

Ny-Ålesund

A Year at the German-French Arctic
Research Base AWIPEV



René Bürgi

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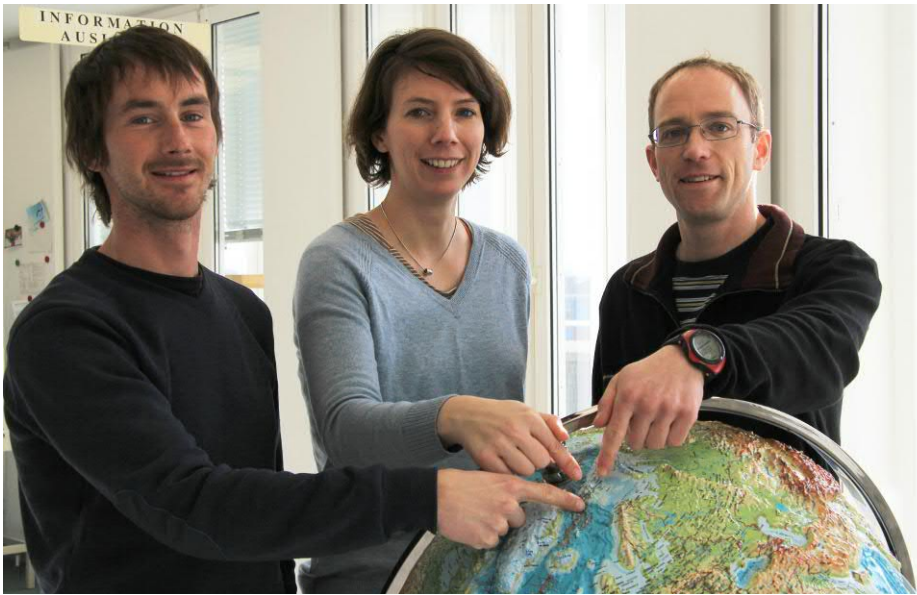
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Preface

Ny-Ålesund is an exceptional place to live and work. The small village is located further north than any other civilian, year-round inhabited settlement on earth. The winter is cold and the sun does not shine at all for several months. There are hardly any roads and the nearest neighbouring village is over 100 km away.

Today, Ny-Ålesund is used exclusively for international research. Numerous institutes from over 10 countries have taken up residence here. The German Alfred Wegener Institute and the French Institut polaire français Paul-Emile Victor also jointly operate a research station here. Every year, they look for a scientist and two engineers who are willing to work together on site to support the researchers and technicians in their projects.

As part of this team, I was able to spend 15 months on Spitsbergen from April 2015 to July 2016. The preparation time in Potsdam, Bremerhaven and Brest lasted three months. While logistics engineer Thomas Ribeaud mainly familiarised himself with the logistics and mechanics of the vehicle fleet, station manager Kathrin Lang and I visited scientists and technicians to familiarise ourselves with their projects and measuring instruments. We

attended a safety course in Longyearbyen, a shooting course and obtained driving licences for electric forklifts and boats. As observatory engineer, I also attended a laser safety course.

The flight to Longyearbyen, the main town on Spitsbergen, and the onward flight to Ny-Ålesund are spectacular: You fly over a magnificent landscape of pack ice, fjords, glaciers and mountains. In April, the country lies almost untouched under a blanket of snow. Peak mountains rise up from it. Then the Kongsfjord gradually appears in the small window of the 16-seater propeller plane. I get a quick glance at the new home before the pilot touches down on the runway. It's love at first sight: Because Ny-Ålesund is definitely not only "Potsdam's coldest workplace" as the advertisement on Potsdam's tramway makes us believe, but certainly its most beautiful.

This illustrated book provides an insight into the work and life at the French-German Arctic Research Base on Svalbard.

René Bürgi





Spitsbergen

Spitsbergen is the largest island in the Svalbard archipelago, a group of islands in northern Europe that was discovered by Willem Barentz in 1596. Almost 60% of the archipelago is covered by glaciers. The main island is located around 650 kilometres north of the Norwegian mainland, 440 kilometres east of Greenland, 500 kilometres west of Franz Joseph Land and 1100 kilometres south of the North Pole. The Spitsbergen Treaty of 1920 grants Norway sovereignty over the archipelago and all signatory states equal rights to labour and trade.

The largest settlement on Spitsbergen is Longyearbyen, a small town with 2500 inhabitants in Norwegian hands. It was founded in 1906 as a mining town and today has an international airport, the UNIS University and numerous hotels. The Russian mining town of Barentsburg lies to the west at the entrance to the Isfjord. Sveagruva, a mining town 45 kilometres south-east of Longyearbyen, was closed in 2020.



Ny-Ålesund is located around 115 kilometres from Longyearbyen at a latitude of just under 79° north. It is located on Spitsbergen's west coast on the northern side of the Brøgger Peninsula on the Kongsfjord. Access is either by ship or by aeroplane.

In terms of climate, West Spitsbergen is strongly influenced by the northernmost branch of the North Atlantic Current. Temperatures at sea level on Kongsfjord typically range from -25°C in winter to around +14°C in summer, with record temperatures of -42°C and +18°C measured. This is significantly warmer than other places at the same latitude.





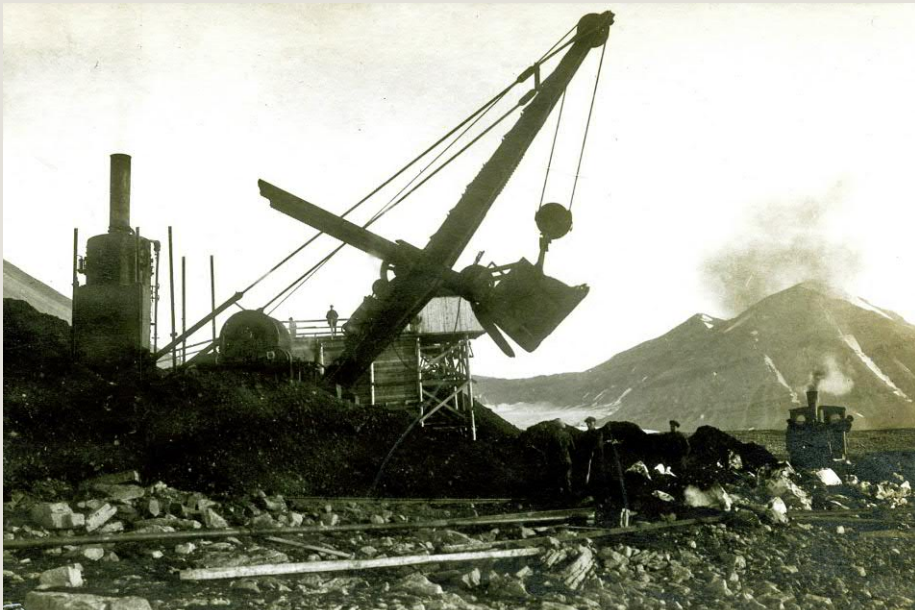


The Northernmost Settlement in Europe
Settlement

The small town of Ny-Ålesund looks back on a short but eventful history: from the 17th century, walrus and whales in particular were hunted on Spitsbergen. The whale population was drastically reduced, so that whaling was no longer worthwhile from around 1830 and was discontinued. In the 19th century, numerous expeditions and study trips were organised to Svalbard and the first forms of Arctic tourism began as early as 1890. Trappers who hunted seals and Arctic foxes for their pelts also settled here occasionally.



However, the large settlements of Longyearbyen, Barentsburg and Ny-Ålesund all date back to coal mining at the beginning of the 20th century. Longyearbyen was founded in 1906 by the American John Munro Longyear, although coal had already been mined in the Isfjord for the first time a few years earlier. The first operations began in Kongsfjord around 1909, and Ny-Ålesund was finally founded in 1916 by Peter S. Brandal, who acquired the rights from the Green Harbour Coal Company in the same year.



While the mining era in Longyearbyen lasted until 2020, it lasted in Ny-Ålesund with interruptions until 1962. The rock around the coal seams is friable and several accidents occurred in 1920, 1948, 1951-52. After another major accident caused by an explosion in a shaft, in which all 21 miners on the shift were killed in 1962, the mine was abandoned and the site deserted.



Ny-Ålesund became famous above all for Roald Amundsen's and Umberto Nobile's polar expeditions. The two took off from here in May 1926 with the airship Norge and 15 hours later were the first to fly over the North Pole. In 1928, Umberto Nobile attempted to repeat the journey with the Italia airship and land at the Pole. However, parts of the airship iced up during the crossing, rendering it unable to manoeuvre. Umberto Nobile survived the crash of the Italia. Roald Amundsen, on the other hand, died during the subsequent international rescue operation. Today, several museums with numerous exhibits tell stories and anecdotes from that time.

In the sixties and seventies, the first scientists began to use the empty huts. The existing infrastructure, such as the harbour and buildings, was unique at this high latitude and greatly simplified the logistics of Arctic exploration. Gradually, more institutes were added, especially in the 1990s. The site is still managed by the Kings Bay Kull Company (now Kings Bay AS), founded in 1916, and is home to scientists and technical staff from institutes in 10 different countries. The numerous wooden buildings were gradually renovated, transforming the originally barren mining village into a colourful place to live and work.



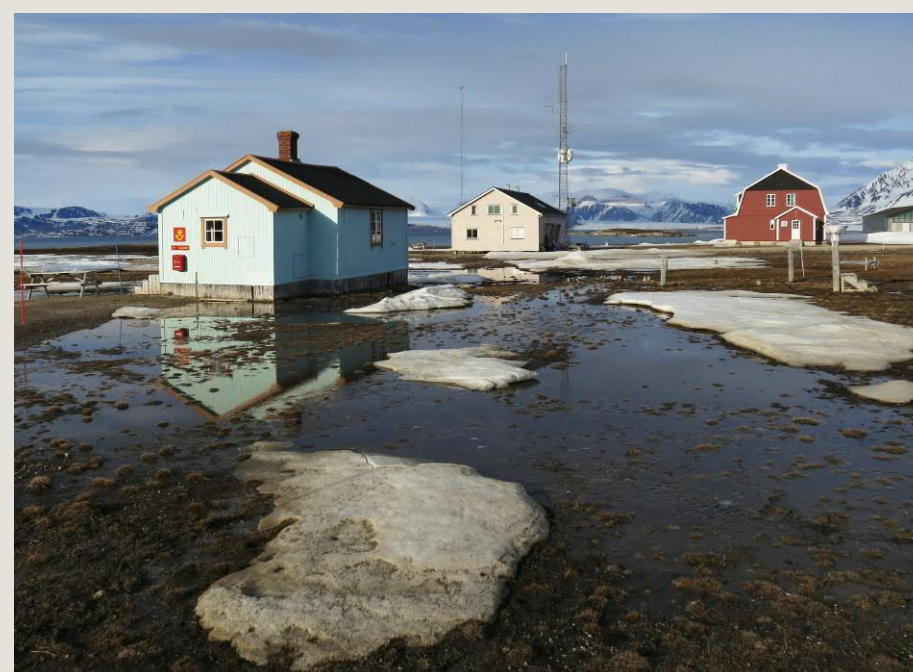
Ny-Ålesund has its own airfield, which is served twice a week by a Dornier 228 turboprop aircraft. The fjord is now navigable all year round. This was not always the case: Just 30 years ago, the Kongsfjord used to freeze over every winter, meaning that shipping operations had to be suspended in winter.



During the summer months, Ny-Ålesund is regularly visited by the Hurtigruten and other smaller cruise ships, which stop here for a few hours. Today, the settlement has a small souvenir shop and a bar that open once or twice a week, a museum, a large office building with a spacious canteen, a small sports hall, various workshops, research buildings and accommodation.

There are only a few kilometres of roads. They connect the village with the airfield, the new geodetic station at Brandalpynten and the cable car station to Zeppelinfjellet. Depending on the time of year, anyone wanting to get out of the village will have to rely on either snowmobiles or boats.

Incidentally, there is a radio ban for wide frequency ranges in the village itself: Mobile phones, drones and other transmitters would severely interfere with the daily measurements taken by the geodetic station's large radio telescope.







Kongsfjord

The village of Ny-Ålesund lies on the shores of the Kongsfjord. The landmark of this inlet in the west of Spitsbergen is the mountain range with the towering peaks of the "Tre Kroner", visible from afar. The panorama from the summit of Scheteligfjellet shows the village with the famous mountains and the glaciers Kongsbreen and Kronebreen, 14 kilometres away, in the late evening light. The most striking peaks are from left to right: Diadem, Svea, Nora, Dana, Palasskrona, Pretender and Dronningfjella.



Surrounded by Sea and High Mountains

The village of Ny-Ålesund was built on the north side of Brøggerhalvøya, nestled between the 500m to 700m high mountains of the peninsula and the 250m deep Kongsfjord. On the opposite side of the inlet lie the mountains on both sides of the Krossfjord, which stretches north-eastwards into north-west Spitsbergen. At the end of March, the whole country is covered in a blanket of snow and the first ski tracks adorn the slopes of Lundryggen.



Ny-Ålesund in Spring

The village has just under 70 buildings. The oldest dates back to 1909, when the Green Harbour Coal Company claimed the village for its coal deposits. Around a third of the buildings were constructed shortly before or after the war. Further barracks were added between 1945 and 1962 during the second mining period. Newer buildings were erected mainly for scientific purposes from the 1990s onwards, such as the Marine Laboratory, the NDACC observatory and the Kongsfjordhall.



Ny-Ålesund in Summer

During the short summer, large areas of land are coloured in shades of brown and green. They are colonised by lichens, mosses, willows and grasses. The island owes this to the large numbers of birds that carry nutrients from the sea out onto the land and deposit them as faeces on the cliffs and shallow shores. The shore area of the small Solvatnet lagoon is home to numerous geese in summer. The many small hills are spoil heaps and are the result of mining activities.



A colourful place

Ny-Ålesund is a colourful place today. The small red hut in front of the blue house in the centre of the picture was the first building in the village. It is the Green Harbour House and dates back to 1909. Many of the buildings have been converted over the years: The warehouse became a bar, the former hospital is used as a scooter garage and the former school now serves as the Indian Research Station. The four yellow huts on the left in the foreground originally stood on Blomstrandhalvøya.

Behind the village, the 557 metre high Zeppelinfjellet, Ny-Ålesund's local mountain, rises up.







Midnight Sun and Snow

From the end of April, the sun no longer sinks below the horizon and it stays light for 24 hours. However, the snow remains in the lowlands until the beginning of May.







Buildings in Ny-Ålesund

Column by column from left to right:
 Sverdrup Station (Norwegian Polar Institute, 1999), Amundsen Villa (1918), Mellageret (1919), old post office building (1920), Kongsfjord Shop (1993), Service Building (1957), Marine Laboratory (2005), Kongsfjord Hall (2016), two of the four London buildings (1912, now used by the Arctic Centre of the Dutch University of Groningen), Blue House (1919, former officers' building, now used by AWIPEV), former telegraph station (1917).





The North Pole Hotellet

When the building was erected in 1919, it provided accommodation for 76 miners. In 1938 it was converted into a hotel and accommodated tourists, many of whom visited the town even then. Today, regular tourists can no longer stay in Ny-Ålesund. The Nordpol Hotellet is now used to accommodate short-term guests of Kings Bay AS.



Harbour Area

The cargo ship Norbjørn and the passenger ship Nordstjernen regularly call at Ny-Ålesund. The Norbjørn supplies the town with food and technical materials. The Nordstjernen, a former Hurtigruten ship built in 1956, operates as a cruise ship on Spitsbergen.

At the beginning of the 20th century, when there was no airstrip and supplies were delivered entirely by ship, the fjord was only ice-free for 4-5 months in summer. Since 2006, the harbour has been open all year round.







Old Mine Railway

Berlin locomotive no. 2, built in 1909, was brought to Ny-Ålesund during the first mining period in 1917, where it pulled lorries to the dock. It was brought to the mainland for restoration in the winter of 2015, shortly after these photos were taken.

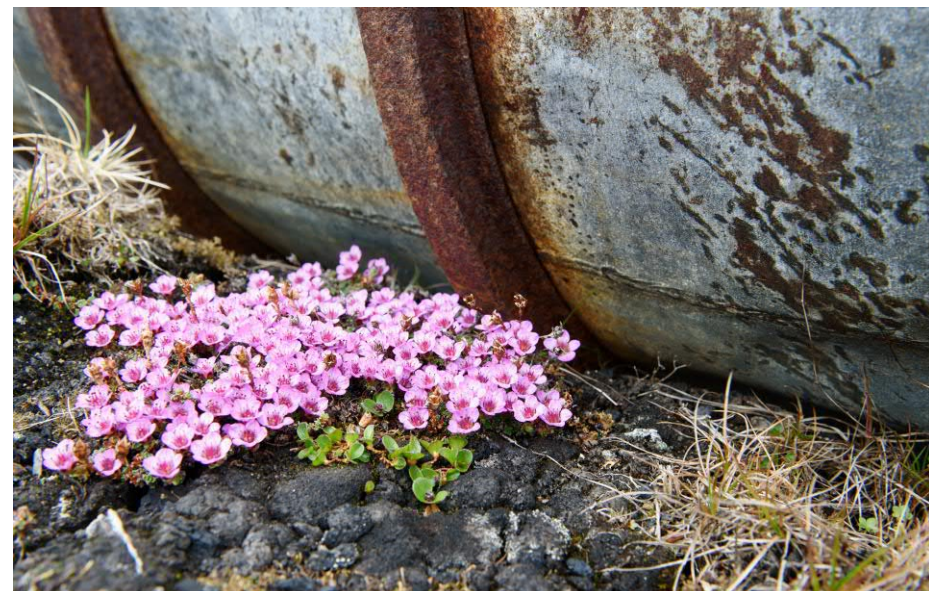
The mine entrances have long since been closed, but the tracks of the old mine railway still lie unchanged in places.

Countless relics from the mining era turn the island of Spitsbergen into an open-air museum.

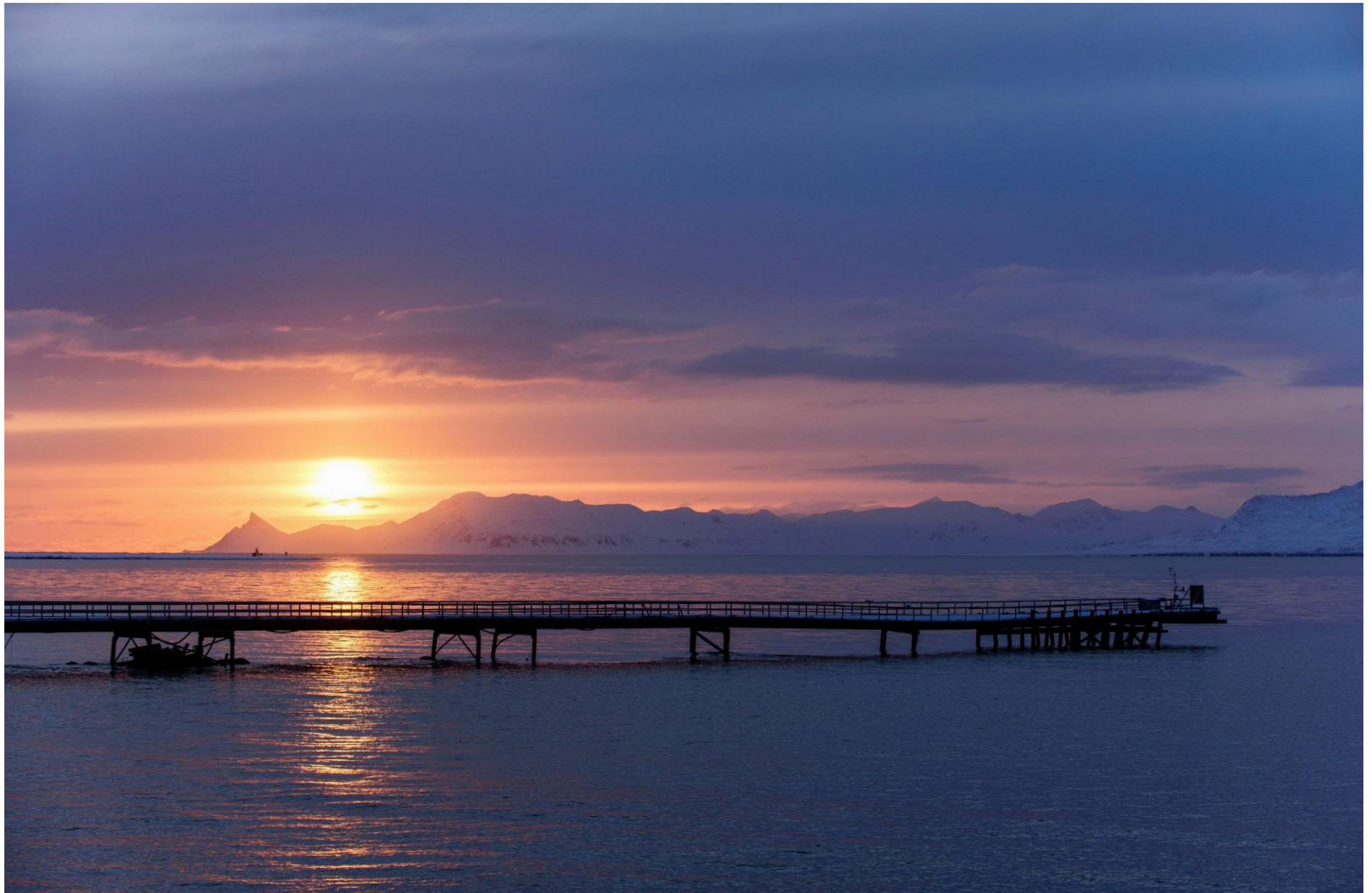


Between Waste and Cultural Heritage

All remains and relics dating from before 1946 are considered cultural assets and are protected as historical monuments. This applies to trappers' traps as well as old wooden pillars from the surrounding coal mines. These rusting barrels are gradually blending back into the landscape. In colourful harmony with mosses, grasses and flowers, it almost seems as if they have become one with nature.







Old Pier

The old pier was built between 1957 and 1960 and stands right next to the coal cleaning building, which was erected at the same time. The 113 metre long pier can no longer be navigated. Countless small icebergs have sloshed against the iron pillars over the past half century and have taken their toll on the pier. Today, only a small meteorological measuring station remains at its end.



Bell Tower

The small bell tower, which stands between the naval laboratory and the carpentry workshop, was erected in 1951 by the Polarklokken Women's Association. The bell marked the beginning of the financing of a chapel, which has never been built in Ny-Ålesund.



Amundsen Mast

The 35 metre high Zeppelin mast was erected in 1926 for Amundsen's North Pole expedition. The Italian Umberto Nobile and the Norwegian Roald Amundsen took off from here with their airship and flew over the North Pole, 1230 km away, on 12 May 1926. Nobile repeated the flight on 24 May 1928 with the airship Italia, which led to a tragic rescue operation in which Roald Amundsen lost his life. A bust in memory of the great explorer stands in front of the blue house today. Incidentally, it is not known whether the airship was ever moored to the mast.











The Amundsen mast in front of the striking Pretender, Dronningfjella and Garwoodtoppen mountains.

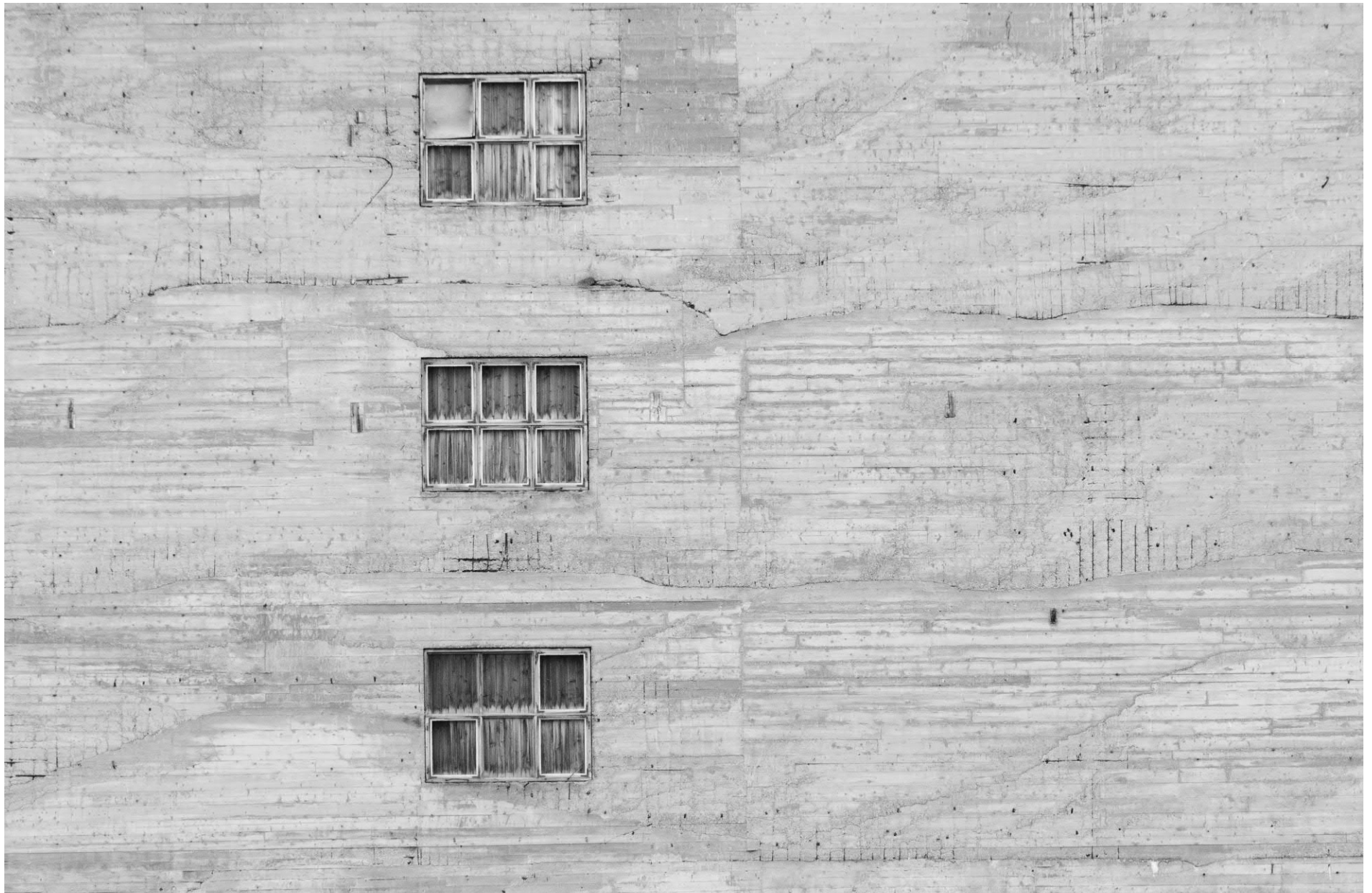




Ruin

This building in front of the old coal-fired power station is living out its last days.





Exposed Concrete

In 1960, the mine site was modernised and a large coal cleaning plant was built. Over 100,000 tonnes of coal were mined the following year. Just two years later, an explosion in a shaft killed 21 miners, bringing the mining era in Ny-Ålesund to an abrupt end. Since then, the building has fallen into disrepair. The cleaning plant and the coal-fired power station built in 1949 are now "lost places" in Ny-Ålesund. The flat roofs provide ideal nesting sites for Arctic terns, as they are inaccessible to Arctic foxes.









Former Telegraph Station

The telegraph station was built in 1917 and moved to its present location during the Second World War. From here, news of the success and failure of Amundsen's and Nobile's polar expeditions was sent all over the world. The building was restored in 2012-2014 and converted into a museum. Numerous old pieces of equipment and anecdotes tell of times gone by. Like the other museum buildings, this one is also open at all times and invites visitors to linger and marvel.







Town and Mine Museum

The museum was completely restored in 2015-2016 by Stein Domaas (right) and Steinar Snøtun (above). Many of the museum houses numerous exhibits had been stored in the attic since the mining era.





Inauguration

The restored museum was inaugurated in May 2016. It displays numerous photographs and equipment from the mining era. One of around 10,000 gas cylinders, which were needed to refuel the Norge airship with hydrogen in 1926, is on display on the upper floor.



In the Attic

During the restoration of the museum, the attic was also lovingly refurbished.

Previously, countless boxes and equipment were stored here for years, while outside the icy wind shook the beams and howled through the cracks.

The old gynaecologist's chair, which Stein Domaas has made ready, is reminiscent of a time when families of miners with children still lived in Ny-Ålesund.



Old Sawmill

The sawmill from the second mining period is no longer in use. The carpenter now works in a modern joinery opposite the mechanical workshop.

All the wood used for the mines and the surrounding huts had to be transported by ship from the mainland.



Boat Shed

Old boat shed from the first mining period in the east of the village. In the background are the mountains Nielsenfjellet, Grønlietoppen and Haavimbjellet. The towering mountain to the right is called Nobilefjellet.



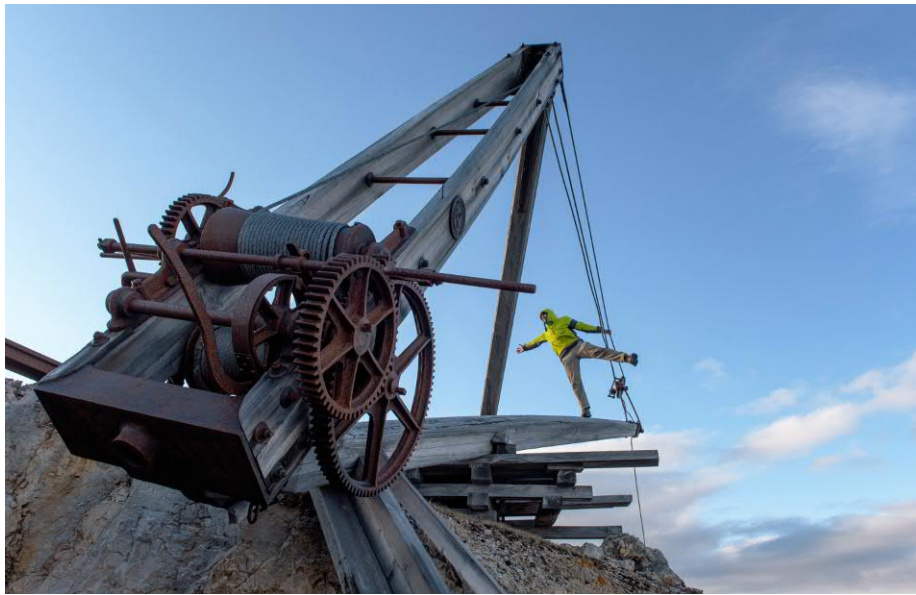


Museum Hut

The small museum hut still shows the lifestyle in Ny-Ålesund shortly before the end of mining activities. A family lived in this house until 1962, when all activities in the village came to a standstill after the tragic mining accident and the entire workforce returned to the mainland. A small memorial not far from the village commemorates the many victims of that time.







Ny-London

Ny-London on Blomstand Island opposite Ny-Ålesund essentially consists of two buildings. Cranes and steam boilers bear witness to the fact that marble was once to have been quarried here. However, the stone was not of good quality and quarrying ceased after a short time.







A Temporary Community
Community

Today, between 30 and 120 people live in Ny-Ålesund: Carpenters, cooks, mechanics, accountants, housekeepers, electricians, scientists, construction workers, technicians and artists. It takes all of them to keep the community together and the research operation going this far north.



But it is only a temporary community: while the Norwegian permanent employees usually spend up to four years in the village and travel back to the mainland during their holidays, the wintering team at the German-French AWIPEV station is reassembled every year. Scientists and technicians, on the other hand, often only spend a few weeks here for a measurement campaign or equipment service. In many cases, they have been coming here for decades and know the area like the back of their hand. Even though most of the inhabitants are Norwegians, the town is also home to scientists from England, the Netherlands, Germany, France, Italy, India, Japan, Korea and China. As a result, Norwegian and English are spoken in equal measure and intercultural exchange is actively cultivated.



When Kathrin Lang and I travelled to Ny-Ålesund in April 2015, during our stopover in Longyearbyen, the young locals immediately and easily dressed us in warm scooter clothing and took us to a barbecue. We celebrated our arrival on the evening of 8 April with hot sausages in the cold at the end of the Adventfjord. Norwegians are very warm-hearted, friendly and open if you don't close yourself off to them.



