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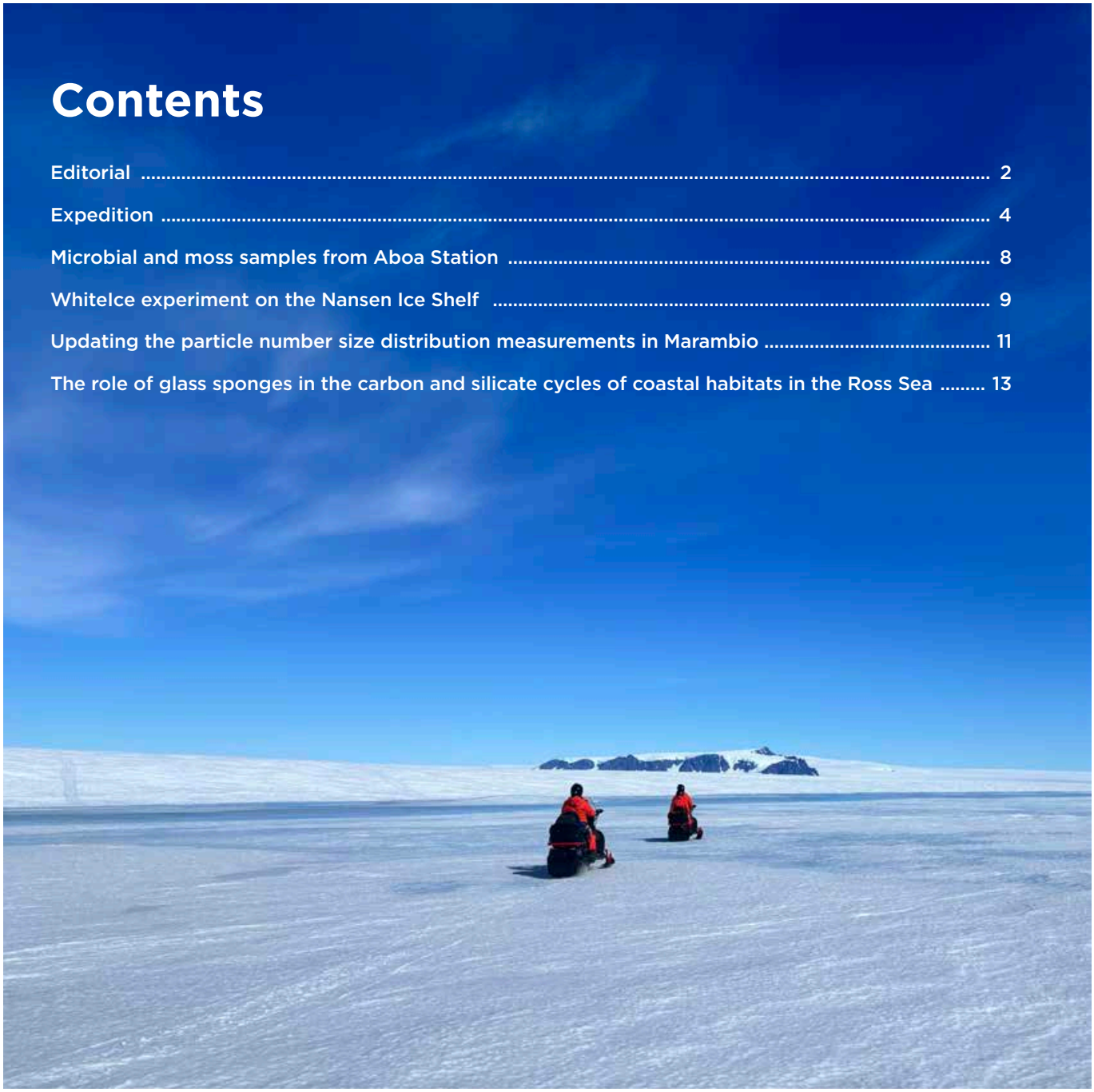
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

FINNARP

FINNARP FIELD OPERATIONS 2025–26

Photo: Sari Matilainen/ FINNARP

Contents



Expedition members riding snowmobiles toward Plogen nunatak.

FINNARP

Publisher: Finnish Meteorological Institute | Finnish Antarctic Research Program (FINNARP)
Address: Erik Palménin aukio 1, 00560 Helsinki
Layout: Alfons Digital, Mina Nytorp
ISBN 978-952-336-214-7

www.antarctica.fi

Cover: Fossilryggen nunatak. Photo Kari Saikkonen.
Back cover: Basen nunatak. Photo Priit Tisler.

