities carried out within the INTERACT project [“Prokaryotic communities at the Southern edge of the Arctic: a focus on antibiotic resistance in lakes of the Melrakkaslétta Peninsula \(Iceland\)”](#) – PUFFIN - have just concluded with the support of the [RIF Field Station](#), in Raufarhöfn. The project aims at furnishing a baseline to disentangle the role played by birdlife in antibiotic resistance spreading in low human-impacted sub-Arctic lakes and ponds. The Melrakkaslétta



Lake sediment collection (credits: Carlo Michaud)

Peninsula (Iceland), where human pressure is low, has a coastline punctured by creeks and lagoons as well as grassy heathlands and lakes and serves as a rest stop for migratory birds. It is home to tens of thousands of birds, and more than 50 species of birds have been recorded breeding in the area. Wildlife could serve as a point source for antibiotic-resistant bacteria (ARB) infections in human or domestic animals and provide a reservoir of antimicrobial-resistance genes (ARGs)

with potential to spread through horizontal gene transfer. The project PUFFIN, coordinated by CNR-ISP in collaboration with the [Zoological Station “Anton Dohrn”](#), aims at relating the occurrence of pollutants, including antibiotics and other pharmaceutical products, to the bacterial community composition, antibiotic resistant bacteria and resistance genes in water, sediment and bird droppings in lakes differently



Bird dropping collection (credits Carlo: Michaud)

visited by birds. Samples will be also screened for the presence of microplastics, a carrier of contaminants and bacteria (including potential pathogens and ARB) on their surface. The study of the diversity and abundance of both ARGs and ARBs in regions characterized by relatively low anthropogenic activity could provide invaluable insights into the mechanism controlling the diversity of primary genes and the historical evolution of antibiotic resistance.



Angelina Lo Giudice (on the left) and Carmen Rizzo (on the right) with the RIF Station Manager Pedro Rogrigues

2-Aboard the icebreaker Sir David Attenborough: first scientific expedition through the fjords of Greenland to study ice sheet melting

[Luisa Patrolecco](#), [Nicoletta Calace](#)

After six weeks of navigation, the Arctic oceanographic cruise aboard the British icebreaker “Sir David Attenborough” of the British Antarctic Survey (BAS), concluded on August 31. This exciting scientific exploration, which involved the Institute of Polar Sciences, included 80 scientists and crew members who set sail on July 19 from Scotland, heading toward the icy fjords of southeastern Greenland, one of the least known and most climate-affected Arctic regions. The



expedition is part of the international project “Kang-Glac” (Assessing ocean-forced, marine-terminating glacier change in Greenland during climatic warm periods and its impact on marine productivity), funded by BAS.

Thanks to the ship's state-of-the-art facilities, the primary objective was to assess the impact of ice sheet melt on oceans, ecosystems, and climate.



Through oceanographic, physical, geological, chemical, and biological measurements, the

multidisciplinary research team collected data and samples (soil, freshwater, seawater, marine organisms, and sediment) to gain a comprehensive understanding of the past and present behavior of the ice sheet and predict future changes. Currently, the ice sheet is shrinking at a rate five times faster than in the 1990s, leading to the release of enormous amounts of freshwater into the ocean, which could affect the planet's major ocean currents, with repercussions on climate, sea level rise, and marine life.



The two ISP researchers on board, Luisa Patrolecco and Nicoletta Calace (ISP associate), conducted experimental activities in collaboration with the international team led by Dr. C. Manno (BAS). Through isotopic measurements, nutrient analysis, and the study of bioactive organic contaminants in the waters of the main fjords, correlated with other biological parameters, the goal is to identify the effect of ice melt on marine biota, particularly zooplankton (such as copepods and krill).