For the AWIPEV team, the months of April and May are a learning period. The daily routine has to be gradually taken over from the previous team so that inspection rounds, service work and measurement series merge seamlessly. Finally, the day the station is handed over is celebrated in front of the blue house, one of the many small events that bring the whole village together.

Set meal times in the service building also provide a fixed daily routine during the darker months of the year. The canteen is a place where people meet and make new plans. If you don't bump into each other on the street, you will see each other in the small village shop or at the bar, which are open once or twice a week.



There are plenty of opportunities to do things together: Whether it's cooling off together in the fjord, baking pizza, enjoying raclette for the Swiss bank holidays, having a pasta evening or games evening or shooting beer cans in the home-made beer cannon: there's never a shortage of original events. Three times a year, volunteers organise a fancy dress party. Then the whole village comes together and there is no-one who doesn't turn up dressed in their favourite costume. Everyone is equal, there is no top or bottom, no left or right. There are only frolicsome, grounded people celebrating together.



In such a small community, you inevitably get to know each other and it is difficult to say goodbye. When a member of the community leaves, a large delegation always turns up to say goodbye. This recurring ritual ultimately reminds everyone that you only live and work here for a limited time. The time to leave will come for everyone at some point.





Meeting at the Blue House

The current staff of the AWIPEV Arctic Base meets in the Blue House after work, ready for dinner together: The old and the new station team as well as the logistics manager Dominic Fleury (IPEV) and the coordinator for the scientific projects Roland Neuber (AWI).



Cinema Film Shoot

Shooting the successful film "Quo vado?" with Checco Zalone enriches village life. The film was released in cinemas in Germany in 2016 under the name "Der Vollposten".





Man's Best Friend

Some residents keep dogs. They are kept in the kennels in the west of the village. When winter sets in, the joyful and impatient barking and howling cannot be ignored.

From top left to bottom right:

Torbjørn Norling and Marcena Kaczmarska with their two dogs, the faithful four-legged friends Kayla, Chili and Idun, Verena Mohaupt with Gau-te Hermansen's dogs Balder and Garm, travelling out with Sebastien Barrault on his sled dog team.



Live Concert

The service building is a meeting place during meal times and Sunday coffee, but also offers space for lectures, bar service and parties in the winter months. In February, after the Polar Jazz Festival in Longyearbyen, the Norwegian singer Sondre Lerche and his band were invited to give a concert and the lounge was packed. Everyone takes it with humour that only a bucket and soup spoon are available to replace the drums. Spontaneity and improvisation are the order of the day here.





Mellageret

During the summer, the bar in the Mellageret opens once or twice a week, organised by the Velferden Association. Then people chat, party and dance over sausages and beer until the early hours of the morning, while the sun shines outside around the clock.





Costume Party

The summer solstice in June and the equinox in March and September are celebrated with a costume party. Everyone takes part, regardless of origin, length of stay or professional background.





May 17th

The Norwegian National Day starts with an early morning wake-up call from the organising committee. A small parade leads from the observatory to Mellageret, where a speech is given. This is followed by joint activities or games such as milk churn throwing.



Stations Meeting

Only a few research stations are manned all year round. Per Erik Hanevold, who runs the Norwegian Polar Institute's Sverdrup Station, invites those present to a dinner at the Amundsen Villa in January. This will be accompanied by reindeer meat that the passionate hunter and fisherman has shot and prepared himself.





Gym

Samfunnshuset has a small sports hall. This is where people meet during the darker months of the year to play innebandy (floorball).



Christmas Dinner

Moritz Sieber and Hallgeir Reitan play Christmas carols on their brass instruments. The congregation has shrunk to around 30 people for the Christmas celebrations such as Julaften and Julebord.



Snowmobile Service

The snowmobile is the only means of transportation during the spring months. Some residents even have their own. These vehicles also need to be serviced. The Velferden club has invited people to do this together. In Ny-Ålesund, this is by no means just a male activity! Åsne Dolve Meyer and Kathrin Lang get Åsne's sled into shape themselves.





Into the Cold Water

The water in the fjord never reaches temperatures that would motivate a Central European to take a dip. Nevertheless, every now and then a few hardy souls take a quick dip in the sea, which is just a few degrees cold, before warming up again in the sauna.

Wojtek Moskal, a long-time employee at the Norwegian Polar Institute, invites people to go river rafting on the local Bayelva River during a rainy autumn weekend. There is never a shortage of original ideas for shared experiences.





Big Machines

Norwegian builders love big vehicles with powerful engines! Whether fire engines, forklift trucks or crane lorries, Trond Nasvik drives them all.





Power Station

William Engesland is an electrician and works at the power station to supply electricity and heat. This is a responsible job: if the three diesel generators were to fail, the supply lines would soon freeze. The town would have to be evacuated within a few days.



Canteen

What would the canteen be without the many chefs like Jørgen Sjøvold Strand, who cater for the physical well-being of the staff every day. At lunchtime, there is usually a cold buffet, often with hot leftovers from the previous day. In the evening there is a warm menu, which is served at 4.30 pm. In Norway, it is customary to eat early so that you have enough time to go outside afterwards. Unimaginable for the Spanish workers who are installing the antenna for the new geodetic station: They don't turn up at the open buffet for a bite to eat until eleven in the evening.





Vernissage

AWIPEV station engineer Christelle Guesnon loves to paint and has invited all residents to a vernissage in the old greenhouse, which is due to be demolished one day.







Ice Cream

Verena Mohaupt (station manager) and Christelle Guesnon (observatory engineer) have something special in mind: They want to supply the town with homemade ice cream to mark the inauguration of the new "Ice Cream" electric vehicle. The cream and yoghurt will be cooled in liquid nitrogen from the observatory.

Station Handover

Competition during the station handover: The new AWIPEV team (Verena Mohaupt, Christelle Guesnon and Simon Escalle) has to hold its own against the village delegation (Marion Nødset, Ryan De Wolf and Stefano Ponti).







The German-French AWIPEV Station
awiper

Arctic research in the Kongsfjord has a long tradition for the German Alfred Wegener Institute, based in Bremerhaven and Potsdam, and the French Institut polaire français Paul-Emile Victor in Brest. France has been conducting research here since the 1960s and Germany has been present year-round with the Koldewey Station since the 1990s. Since 2003, the two institutes have been working together as a single organisation in Ny-Ålesund, AWIPEV. Buildings, boats, tools: everything is used, maintained and organised jointly.

On site, the AWIPEV station is managed year after year by a wintering team. The three-person team consists of a station manager and an observatory engineer, who applied through the Alfred Wegener Institute, as well as a young logistics engineer provided by IPEV.



The station manager or base leader takes care of the concerns of the scientists and guests at the AWIPEV station on site. As the interface between Kings Bay AS and the AWI and IPEV institutes on the mainland, she or he has an overview of who is at the station and when, with which project, and where support is needed. She helps the scientists to plan their stay or when authorisations are required. Sometimes she also supports the Dutch team led by ornithologist Maarten Loonen, whose institute is not represented all year round.

The observatory or station engineer primarily looks after the measuring equipment in the observatory. During the daily rounds, he or she checks whether they are working and providing data. If something breaks down, the engineer is in close contact with the technicians at the respective institutes by e-mail or telephone. It is not always possible to get the devices up and running again without spare parts and device-specific knowledge. Most instruments carry out their measurements automatically. However, even such devices require intervention from time to time. This may be for calibration, cooling or regular component replacement.



The logistics engineer is rarely to be found in his office in the Rabot building, but more often in the workshop in the Rabot building, on the boat or in the harbour warehouse. He looks after and repairs the boats, snowmobiles and bicycles at the station. The engineer takes care of transport with a forklift truck, TipTop tractor or the new Icecream electric vehicle and sometimes takes scientists out on a boat or snowmobile. He also provides the scientists with clothing and safety equipment.



Certain tasks are shared between the team of three. These include the daily radio sounding (weather balloon) at 13:00, the picket duty in the evening and at weekends and the shortened patrols at weekends. Station residents who leave the village sign in and out with this person to ensure that no one goes missing and that help can be provided quickly in the event of a problem.



The background work is mainly carried out by the two logistics managers Dirk Mengedoht (AWI) and Dominic Fleury (IPEV) as well as the coordinator for the scientific projects Roland Neuber (AWI) on the mainland.



Many other employees in the individual departments of the institutes are responsible for hiring, training and supporting the wintering team, the research projects and the continuation of important scientific work and time series. A large department takes care of the logistics and the necessary shipping documents. It is extremely time-consuming to ship all goods and hazardous materials, such as the gas for the weather balloons or cooled scientific samples, across half the globe on time.



The small company IMPRES, which emerged from the operation of the NDACC observatory, is of great importance. Year after year, the two owners Ingo Beninga and Wilfried Ruhe ensure the smooth operation of the lidar, compressor, liquid nitrogen system, house control system and the control of the solar tracker for trace gas measurement. They support the station engineer with advice, great personal commitment and a lot of motivation and humour.





The Blue House

In mining times, the Blue House was an office building where salaries were paid. Today it is part of the AWIPEV base. It contains dormitories for the short-term residents, a lounge with a wall of books, the station manager's office and a workroom for the scientists. In the small extension, small white spheres house equipment for measuring cosmic radiation.



Onsite Staff

Joint photo of the two station teams 2015-2016 and 2016-2017 with two of the responsible supervisors in front of the Blue House:

Dominic Fleury (Head of Logistics IPEV), Kathrin Lang (Base leader), Thombas Ribeaud (Logistics engineer), Verena Mohaupt (Base leader), Roland Neuber (Scientific Coordinator AWI), Christelle Guesnon (Observatory engineer), René Bürgi (Observatory engineer), Simon Escalle (Logistics engineer).



Parcels for the Station

The mail travels with the propeller plane, which operates twice a week between Longyearbyen and Ny-Ålesund. Base leader Kathrin Lang receives the mail for the AWIPEV station in the service building.



Young Researchers

Students from the universities of Kiel and Bremen visit the station as part of a study week. They spend time here on excursions, e.g. to the local flora. Today they are helping to test the survival suits for leaks. The station manager gives clear instructions. Unfortunately, not all of the young participants are lucky enough to have a tight dry suit and the seawater is only a few degrees warm.



Boat Trip to Corbel

Thomas Ribeaud steers the boat "Sabrina" towards Corbel. The outpost of the French-German Arctic station AWIPEV can only be reached by boat or an arduous walk in summer. When the buildings are unoccupied, the logistics engineer checks on things from time to time.



Corbel

In 1963, the French geologist Jean Corbel set up a camp south-east of the village at the foot of the two glaciers Midtre and Austre Lovénbreen. The four huts were among the earliest buildings used for scientific purposes in the village, but were only occupied by the French scientists in the summer.

NDACC Observatory

The observatory at the AWIPEV station is primarily used for atmospheric research. Numerous series of measurements are carried out here all year round. A weather balloon is launched daily from the balloon house, which rises up to almost 30 kilometres into the stratosphere and sends back current weather data by radio.





Workshop

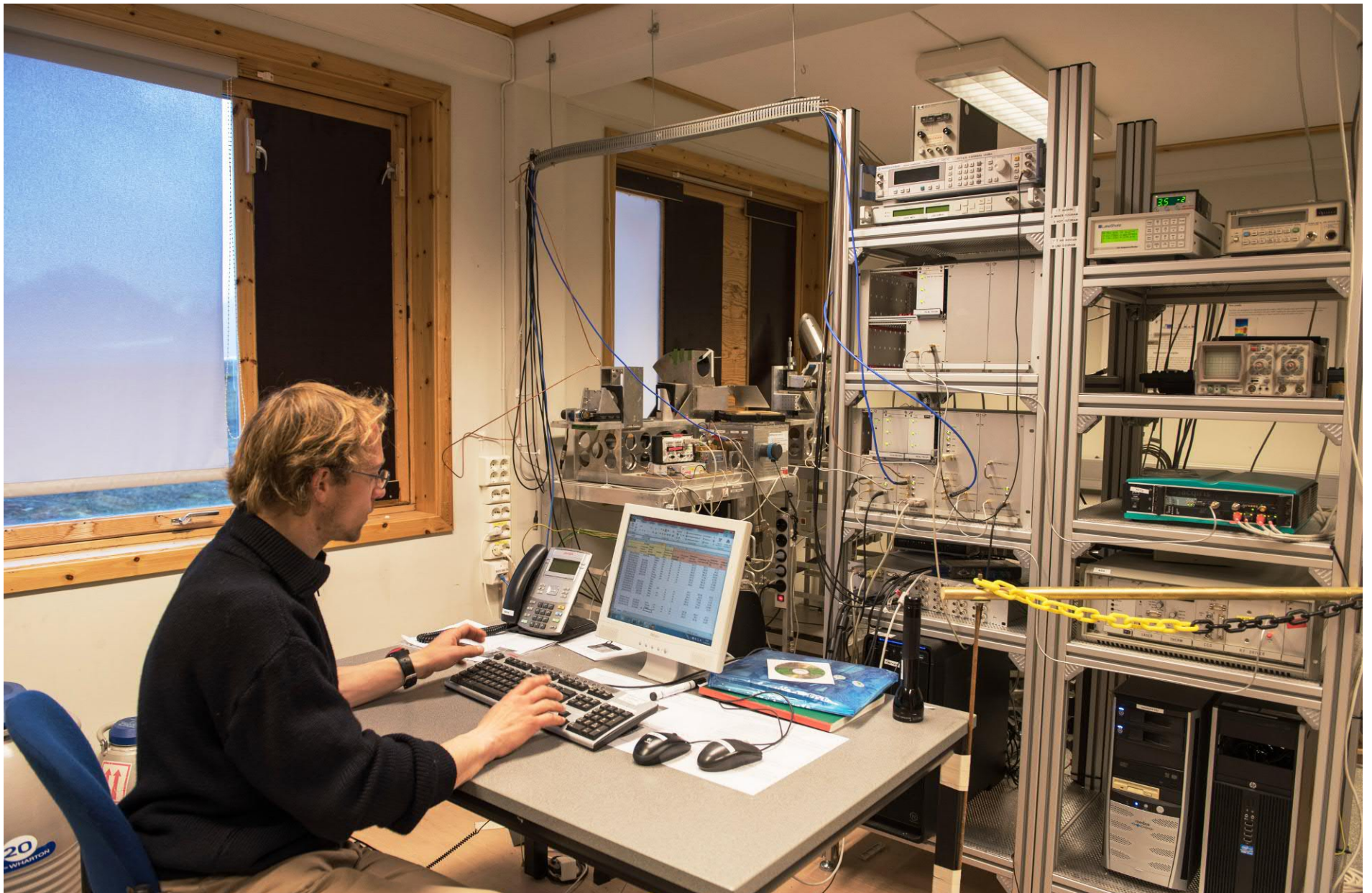
The team led by biologist Philipp Fischer has taken over the workshop in the observatory: The systems of the remote underwater observatory REMOS are being eagerly repaired. Together with the Ferrybox, which is located next to the old pier, the instrument collects data such as CO₂ content, water temperature, salinity (salt content) and much more. It takes an enormous effort to keep this equipment running throughout the cold winter months.



Ozone Radiometer

The radiometer from the University of Bremen continuously measures the ozone layer in the stratosphere. The most important control data is recorded by hand every day.

The radiometer's vacuum pump emits a strange humming noise. Together with the background noise of the other technical and scientific instruments, it fills the rooms of the observatory with a strange sound atmosphere.

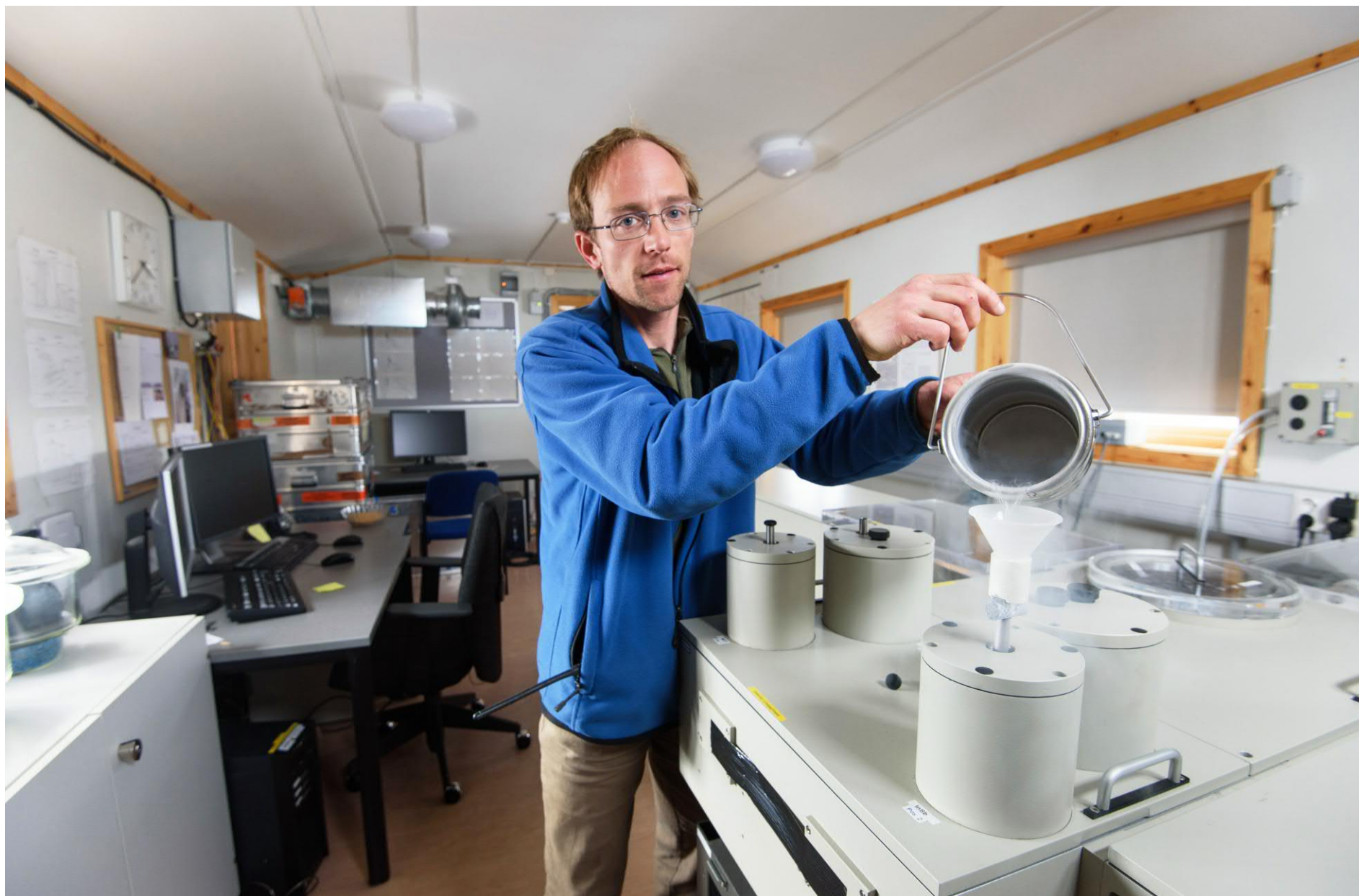




Trace Gas Measurement

Christine Weinzierl, alias Tine, a technician at the University of Bremen, adjusts the Fourier transform infrared spectrometer FTIR. A tracker tracks the sun and reflects its light into the interior of the device. There, a high-resolution spectrum is recorded interferometrically. The absorption lines of individual trace gases are analysed to regularly determine their concentration in the atmosphere.





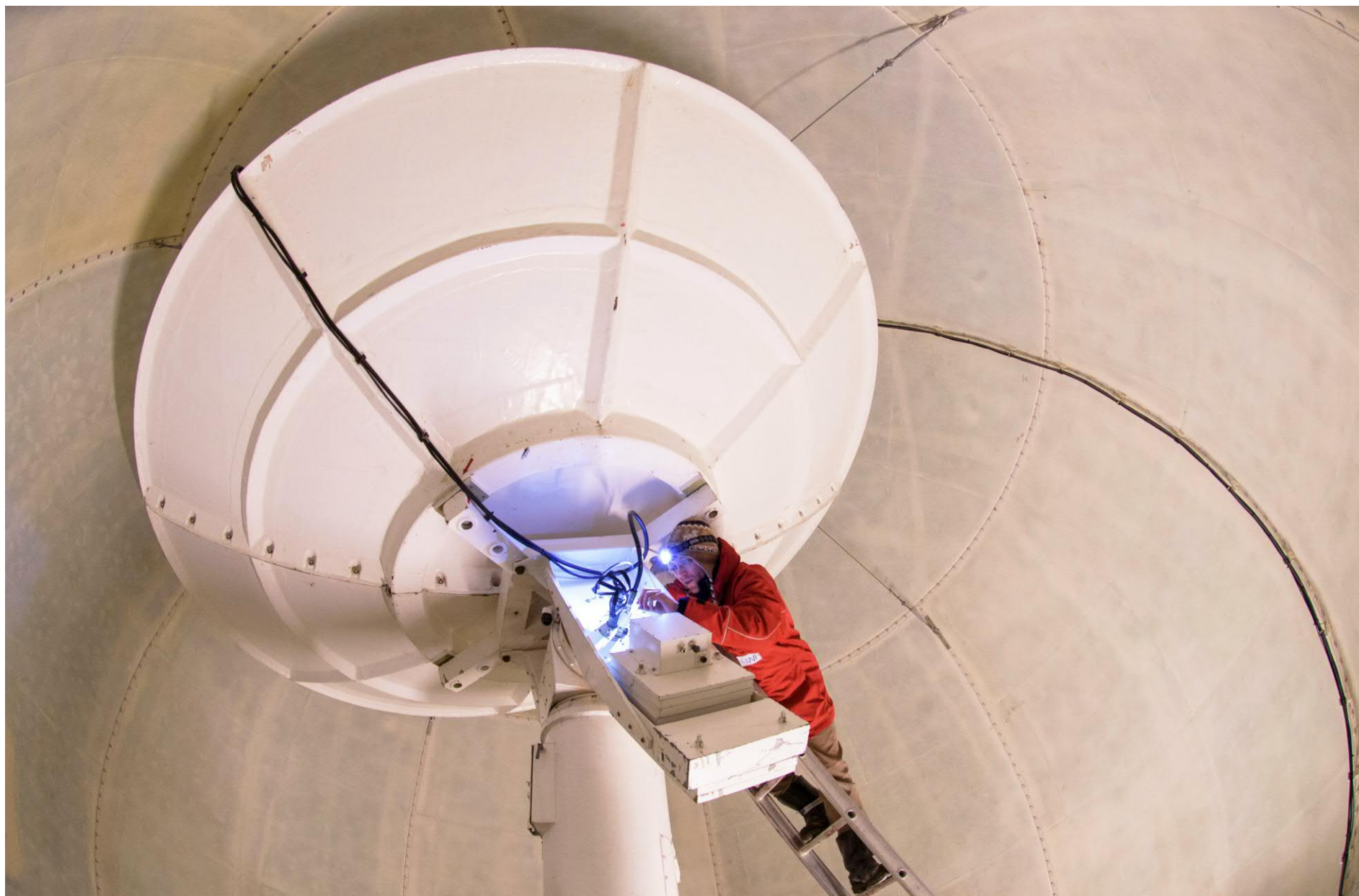
Liquid Nitrogen

Many of the apparatuses have to be cooled to low temperatures so that they can work with high precision. For this purpose, nitrogen is separated from the air on site, liquefied and stored in large thermos containers (Dewar). Liquid nitrogen maintains a temperature of -196°C . The station engineer refills the detector chambers of the spectrometer every day during his tour.



GFZ Satellite Station

Carsten Falck from the GFZ georesearch institute in Potsdam has been operating a satellite receiving station not far from the site since 2001. Data from satellites such as GRACE, TerraSAR-X and TanDEM-X are received here. The good data connection and the high latitude make Ny-Ålesund perfect for communication with satellites that have a polar orbit. This is because practically every orbit passes over the station and can be used for data exchange.



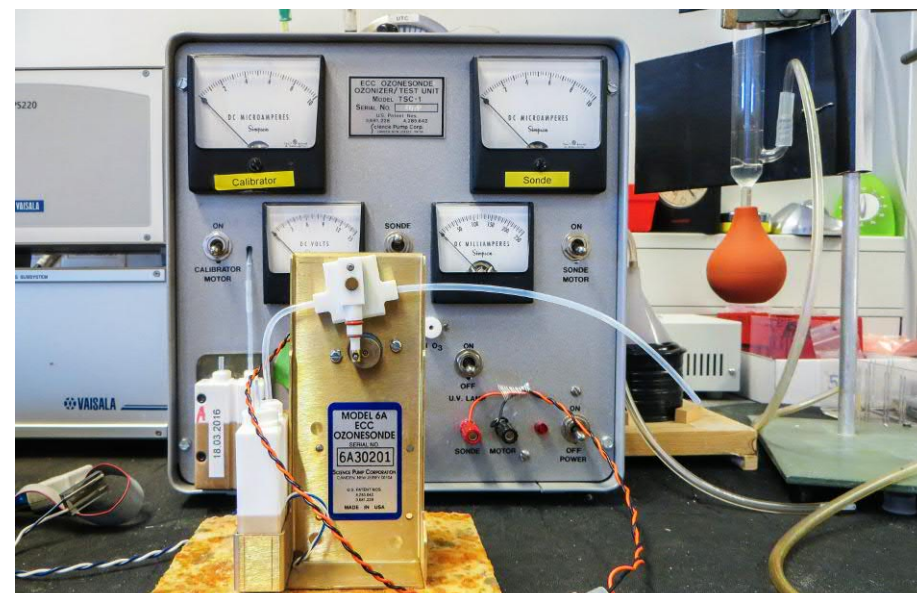
Repair

A defective receiving amplifier needs to be replaced. Outside of the maintenance intervals, this is a task for the observatory engineer at the AWIPEV station. He is in close contact with the scientists and technicians of the respective institutes and tries to identify problems and repair minor damage under their guidance. With the station vehicle "Emily", it is barely two minutes from the village to the satellite facility.



Radiosonde Preparations

Jürgen Graeser alias EGON, Kathrin Lang and Holger Deckelmann are preparing a new ozone probe. A weather balloon filled with helium will carry it up into the stratosphere. During the ascent, a small pump continuously bubbles ambient air through an electrolyte, which enables the ozone content to be measured electrically. The probe is packed in a heat-insulating polystyrene container so that the liquids do not freeze and the electric pump works perfectly up to an altitude of around 30 kilometres.





Special Sonde

Every two months, the ozone radiosonde is supplemented by a CFP (Cryogenic Frost Point Hygrometer) sonde. It contains a small metal mirror that is tempered so that it does just not fog up. The very low humidity in the stratosphere can be determined from the dew point temperature.

To do this, atmospheric physicist Marion Maturilli fills the cold reservoir of the CFP probe with coolant. The liquid was cooled down to a temperature of -80°C in the freezer. It has a boiling point of -30°C and is gaseous at room temperature.



Calibration

To ensure that the radiosounding data can be used not only for weather forecasting but also for long-term climate modelling, a great deal of effort is put into calibrating the temperature and humidity sensors at all the stations that are part of the GRUAN network. This means that the data remains comparable even within long-term series and changes over decades can be tracked.



Launching a CFP Radiosonde

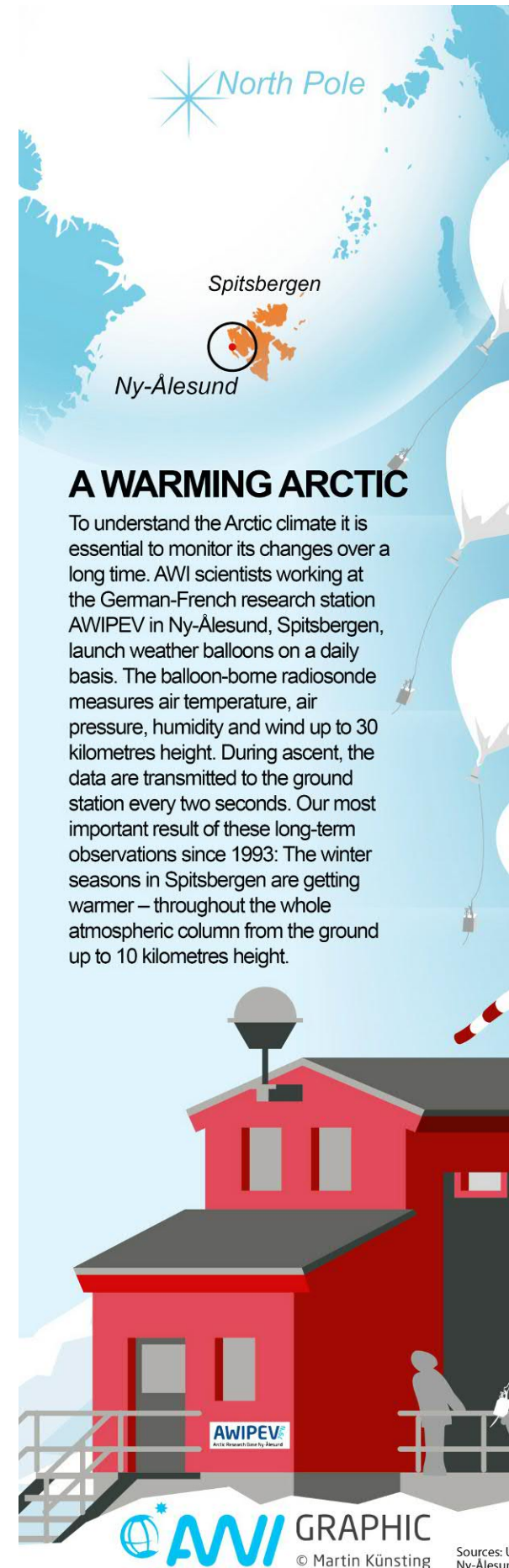
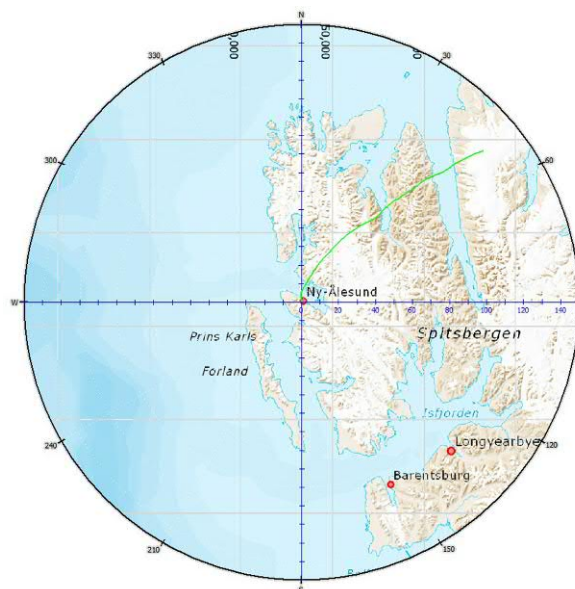
All radiosondes worldwide must be launched within a short time window of 15 minutes. Many helping hands are needed to ensure that the launch of the expensive CFP radiosonde is a success. The hydrogen filling quantity of the weather balloon is adjusted to the payload so that the ascent speed is always around 5 metres per minute. Depending on the wind conditions, the radiosonde flies far out to sea. It can therefore only be found and recycled with a lot of luck.