Editorial

Finnish Antarctic operations have faced significant financial challenges over the past year. As part of the central government's savings program, funding for Antarctic operations was also reduced, forcing research teams to postpone fieldwork for one year. The reduction in budget has required a new approach and adjustment of activities according to the new financial situation.

Finnish Antarctic research is primarily funded by the Academy of Finland. The four-year funding period 2025–2028 began with research groups focusing on planning and preparing for upcoming fieldwork. Due to the challenging financial situation, research activities are also being reviewed and developed from a new perspective.

The FINNARP 2025 expedition field season was shorter than usually, and the expedition team was also small. During the six-week period, year-round monitoring instruments and research infrastructure were maintained and measuring data collected. As a new mode of operation, research group travelled to Aboa with their own funding. The biodiversity group from the University of Turku was the first visiting research team to finance its field campaign by oneself. This also marked a new opening for Finnish Antarctic research in the field of moss studies. Lichens and algae in the area were also studied. In addition, microplastic samples from wastewater were collected in order to investigate its environmental impact at Aboa station.

In addition to Aboa, Finnish scientists worked at Argentina's Marambio station, Italy's Mario Zucchelli Station, and New Zealand's Scott Base. Finland also supported the international airborne measurement campaign RINGS. The most important cooperation partners in operations and logistics were the German Alfred Wegener Institute and the Swedish Polar Research Secretariat. Air transport to Aboa was carried out by White Desert.

Despite uncertain times and financial challenges, the season was successful. International cooperation, reliable partners, settled in operational procedures, and Aboa – open for new project and collaboration, will help carry activities through financially challenging times. In the upcoming season, much longer research expedition will be carried out. Research groups that have already waited a year will finally be able to begin their planned fieldwork.

Mika Kalakoski

Manager,
Antarctic Operations and Services

Finnish Meteorological Institute

FINNARP expedition

The Finnish Antarctic Research Program (FINNARP) carried out the FINNARP 2025 research expedition to Finland's Antarctic research station Aboa in Queen Maud Land between December 2025 and February 2026. The expedition team consisted of six members: the expedition leader, two senior specialists, a mechanic, and two researchers from the University of Turku.

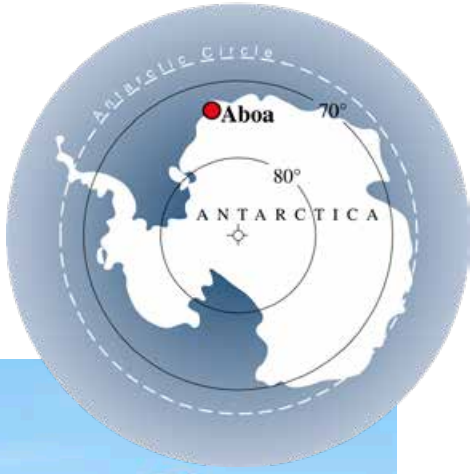


Photo: Kari Saikkonen

FINNARP 2025 expedition team from left to right: Marjo Helander, Kari Saikkonen, Mika Kalakoski, Priit Tisler, Tapio Hyppönen, Sari Matilainen.

FINNARP 2025 EXPEDITION TEAM

Mika Kalakoski, Expedition Leader
Priit Tisler, Senior Specialist
Sari Matilainen, Senior Specialist
Tapio Hyppänen, Mechanic
Marjo Helander, Scientist
Kari Saikkonen, Scientist

The expedition departed Finland on 27 December 2025. The team first traveled on a scheduled flight to Cape Town. From Cape Town the journey continued aboard an Airbus A330 operated by British White Desert company to the Wolfs Fang Runway ice runway. There the expedition arrived late in the evening on 29 December 2025. On 31 December, the expedition continued to Aboa aboard a ski-equipped Basler BT-67 operated by White Desert, arriving around midday with their cargo.

Arriving at Aboa

The Aboa Research Station had weathered the harsh Antarctic winter well. However, significant snow accumulation had formed high drifts around the station. The experienced team brought the station quickly back into operation mode. The new power generators installed by the previous expedition were soon in operation and the station was heated already on the evening of arrival. The end-wall structure of the generator container, repaired last season, had also withstood the severe winter conditions successfully.