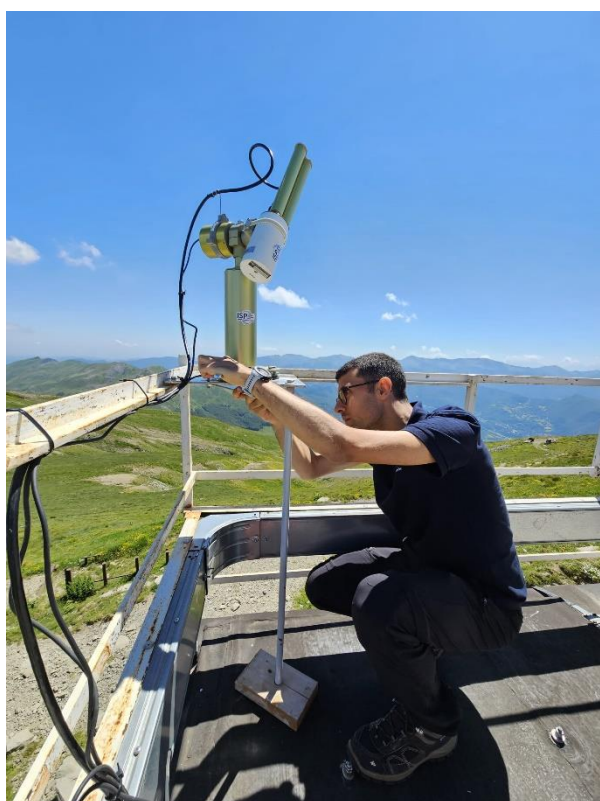
Photo's credits: Luisa Patrolecco

BEYOND THE POLES

1-A new Solar Photometer managed by ISP at Mount Cimone

[Simone Pulimeno](#), [Mauro Mazzola](#), [Angelo Lupi](#)

To better understand the evolution of aerosol loads and study the seasonal variations in aerosol optical characteristics, the solar photometer CIMEL CE318-N has been deployed by ISP researchers at the [Research Observatory 'Ottavio Vittori'](#) on Mount Cimone at 2165 m a.m.s.l.



Installation of the photometer at the O. Vittori observatory of Monte Cimone

Mount Cimone is a strategic site for atmospheric investigation, being the only high-mountain research station south of the Alps and the Po basin.

The solar photometry technique provides information about the total atmospheric attenuation of the solar beam along the slant path in the atmosphere by applying the Beer-Lambert law at various wavelength. The solar radiation reaching the surface under cloud-free sky conditions is attenuated not only by aerosols but also by scattering and absorption effects caused

by gases such as methane, water vapor, ozone, and oxides of nitrogen. All these factors must be considered to retrieve high-quality Aerosol Optical Depth (AOD) measurements.



The CIMEL photometer in measurements at the observatory

Since July 2024, the instrument has been part of the [Aerosol Robotic NETwork \(AERONET\)](#), along with two other stations in the Po Valley: (i) San Pietro Capofiume, a research infrastructure managed by ARPAE and CNR, representative of a rural site; and (ii) Modena, a small city on the slopes of the Apennines, representative of an urban site. The positions of these stations form a transect in the W-E direction, allowing the evaluation of aerosol load evolution in the Po Valley, for example during episodes of Saharan dust intrusions from North Africa, from the pristine environment of Mount Cimone to urban and rural areas.



The Po Valley seen from Monte Cimone. The smog layer in the lower part of the atmosphere can be seen

2- A remotely operated vehicle helps us preserve and restore the deep ecosystems of the Mediterranean

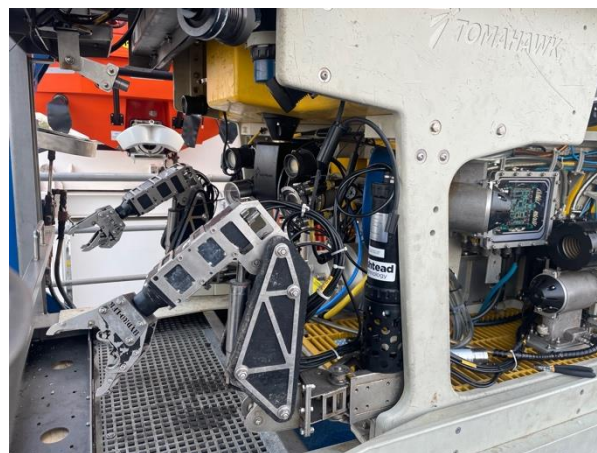
[Paolo Montagna](#)