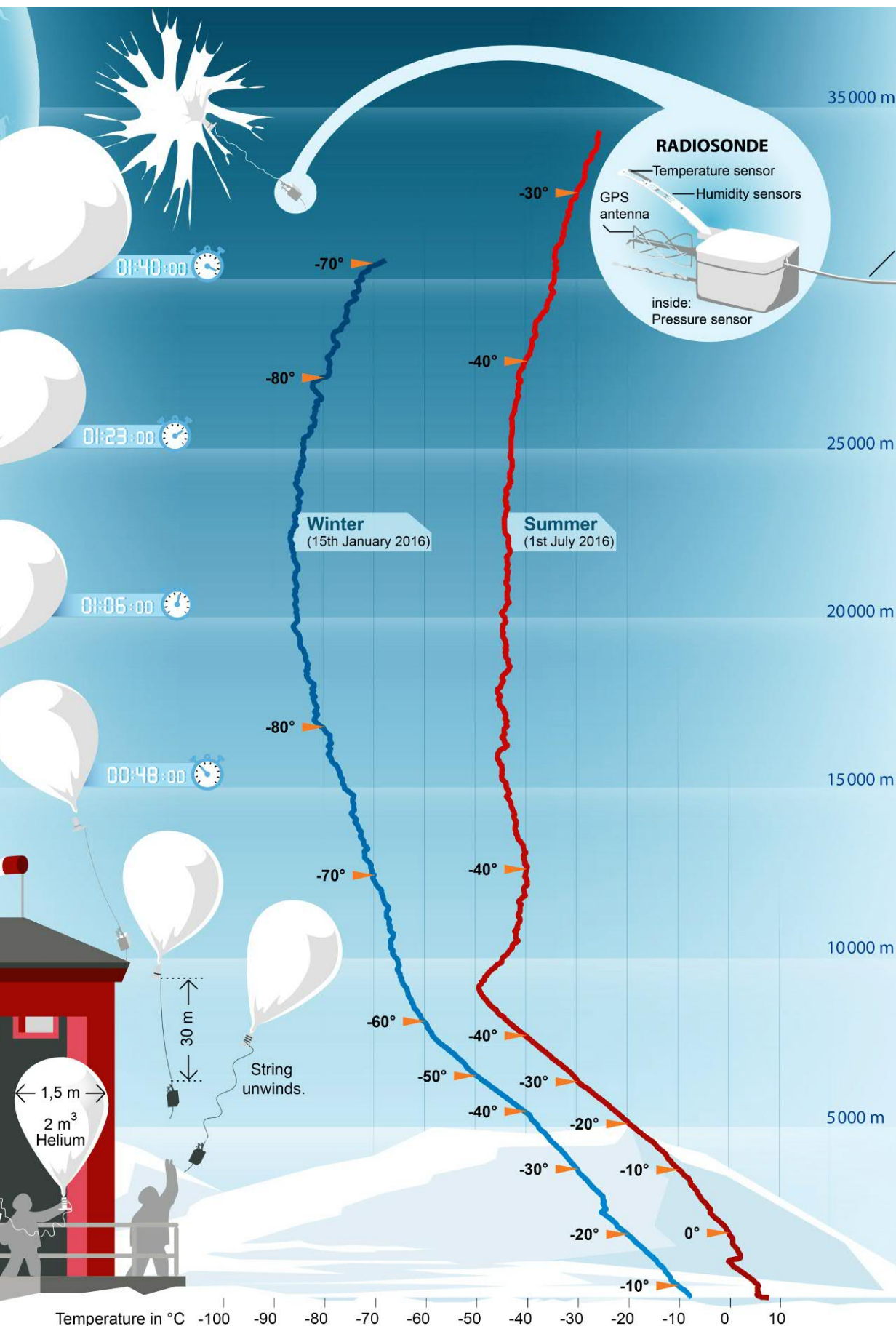




Completion

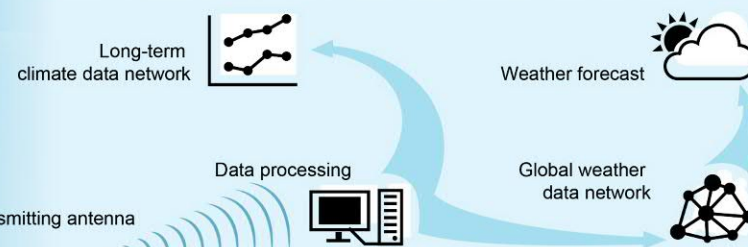
The balloon is only launched after telephone consultation with the manager of the local aerodrome. The data received (temperature, humidity, position, altitude) can then be followed live on the monitor. The balloon rises to an altitude of around 30 kilometres at an ascent speed of around 5 metres per minute. If the winds are strong, it will travel over 150 kilometres in this time.





WHO IS USING THE RADIOSONDE DATA?

Weather forecast centres and climate researchers all over the world.

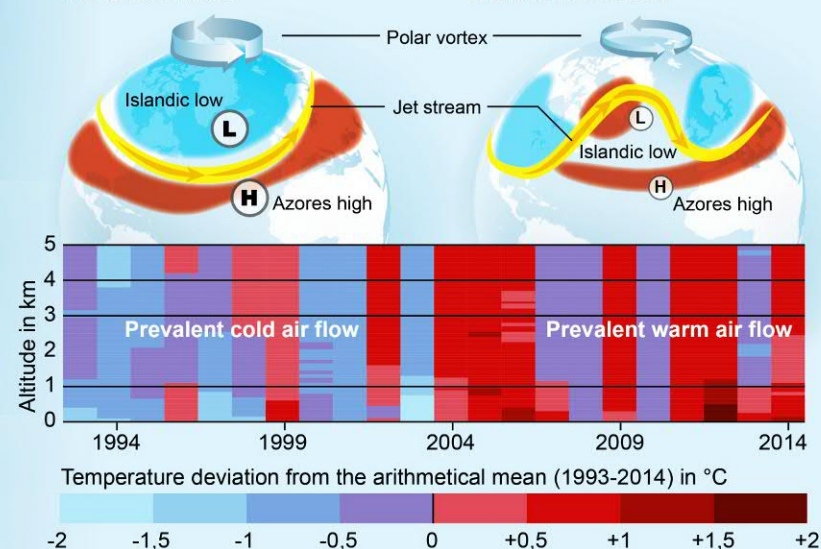


HOW HAS THE WINTER TEMPERATURE CHANGED?

The winter temperature of the air masses above Spitsbergen has been rising since the start of our measurements. This warming is related to changes in the atmospheric circulation patterns in the North Atlantic region, resulting in transport of warm, humid air from the lower latitudes further up North.

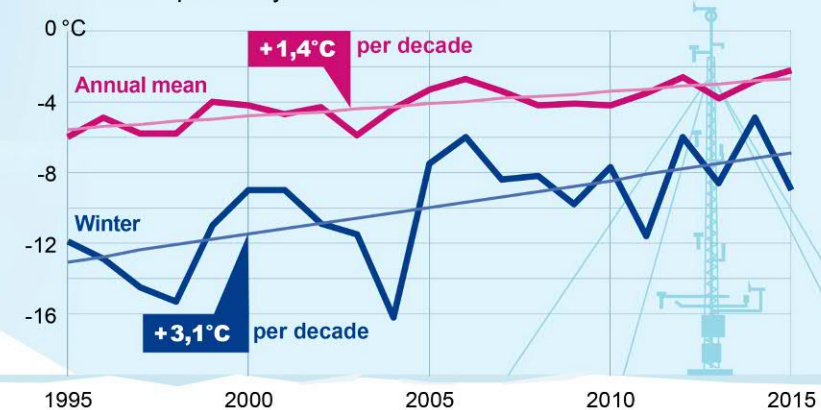
Circulation pattern in **cold** Arctic winters

Circulation pattern in **warm** Arctic winters



HOW MUCH IS THE SURFACE TEMPERATURE RISING?

Also the AWI long-term measurements in Spitsbergen show that the surface temperature in the Arctic is rising faster than in every other part of the world – particularly in the winter season!



Update of Maturilli et al. (2015): Surface radiation climatology for Ny-Ålesund, Svalbard (78.9° N), basic observations for trend detection. Theor. Appl. Climatol. 120:331–339. doi:10.1007/s00704-014-1173-4; Maturilli and Kayser (2016): Arctic warming, moisture increase and circulation changes observed in the homogenized radiosonde record. Theor. Appl. Climatol., doi:10.1007/s00704-016-1864-0

Miss Piggy

Using the tethered balloon "Miss Piggy", heavier measuring devices can be lifted up to altitudes of 1800 metres and then retracted again using a cable winch after a dwell time of up to several hours. Jürgen Graeser from AWI Potsdam takes care of the aircraft when he is on site.





Radiation Measurements

The tethered balloon allows, for example, radiation or albedo measurements, such as those carried out here by Ingo Beninga and Ralf Becker, meteorologist at the German Weather Service DWD. How small the snow-covered village looks from above!







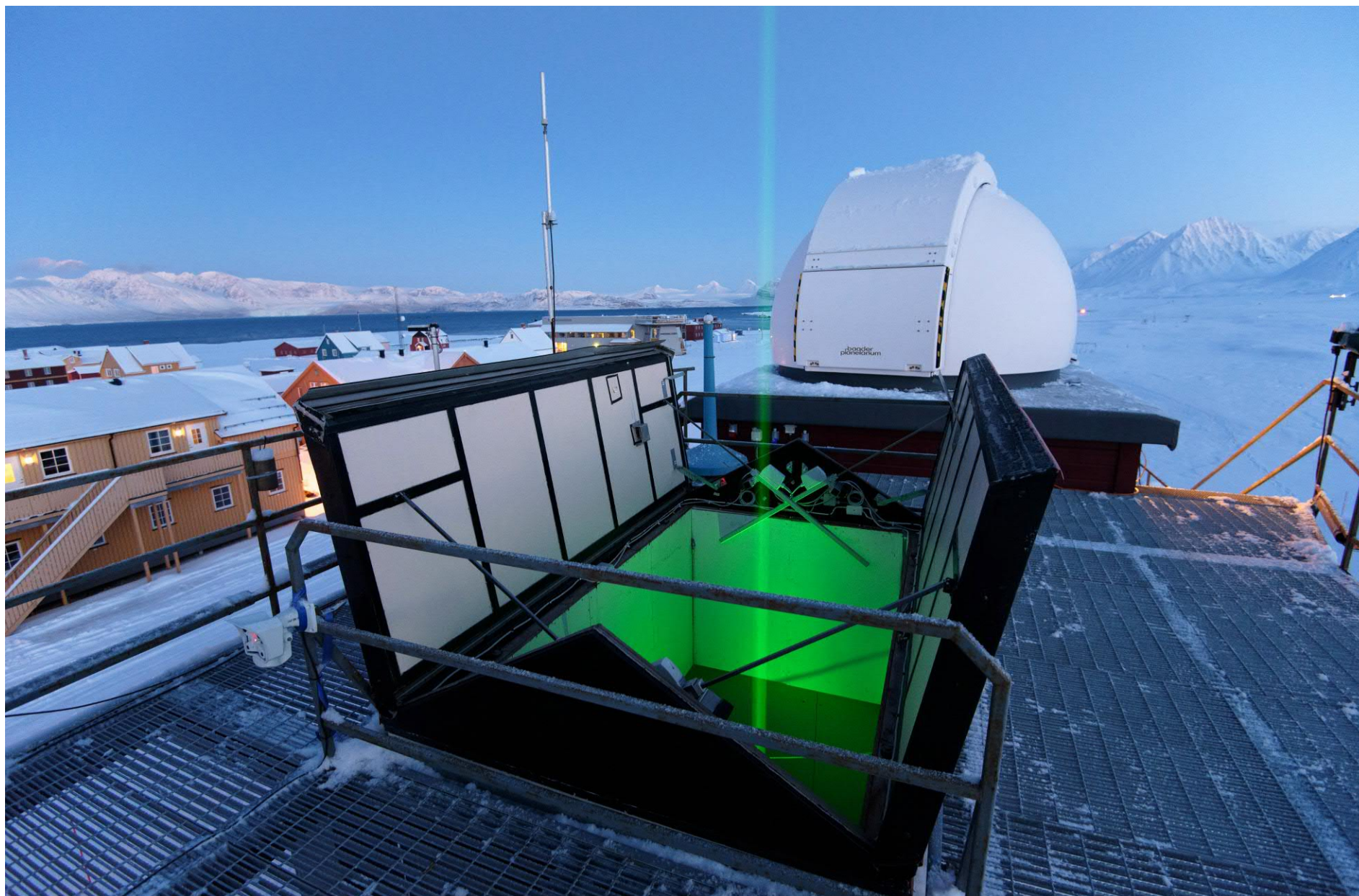
BSRN and Weather Mast

Ground data is continuously recorded by the Baseline Surface Radiation Network (BSRN) and the instruments on the weather mast. These include temperature, humidity, wind, solar radiation and long-wave reflection. Jürgen Graeser and Christelle Guesnon adjust the solar tracker, which shields the radiation meters for diffuse radiation from the sun using three black spheres.





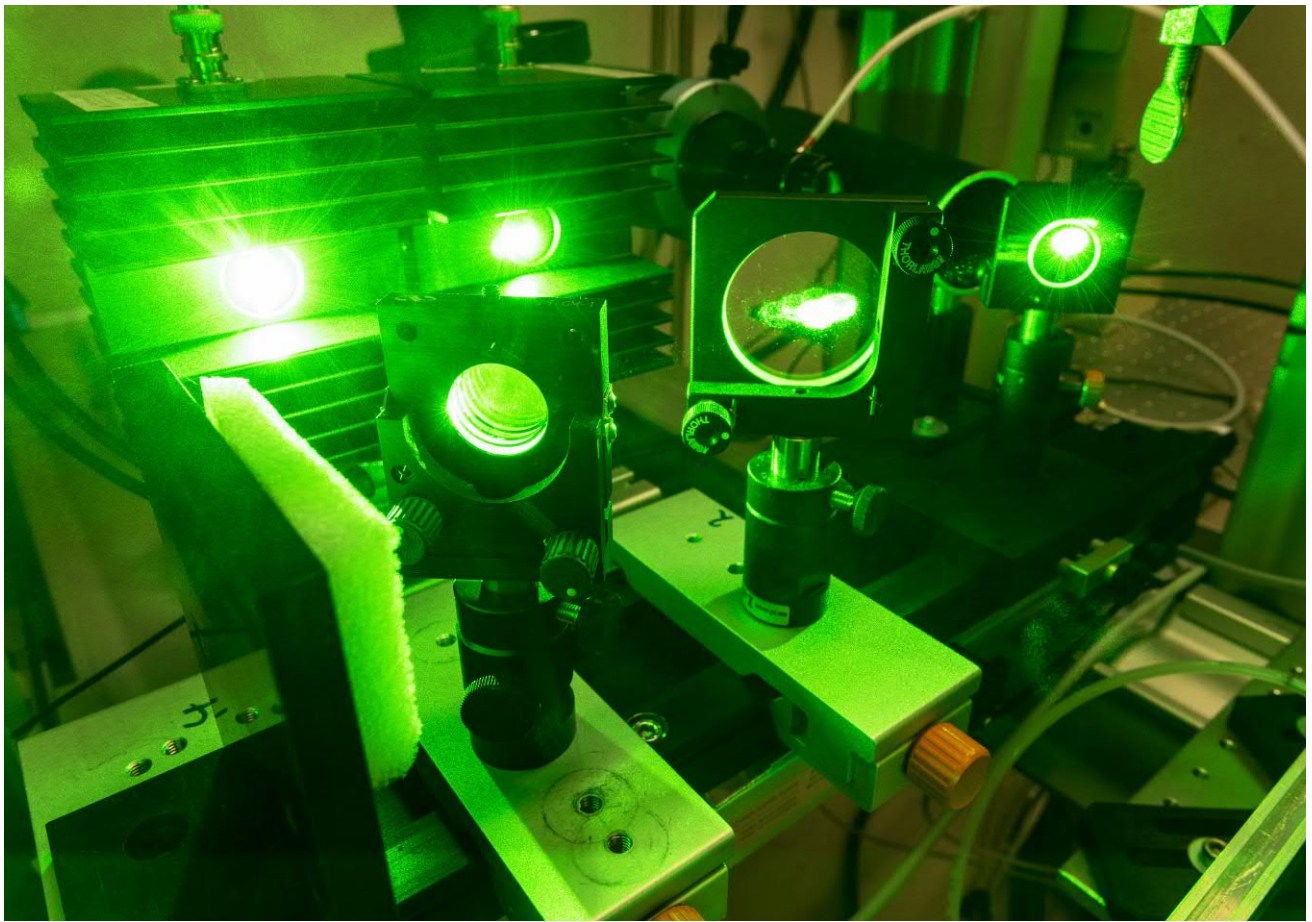
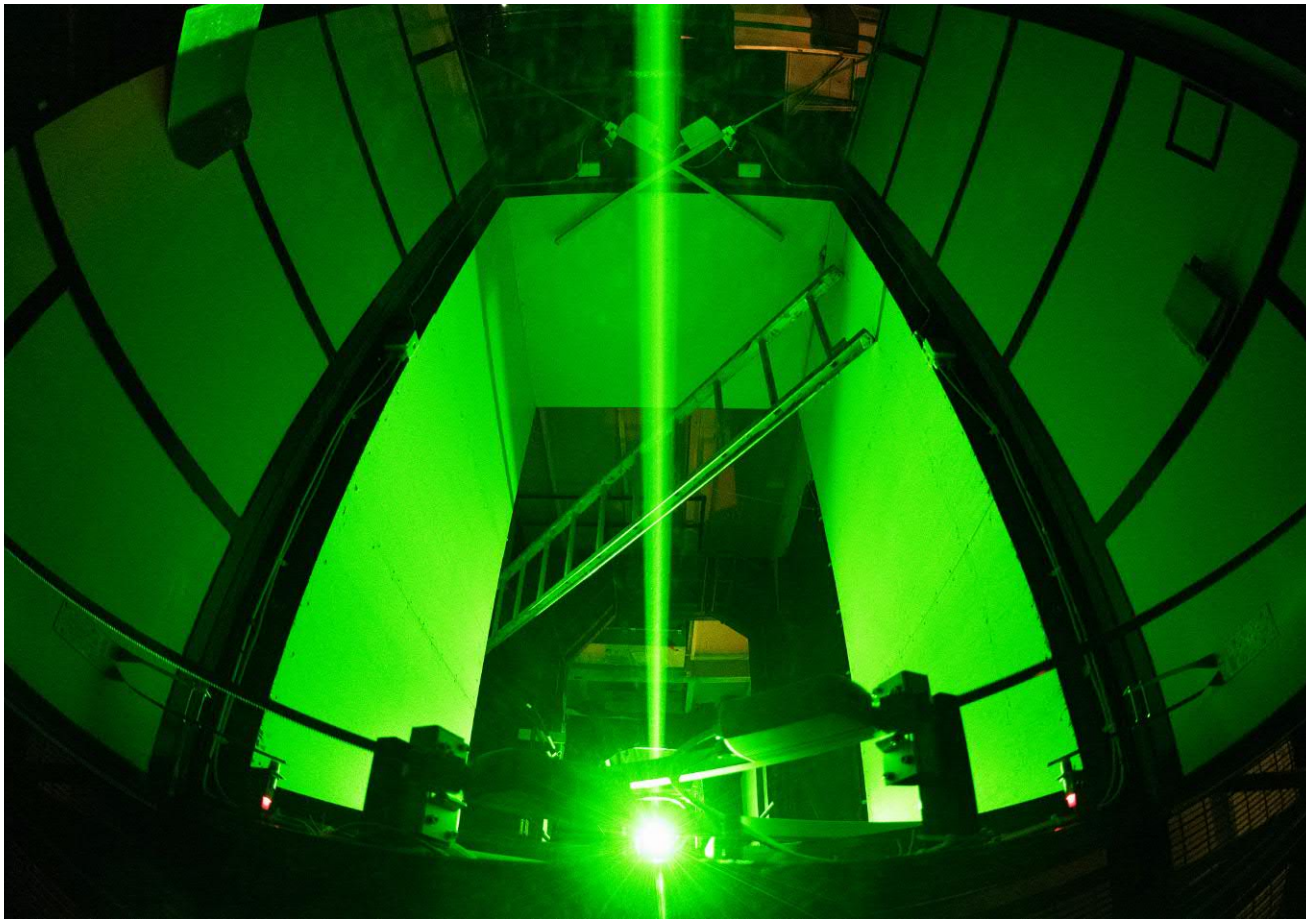


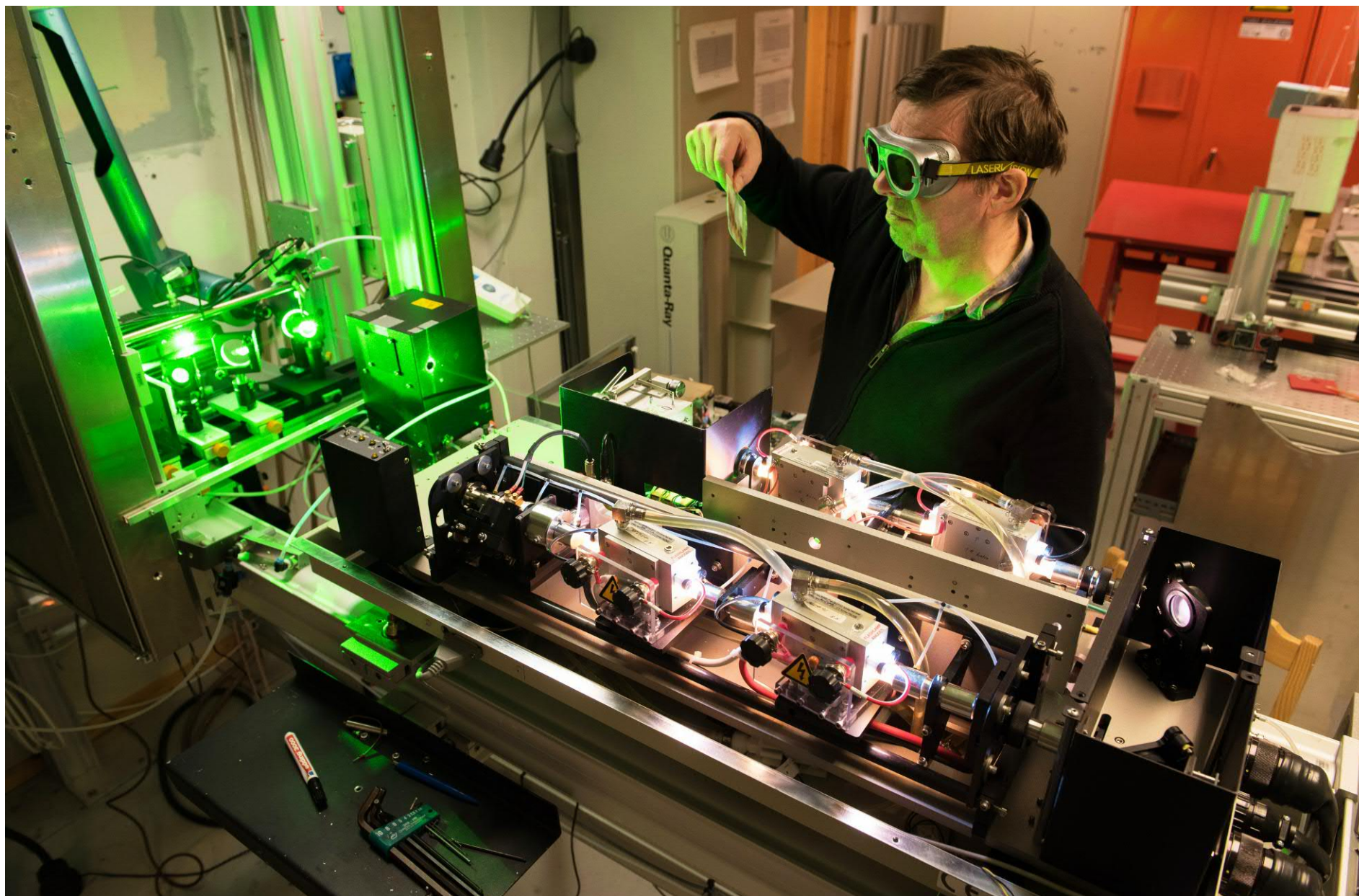


Aerosol Raman Lidar KARLI

In good weather, a lidar can be used to measure the backscattering of light from the finest aerosols and particles in thin, high ice clouds. The recorded measurements are analysed by physicist Christoph Ritter in Potsdam. This provides information about particle shape and size as well as their height.

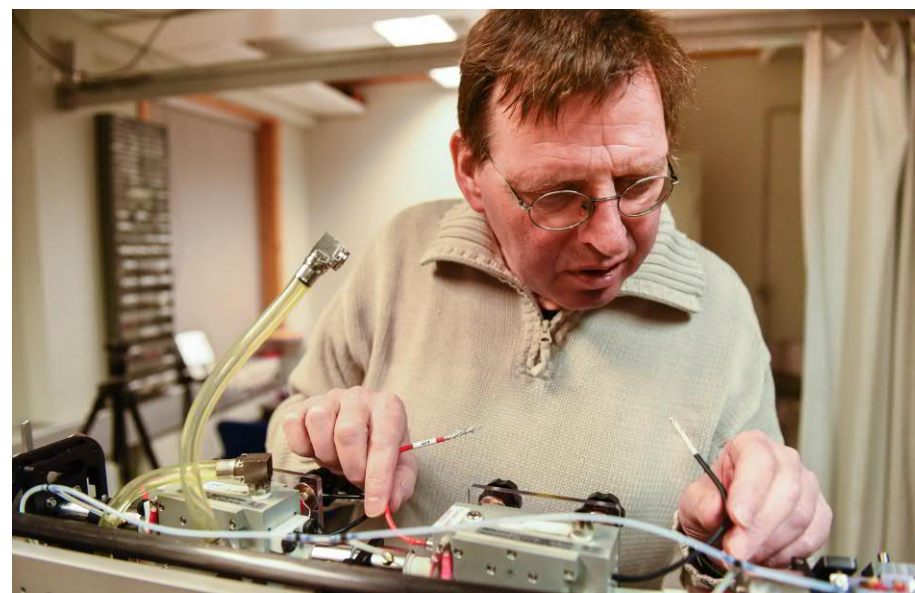
Although the lidar is operated all year round, the bright, green, 11cm-wide laser beam is only visible in the darker months of the year.

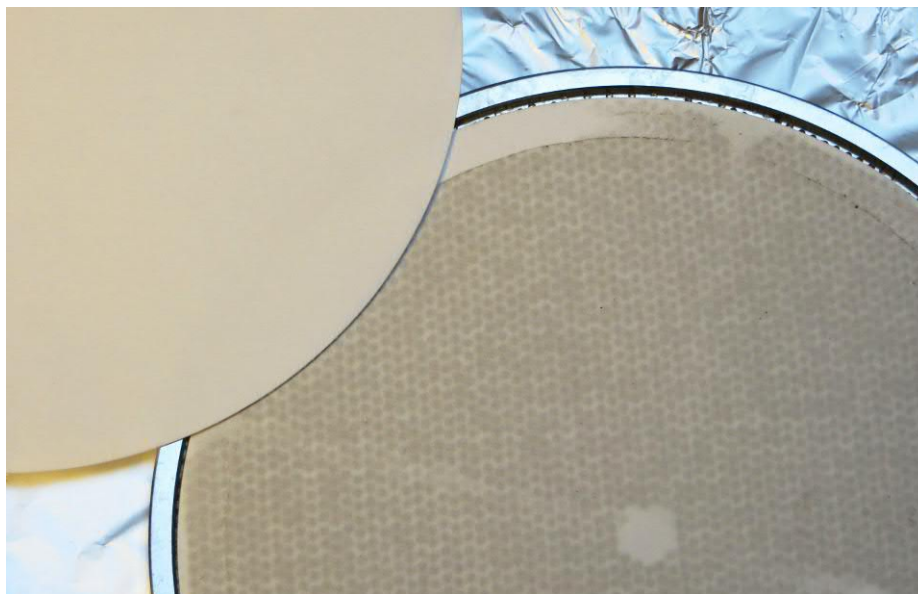




Laser Alignment

IMPRES employee Wilfried Ruhe adjusts the Nd:YAG laser, which is pumped with flash lamps and emits infrared light at 1064nm. Some of this radiation is converted into green light and UV radiation. The laser pulses, which are only a few nanoseconds long, have a dangerously high intensity, which means that laser goggles must be used for safety. The adjustment is extremely complex and requires a great deal of experience and patience.

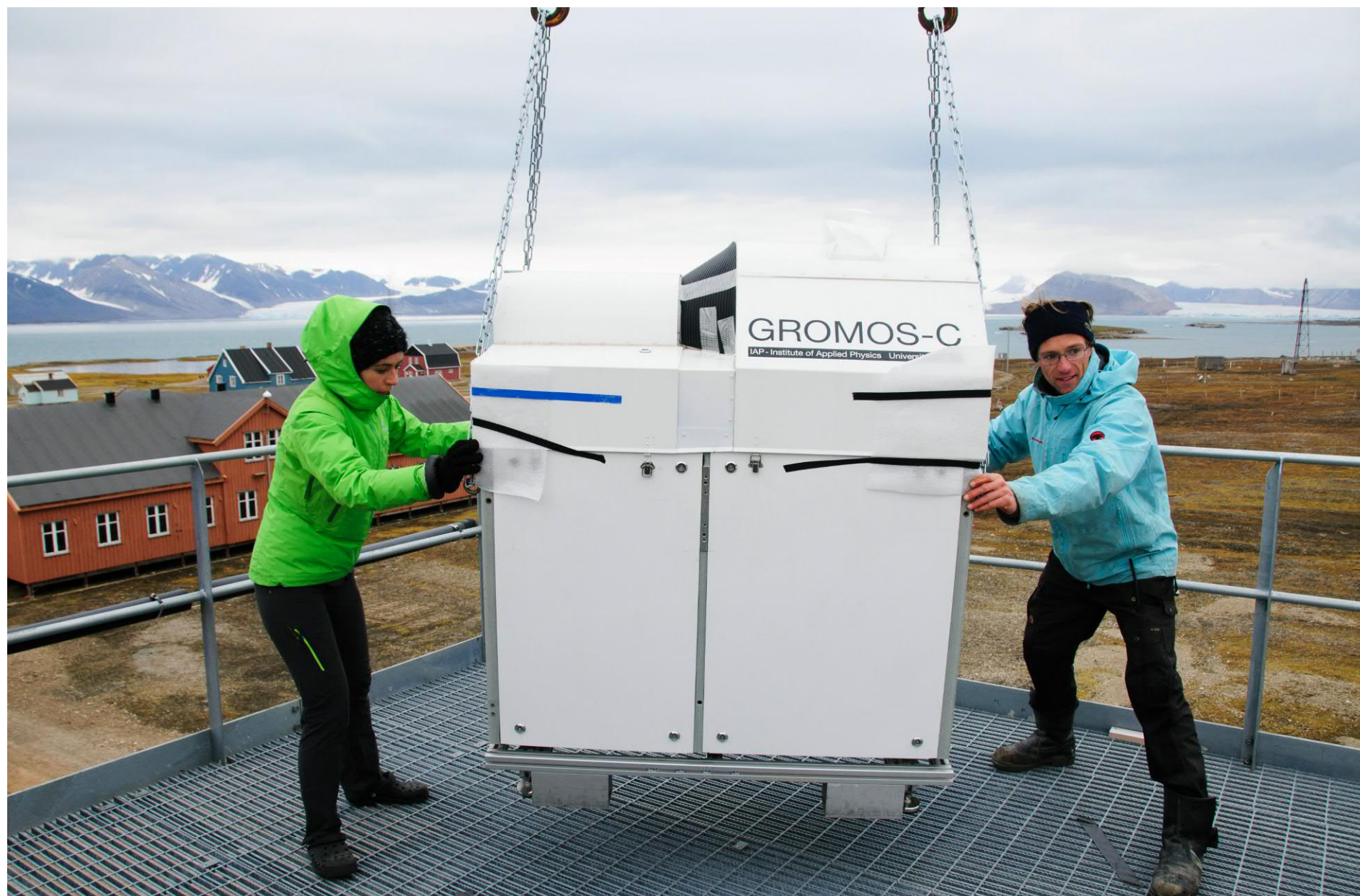




Arctic Haze

When winds blow in the dark brown fine dust of Arctic forest fires or other dense aerosols, this is known as "Arctic haze". As condensation nuclei, aerosols are central to the formation of water droplets and thus to the formation of fog or clouds. In turn, cloud cover influences the radiation budget and thus the climate in the long term. In addition to measuring polar stratospheric clouds, this particular event is therefore one of the research objects for physicist Christoph Ritter, who is analysing the Lidar data. The fog hung over the fjord for several days after the event.