Field Research Operations

The biologists from the University of Turku studied how Antarctica's unique environment is changing as glaciers retreat due to climate warming. They collected a variety of samples, and permanent sensors measuring soil temperature and moisture were installed near the station. In the future, station technical staff will be responsible for collecting data from these sensors. As a new research initiative, samples were also collected from wastewater and greywater for nano- and microplastic analysis. The results will help to assess the environmental impact of Aboa station.

The expedition's technical personnel maintained the instruments that perform year-round measurements at the station. Observational data were collected and transported to Finland for scientific analysis. The team also carried out essential station maintenance, including servicing facilities, repairing storm damages, and conducting annual maintenance and repairs on vehicles such as snowmobiles, tracked transport vehicles, off-road vehicles, and tractor. Reliable infrastructure and proper planning, including functional vehicles, water and food supply, medical preparedness, and communications—is critical for conducting demanding research work in Antarctica.

Weather conditions during the expedition were mostly favorable, although somewhat wintrier than in recent seasons. In January, a three-day storm brought wind gusts exceeding hurricane-force levels. Despite this, the expedition successfully achieved its objectives, and the station is now ready to host a larger research team in the coming season.

Photo: Priit Tisler/ FINNARP

Priit Tisler maintaining the AWS5 automatic weather station on the glacier. The annual snow accumulation averages 40–60 cm.

Photo: Priit Tisler/ FINNARP

Reliable infrastructure and proper planning, including functional vehicles, water and food supply, medical preparedness, and communications—critical components for conducting demanding research work in Antarctica.

Tapio Hyppänen servicing the engine of a SISU NASU tracked transport vehicle.

Photo: FINNARP Sari Matilainen

Research station Aboa.

FINLAND'S ANTARCTIC RESEARCH STATION ABOA

- Finland's Antarctic research station Aboa is located on Queen Maud's land about 130 kilometers from the coast and about 5,000 kilometers from Cape Town, South Africa. The research station was built during the austral summer of 1988–1989. After the construction of the research station, regular research expeditions to Antarctica have been arranged.
- Since 1998, the Finnish Meteorological Institute has operated and maintained an automatic year-round weather station (AWS) at Aboa. The weather station belongs to the WMO International Weather Observation Network. Another automatic weather station (AWS5) is located on a glacier 10 km from Aboa.
- Research expeditions are usually carried out between November and February when it is summer in Antarctica and the temperature stays between 0 and 20 degrees below zero. Antarctic summer is characterized by constant light and strong solar radiation, as well as strong snowstorms.
- Finland's Antarctic operations and services FINNARP, operating at the Finnish Meteorological Institute, organizes annual research expeditions to Aboa and supports the fieldwork of projects funded by the Academy of Finland in different parts of Antarctica. The research work of the FINNARP expeditions is mainly focused on Queen Maud's land and in the vicinity of the research station Aboa.
- Finland is a member of the Antarctic Treaty. A prerequisite for this is the implementation of significant research activities in the region.

Photo: Priit Tisler/ FINNARP

Priit Tisler servicing the research station's automatic weather station.

Photo: Sari Matilainen/ FINNARP

Home mountain Basen nunatak.

Photo: Kari Saikkonen/ FINNARP

The tractor is the station's workhorse.

A Successful Antarctic Season

The expedition closed the station on 5 February 2026. The team then traveled from Aboa to Wolfs Fang Runway aboard a ski-equipped Basler BT-67 operated by White Desert, and continued the following day, 6 February, on a White Desert Airbus operated A330 to Cape Town. Departure from Aboa was delayed by several days due to poor weather conditions. The expedition returned to Finland on a scheduled flight on 10 February 2026. In total, the Aboa Research Station was staffed for 36 days.

MEASUREMENT AND OBSERVATION ACTIVITIES AT ABOA DURING THE 2025/26 SEASON

Measurement campaigns:

- Biological research conducted by the University of Turku in the vicinity of Aboa Station.
- Sampling of wastewater and greywater for nano- and microplastic analysis by the University of Turku.

Annual maintenance of year-round measuring instruments and data collection:

- Maintenance and data retrieval from the Finnish Meteorological Institute's year-round automatic weather stations.
- Maintenance and data retrieval from the seismometer of the Institute of Seismology, University of Helsinki.
- Maintenance and data retrieval from the National Land Survey of Finland's satellite positioning receiver.
- Inspection and maintenance of Aboa's satellite radar reflectors.