In April and May of this year, a remotely operated vehicle (ROV), managed from the CNR ship Gaia Blu, explored the depths of the Mediterranean between 300 and 1000 meters along the Dohrn Canyon and Bari Canyon, two areas of extraordinary biodiversity threatened by both climate change and human activity. The ROV is a tethered vehicle that captures high-resolution images and videos and can collect geological and biological samples up to depths of 5000-6000 meters. During the two ECO-REST campaigns (first and second leg), funded by the Life+ program of the European Commission and the [National Biodiversity Future Center](#) (PNRR-NBFC), the ROV completed several crucial missions: it identified and removed anthropogenic waste, including plastics and lost fishing gear, and helped place 24 artificial structures made from eco-compatible materials. These structures, called ecoreefs, are



Photo of an artificial "ecoreef" structure positioned at the stern of the ship and ready to be placed on the seabed (Credits: Paolo Montagna)

designed to provide a substrate for the growth of benthic organisms, such as deep-sea corals, which are true "biodiversity hotspots," offering refuge and habitat for other marine species. The ROV conducted over 40 dives into the depths of the two submarine canyons and surveyed more than 5 km of seabed. The high-definition camera installed on the ROV proved invaluable in



Detail of the cameras and mechanical manipulators installed on the remotely operated vehicle Tomahawk used during the ECO-REST campaign (Credits: Paolo Montagna)

identifying areas impacted by marine waste and determining the areas for the ecoreefs deployment. Mechanical manipulators were essential for removing the waste from the seabed and collecting valuable biological and geological samples for marine research. Some of the recovered waste will be recycled using a prototype that will convert it into second-generation fuel for local fishermen.

Onboard the Gaia Blu were four ISP researchers ([P. Montagna](#), [P. Giordano](#), [S. Misericchi](#), and [L. Langone](#)), who, along with other colleagues from the CNR, the [Stazione Zoologica Anton Dohrn](#), and the [University of Bari](#) and [Marche Polytechnic University](#), worked in four-hour shifts. We now expect the ecoreefs placed in the Dohrn and Bari canyons to be naturally colonized by various deep-sea coral species. These efforts not only help preserve the natural beauty and biodiversity of the Mediterranean but also establish a significant precedent for global marine conservation.



The CNR ship Gaia Blu in the Gulf of Naples (Credits: Giorgio Castellan)

POSTCARDS FROM THE FIELD

We are guests of the Polish Polar Station in Hornsund to conduct the field activities foreseen by the INTERACT FreshHorn project (Exploring FRESHwater Lakes of the HORNSund area (SW, Spitsbergen) for prokaryotic diversity and antibiotic Resistance), which CNR-ISP carries out in collaboration with the host station. Samples of water, sediment, soil, guano and fish were collected in a periglacial and glacial system of lakes in the Hornsund Fjord, in locations selected on the basis of the different impact of avifauna. We look forward to being able to analyze them to determine the microbial diversity of the place, the concentration of contaminants, in particular antibiotics, which will be related to the presence of antibiotic-resistant bacteria (ARB) and antibiotic-resistance genes (ARG). Furthermore, we will investigate the influence of migratory birds on prokaryote communities in lake waters. We are sure that the collaboration with our Polish colleagues will bring excellent results!

Alessio Nancy



Greetings from Norway! In July we were guests of the NIBIO Svanhovd Research Station to conduct fieldwork for the INTERACT MORPHEUS project (HuMan footprint elucidation in the subarctic region of the Pasvik River by PHarmacEutical and microbial multidrug resistance detection), which CNR-ISP is carrying out in collaboration with the Stazione Zoologica "Anton Dohrn". Water, sediment and sponge samples were collected in the Pasvik River area, in locations selected based on the different human impact. We look forward to analyzing them to determine the concentration of contaminants, especially antibiotics, which will be related to the presence of antibiotic-resistant bacteria (ARB) and antibiotic resistance genes (ARG). Microplastics will also be searched for, as possible vectors of contaminants and pathogenic bacteria. We are confident that the collaboration, now ten years old, with our Norwegian colleagues will continue to bring excellent results!

Angelina Carmen



Greetings from Greenland, where the first exciting scientific expedition in the Arctic aboard the new British Antarctic Survey icebreaker, "Sir David Attenborough," has just concluded. The six-week exploratory mission is part of the KANG-GLAC Project, "Assessing ocean-forced, marine-terminating glacier change in Greenland during climatic warm periods and its impact on marine productivity," which aims to understand the extent of ice sheet melting in southeastern Greenland caused by global warming and its repercussions on the climate and environment. We reached the main fjords, where we sampled water and sediments, collected chemical and physical data from the water column, and organisms (zooplankton) using specialized nets. This was done to study biological and biogeochemical processes, nutrient cycling, contamination, and isotopes of organic material to understand how Arctic marine organisms and these fragile ecosystems are responding to climate change.