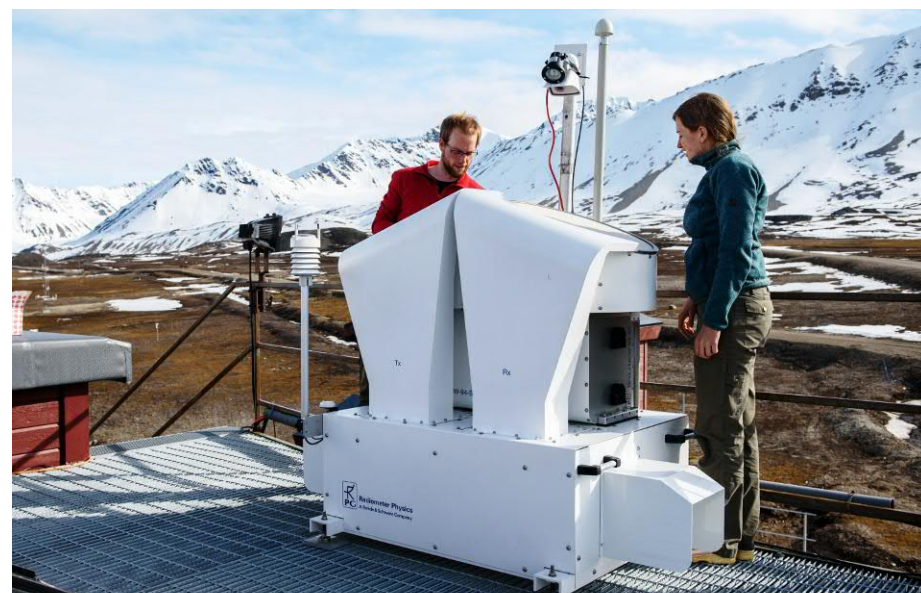
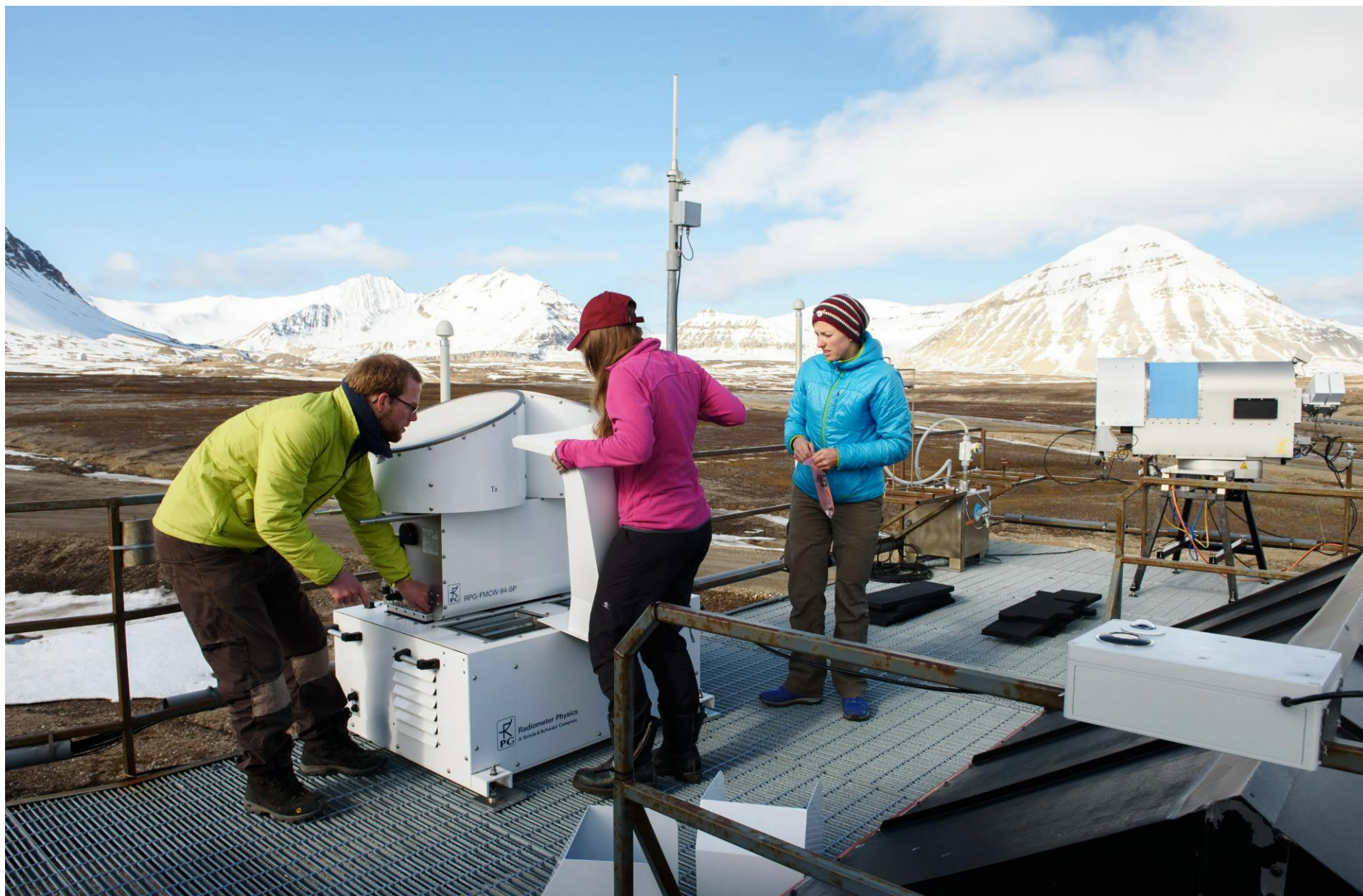




New Instruments

The observatory's roof platform provides space for stationary and temporary measuring instruments. The latter only remain in place during a measurement campaign, such as the GROMOS-C microwave radiometer from the Institute of Applied Physics at the University of Bern. Susana Fernandez designed the device and helps to set it up.

The cloud radar from the University of Cologne, on the other hand, is to remain on the platform for several years. Lisa Dirks and Nils Kuchler have travelled from Germany to install and commission it.







Working for Research
Research

It is not only the two institutes AWI and IPEV that conduct research at the AWIPEV station. The base provides a platform for countless other short and long-term research projects in the Arctic. Scientists from all German and French institutes can apply.



The field of climate plays a major role in research. The NDACC observatory and a few field stations collect long-term climate-relevant data such as temperature, solar radiation, ozone content and trace gas concentrations. The atmosphere, hydrosphere, lithosphere and cryosphere all interact and cannot be considered individually. Other parameters are therefore also measured continuously, for example soil temperatures in permafrost down to a depth of 10 metres or salinity and pH value in fjords. This is how the individual research projects dovetail. Data from different sources is



summarised and jointly utilised in order to ultimately gain a holistic understanding of the world.

A French team has been analysing the development of the Austre Lovén glacier to the east of the village for decades. This involves determining in-flow and outflow as well as glacier thickness. This is because glaciers recede very quickly, especially in the Arctic. What changes the landscape ultimately has an impact on the climate: if there is less snow, less solar radiation is reflected back into space. A feedback effect which, together with the dwindling sea ice, warms the poles more and more.



Biological work is also well represented at the station. This year, for example, Marie Dankworth and Inka Bartsch are investigating the growth of brown algae, while Clara Hoppe and her team are researching zooplankton in the sea. Her group is travelling here at different times of the year depending on the focus of the current project. Olivier Chastel and Pierre Blévin, on the other hand, who check the population of the kittiwake colony every year, are always here during the breeding season. Maarten Loonen from the Dutch University of Groningen has also acquired a great deal of knowledge about the birds in the fjord over the last few decades. Among other things, his team rings the geese in the village to obtain information about their population.





The measurement of environmental toxins is also relevant for humans and animals: Xie Zhiyong regularly measures the concentration of PFAS, industrially produced chemical compounds that continually accumulate in nature because they are almost impossible to break down, in the surrounding waters.



Other institutes in Norway and other countries are focussing on completely different areas of research: The Norwegian Polar Institute operates a clean air observatory on the Zeppelinberg in collaboration with the NILU Institute. The Norwegian mapping institute Kartverket maintains an antenna system from a network that enables the exact measurement of the earth. Liu Jianjun and Junming Liu from the Chinese station study the aurora borealis in winter. The Andøya Space Centre operates a small rocket base for atmospheric measurements. The list of different fields of activity is long.



Access to the Arctic is also made easier for journalists and film crews. Communicating the activities at the institute is not only important for new funding: Reports make the work and its results transparent for the public, but also for political decision-makers. This is absolutely crucial if the researched interrelationships are to bring about the necessary social changes.







Bayelva Permafrost Monitoring Station

Not far from the Bayelva River, just outside the section of the picture on the left, is the permafrost measuring station of the same name. It is run by Julia Boike and her team at the Alfred Wegener Institute in Potsdam. Among other things, temperature cycles are measured at different soil depths. Snow depth, radiation and other meteorological data are also continuously recorded.







Glacial Measurements on the Lovénbreen

Jean-Michel Friedt places measuring rods on the Austre Lovén glacier by first melting a long, thin hole into the ice with a water vapour lance. Part of the sunken rod will melt out over the next summer. This can be used to measure the annual glacier shrinkage. Even in the Arctic, this can now amount to between 0.3 and 5 metres per year. Even at these latitudes, a good 2-5cm of ice disappears over a rainy weekend. An Arctic without glaciers? Unimaginable, but in West Spitsbergen it could be a reality in just a few centuries.





Sampling in the Fjord

Logistics engineer Simon Escalle steers the Jean-Floc'h to the predetermined position on the Kongsfjord. Using a crane, biologist Clara Hoppe lowers a Niskin bottle into the water to take a seawater sample at a certain depth. The seawater sample is scrutinised critically: it is practically empty, this year's plankton bloom is over. The measurement campaign is now coming to an end and the group will soon be travelling back to the mainland.



Marine Plankton

Each seawater sample from the fjord is followed by many hours of work in the laboratory. Klara Wolf sorts the countless samples. Professor Björn Christian Rost and laboratory assistant Laura Wischnewski inject CO_2 into the seawater samples to investigate the effects of ocean acidification and light on phytoplankton.





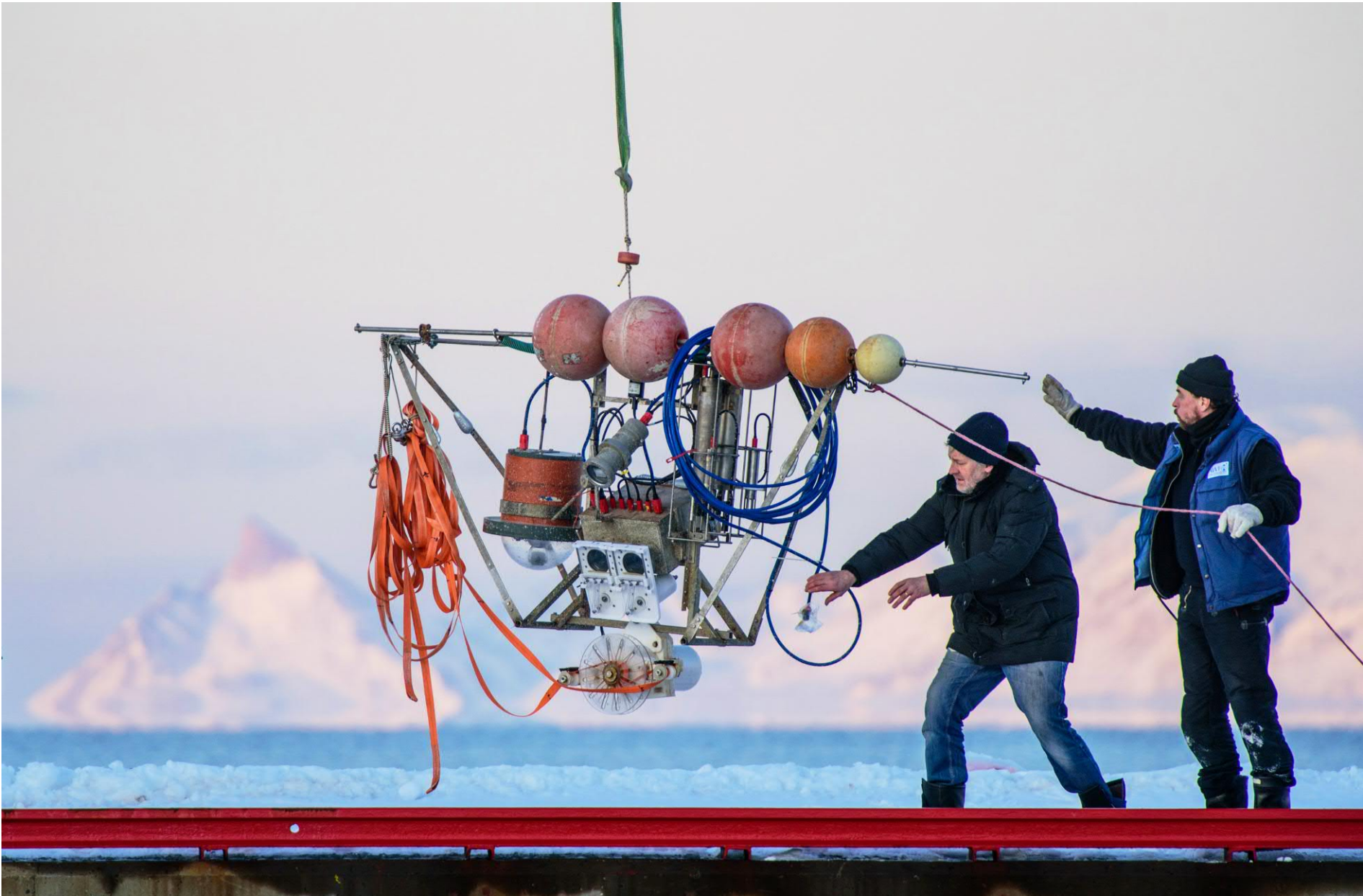
Working in the Marine Laboratory
During her short stay, lab technician Laura Wischniewski set up the lab for her purposes. Marie Dankworth examines seaweed under the microscope as part of another project.





Underwater Observatory

The head of diving operations Max Schwanitz has come here with his small A-team (Maurits Halbach, Anke Bender) to carry out small jobs for the biologists and to carry out maintenance work on the water inlet to the Ferrybox and the REMOS underwater observatory. The Ferrybox (top right with Uwe Posner) draws seawater with a pump and feeds it through a large number of sensors. The underwater observatory is a floating platform with cameras and sensors that is lowered to a certain depth by remote control using straps.





Kittiwake Colony

There is a colony of kittiwakes on the cliffs below Austre Lovénbreen. Olivier Chastel and Pierre Blévin from the French National Centre for Scientific Research CNRS have come here to count and study the birds.

To do this, each individual is carefully fished out of its breeding site with a rod. A brief moment of fright for the gulls, but they are not injured in the process.

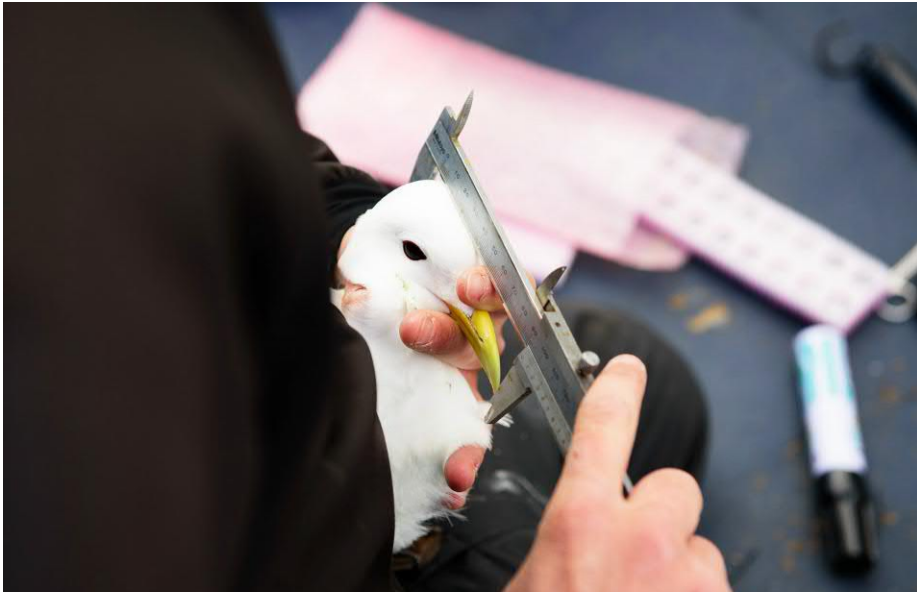




Catch, Measure, Mark

Most breeding pairs return every year to the exact same rocky niche, which is marked on photos from the previous year. Each gull is captured, measured and weighed and a blood sample is taken. Finally, the bird is given a small data logger that makes it possible to determine its flight route based solely on light conditions. It is amazing how quietly the birds behave during the examination. At the end, the gull is released and returns to its breeding site.







Soil Crust

Laura Williams, a biologist at the University of Kaiserslautern, is interested in the soil crust, i.e. the mosses and lichens that cover the Arctic tundra for kilometres squared. What kind of CO₂ balance do they have? Fluorescence is used to measure when and to what extent the plants photosynthesise. It is assumed that the soil crust is responsible for 6% of global CO₂ binding to the soil and for about 10% of nitrogen binding.

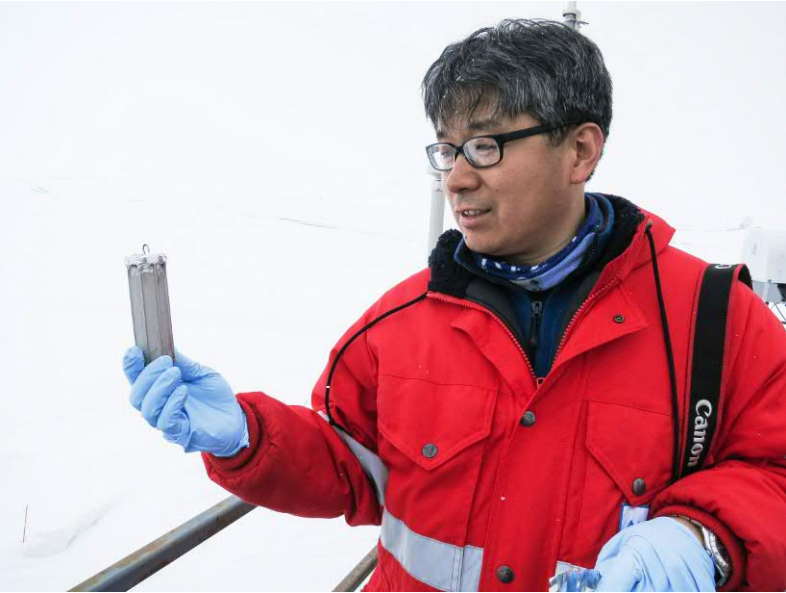




Carbon Dioxide Exchange

The technician Hans Reichenberger has brought along a device that will measure the gas exchange of the soil crust, in particular CO₂ uptake and water release. If you really want to understand and model climatic changes, no mosaic stone should be left out.







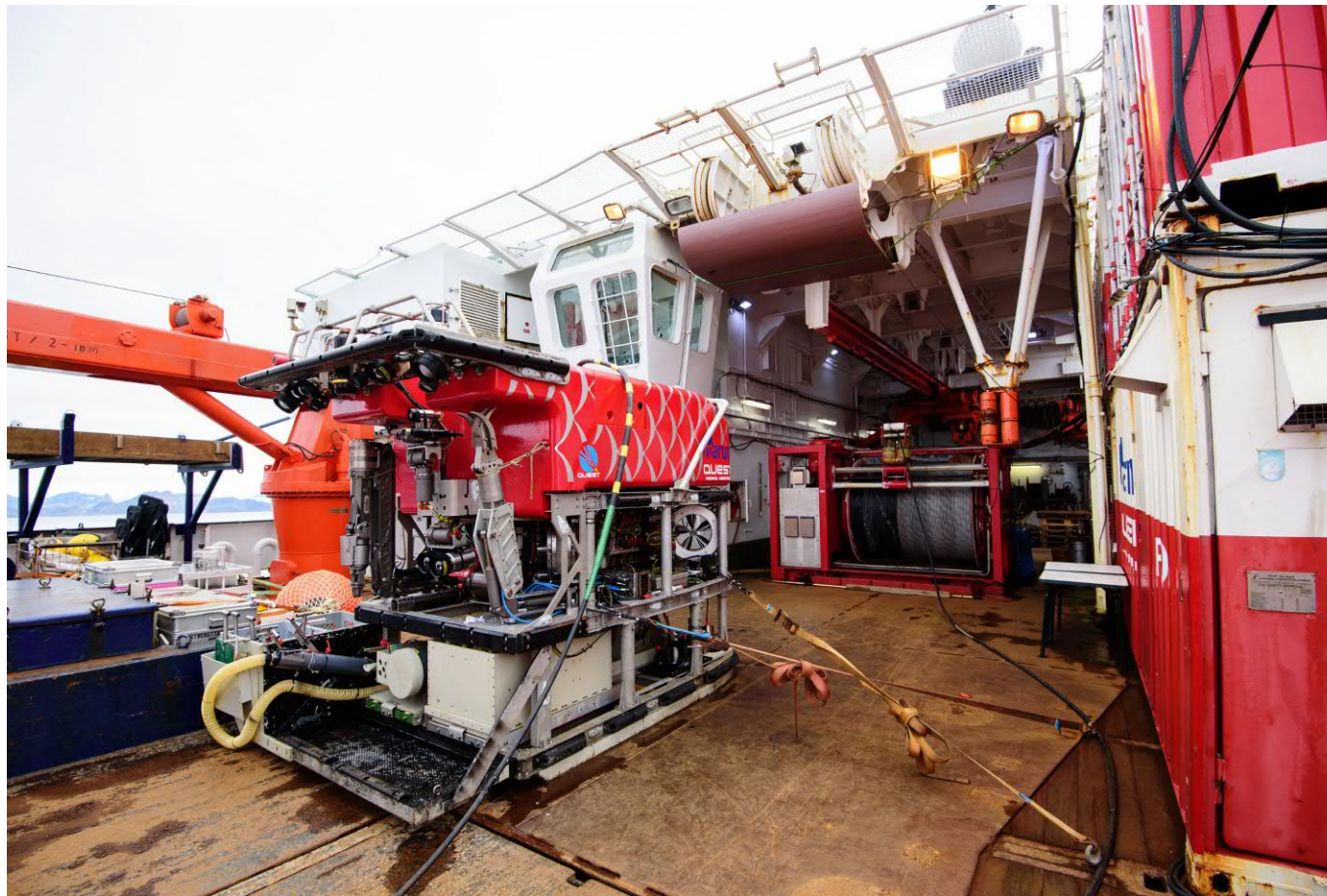
PFAS

Xie Zhiyong has dedicated his research activities to the perfluorinated and polyfluorinated alkyl compounds PFAS. These harmful compounds, which are not found in nature and produced on an industrial scale, are used for non-stick coatings and as impregnating agents for textiles, among other things. As the compounds are hardly degradable, they accumulate over time and can also be detected in remote places such as the Arctic. The environmental chemist at the Helmholtz Centre collects samples together with his wife and two daughters at various locations in the fjord, in lakes and on glaciers.



Polarstern

The 118-metre-long research vessel Polarstern has been in operation since 1982 and has since made countless expeditions to the polar regions possible. On its return from a trip to the Arctic pack ice, the German flagship stops off in Kongsfjord to take frozen samples from the sea and soil on board. Operating the ship is expensive and the schedule is tight: the Polarstern will not be on site for long.

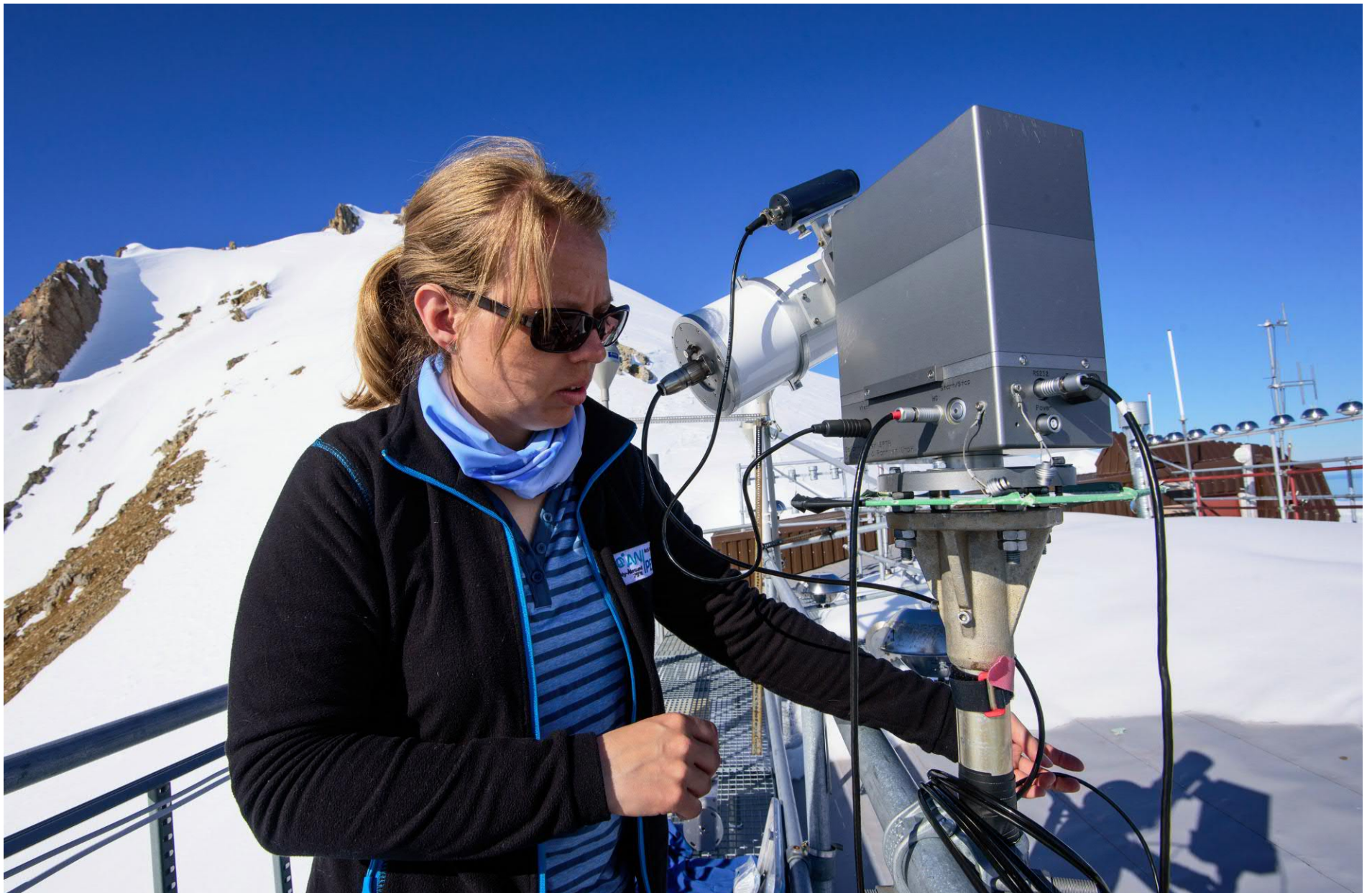




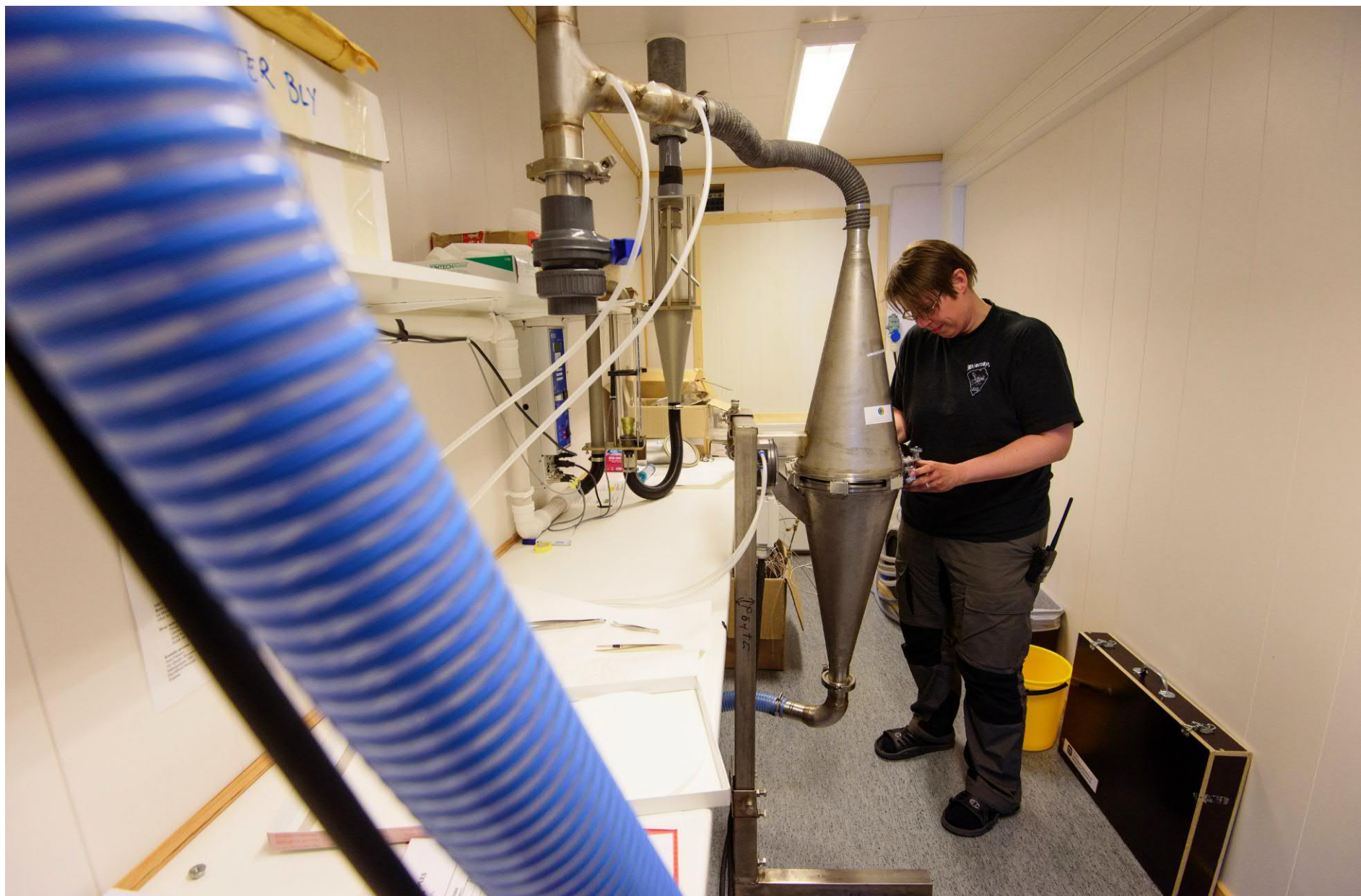


Clean Air Observatory

Since 1998, the Norwegian Polar Institute NPI and the Norwegian Institute for Air Research NILU have been operating a clean air observatory on the shoulder of the 556 metre high Zepelinfjellet. A small cable car leads up the mountain. AWIPEV station engineer Kerstin Binder is only allowed to maintain the AWIPEV solar tracker on the terrace under certain conditions.

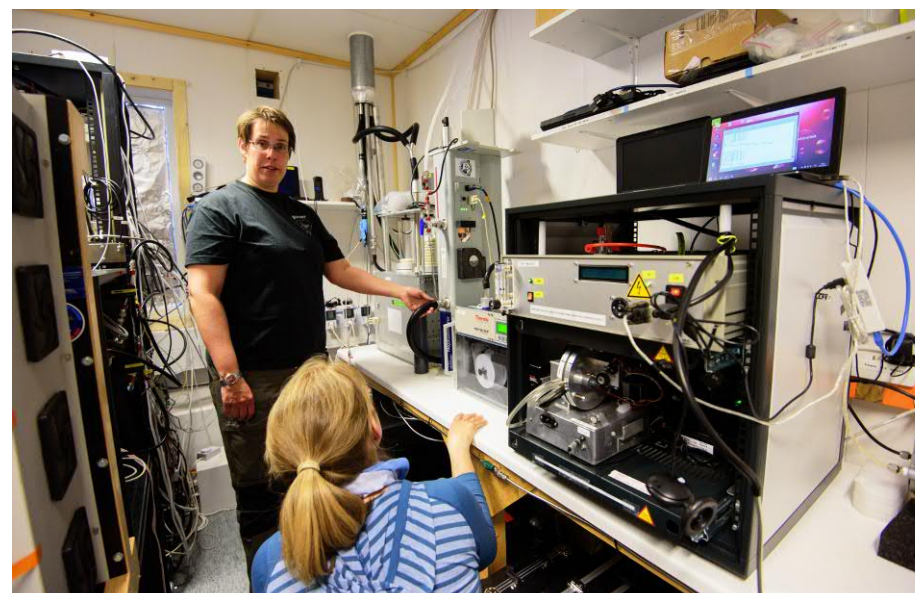






Clean Air Measurements

Norwegian Sami Anne-Cathrine Nielsen is a technical employee at the Norwegian Polar Institute NPI. She takes the cable car up to Zepelinfjellet every day. There she carries out clean air measurements, checks the measuring equipment and replaces air filters.