Photo: Kari Saikkonen/ FINNARP

Sari Matilainen at the base of the Basen.

Photo: Kari Saikkonen/ FINNARP

Cliffs of Basen.

Microbial and moss samples from Aboa Station

The unique nature of Antarctica will change with global warming. Previous projects funded by the Academy of Finland have collected plants and related DNA and microbiome samples from the Antarctic Peninsula, and also isolated live bacterial strains from the area.

Photo: Kari Saikkonen/ FINNARP

Researchers collecting samples.

During the 2025-2026 field season, the research expanded to the nunataks around Finland's Aboa Station, where only mosses and lichens grow. DNA, bacterial, cyanobacterial and algae samples were collected from mosses, soil, glaciers and water bodies. Nine sensors measuring soil temperature and moisture were also installed in the area, and the data from them will be collected by station staff in the coming years.

In Finland, the processing of DNA and microbial samples continues, utilizing a variety of methods – genetics, microbiology, molecular biology, plant chemistry, computational biology, and greenhouse and mesocosm experiments. The goal is to understand how the chemical properties of plants and their associated microbes affect the interactions between different groups of organisms and, through this, the development of Antarctic biological communities. The research results will deepen our understanding of human impacts on nature and the biological factors that maintain the diversity of life on Earth.

As a new research initiative, samples of service and greywater were taken for nano- and microplastic analyses. The results can be used to assess the responsibility of station operations in the sensitive Antarctic ecosystem.

Photo: Kari Saikkonen/ FINNARP

Sampling macroalgae.

Photo: Kari Saikkonen/ FINNARP

Researchers Marjo Helander and Kari Saikkonen collecting microbiome samples from the glacier for nano- and microplastic analyses.

Whitelce experiment on the Nansen Ice Shelf

The aim of the Whitelce field campaign, which is funded by the EU Polar Research Infrastructure Network (POLARIN) project and the Italian National Research Program (PNRA), was to measure the characteristics of the "surface scattering layer" (SSL) that forms at the surface of the Nansen Ice Shelf (NIS) during the summer melting period.

The Whitelce team included Roberta Pirazzini (PI) and Daan van den Broek (PhD student) from the Finnish Meteorological Institute (Helsinki, Finland) and Anja Mödl (PhD student) from the Laboratory of Cryospheric Sciences, Environmental Engineering Institute, Civil and Environmental Engineering, Ecole Polytechnique Fédérale de Lausanne (Lausanne, Switzerland) and the WSL Institute for Snow and Avalanche Research SLF (Davos, Switzerland). The team was hosted at the Italian Station Mario Zucchelli, located ~40 km from the NIS, and reached the measurement site via helicopter. Two automatic stations were installed on the NIS for the duration of the experiment: one was equipped with sensors to measure the surface energy budget and the water vapor flux generated by the melting ice, and the other station measured the surface spectral albedo. Density, temperature, microstructure, and spectral albedo of the ice were manually measured along a transect between the two stations at each revisit of the site, and drone-based RGB and temperature mapping of the measurement area were performed at the beginning and at the end of the melting period, to assess the spatial and temporal variability of surface

FIELD MEASUREMENT STATIONS

Photo: Lorenzo De Silvestri/ PNRA

FMI Automatic weather station installed on NIS from 28.11.2025 to 22.01.2026. The station measured the net surface radiation budget, the 2m temperature, humidity, wind speed and direction, the 3.5m turbulent fluxes, water vapor flux, temperature and humidity, as well as the snow depth.

Photo: Daan von den Broek / PNRA

Mini-radiation station installed on NIS from 30.11.2025 to 22.01.2026. The station was 70 m apart the bigger AWS and measured the surface net radiation budget and the surface spectral albedo.

Density, temperature, microstructure, and spectral albedo of the ice were manually measured along a transect between the two stations at each revisit of the site.

properties. During the most intense melting weeks, the ice in the measurement area developed holes and channels filled with meltwater, causing challenges for the measurements. Despite this, the key atmospheric and cryospheric observations needed to characterize the evolution of the SSL were successfully measured.

The WhiteIce experiment was carried out in the framework of the IceScales project funded by the Research Council of Finland (Jan 2025-Dec 2028), where the datasets collected over the NIS will be analyzed together with the Arctic sea-ice SSL observations to develop a prognostic scheme for SSL that consistently applies on Antarctic ice shelves and Arctic sea ice. The SSL scheme will be integrated into the HIGHTSI thermodynamic snow/ice model.