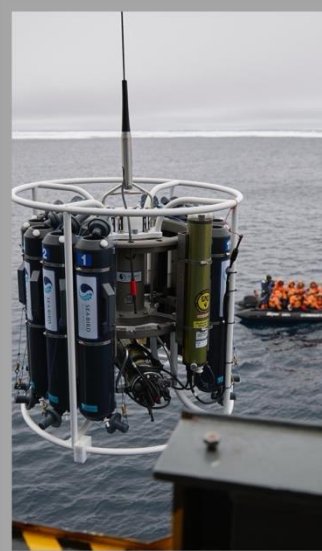
Luisa e Nicoletta



Greeting from the North Pole

The Institute of Polar Sciences coordinates the multidisciplinary activities of the CHARCOT project, funded by PONANT/ARICE-EU2020, aboard the vessel "Le Commandant Charcot." Twenty scientists from various scientific Institutions in seven different Countries are involved in collecting oceanographic data (seawater, ice and atmosphere) during an oceanographic expedition crossing the Arctic Ocean, with a route from Nome (Alaska) to Longyearbyen (Svalbard Islands), and reaching both the magnetic and geographic North Poles.

Francesco Alessandro Ciro Maurizio





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UPCOMING EVENTS

- [Developing a Framework for Essential Biodiversity Variables \(EBVs\) in Terrestrial Antarctic and Sub-Antarctic Ecosystems](#), 18-20 September 2024, Scott Polar research Institute, Cambridge (UK). This workshop will be held in person. Online participation is also available. The workshop will be focused on developing a standardized framework for calculating Essential Biodiversity Variables (EBVs) for terrestrial Antarctic and sub-Antarctic ecosystems. [Register here!](#)
- The [2024 Arctic Circle Assembly](#) will be held in the Harpa Concert Hall and Conference Centre, Reykjavík, Iceland, on October 17-19. The annual Arctic Circle Assembly brings together governments, organizations, corporations, universities, think tanks, environmental associations, Indigenous communities, citizens, and others for a comprehensive and democratic Arctic dialogue. The Assembly is the largest gathering on Arctic affairs. It is a place for international engagement, cooperation, and celebration. [Register here!](#)
- [SIOS Online Conference 2024](#), 11 - 13 Nov 2024. SIOS Knowledge Centre and the SIOS Remote Sensing Working Group invite abstract submissions from anyone involved in Earth System Science research in Svalbard including remote sensing, fieldwork and modeling. Abstract submission closes: 20 Sept 2024. [Submit an abstract here!](#)
- [Chemical, biogeochemical, and physical drivers of the coupled polar atmosphere and climate: an International Polar Year 2032-33 planning workshop](#), November 17-22, 2024, Centre Paul Langevin, Aussois, Alps/ France. The international initiatives [CATCH](#), [PACES](#), [BEPsII](#), [ASPeCt](#) and [QUIesCENT](#) will hold a joint workshop bringing together scientists and stakeholders with an interest in atmosphere-ice-ocean research focussing on chemical, biogeochemical and physical processes in the Arctic and Antarctic and links to climate change. Cold regions which are seasonally or permanently covered by snow and ice, notably the Third Pole, are also of interest. The workshop will fully integrate hybrid participation from attendees both on-site and on-line.
- The [15th Symposium on Polar Science](#), 3-5 December 2024, National Institute of Polar Research (NIPR), Tokyo (Japan). The NIPR is organizing this annual symposium to present and promote a wide variety of polar scientific research and interdisciplinary studies. The symposium will include both oral and poster sessions. The official language of the symposium is English. Registration deadline for participants: 28 November 2024
- [Arctic Youth Conference 2025](#), 24-26 January 2025, Tromsø (Norway). The Arctic Youth Conference aims to empower Arctic youth, enhance their participation, increase Arctic literacy, celebrate diversity, and serve as a platform to realize Chairship priorities.

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