Kartverket

The large antenna of the Geodetic Observatory of the Norwegian Institute Kartverket (Norwegian Mapping Authority) is one of 30 comparable installations of an entire network distributed around the world.

This network of measuring points is used to determine the position and movement of the continental plates and record their height.

Ultimately, it is not only possible to measure tectonic processes, but also to determine changes in sea level.



Up and Down

According to measurements taken by Kartverket, Svalbard is currently rising by 7mm per year, while the sea level is only rising by 3mm per year. The station rises and falls by around 20 centimetres every day due to the tides.



Nothing but Noise

During a measurement, several of the antennas are aimed at quasars at the same time. These are astronomical objects 7-13 billion light years away, deep in space. The signal that is received is merely noise. This noise is recorded on hard discs in synchronisation with a time signal. For this purpose, there is an atomic clock in the building, which is just 1 second wrong in 60 million years. If you compare the signals from antennas at different locations on earth, you realise that the signals do not arrive at the same time. The positions of all antenna locations in the network can be calculated from this time

offset using triangulation and statistics. The geodetic reference system is derived from this: A reference system on which all map services and ultimately GPS are based. Although the antennas are aimed at the most distant astronomical objects, the system is not used to explore the cosmos, but to measure the earth.



Control Room

Axel Meldahl and Kent Roskifte work in the Geodetic Observatory. An enormous amount of technology and computing power is required to ultimately determine the position of the European continent to an accuracy of two centimetres.





Construction of the New Observatory

A new geodetic observatory with two antennas is being built near Brandal, just a short distance from the current site. Spanish and German technicians install one of the two antennas on the fast and backlash-free gearbox. The antennas stand on a solid, 1 metre thick concrete foundation that rests directly on the rock base. The Scandinavian construction company Veidekke poured a total of 550 tonnes of concrete for this. Definitely not an easy job in this harsh climate.



New Technologies

The new system at Brandal should not only be technically up to date again, but also enable position measurement down to the millimetre range over the coming decades. In 2018, the two antennas of the new building will take over the work. A new gravimeter will help to compensate for the effects of the earth's gravitational pull, e.g. due to the snow load over the spring. A satellite laser ranging system (SLR) will enable additional measurements and further increase accuracy.



Politicians Visit

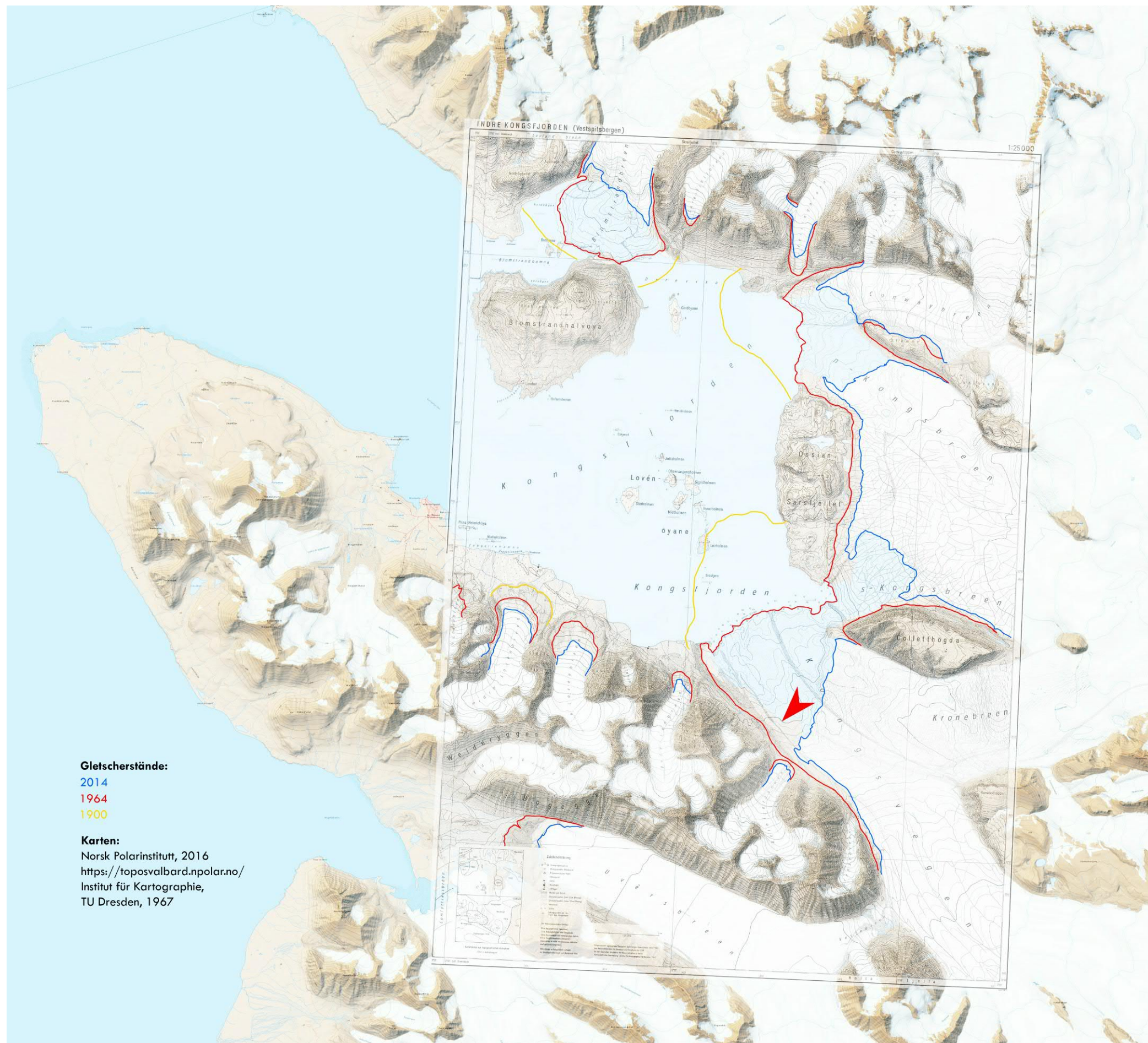
Visit by the then German Environment Minister Barbara Hendricks (right) and the Director of the Alfred Wegener Institute Karin Lochte (centre). Without dialogue between scientists and politicians, all scientific results are toothless. The climatic changes of recent decades must not only be understood, but also emotionally grasped in order to achieve social change. The UN Secretary General Ban Ki-moon and the US Secretary of State John Kerry – they were all here to get an idea of the work and findings.





Climate Change

Physicist Roland Neuber shows the temperature data measured on site over the last two decades. The measurement results are alarming: the average annual temperature increase is $+1.35^{\circ}\text{C}$ per decade, and twice as much when averaged over the winter half-year. The NCCS climate report describes a warming of $+4.0^{\circ}\text{C}$ for Svalbard over 46 years from 1971-2017, $+7.3^{\circ}\text{C}$ in winter. And the trend is continuing. This means that rain will fall more frequently in the winter months in future, and glaciers and sea ice around Ny-Ålesund will continue to decline significantly in the coming decades.





Glacier Retreat

The graph shows the retreat of the glaciers after the turn of the 20th century. At that time, Blomstrandhalvøya was still considered a peninsula. Today it is an island in the middle of the fjord.

During the filming of the Norwegian film classic "Orions Belte" (1985), a snowmobile fell into a crevasse, the location of which is marked with a red arrow on the map. Today, the remains of the vehicle can be found over a kilometre away from the glacier front.





Nature and Landscape in Summer
Nature



If you live and work in Ny-Ålesund, nature is literally on your doorstep. The view from the window of the canteen is breathtaking, as is sometimes the play of light over the fjord, which you can watch from the cosy warmth while the wind drives small icebergs out of the fjord. Arctic foxes hide under the wooden houses and reindeer graze in front of the veranda from time to time. In winter, ptarmigans brave the cold right behind the house.

The views from the peaks of the surrounding mountains are fantastic and the vast plains are perfect for hiking. So it's no wonder that many people are out and about at weekends or after work: on foot, with a dog, kayak or boat, usually in a group, but sometimes alone. The main thing is to get out into nature!



The wilderness begins as soon as you leave the village: Spitsbergen is also the realm of the polar bear. Anyone travelling away from the village should therefore always take a flare gun and a rifle with them to keep the animals at bay in the event of an unexpected encounter. A satellite messenger and a satellite phone also accompany the hiker, as often does the GPS. This means that the backpack ends up being quite heavy, even if you are only out for a single day.



The local Velferden association owns numerous small neighbouring shacks and huts, which can be used by all residents. The smallest hut, the Papphytta, offers just one place to sleep. In the larger huts, you can have a party with a dozen people if you move a little closer together. Therefore many people are content to spend a cosy weekend in a hut. Here you can discuss, read, laze around or write while the fire crackles quietly in the oven and it still smells of the pancakes from breakfast.





Fishing and hunting are also popular pastimes, especially among Norwegians. And for those who prefer things a little more airy, there are even a few rocks on Blomstrand where you can set up a top rope for an afternoon of climbing.



Spitsbergen is a rough land. The rocks are craggy, the vegetation sparse. Splashes of colour such as the purple of the saxifrage are rare, mostly grey, brown or pastel shades prevail. At times, the sun rarely makes an appearance during the summer and dark banks of clouds creep over the fjord. But if you love peace and solitude and enjoy the little things, you will find an Eldorado from which you can take home thousands of impressions. Many people who have spent part of their lives on Spitsbergen return to this place at some point.







Travelling in the Fjord

Away from the short roads that connect most of the buildings, boats are the only means of transport during the summer months – whether for scientific purposes or for recreation. For example, in one of the surrounding small cabins, which are available to residents at weekends, on an excursion to Lilliehöökbrean or for a spring ski tour on the opposite side of the fjord.

At the end of May, most of the shoreline areas are bare. However, there is still a thick blanket of snow in the mountains.







Hyttetur at Camp Zoe

Norwegians love hiking to cabins! Numerous small cabins line the coast around Brøggerhalvøya and the shores of the Kongsfjord and Krossfjord. French logistics engineer Thomas Dupeyron also appreciates this. Hans Erik Fjeld writes an entry in the hut book. A nice tradition as a memento and as thanks for the roof over his head.





The Huts

The following double-page spread shows twelve of the approximately 20 Velferden huts (column by column from left to right): London (Camp Mansfield), Tyskahytta, Juttaholmen, Brandal, Papphytta, Geopol, Camp Zoe, Ragnahytta, Haugenhytta, Gorillaheimen, Jensebu, Laxebu.







In the Realm of the Polar Bear

Whether on land or at sea, polar bears are amazingly fast travellers and can cover long distances every day. Even if polar bear sightings are rare, you must always be vigilant and be prepared for an unintentional encounter with a bear at any time. A rifle is used for self-defence in an extreme emergency. Åsne Dolve Meyer supervises Sarah Huber during training at the local shooting range.







The Rifle as a Constant Companion

Everyone who leaves the village takes a large-calibre rifle with them. The rifle is semi-loaded, i.e. there are cartridges in the magazine, but not in the chamber. The weapon is ready to fire with just a few hand movements. Over time, you get used to the unwieldy thing that accompanies you on hikes and patrols. A signal pistol also belongs in your luggage. This can usually be used to make a bear flee without having to get right up against it.

Fishing

Anyone can fish in the sea with a normal fishing rod. For the rivers, you need a fiskekort, i.e. a fishing licence. Jørgen Sjøvold Strand is visibly pleased with the arctic char he caught.







Hunting

Hunting has a long tradition in Norway, as it does in the Swiss mountain cantons, where Norwegian Polar Institute employee Christian Zoelly is originally from. The ptarmigan he hunts are probably intended more for a delicious dinner than for the belly of the faithful Greenland dog Kayla. Here and there you can still see old trapper huts.





Trapper Traps

Old traps can still be found on Blomstrand and near the abandoned coal mines.





Kongsbreen with Steindolpen in the evening light.



Trongskaret

The landscape around Trongskaret is rocky and barren. Only occasionally is there a small carpet of moss. The rocks of Røysa and the western foothills of Brøggertinden in the background present themselves in a broad spectrum of red and brown colours.

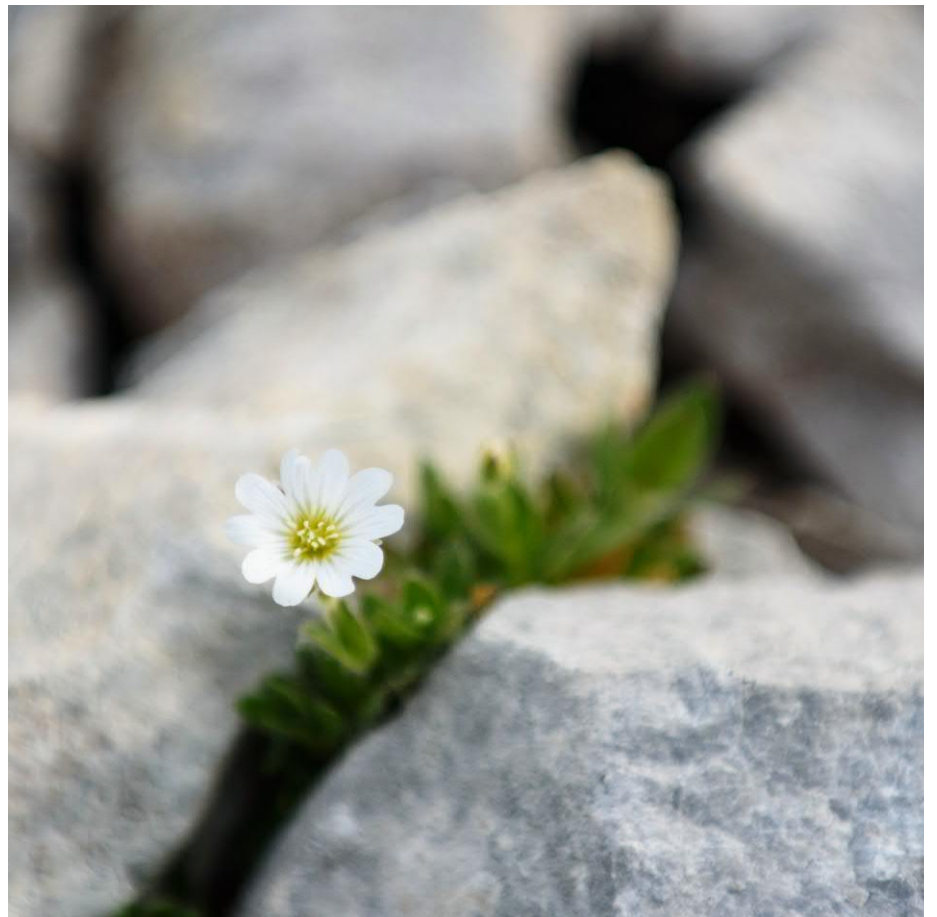


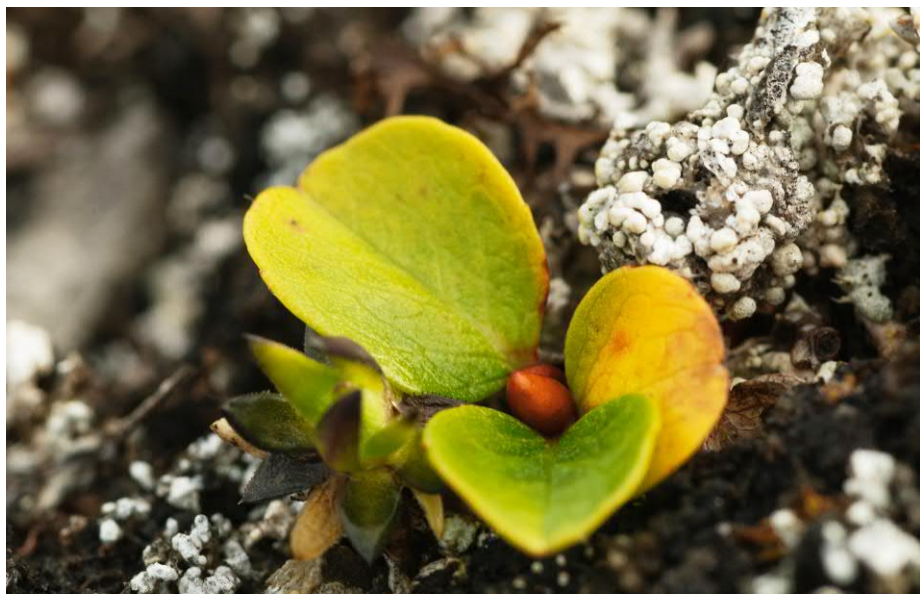


Floral Splendour

There are also numerous flowering plants on Svalbard. Some of them can also be found in the Alps. The most striking, purple flowers are those of the purple saxifrage or the stemless moss campion, whose flowers often appear first on the south side of the cushion and thus roughly indicate the direction of the compass. Right: Polar Campion, Mountain Avens, Svalbard Poppy, Arctic Mouse-ear.







Of Trees and Mushrooms

Polar willow and dwarf birch are the only trees or shrubs that thrive at this latitude. The weaver barely grows a few centimetres high. This means that in summer even the mushrooms are taller than the "forest".

Right: Polar scurvygrass, polar fir clubmoss, sea sandwort, drooping saxifrage.





Geology

Repeated thawing and freezing processes can cause stone rings to form on the permafrost soil, covering entire plains.

The fossilised leaf makes it clear that this part of Spitsbergen must once have been located further south, where it was warmer and there were deciduous forests. The coal seams also bear witness to lush forests more than 250 million years ago.





Layered Sediments

At the very back of the Brøggerdalen valley is the 722 metre high Brøggertinden with its steeply inclined layers of sandstone and shale from the Carboniferous and Permian periods.







Kiærdammen with Kvadehuken and Steinflåen
at the entrance to the Kongsfjord.







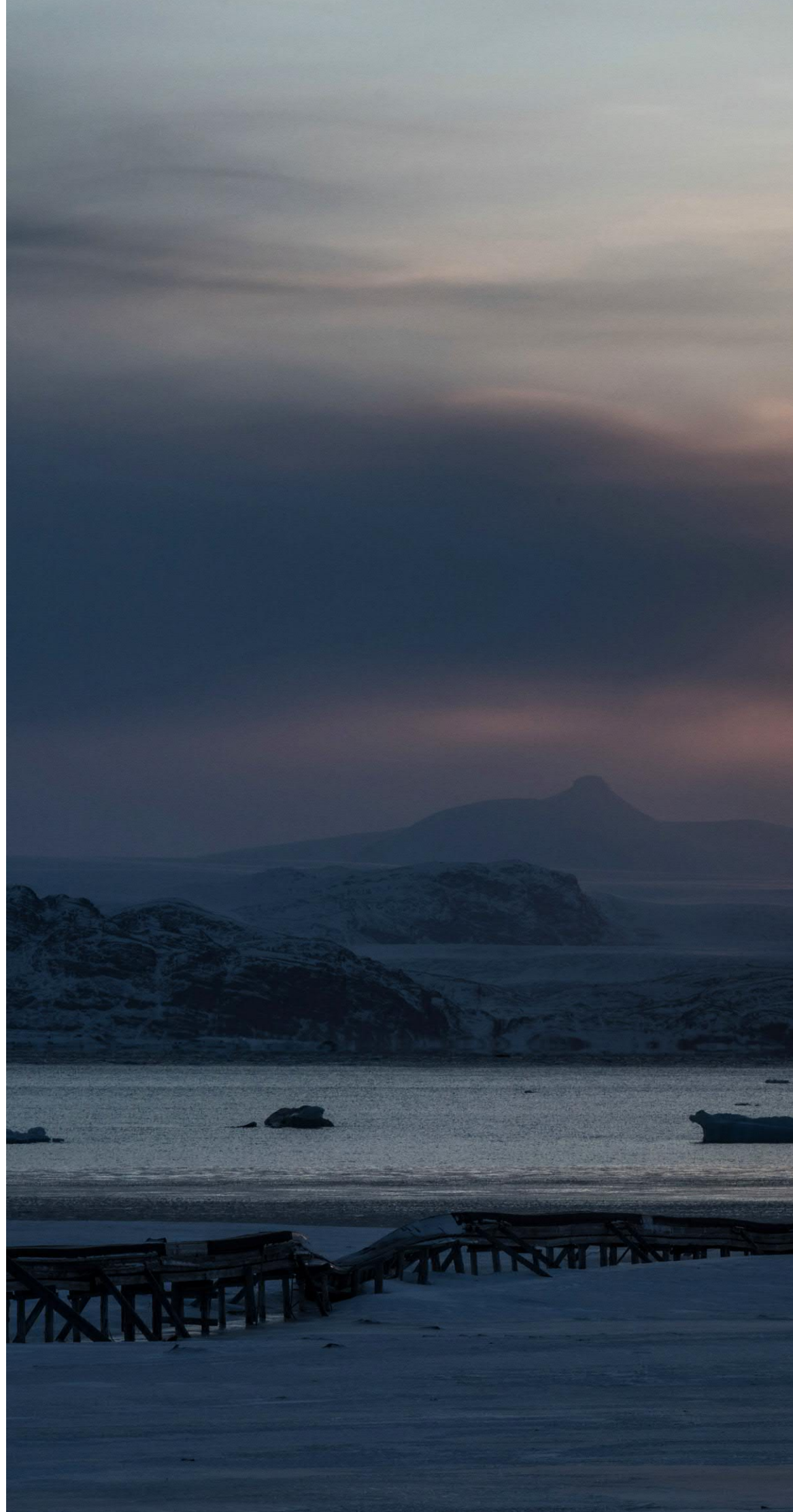


Nekknuten

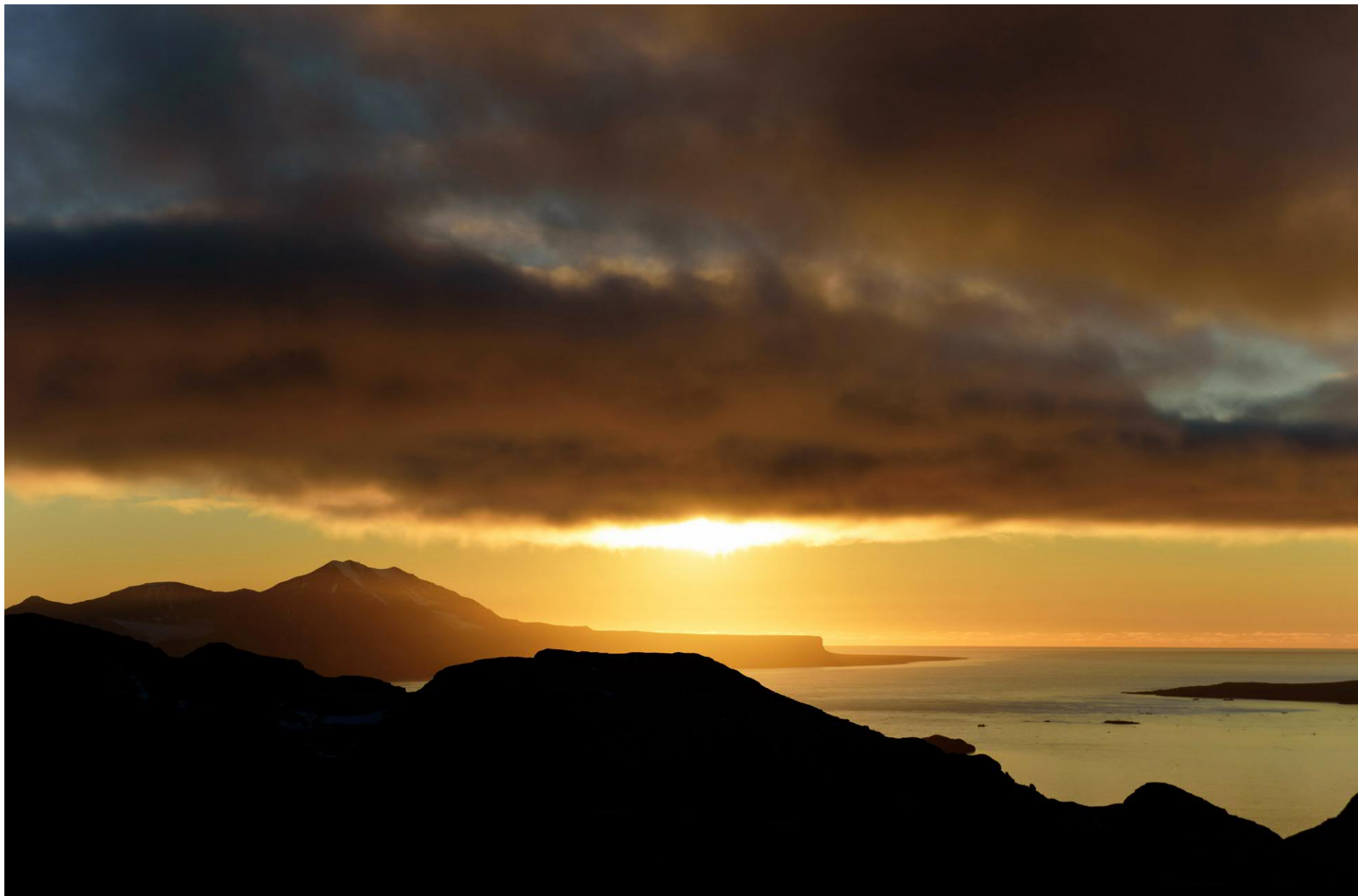
Erosion produces bizarre shapes.

Tre Kroner

Two of the three well-known mountain peaks rise up at the end of the Kongsfjord: Svea and Nora. They are both around 1200 metres high and, together with Dana as "Tre Kroner", are the trademark of the fjord.







Kongsfjord bathed in Evening Light

Sunset in the area of Raudvika and Ossian Sars. Scheteligfjellet and the cliffs at Stuphallet can be seen from afar.





Lovén Islands and the Coast off Ny-Ålesund

Between Ossian Sars and Ny-Ålesund lie the islands Inner-, Midt-, Sigrid- and Observasjonsholmen as well as Storholmen in the background. Leirholmen and Juttaholmen (left and right outside the picture) complete the small archipelago.



Steinflåen and Kvadehuken

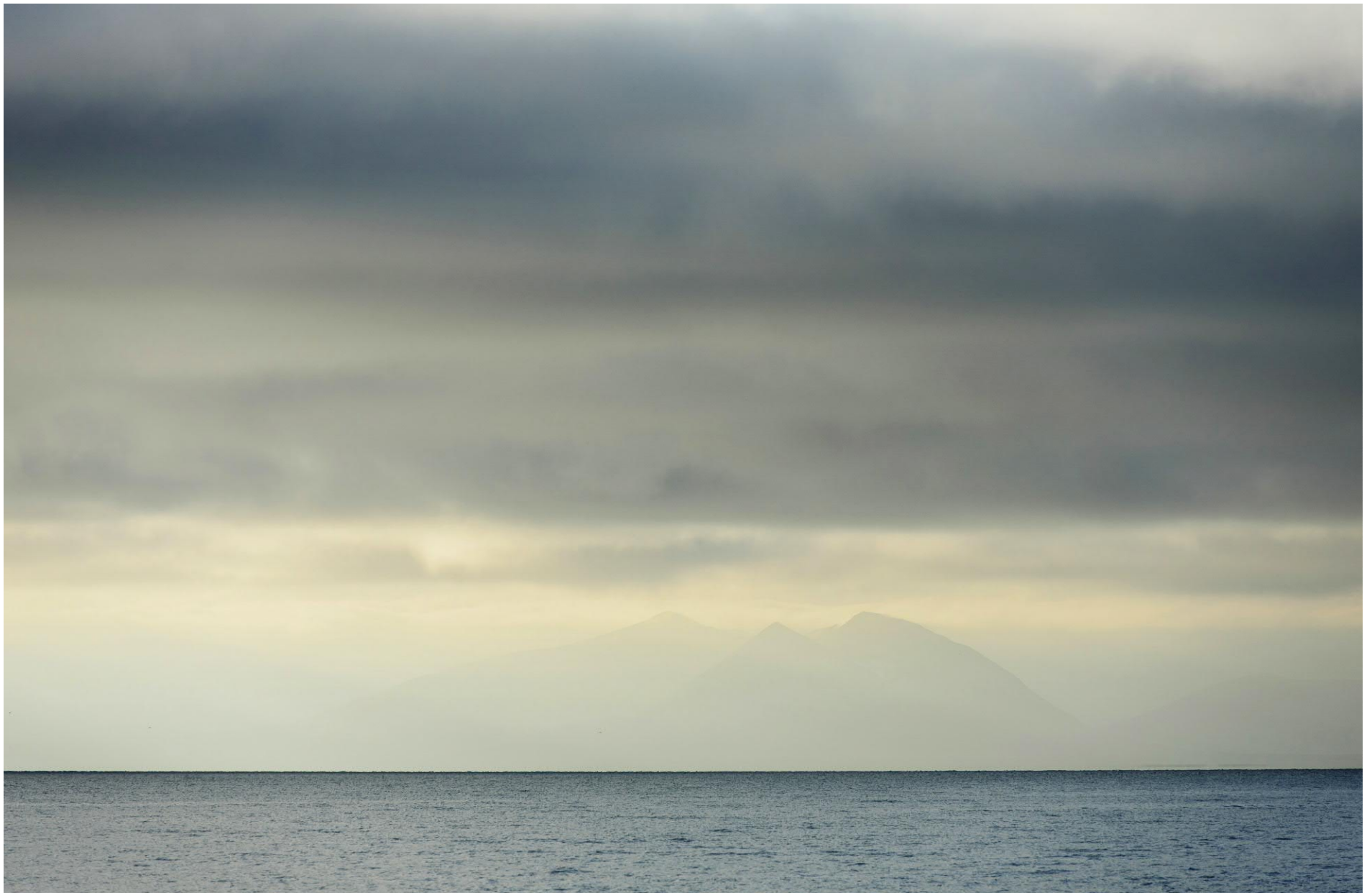
The cliff at Steinflåstupet drops precipitously 100 metres into the plain at the north-eastern-most point of Brøggerhalvøya.