Photo: Roberta Pirazzini/ PNRA

Anja Mödl measuring the surface spectral albedo along a transect with the portable ASD FieldSpec radiometer.

Photo: Roberta Pirazzini/ PNRA

The Italian Station Mario Zucchelli seen from the helicopter, when returning from the field work.

Updating the particle number size distribution measurements in Marambio

Continuous year-round in-situ measurements of aerosol particles and greenhouse gases in the Antarctic Peninsula, Marambio station, have been operational since January 2013.

This long data series (13 years) has been used to understand the trends and drivers of atmospheric composition in this remote, marine environment. Maintaining the measurements at high-level is a constant effort of the contributing parties: Argentinean Meteorological Service (SMN), Finnish Meteorological Institute (FMI) and the Institute for Atmospheric and Earth System Research / University of Helsinki (INAR/UHEL), requiring regular maintenance and updates in infrastructure and instruments, daily data QA/QC and continuous scientific analysis of results.

Marambio has instrumentation to measure aerosol and ion number concentration and size distribution, aerosol scattering and absorption, aerosol optical depth, surface greenhouse- and trace gas concentrations and vertical profiles of ozone and supporting instrumentation for meteorological parameters and clouds serving various multi-disciplinary scientific projects. Recent major upgrades have taken

Photo: Eija Asmi

The upgraded measurement system. On the right are the renewed DMPS particle size distribution instrument and the new particle counters; to the left are scientific equipment to measure black carbon, scattering, and different gases.

Photo: Eija Asmi

The view from the roof of the measurement container on a beautiful summer day. There was little snow, and ice floes were drifting in the sea.