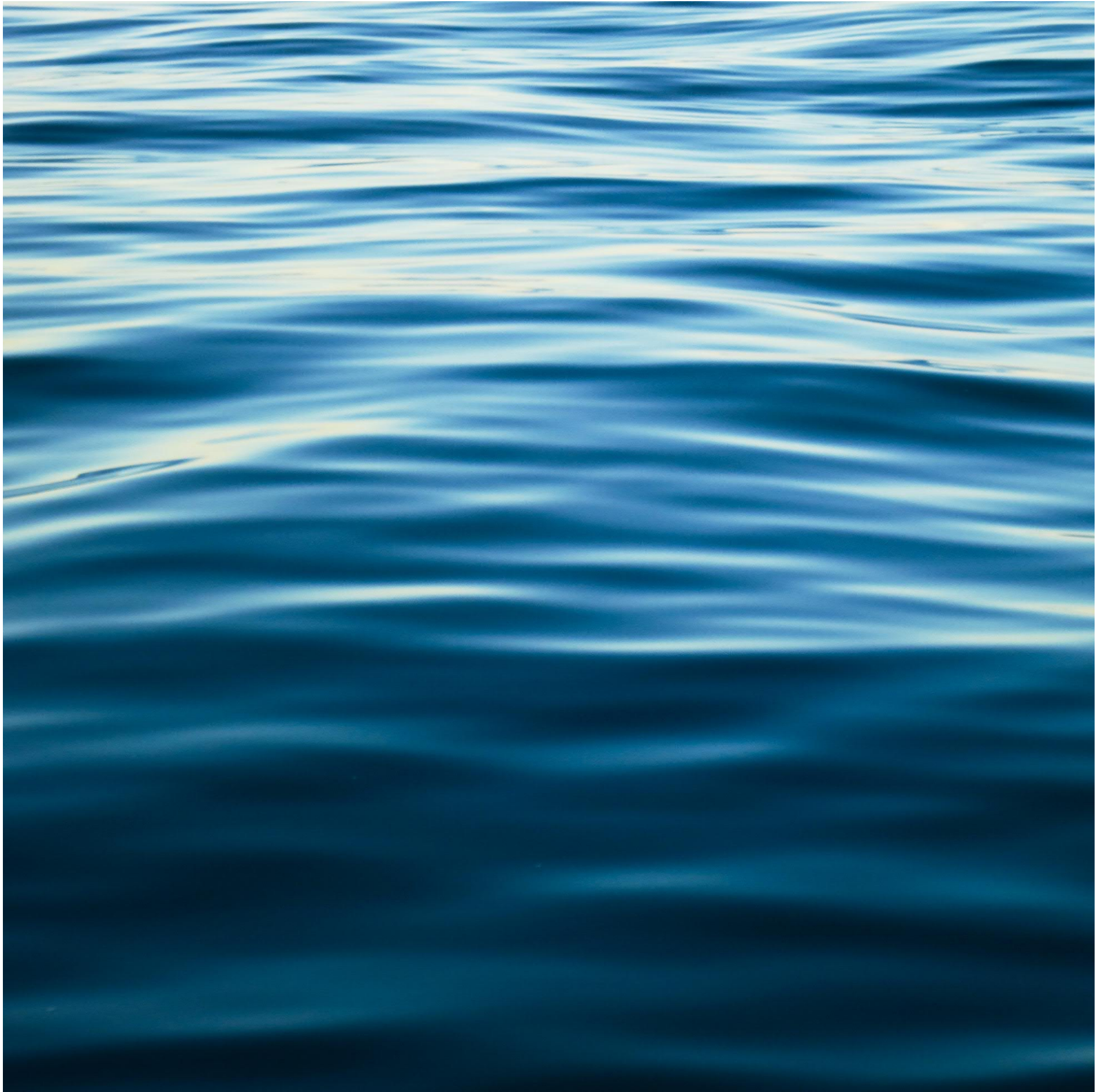
In the Haze

The 393 metre high Mitra mountain stands like a lighthouse at the Kapp of the same name, which flanks the entrance to the Kongsfjord and Krossfjord.

Taylor- and Balfourfjellet on Prins Karls Forland rise out of the haze above the wide plain of Aberdeenflya.



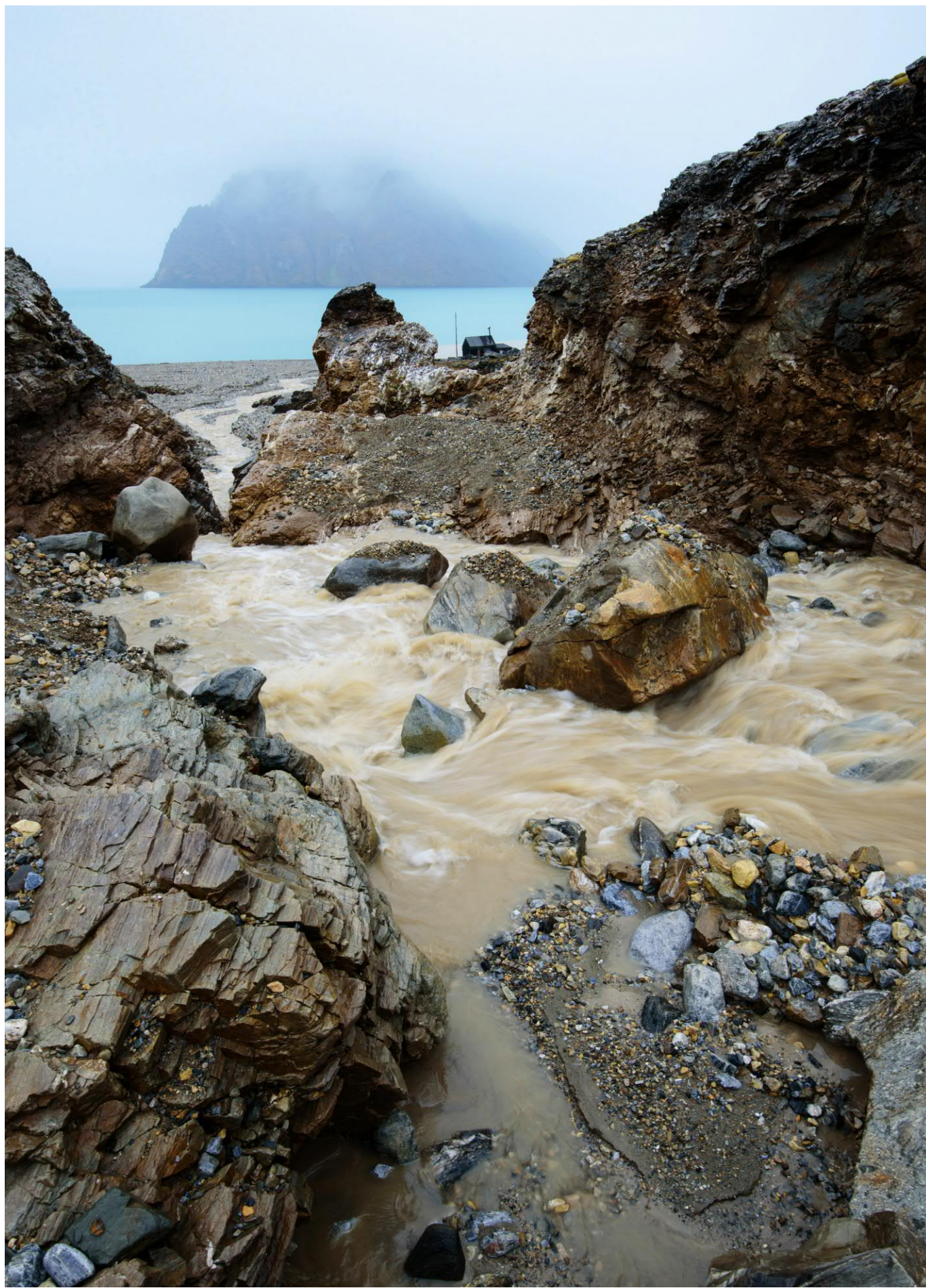






Krossfjord

If you turn off to the north at the entrance to the Kongsfjord, you enter the Krossfjord, which stretches around 30 kilometres to the Lilliehöökbreen. It is part of the Northwest Spitsbergen National Park. Camp Zoe is located halfway there, opposite the elongated Haakons-Halvøya.





Prins Karls Forland

The island of Prins Karls Forland, 85 kilometres long and less than 12 kilometres wide, also forms a national park within Spitsbergen. View from Niggghaugen into Niggdalen.







Fuglehuken

Fuglehuken at the northern tip of Prins Karls Forland is the easternmost point of Spitsbergen. It is around 500 kilometres across the sea from here to Greenland.



Lake on the east side of Prins Karls Forland.







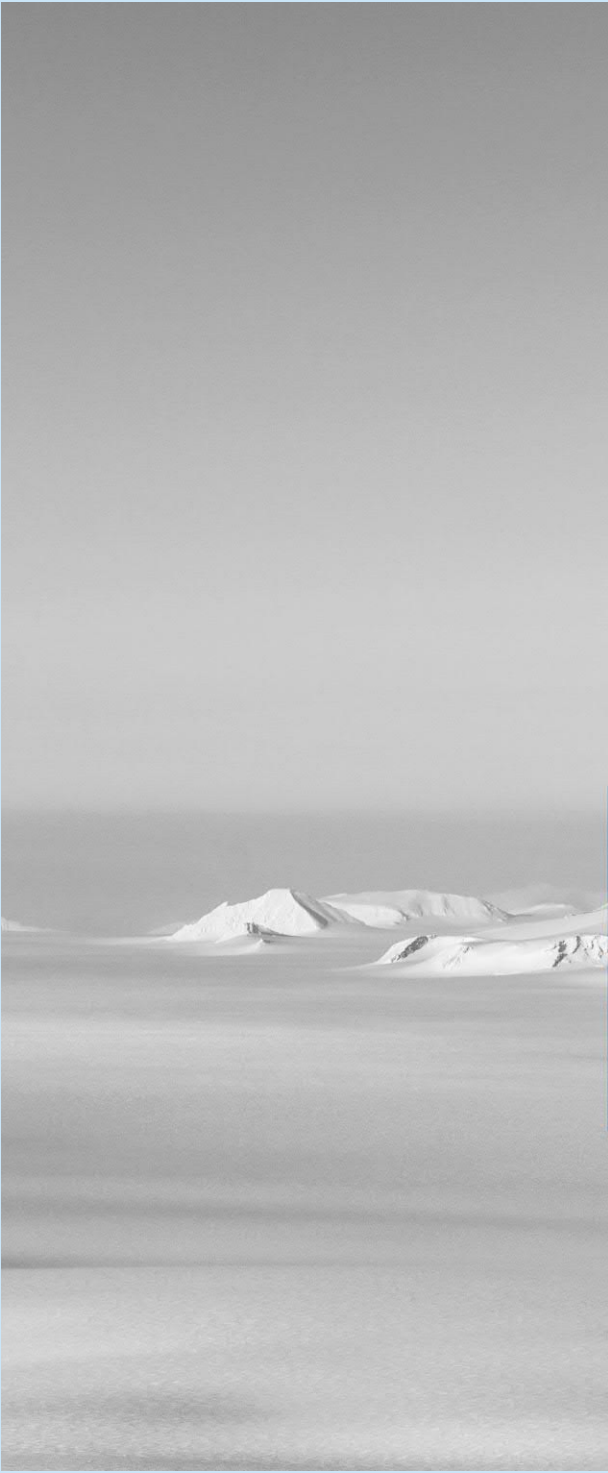
Sarstangen

On many stretches of coastline, the mountains are surrounded by wide deltas. This includes the mountains to the west of the Comfortless-breen, whose Sarsøyra plain extends far out into the strait to Sarstangen point. Behind them, the high mountains of Prins Karls Forland rise up, above all Philipps and Monacofjellet, the two highest to the right of the centre of the picture.



Blomstrandhalvøya

Grotto north-east of Blomstrandhalvøya with a view of Nordvåg fjellet.





A World of Snow and Ice
Snow & Ice



As in the Alps, snow can fall on Svalbard all year round. However, it is also not completely unusual for it to rain around Christmas, although this is unfortunately becoming increasingly common. The lowest temperatures are typically recorded in March and the winter season as we know it is concentrated in the months of February to April. During the polar night, the village



and its inhabitants keep to themselves. It is too dark for walks far off the short roads and boat operations are suspended. In addition, stormy winds at the beginning of the year mean that, despite occasional snowfalls, there is still not enough snow to ski on. All the more reason for everyone to look forward not only to the light returning in February and March, but also to the long-awaited snow cover. Then the "scooter season" starts, which everyone has been waiting for. On the one hand, it's great fun to whizz around on the powerful vehicles. On the other hand, the ideal



means of transport at this time of year gives you back all the freedom you had given up during the winter. It is true that it has not been possible to cross the Kongsfjord from Ny-Ålesund for two decades, as was previously the case when the fjord still froze over year after year. However, the southern side of the peninsula and the mountains to the east are still easy to reach and explore. Those who prefer physical activity can use a snowmobile to get to the starting point of the numerous ski tour options around Ny-Ålesund. But the "scooter season" is short-lived. The white surface only lasts around 3-4 months and disappears with the rising temperatures at the beginning of May. Then the snow melts and parts of the scooter tracks turn into streams, ponds or rocky deserts. Once the top layer of soil has thawed, the caterpillars of the heavy equipment would do too much damage to it.



Large parts of Spitsbergen are covered in ice. When temperatures rise into the double digits in summer, the glaciers are covered in meltwater rivulets that merge to form small streams that then grow in size. If such a stream meets a crevasse, the water can make its way deep down into the interior of the glacier. As an underground river, it eats its way through the ice to emerge again at the glacier gate under the ice tongue. Only when it is cold and the streams dry up is it possible to descend and look for a brief moment into the bizarre world in the belly of the ice giants.



Due to global warming, practically all the surrounding glaciers are retreating. Some of the ice masses are still sliding out into the fjord. There, the warm seawater melts the ice from below and small parts of the glacier tongue regularly collapse: The glacier calves. The resulting small to medium-sized icebergs collect in the bay in front of the glacier before the wind



blows them out into the fjord. Freshly calved icebergs shine in fantastic shades of blue: a spectrum between blue and white that is magically attractive and makes you forget for a moment that all this splendour may no longer exist here in the not too distant future.





It's snowing!

Everyone has been eagerly waiting for this! After it had rained cats and dogs at New Year and the ground had been swept clean of the little snow by the storms that followed, there was finally enough snow in late March. The swirling flakes put a smile on everyone's face in the village: this is what the Arctic looks like! Justyna Lisok, Klara Wolf and Simon Escalle set off on a short ski tour from the foot of Zeppelinfjellet up to the saddle between Zeppelinfjellet and Lundryggen.













Traudalen, Feiringfjellet, Kongsvegen

If the conditions are safe, there are numerous ski touring opportunities in the surrounding area. For example in Traudalen or on Feiringfjellet, where Trond Nasvik, Verena Mohaupt and Olav Ljøkjel are travelling (previous double page).

Sarah Huber is on the ascent to Lundryggen and the small hut Jensebu at the western end of Brøggerhalvøya. In mid-March, it is almost -25°C at an altitude of 500 metres and there is a steady wind. You have to dress well to avoid getting cold.



Nora

Nora (1224m), the middle summit of Tre Kroner, can be climbed in late spring via its evenly steep southern flank. The view to the north over the vastness of the Hoftedahlfonna, down to the Kongsfjord and to the east over the countless mountains rising out of the ice is indescribable. An unforgettable tour with Axel Meldahl, Marion Lexau Nødset and Thomas Ribeaud.





View from the summit of Nora in a south-easterly direction: the neighbouring mountain is called Dana. Ny-Ålesund is far to the right at the edge of the picture.





Dronningfjella

Ragnhildtoppen (1264m) is the highest peak of Dronningfjella and a top-class ski summit. Jørn Nesdal's ascent along the western ridge is gentle and the panorama magnificent.







Rock Outcrops

The summit structures of Nora, Svea, Exilfjellet and Dana, as well as Torafjellet and Vortefjellet, lie like castles above the snow-covered slopes. Tectonically, these mountains belong to the Dickson Fjord Group. The shales and red sandstones were deposited over 350 million years ago. The view stretches far to the east across the Dickson valley.







On the Kongsvegen

Sarah Huber is travelling alone on the Kongsvegen. As the scooter season arrives late, there are still no snowmobile tracks.

Tricky Passage

The "Mariele" cliff just before the German Hut (Tyskahytta) is the bottleneck if you want to get onto the Kongsvegen by snowmobile. Here you have to navigate carefully in icy conditions and shift your body weight to the right to avoid slipping. The Colletthøgda, Dana and Pretender mountains rise up in the background.







Travelling by Snowmobile

During the cold spring months with daylight, i.e. from February/March to the beginning of May, the snowmobile is the preferred means of transport. Large distances can be travelled quickly and efficiently over the wide, snowy surfaces. When it thaws in mid-May, however, the last days are numbered. Puddles of meltwater form here and there and anyone travelling too slowly will inevitably sink into them. Here, the author has driven his snowmobile into the mud because he underestimated the required run-up distance.









Ice Surface

Reindeer persevere through the winter. They clear away the loose snow with their hooves to reach the sparse plant cover. When it rains in December or January, the precipitation runs off the frozen ground and forms small lakes on the banks. These quickly freeze into hard, impenetrable ice sheets. This means that the reindeer can no longer reach their food. With the noticeable rise in temperatures over the last few decades, this phenomenon is occurring more and more frequently. Only when the snow melts do the ice sheets break up into a sea of long ice needles.

Domkyrkja (Cathedral Church) is the name of the mountain towering above the Comfortless-breen in the Uvêrsøyra area. The flat glacier is retreating and the ice has not calved into the Engelsbukta for some time.







Glaciers as Far as the Eye Can See

The Fjortende Julibukta and the glacier of the same name, both named after the French bank holidays. The rugged rocky outcrop is the northern spur of Olssønfjellet, whose southern flank is clearly visible from Ny-Ålesund.











Meltwater

In summer, a labyrinth of meltwater streams runs through the surface of the Kongsbreen (King's Glacier). Where the glacier is flat, mud and small lakes spread out. During the winter months, the rivers are snowed over and the water freezes to clear ice.







On the King's Glacier

Two-day glacier trekking on the Kongsbreen with logistics engineer Thomas Dupeyron. In July, the glaciers are free of snow, i.e. the crevasses are visible on the glacier.



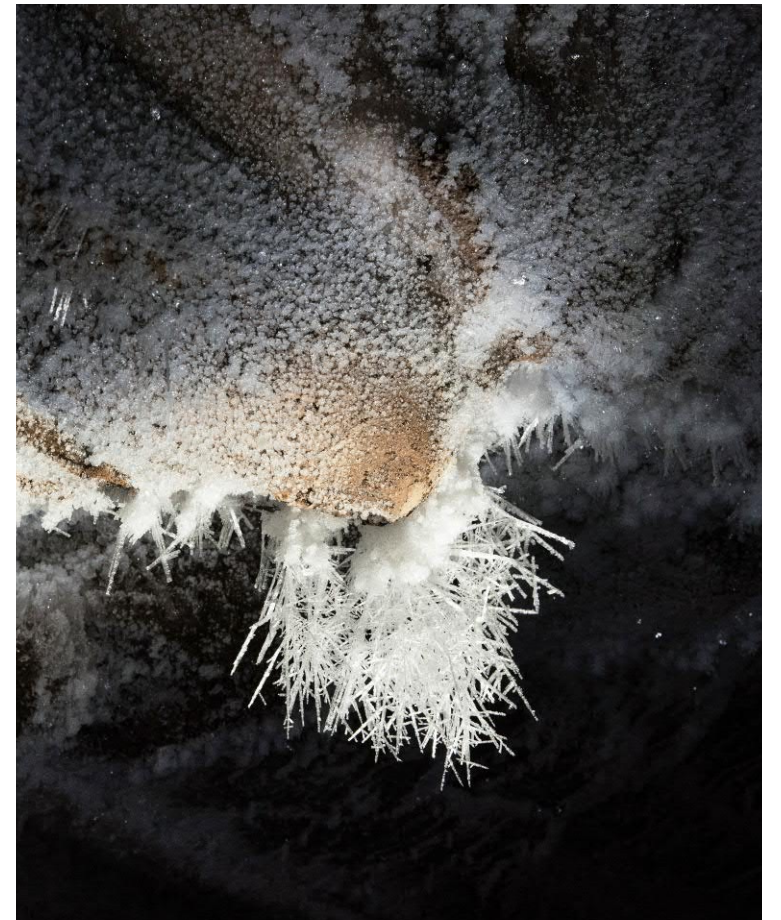
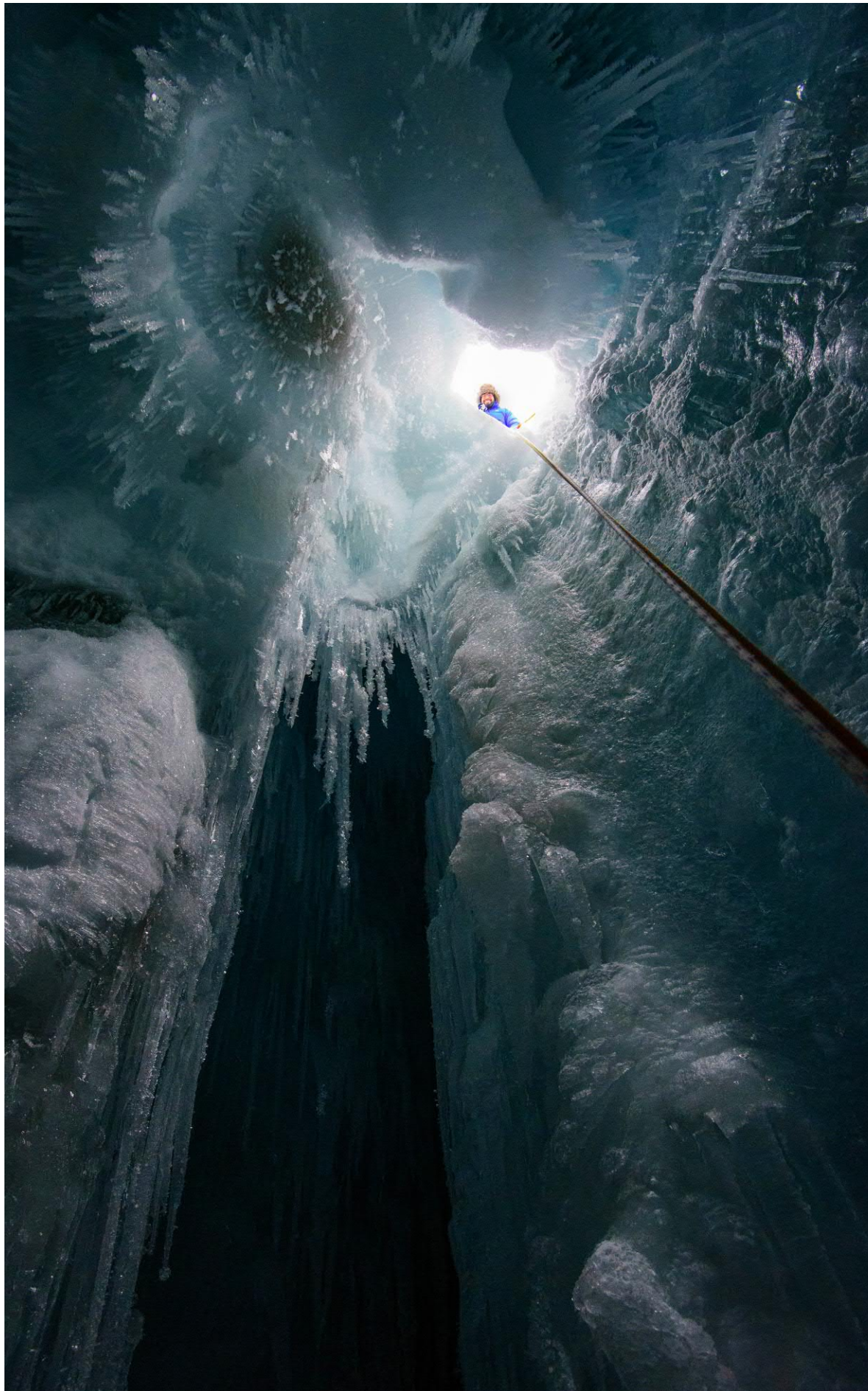


Ice Cave

When streams of meltwater meet crevasses on the glacier surface in summer, they penetrate deep into the glacier ice. The openings through which they plunge down are called glacier mills. In underground tunnels, they can reach the bottom of the glacier, from where they flow out through the glacier gate.

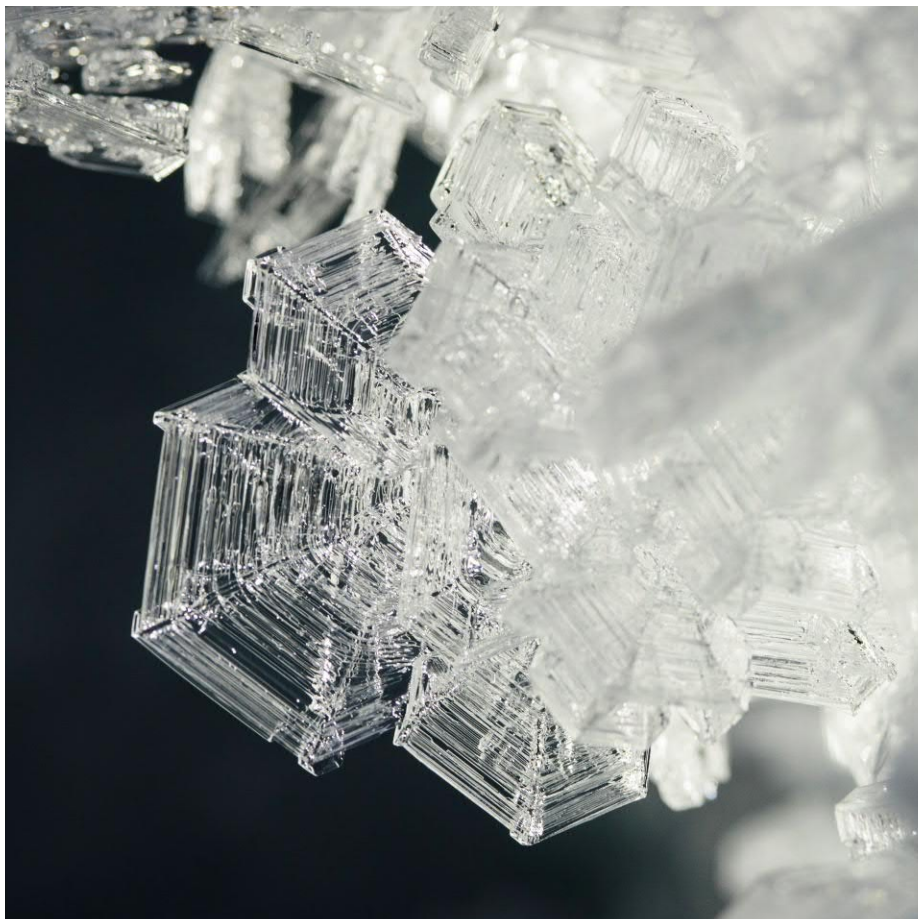
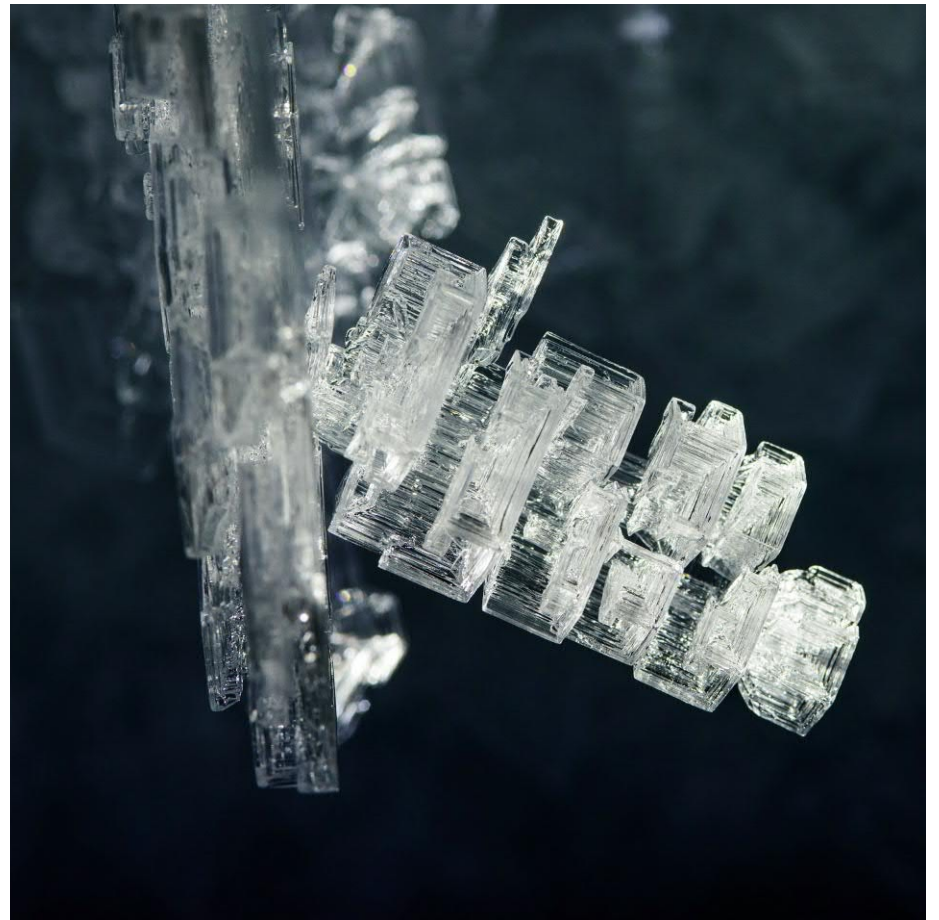
For safety reasons, access to the glacier mill on Brøggerbreen was marked out in the autumn. In April, Thomas Ribeaud and his colleagues are now shovelling it clear. There is still around 3 metres of snow on the access to the inside of the glacier. After hours of work, the cave lies beneath us like a black hole. Verena Mohaupt is the first to dare to enter...





Filigree Ice Formations

Directly below the entrance hole, icicles with filigree ice needles line the entrance to the ice cave. High humidity and constant temperatures have allowed crystals to grow, which are several centimetres in size.







At the Foot of the Shaft

A rope takes you down to the 50 metre deep bottom of the glacier mill. Here lies a frozen lake of glistening blue ice. A wide, washed-out shaft, divided in two by a huge column of ice, reaches up to the entrance. We make ourselves a place to sleep and get ready to explore the side passage left behind by the melting water.





Underground Meltwater Flow

Deep inside the glacier, the water has meandered through the ice. The river continues to flow in arcs into the belly of the glacier. You lose your bearings after just a few bends.

The water has formed underground canyons over 5 metres high in the ice. Where it has made its way down through cracks, columns of ice have been left standing. At some point, a frozen siphon blocks our way. From here on, there is no way through. What it looks like behind it remains hidden from us.

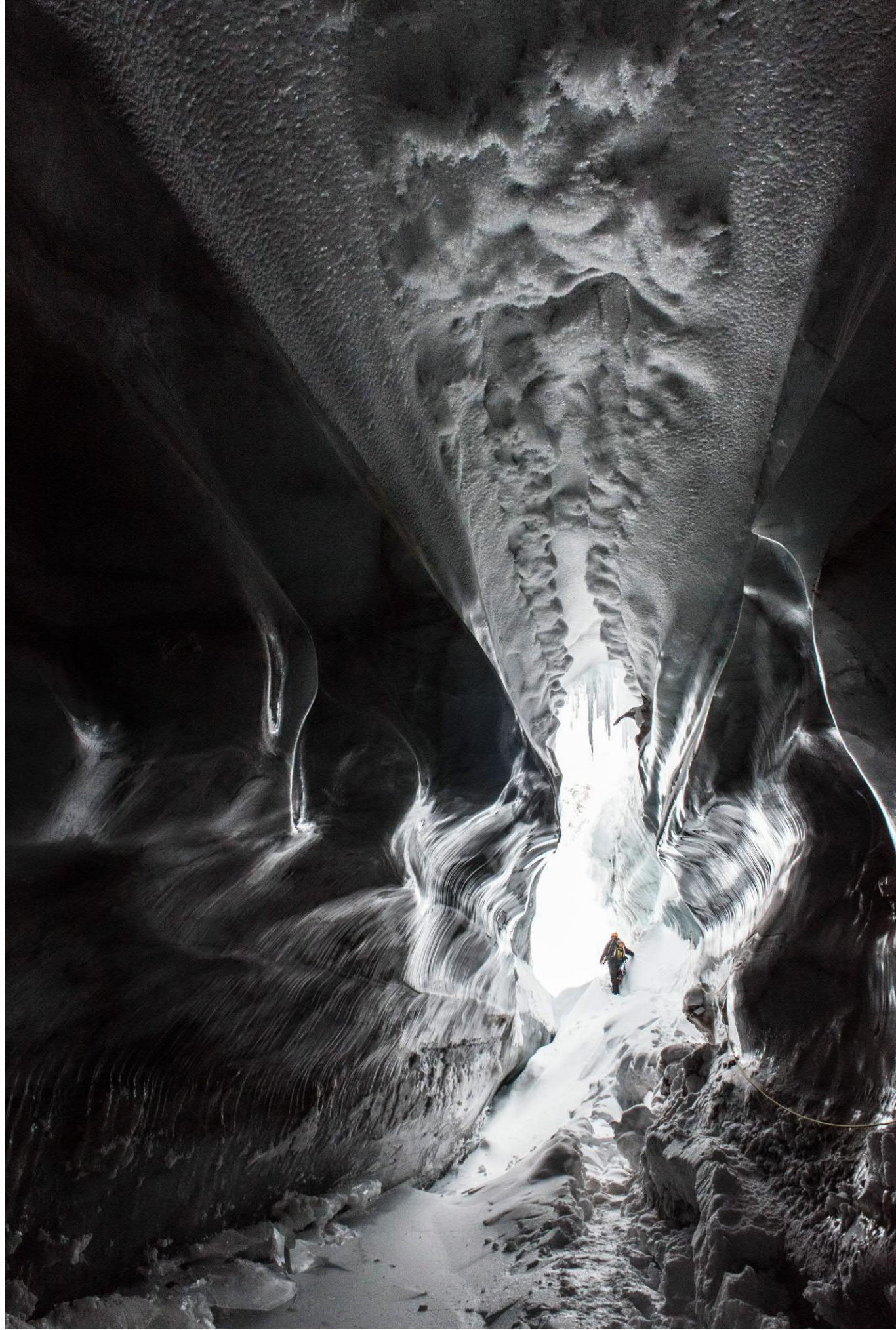




Accessible Crevasse

At the lower end of Brøggerbreen, a small access to the glacier has also opened up. This is where the water finds its way back to the surface at the end of its journey through the ice.







Tinayrebreen

The ice shines blue on the crevasse-rich Tinayrebreen at the Möllerfjord.





Seracs

The Blomstrandbreen has produced bizarre ice sculptures on its tongue. Are there any greater artists than nature itself?







Kronebukta

Two glaciers flow into Krone Bay at the end of the Kongsfjord: the heavily cracked Kronebreen in the background, which flows down from Holtedahlfonna, and Kongsvegen, which originates in Kongsvegpasset on the right.







Calving Kronebreen Glacier

The Kronebreen is still calving into the Kongsfjord and the Lilliehöökreen into the left branch of the Krossfjord (previous double page). But these glaciers are also retreating. At some point in the near future, it will no longer be possible to observe the spectacle of calving ice in the western part of Spitsbergen.

You should not get too close to the edge of the calving edge: it is impossible to predict exactly when blocks of ice will fall into the sea and the force of the wave can be very large.



Icebergs

Icebergs drift westwards out of the fjord from the edge of Kronebreen. A few decades ago, the glacier still reached as far as Bulben, the sunlit, polished rocky ridge west of Colletthøgda.

Ice Floating in the Kongsfjord

Ice has accumulated at the back of the Kongsfjord. Anyone travelling by boat must navigate carefully here.

Merraskallen is the name of the nearby mountain to the right of the centre of the picture.

The dark rock on the right-hand side of the picture belongs to the island of Ossian Sars.







Gone with the Wind

Stormy winds whip up the sea and drive icebergs out of the fjord. The intense blue colour reveals that the icebergs have only recently broken off the glacier front, meaning that the fractures are still relatively fresh.





Fresh Glacier Ice

Compact ice glows blue because it absorbs the red to green components of sunlight and only allows the blue components to shine through. The more cracks and air bubbles that penetrate the surface of the ice over time, the more light is scattered on the surface. Then the magical blue slowly turns into a dirty white.





Ice Sculptures

Waves and sunlight form fantastic shapes from the melting icebergs. It is a temporary exhibition, as the sculptures landed on the beach at the end of April will not last long.



Sea Fog

When warm air meets cooler layers of air that lie directly above the cold seawater, a fine mist can form, which dissipates again in the morning as temperatures rise. The weak March sun is still low in the sky, illuminating the long-lasting scenery outside in the fjord.







Paddling

Sea kayaking is a wonderful way of travelling along the coast under your own steam. The local Velferden association provides three boats for this purpose. It is a special experience to observe small icebergs up close, although you should be careful: 90% of the ice is under water. Sarah Huber and Lisa Dirks enjoy the feeling of being close to the icebergs.





Sea Ice

It takes temperatures below freezing for ice to form in the salty seawater. In calm conditions, a kind of sludge forms on the surface of the sea, which slowly freezes to form a sheet of ice. Slight water movements break up the ice crust again and again, so that pancake ice is formed. It is only during prolonged cold weather that solid, one-year sea ice, several decimetres thick, can form on which you can walk. Multi-year sea ice in the area of the North Pole can even be up to 7 metres thick.







Survivalists
Survivalists



Svalbard was first colonised not very long ago, so there is no indigenous population. The actual inhabitants of the land are birds, mammals and sea creatures. But the animals do not have an easy life on Svalbard: in winter it is sometimes very cold and stormy. The food then lies under a blanket of snow or ice for months on end. It also stays dark all day for several weeks. Summer brings nutritious grass, but it only lasts for a short time before the first snow falls again.

The individual species use different strategies to ensure their survival throughout the winter: While the endemic reindeer are bulkier than their conspecifics on the mainland and try to lose as little heat as possible with their thick winter coats, the Arctic foxes hide in their dens under stones and huts. Many birds, on the other hand, undertake incredibly long journeys to spend the winter in warmer climes. As there are no trees on which they can seek shelter during the breeding season, they nest on rocks or hi-



de in the grass. Or they appear in such large numbers that, despite their predators, there may be enough of the countless young left at the end of the breeding season to ensure their survival. The rock ptarmigan remains here throughout the winter: It spends the polar night in its thick plumage.



Seals and polar bears have become so acclimatised to the climate that they are dependent on the surrounding sea ice. The polar bears in particular, which hunt for seals on the pack ice, are therefore hard hit by the retreat of the vast areas of ice. On long forays, they increasingly raid birds' nests during the breeding season or feed on animal carcasses throughout the summer. The doors and walls of the light trapper's huts are not strong enough to withstand their large paws. No wonder the bears are increasingly gaining access to the small huts in search of food. They use their sense of smell to find the kitchenette even if no food has been left behind.



The foxes crawl into their dens in winter. They starve if no eggs, chicks or mussels can be stolen during the harsh winter. Not all young foxes will therefore survive the winter. It has to be this way: if all the young survive the winter, this means the end for the chickens of the next breeding season. It is an unstable balance that is all too easily disturbed by the presence of the small community – after all, the foxes find a bite to eat from time to time precisely because of the human settlement. It's a good thing that some of the surrounding islands are protected and may not be entered during the bird breeding season in the spring and summer months.



And the Arctic elephant? The last time it was seen was on the solstice festival in 2015, before it escaped from its tamer Woytek...







Arctic Tern

Arctic terns are impressive migratory birds. Every autumn they fly as far as South Africa or the edge of Antarctica to return to northern Europe the following year. Within a year, they cover a distance of almost 70,000 kilometres. Like all birds that do not breed on cliffs, swallows nest on the ground. They only lay a single egg, which they defend against Arctic foxes in daring aerial acrobatics with their pointed beaks. If the brood is not successful, they can lay a second or even a third egg.



Show-off

At the beginning of the breeding season, the males woo females with fresh fish. They then fly round and round with their bridal gift in search of the right mate. Sometimes they even refresh the fish they have caught in the pond to improve their chances with the opposite sex.





The bird on the Shovel

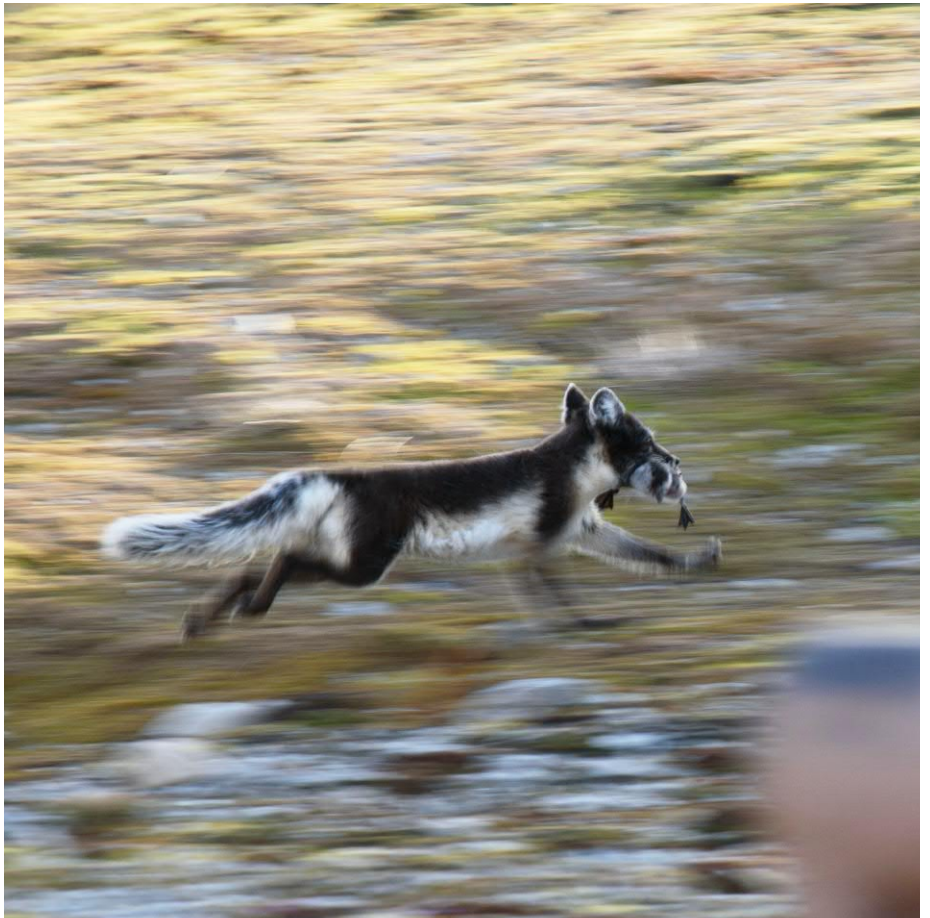
This swallow laid its egg in the middle of the road. And why not? It's nice and clear, you can recognise the fox from far away. The inhabitants of Ny-Ålesund didn't take much pleasure in this tactic, they were probably a little worried about the egg. But you can't just push the egg to one side: if you were to carry it to the side of the road in one go, the bird would no longer accept it as its own. Dutch ornithologist Maarten Loonen therefore placed the egg on a shovel, which could later be gradually pulled off the road. "I wonder if it's mine," the swallow asked itself. But no rival appeared to claim the egg. So

after an hour, the bird finally sat down on its egg and hatched it on the shovel. A happy ending? Unfortunately not: the fox also snatched this egg. When the cunning animals are hungry, even the swallow's pointed beak is of little use as a weapon of war.



Clever

This swallow has laid its egg inside the fuel store, which is protected by a wire mesh fence. There is a chance that the chick will one day fly south with its parents. The ornithologists have marked the nest with a flag and will keep an eye on them.





Geese

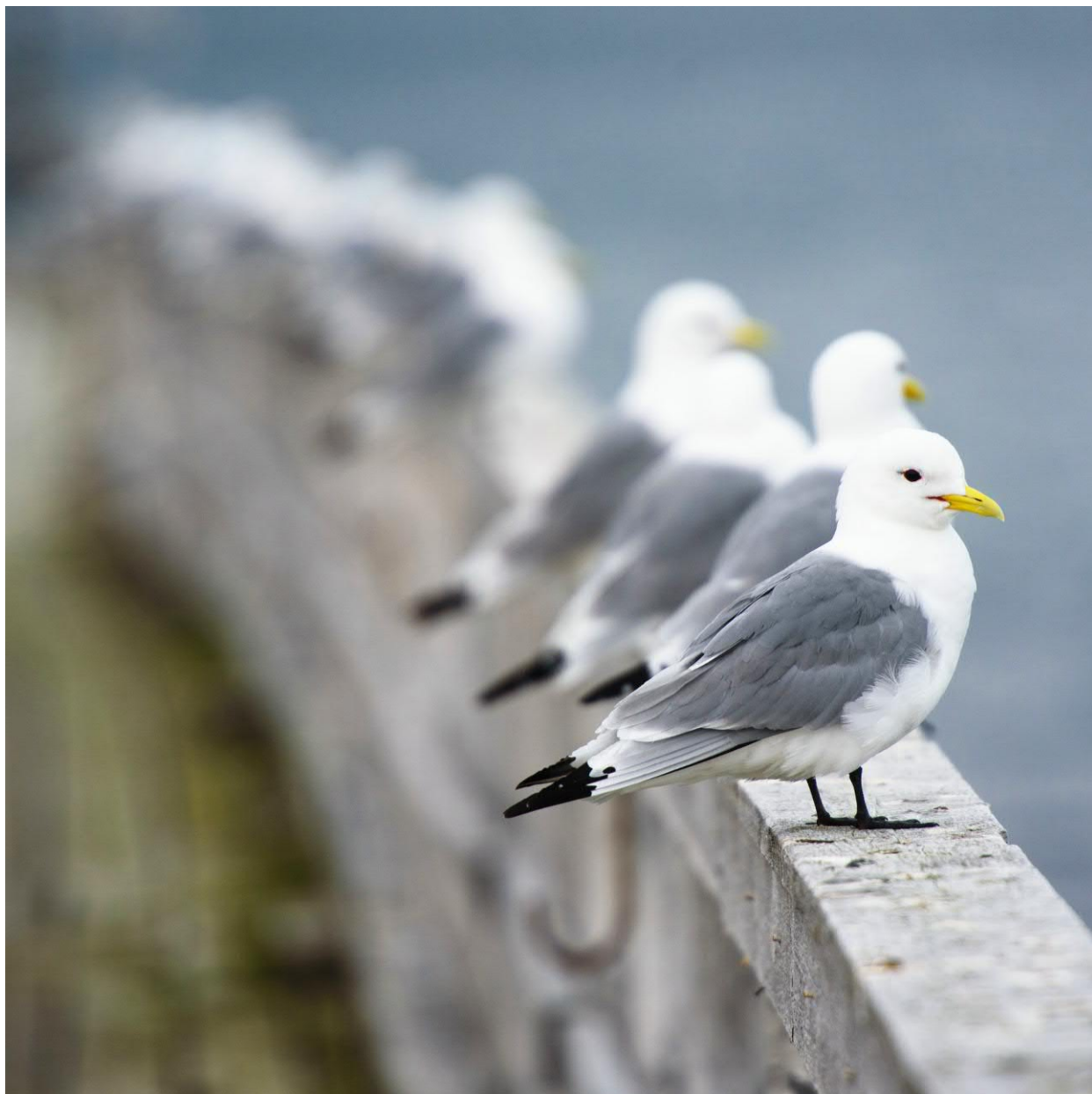
Geese also breed in large numbers around Ny-Ålesund. There are several species of geese, including the short-billed goose (gosling top left) and the barnacle goose (remaining pictures). Geese are dependent on the lush moss and grass areas. Each pair of geese initially raises around six chicks. Most of them will be taken by the fox. At the end of the season, only a small proportion of the offspring will have made it. Geese renew their plumage (moult) during the breeding phase and are unable to fly for several weeks.





Black Legged Kittiwake

Kittiwakes breed on the cliffs around the fjords. They also return regularly from the south in spring. As a rule, each breeding pair will occupy the same nesting site as the previous year. Their distinctive feature is their black feet, which distinguish them from other gull species.









A Hard Life

Around 10 million tonnes of plastic end up in the sea every year. Around 70% of this sinks to the seabed, 15% ends up on the beaches and the rest floats on the water. Plastic is found in the stomachs of many dead birds and it is estimated that around 1 million seabirds worldwide die each year from ingesting pieces of plastic. The kittiwake chick has fallen out of the nest. Its plumage looks increasingly neglected. At some point, the Arctic fox will make a meal of it. The chick has no chance of survival.





Arctic Skua

Two species of skua breed around Ny-Ålesund: the Arctic Skua, with its clearly visible ruff and white belly, and the slightly larger, brown-spotted Great Skua. If you get too close to their nest, they defend it with flight attacks. Thanks to their large wingspan, they are also quite frightening for humans. Skuas have specialised in stealing eggs, chicks and prey from other bird species.



Rock Ptarmigan

The rock ptarmigan can be found in many places on Svalbard. The specimens pictured are all females, the males are relatively easy to recognise by their red eyebrows. They change their plumage in spring and autumn so that they are always well camouflaged.

Ptarmigans spend the winter on Svalbard. During the cold season, they dig for food in the sparse vegetation. As with all birds, the chicks hatch in late spring so that they can develop over the short summer until they are ready to fly.





Snow Bunting

The snow bunting is the only native songbird. It spends the whole summer on the island archipelago between April and the end of August.





Purple Sandpiper

Sandpipers have a somewhat unique strategy to protect their nests from predators: If you get too close to their nest, they feign an injured wing to draw attention to themselves. They then lure the enemy away from the well-camouflaged nest.



Ringed Plover

The Ringed Plover prefers barren areas with sparse vegetation.





Little Auk

Little auks breed in steep cliffs along the coast. They are droll birds that usually travel in flocks.



Ducks

From time to time you can see eiders or long-tailed ducks in the fjord or on lakes.





Puffin

Puffins are rather rare guests in the Kongsfjord, as colonies are not particularly numerous on Spitsbergen. However, individual birds can be observed far out in the fjord from time to time during the summer.





Fulmar

The fulmar is an impressive glider. It can glide just above the surface of the water, but can also be seen travelling high up in the mountains. The petrel is characterised by its beak, which allows it to excrete salt absorbed from seawater. It is said that fulmars can live up to 50 years.



Seals

Seals are curious creatures. Sometimes they rest on a rock or an ice floe. There are various species, including harbour seals (above) and ringed, harp and bearded seals (right).





Walrus

The walrus is the largest seal species found. Bulls can weigh up to 2 tonnes. In the mid-twentieth century, walrus were almost completely wiped out because of their tusks, which are up to 1 metre long. The population is slowly recovering. This small colony lives near Richardlagna on Prins Karls Forland, a sheltered island in the far west of Svalbard. Walrus are good swimmers, even if they make a rather clumsy impression on land. They dive for mussels off the coast and suck them out with their powerful lips.







Threatening Gesture

Walruses are considered dangerous animals. When they raise their huge tusks, this can only be understood as a threat. The animals feel relatively safe in the open sea. Under no circumstances should you cut off their access to the sea on land.





Reindeer

Svalbard reindeer are somewhat smaller than their counterparts on the mainland. They are highly specialised for the harsh conditions that prevail on Svalbard during the winter months. During this time, they lose around a quarter of their body weight. Reindeer therefore wear a thick winter coat during the cold season, which they lose again in spring.







Antlers

Reindeer belong to the deer family. They are the only species in which the females also wear antlers. They develop their headdress between April and July. While the males usually lose their antlers at the beginning of winter, the females often keep them throughout the winter.



When Antlers Become a Risk

When the reindeer want to shed their antlers in autumn or try to free the new antlers from the velvet in spring, they often get caught on wires or fishing waste. If this prevents the animals from feeding, it often leads to their death.





Sparse Food

It is impressive how little food the large animals manage with. They use their hooves to expose the small tundra beneath the thin blanket of snow. They graze on the barely centimetre-high vegetation with a clattering sound. In autumn, the animals even eat goose droppings. The birds cannot fully digest the food in their stomachs, which is why their droppings still contain many nutrients. Perfect recycling!



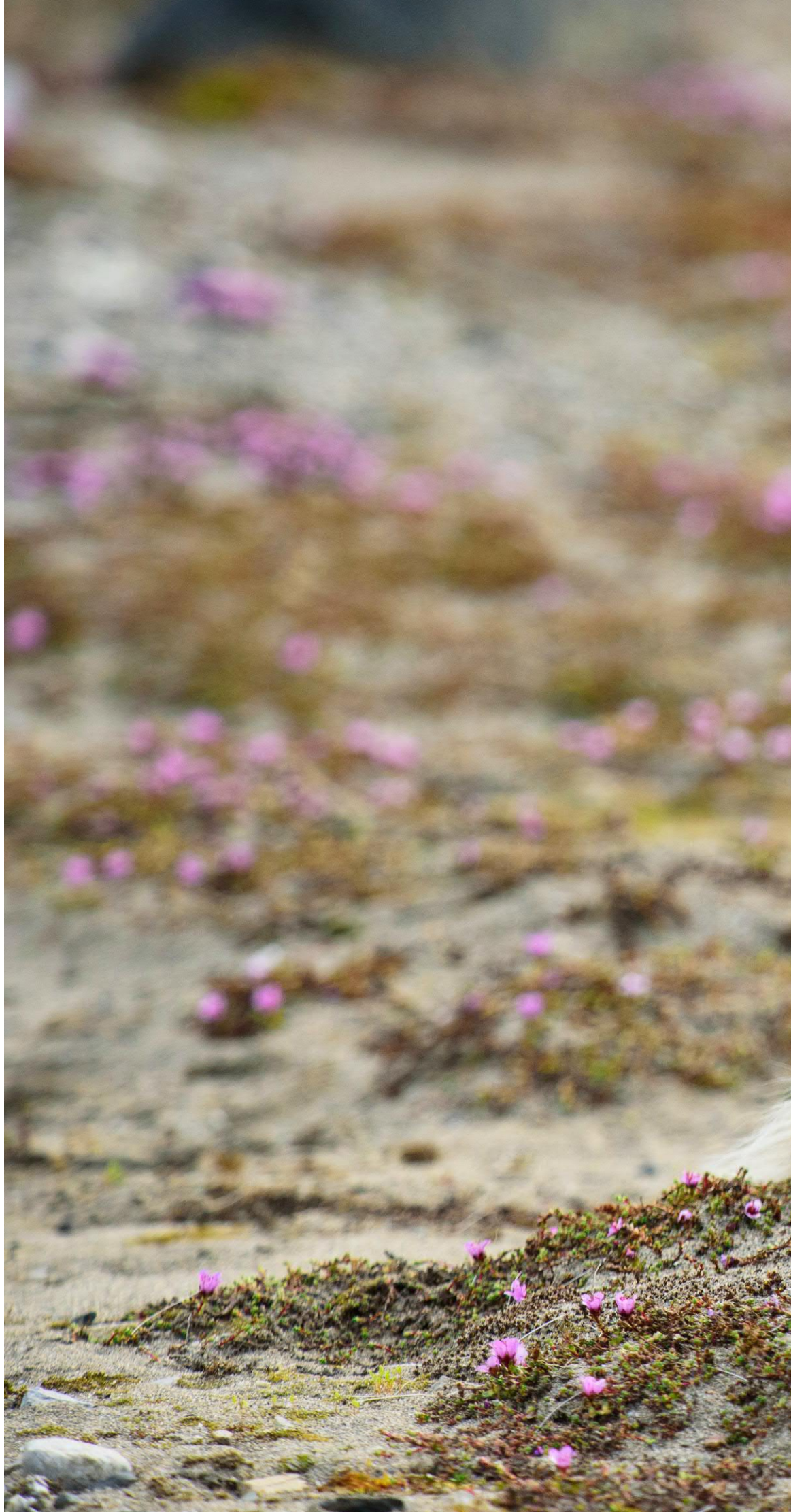
Arctic Fox in Summer

During the summer months, Arctic foxes show off their brown fur. While they are raising their young, they are particularly vigilant and do not tolerate any intruders.



In the Flower Garden

This Arctic fox has its den not far from the kittiwake colony. This means that food is not far away during the summer. After all, he also has to satisfy the hunger of his three young cubs and prepare them for the coming winter. It is the beginning of July and the flowering saxifrage has transformed the tundra into a sea of pink splashes of colour.





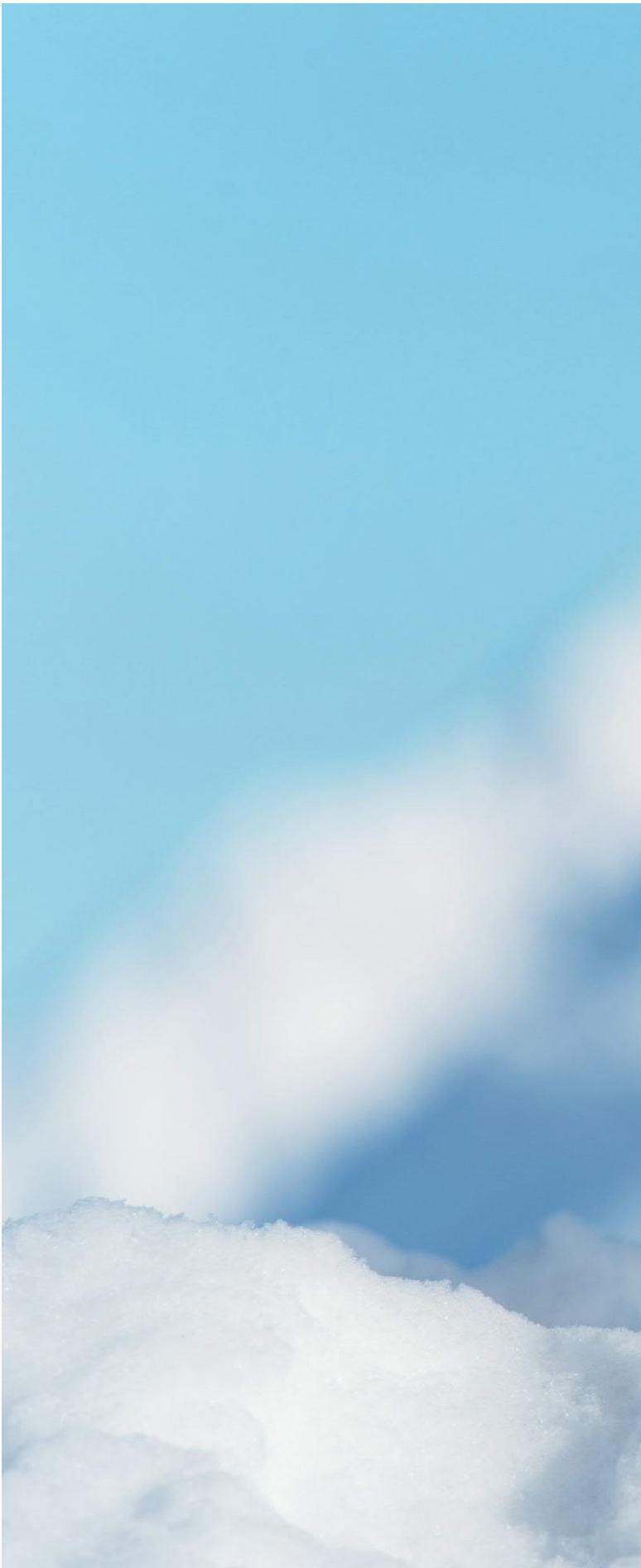




Arctic fox in Winter

When there is snow, this Arctic fox is well camouflaged thanks to its winter coat. Not all Arctic foxes wear a white coat throughout the winter: the rarer blue fox keeps a brown coat all year round.

The animal in these two photos lives under one of the wooden houses in the village and poses close to the canteen. Probably in the hope that a little leftover food will turn up from time to time.







Change of Coat

Arctic foxes change their fur in the late spring months. When the thick, white winter coat comes off and their underlying summer coat is revealed, they are particularly funny. The animals use their hind legs to try and remove the tufts of hair or relieve the itching.





Low Tide

This one-year-old young fox used the strong low tide of the spring tide to fill his belly on the beach with mussels and other delicacies from the sea. Now he is definitely no longer a cuddly toy – and he probably has bad breath too.



Polar Bear Alarm

Watching polar bears from a safe distance is a great experience. If there are bears in the vicinity of the village, the guard is called out to keep an eye on the animals. Word about the visitors quickly spreads. Sometimes the roof of the station has to be used as an observation platform - after all, nobody wants to miss out on an opportunity like this.

Unless there is danger, the bears are not prevented from doing what they do. It is their habitat that humans have invaded.







Ruler of the Arctic

The polar bear is the undisputed ruler of Svalbard. There are said to be around 2000 animals across the entire archipelago. The animals suffer from the fact that the polar ice is receding year by year. As a result, they can no longer reach the birthing grounds of the seals on which they mainly feed. Sometimes they raid birds' nests instead to satisfy their hunger. They can also feed on a walrus carcass for several weeks. Males like this one weigh 300-700kg. Females weigh around half as much at 150-350kg. Their young are born during the winter months.







The Polar Night
Polar Night



When the sun sets again for the first time after the short summer and the geese say goodbye to the south at the end of August, autumn is unmistakably imminent. This means that the time of extremely long days is numbered. If the weather cooperates, the month of beautiful sunsets follows until the sun appears in the village for the last time on 5-6 October. The change to the polar night then takes place within two and a half weeks: From 24 October to 19 February, the sun remains permanently below the horizon.

The village is illuminated throughout the winter. Like a fortress, it defies the blackness of the polar night. But the night also has many beautiful things to offer: Snow drifts, the wind whistling around the houses, a ptarmigan ploughing its way through the fresh snow, ice flowers on the windows, a snow crystal on the doorstep or, on clear nights, the northern



starry sky that hardly seems to change. The most marvellous thing is definitely the northern lights, which sometimes dance in the sky in good weather. Silent and unpredictable. Sometimes restless and rapidly changing, they flit high across the firmament. Then again they linger almost motionless on the horizon. They are usually green, more rarely reddish to violet in colour. However, the colour is often only revealed in the photos taken by the camera.



As darkness falls, the time for long tours is over. The focus is now on the village and free time is used for knitting, cinema evenings, game nights or billiards. Those who don't go out with the dogs spend their time playing floorball. It is no coincidence that all Scandinavian countries attach particular importance to the Christmas period. Throughout December, there are more and more get-togethers where, among other things, Christmas decorations are made. Winter is the time to find peace and quiet. The num-

ber of station guests decreases, work is generally less, the stress of leisure time decreases. "You can sleep in winter" was the saying when someone pretended to have no energy left for an evening tour in summer. Now that time has come.



For the AWIPEV station engineer, however, winter does not necessarily mean less work: a large part of the daily routine remains, as the measuring instruments in the observatory also run throughout the winter. Although most of the work at the outdoor stations is cancelled, certain measuring devices struggle with the cold, the storm has tangled ropes or a curious reindeer has ripped out a cable with its antlers: The necessary service work therefore tends to increase. It is only a few steps outside the village that you realise how much the land is shrouded in darkness and how little you can see in the focused light of the headlamp.



Little by little, the light returns in January. At first, there is only enough light for an hour or two at midday, but then the lighter periods become longer and longer. The surroundings are bathed in a deep blue colour, only surpassed by the blue of fresh glacier ice. Then, finally, at the end of February, the red mountain peaks indicate that it can't be long before the sun rises and the circle of the year slowly closes.



You wouldn't want to miss any of these seasons. They belong together. The sunlight that comes and goes, the birds that fly away and arrive again for the breeding season, the scientists who appear in the new year with great vigour and passion for the measurement campaigns and leave the place again wistfully: they are like a clock, guiding you through the year and keeping Ny-Ålesund alive.

Evening Glow

This is what the view from Ny-Ålesund towards the mountains on the opposite side of the fjord can look like in mid-September: Skreifjellet, Feiringfjellet, Merraskallen and Conwaybreen.







Twilight over Ny-Ålesund

The change between polar day and polar night occurs relatively quickly at high latitudes. The polar day lasts until 27 August, when the sun sinks below the horizon for the first time at night. Equinox is just one month later on 23

September. Another month later, on 24 October, the polar night begins. The picture was taken on 5 October, the day on which the sun illuminated the houses in the village for the last time.







Christmas Tradition

Christmas falls at the height of the dark season. It is very important to all Scandinavians and also has a firm place in Ny-Ålesund. The locals always get together during the run-up to Christmas, whether to create Christmas decorations or bake gingerbread houses. Jianjun Liu shows his Chinese interpretation of Norwegian gingerbread houses, while Per Erik Hanewold prepares the traditional gingerbread village.