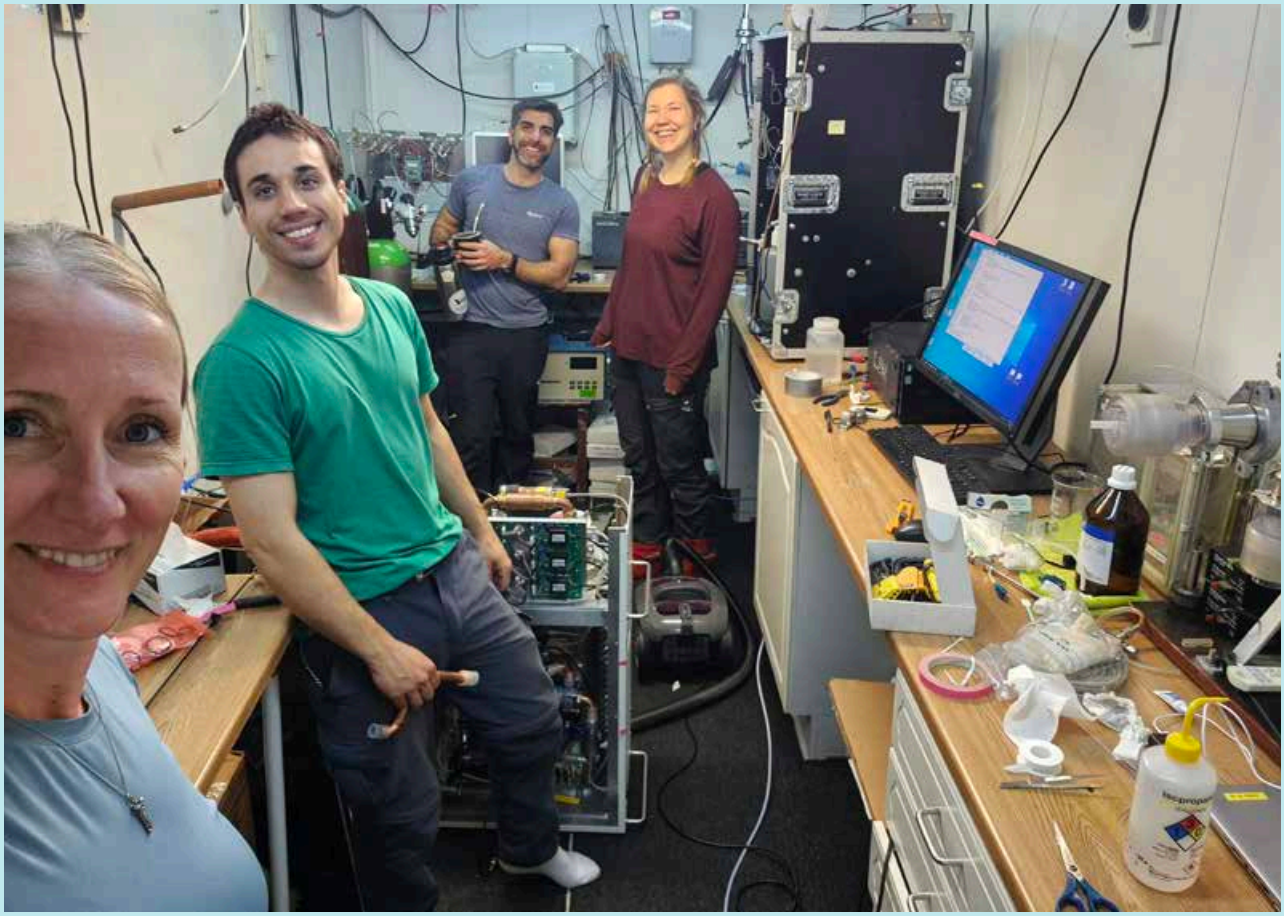
Photo: Eija Asmi

place in years 2024/2025 (particle concentrations), 2021/2022 (optical instrumentation) and 2018/2019 (greenhouse gas measurements). This year, aerosol number size distribution measurement system was upgraded to an ACTRIS/GAW (https://www.actris-ecac.eu/actris-gaw-recommendation-documents.html) compatible instrumentation. During the visit, all instrumentation were maintained and calibrated, data flows were updated and station staff were prepared for year-round operation.

From FMI, Krista Luoma and Eija Asmi participated in the 2026 expedition to Marambio in mid-March, and from SMN Francisco Quarin and Juan Chirino participated in the work – both staying a longer period at the station and overseeing the continuity of the observations.

The round-trip flights from Buenos Aires to Río Gallegos in southern Argentina and onward to Marambio Station were completed aboard an Argentine Air Force Hercules C-130 cargo aircraft. The long flights also provided enough time to read scientific articles.

Photo: Eija Asmi



“Mate” tea helps the instrument technicians stay alert late into the night. From left to right: Eija Asmi, Juan Chirino, Francisco Quarin, and Krista Luoma.

The role of glass sponges in the carbon and silicate cycles of coastal habitats in the Ross Sea

The dive team of the Tvärminne Zoological Station (University of Helsinki) participated in the SPONGESCAN II research project during October–November 2025.

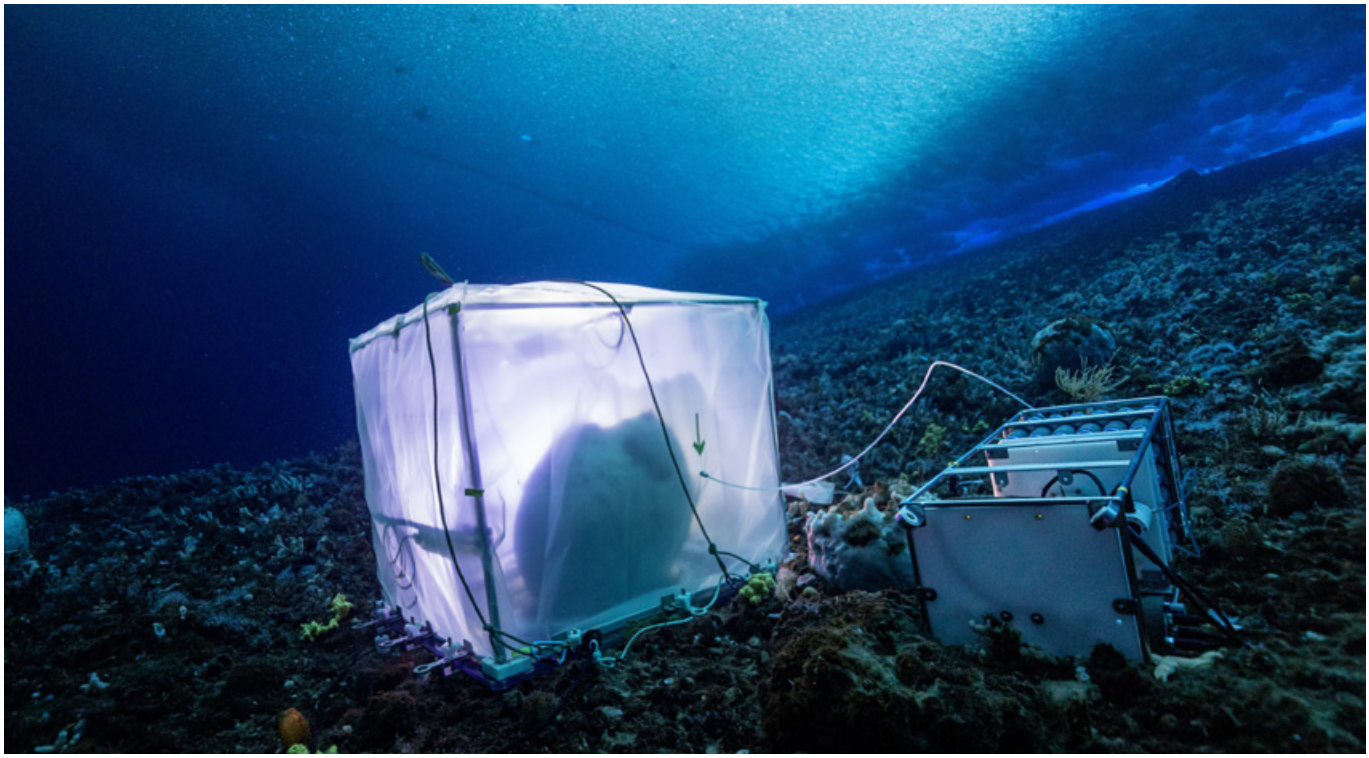


Photo: Erik Wurz

Iincubation chamber over glass sponge.

This three-year collaborative project between the Alfred Wegener Institute (AWI) and the University of Waikato (New Zealand) investigates glass sponges (Hexactinellida) and their role in the carbon and silicate cycles of coastal habitats in the Ross Sea, Antarctica. Glass sponges are key species in Antarctic benthic ecosystems. These large sponges are found at high densities in the Weddell Sea and other parts of Antarctica at greater depths, which has limited their *in situ*-research possibilities. In the Ross Sea, more specifically in the McMurdo Sound area, glass sponges occur at depths of less than 30 meters, enabling the use of diving-based research methods and making the site ideal for experimental *in situ*-setups. Therefore, conducting the research project from Scott Base (New Zealand) research station was optimal.

The 2025 expedition was the second year of the project, and the research team consisted of eight mem-

Photo: Erik Wurz

Building the dive camp.

bers from three collaborating institutions, including Anna Vesanen and Dr. Erik Wurz from Tvärminne. The research was conducted using *in situ*-methods, meaning that all sampling, experimental work and measurements were carried out on site by divers. During the six-week expedition, a total of 64 dives were completed. These included collecting samples of glass sponges and other species in the habitat, collecting water samples, conducting incubation experiments, and gathering measurements using instruments such as ADV (acoustic Doppler velocimeter) and ADCP (acoustic Doppler current profiler) sensors. Additionally, glass sponges were recorded with video and still photography for 3D-modeling.

In addition to diving methods, video data were collected using ROVs (remotely operated vehicles), and analyses of water column properties were conducted using CTD probes. Furthermore, research instruments installed during the first year—which had collected data throughout the winter—were retrieved, their data were collected, and the instruments were reinstalled on the seafloor for the following year. Year-round time series collected during winter, including data from underwater cameras and CTD probes, enhance understanding of glass sponge activity outside the field season.

The expedition was successful, and the team collected a large amount of data for further analysis. Weather conditions were favorable for fieldwork, and the research was carried out as planned. The team will return to Scott Base in 2026 for the final year of the project to continue the research.

RESEARCH GROUP:

Dr. Jürgen Laudien, Alfred Wegener institute
Dr. Ulrike Hanz, Alfred Wegener Institute
Patrik Beggel, Alfred Wegener Institute
Nils Jacobssen, The Flanders Marine Institute
Prof. Dr. Ian Hawes, University of Waikato
Milan Cunliffe-Post, University of Waikato
Dr. Erik Wurz, University of Helsinki
Anna Vesanen, University of Helsinki

Photo: Erik Wurz

Diver surfacing after experiment setup.

Photo: Erik Wurz

Adv measurement setup.

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