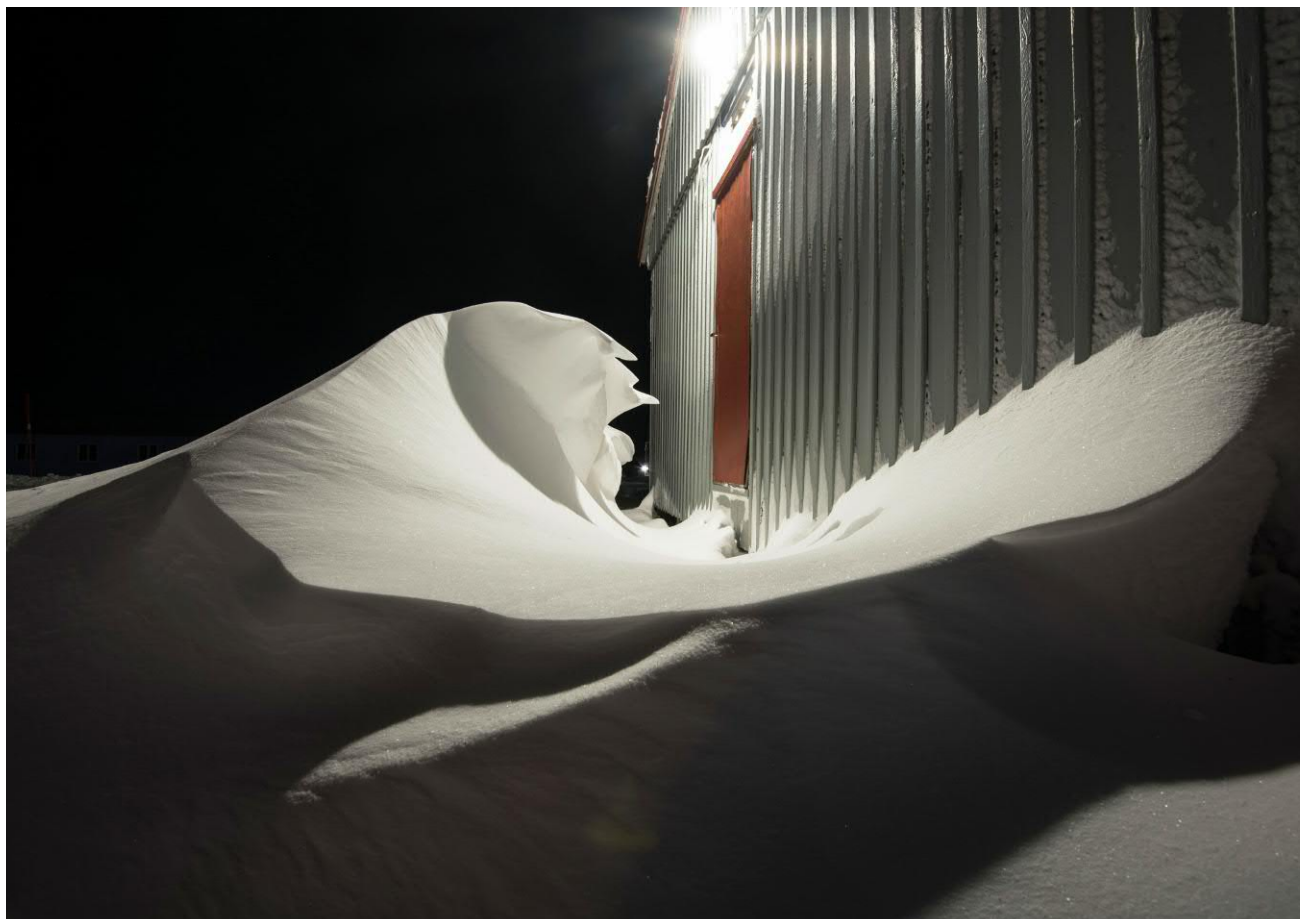
Karverket

The Karverket facility also runs its measurement programme during the winter months. The lights of the large radio antenna and the neighbouring airfield are an exciting photo motif during storms and in the dark.



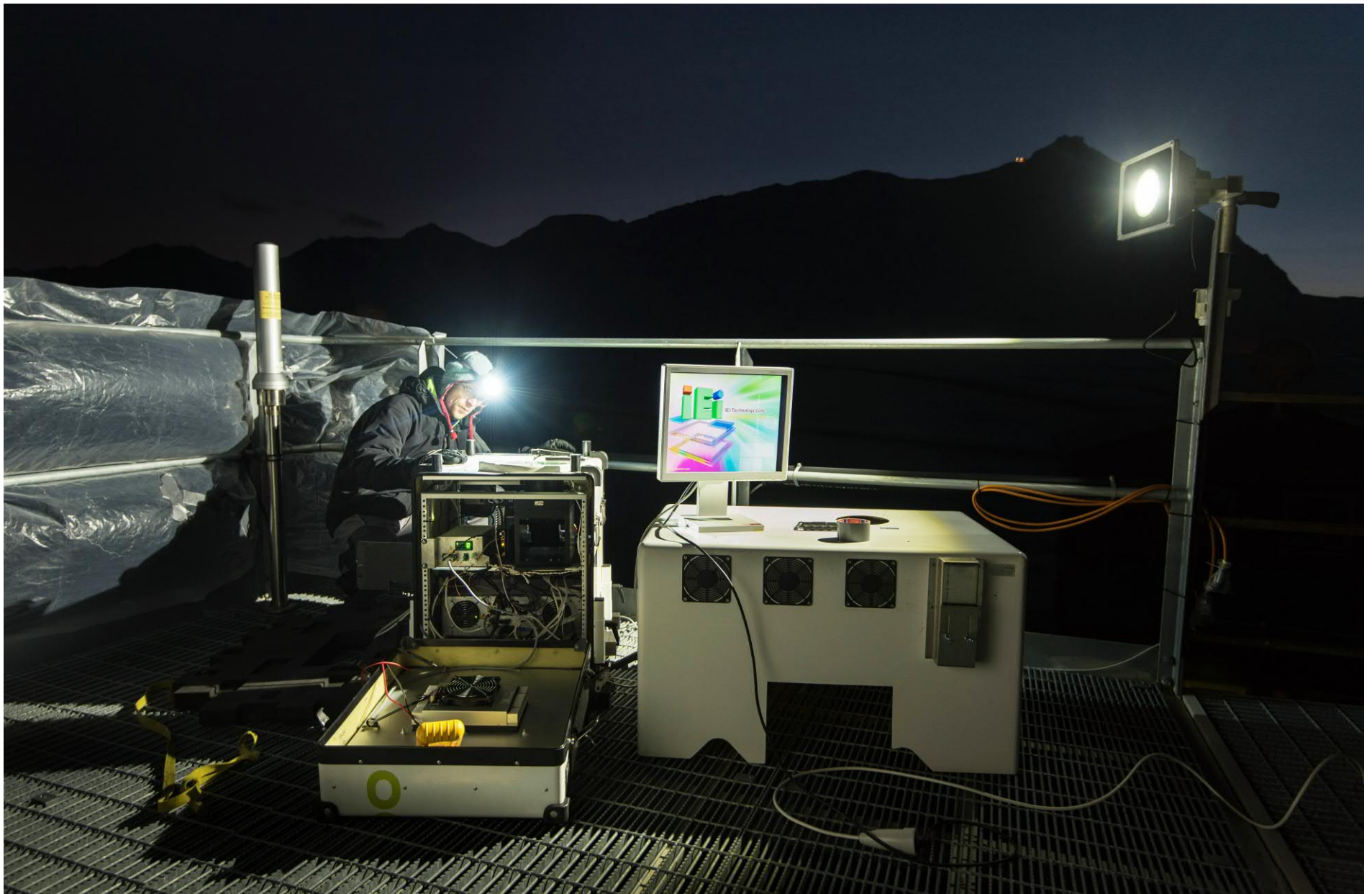
Winter Storm

Powerful storms are nothing unusual, especially in the darker months of the year. The winds drive the little snow around, everything is shrouded in diffuse light. After the storm has subsided, bizarre snow drifts remain.



Repair

The windlidar on the roof platform no longer starts, the computer has to be removed for repair. It is not easy to keep the many devices permanently running in the wind, cold and wet. Time and again, the engineer has to check that everything is working properly when no more measurement data arrives on the control monitor or in the databases on the mainland. If the drift has only caused a short circuit at the socket, a restart may be sufficient. But sometimes minor repairs are also necessary, as with this instrument here.





Relaxing

You rarely get out of the village during the winter months of December and January. Unless there is a full moon in the sky, the only sources of light are candles, the flickering glow of the warming fire in the stove and a head torch. Is there anything more relaxing than being centred on yourself in a cabin like with Åshild Rye or Espen Blix? The nearby cabins Gåsebu, Nilsebu, Antonsverket, Brandal or Tyskahytta are therefore also popular weekend excursion destinations in winter.

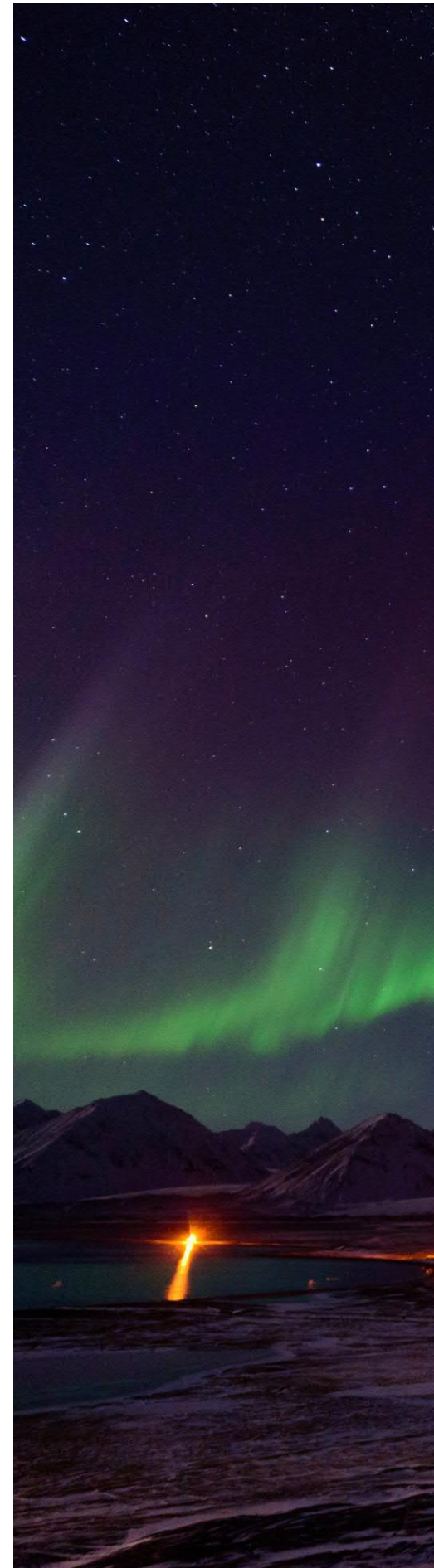






Northern Lights

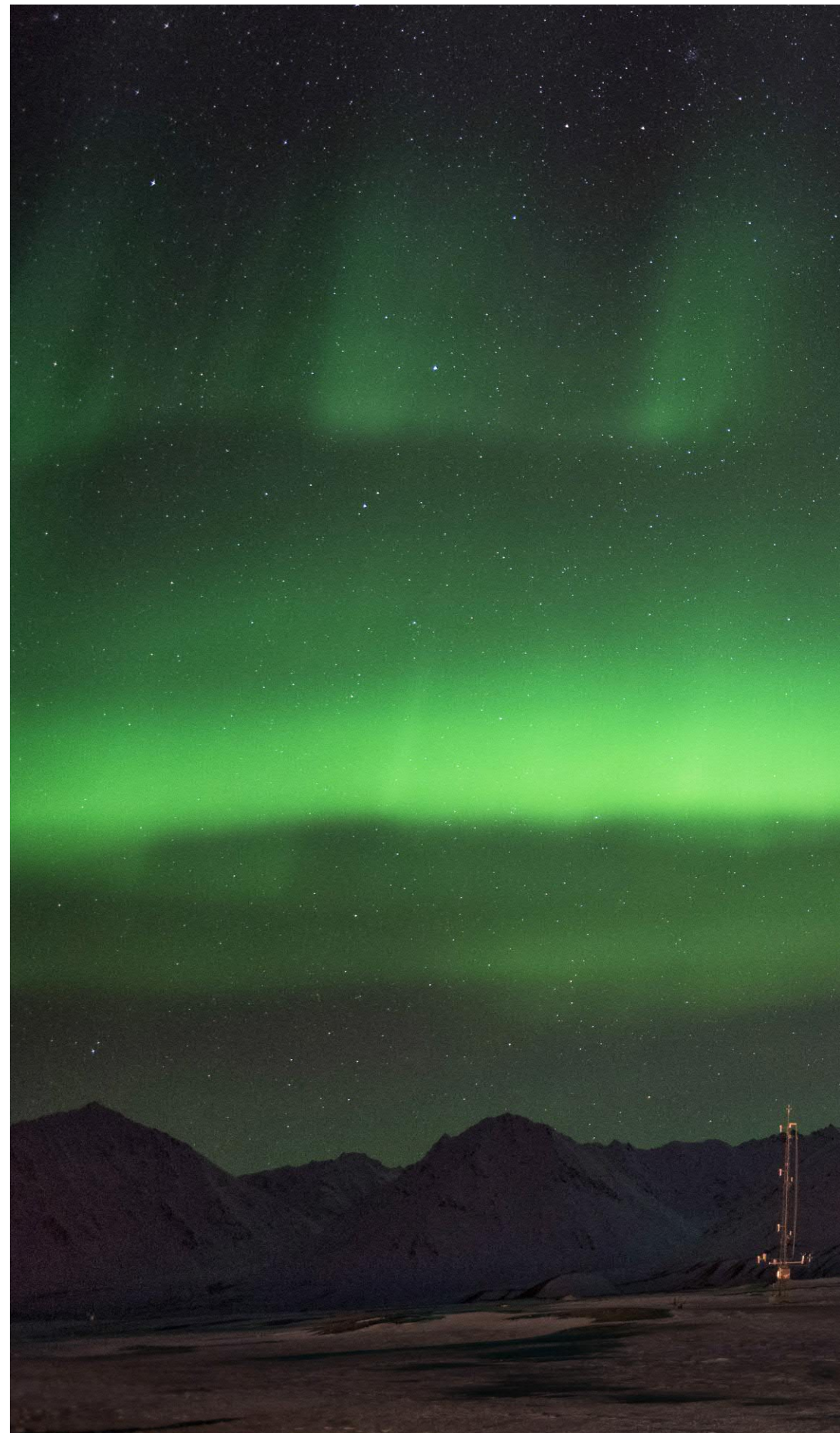
As solar wind, charged particles stream incessantly from our home star into space, including towards Earth, where they arrive after around 1-2 days. Most of them are deflected by the Earth's magnetic field, which is influenced by the solar wind. During strong solar flares, however, the stream of particles can reach the uppermost layers of the atmosphere in a narrow, oval-shaped area. These auroral ovals are located around 65 to 70 degrees latitude. This means that Svalbard is actually too far north to be considered an ideal observation location. Nevertheless, there are often opportunities to see auroras in the winter months. Sometimes the green laser light of the lidar is also present.





Green Curtains

Northern lights are probably the most beautiful thing that the night in the far north has to offer. The lights are often green, but they can also take on other colours depending on the intensity of the solar storm. Green light is produced when electrons at an altitude of 110-250 kilometres excite oxygen atoms to glow. Red lights are triggered in the same way at even higher altitudes. Blue-violet to whitish light is emitted when particularly high-energy electrons penetrate to lower air layers between 80km and 100km altitude and encounter nitrogen atoms there.











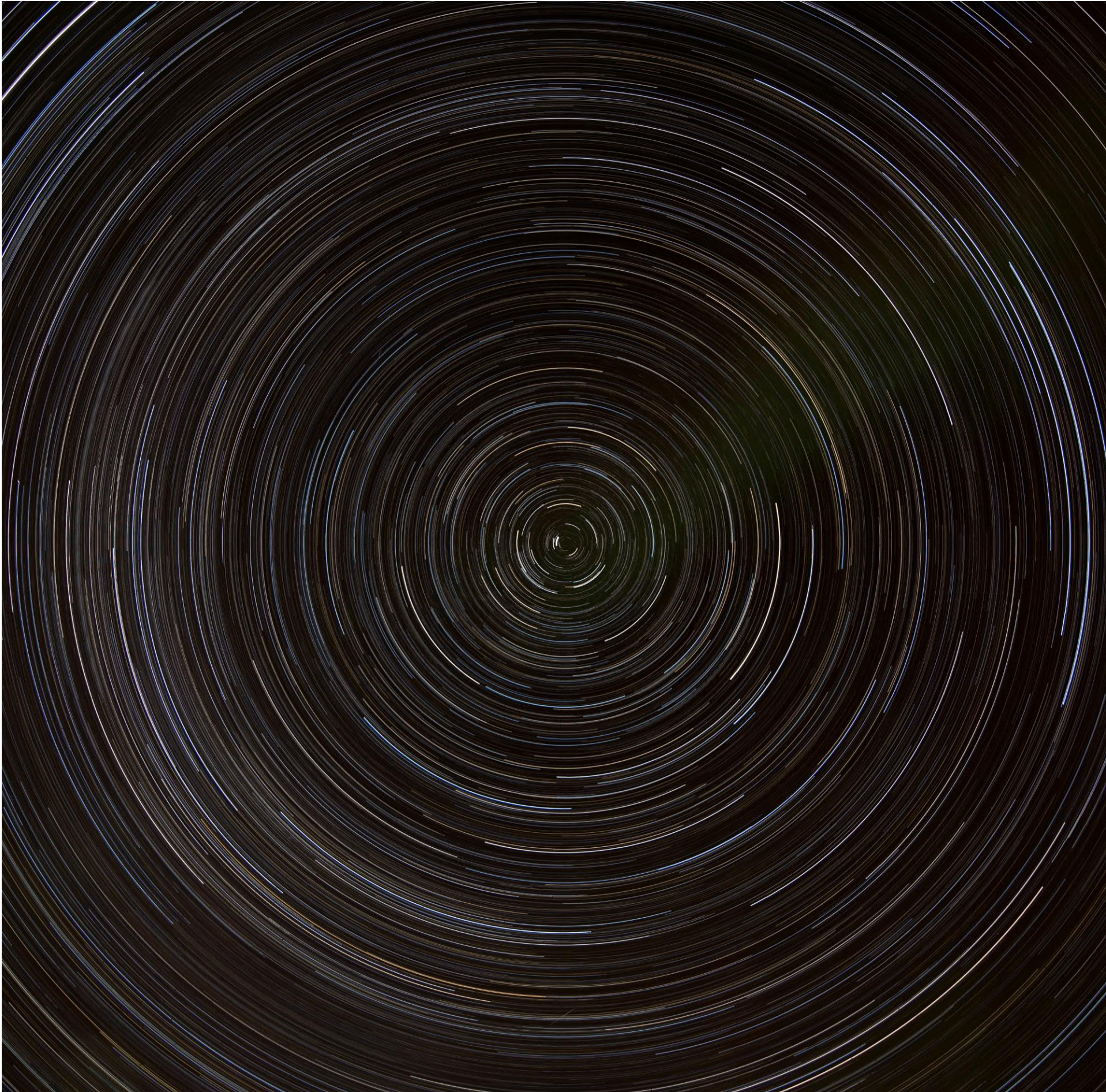
Play of Colours

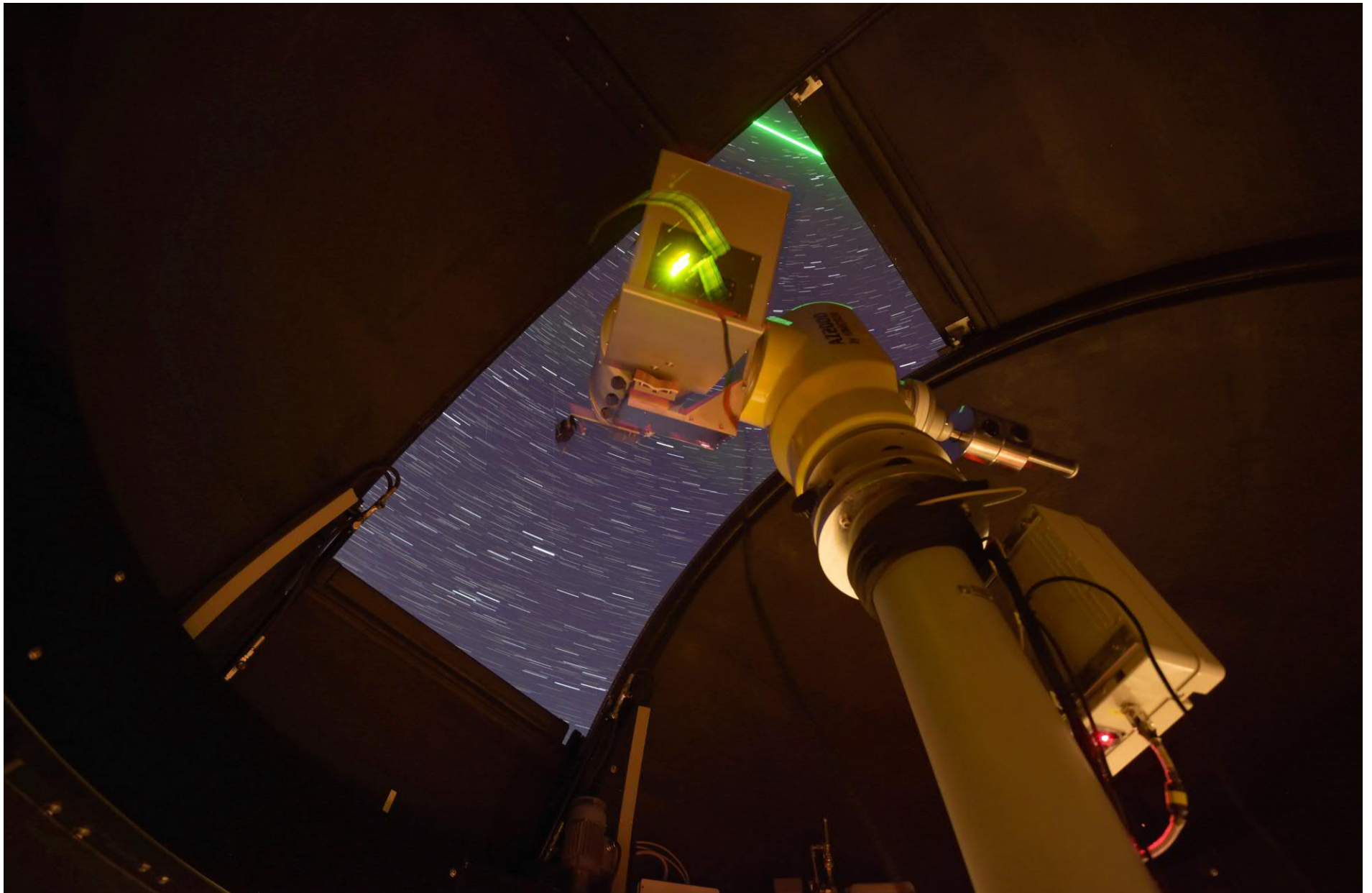
When deep auroras mix with the dawn on the horizon, a kaleidoscope of unusual colours appears in the sky. Due to the long exposure time, the stars have left long trails in this long exposure.



Nocturnal Illumination

The lights never go out in Ny-Ålesund during the polar night. In addition to the street lighting, the bright yellow and red lights of the airstrip, which line up diagonally, are particularly striking. On a clear night, these are joined by the many stars, which are only really visible outside the town because of the strong lights in Ny-Ålesund.





Everything is Revolving

The firmament seems to revolve inexorably around the North Star. Here, at 79 degrees latitude, it is particularly high in the sky. Meanwhile, the star spectrometer automatically measures the light intensity and spectra of the brightest stars. This enables statements to be made about the absorption capacity of the atmosphere, even during the polar night. The data is sent to Potsdam, where it is analysed by Siegrid Debatin, aka Siggie, who has been lovingly looking after the AWIPEV station team for years.







Sunset glow at Noon

At the end of December, the sun is still 12 degrees below the horizon at midday, so nautical twilight has not yet set in. The pale red colour, which can be seen on rare days, is only due to multiple reflections of the sunlight on high stratospheric ice clouds.





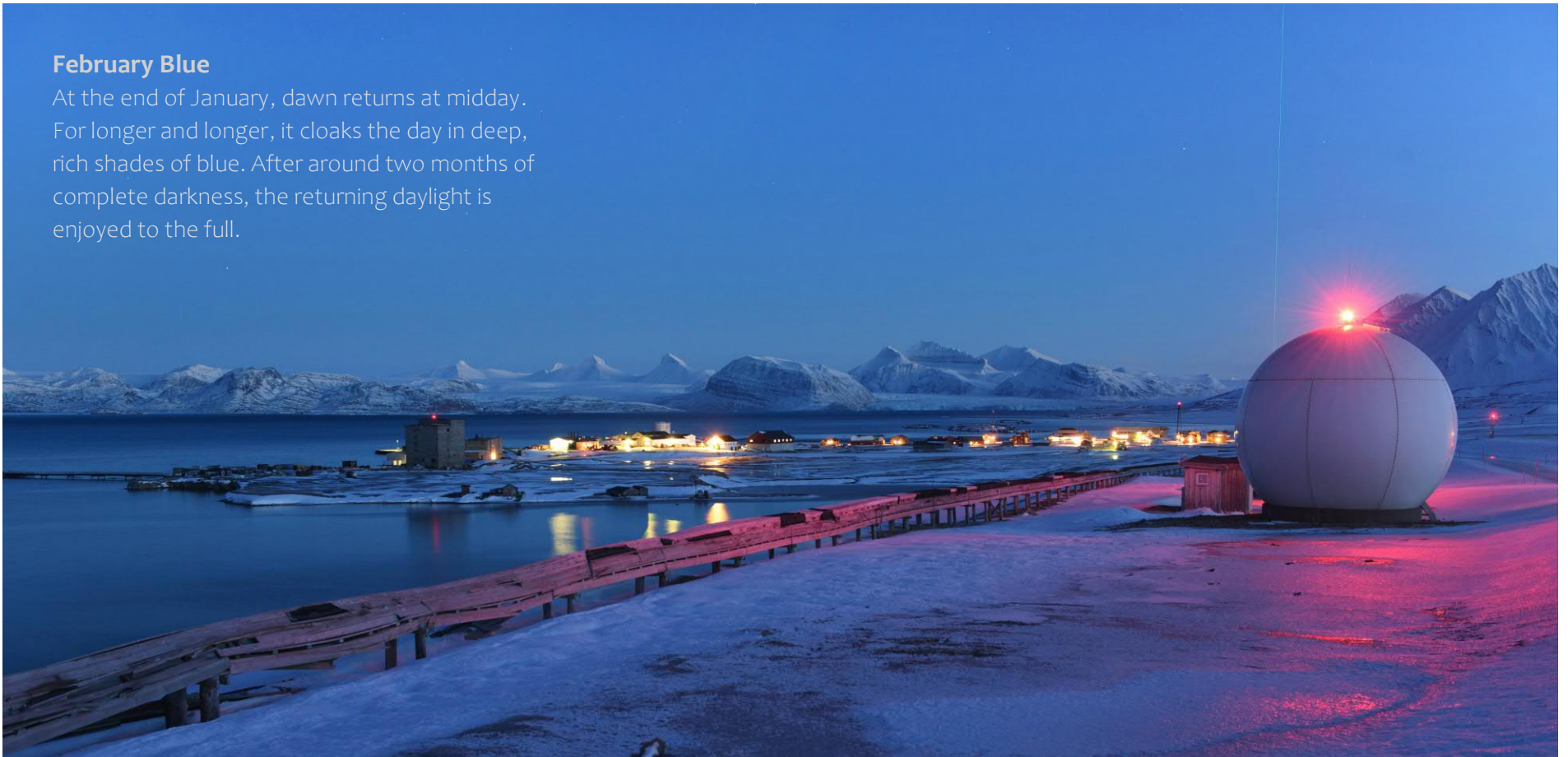
Full Moon Nights

While the sun always remains below the horizon in the polar winter, the full moon appears in the sky for a few days without setting. This means that the full moon nights offer a window of opportunity to go outside and visit the nearby huts even during the dark season.



February Blue

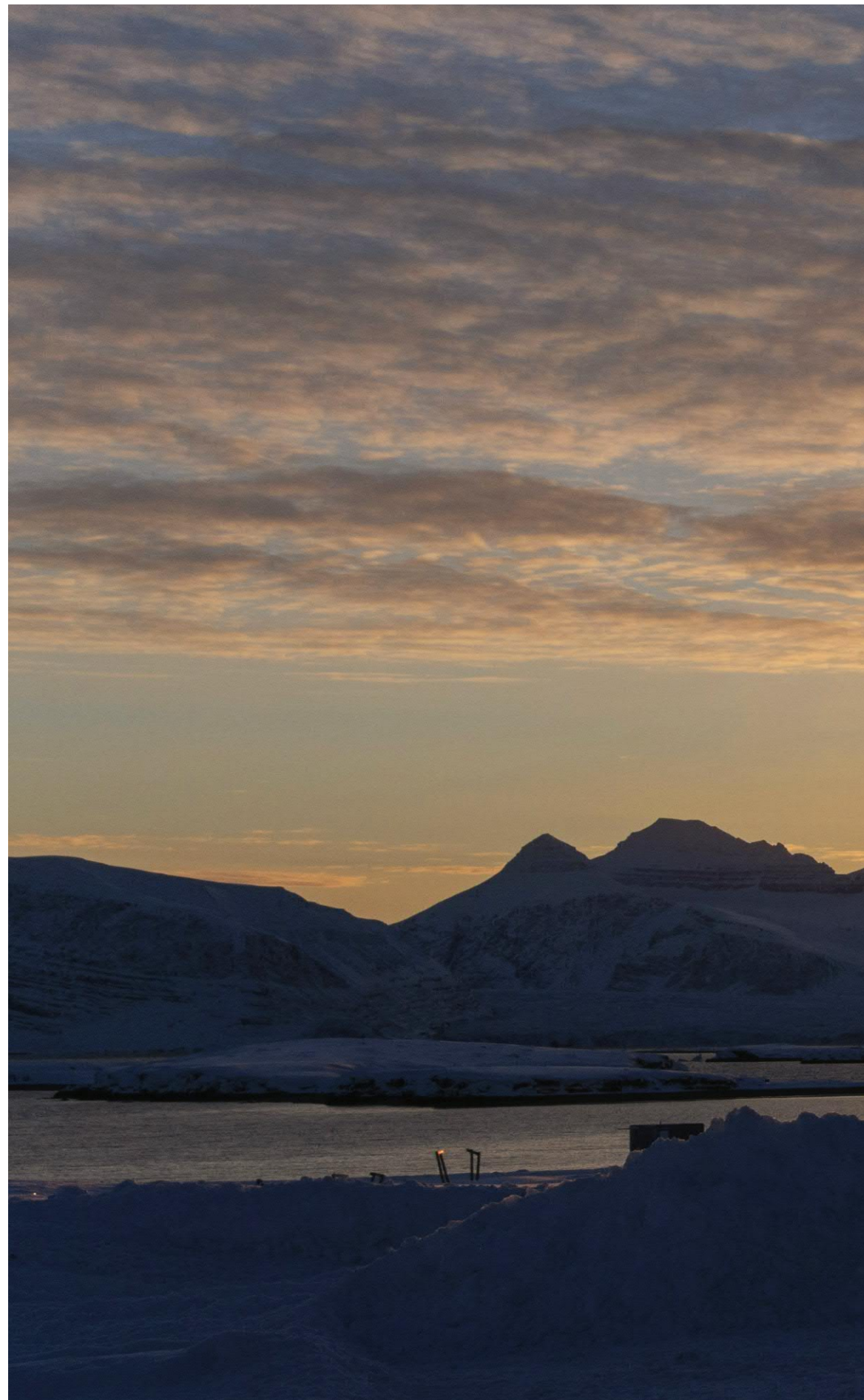
At the end of January, dawn returns at midday. For longer and longer, it cloaks the day in deep, rich shades of blue. After around two months of complete darkness, the returning daylight is enjoyed to the full.





The End of the Polar Night

Officially, the polar night ends on 19 February, when the sun illuminates the surrounding mountain peaks for the first time at midday. However, it is not until 8 March that the sun shines through the narrow gap of Kongsvegpasset into the village again for a few minutes, an event that is celebrated accordingly after the long period of darkness. The change happens quickly: after two and a half weeks, the sun is already shining for twelve hours and by the end of April it will be shining for a full 24 hours a day.





Acknowledgment

This photo book would not have been possible without the many helpful people. First and foremost, thanks are due to the many kind visitors and residents of Ny-Ålesund who have welcomed me, taken me on tours or accompanied me on such tours. Many thanks for the warm welcome, loyalty and tolerance when the camera was all too often with me. Many thanks to my team colleague Kathrin Lang and my team colleague Thomas Ribeaud as well as the previous and subsequent AWIPEV wintering team. We had many great experiences together and the collaboration was very constructive. It was hard to say goodbye – I still miss you.

I would also like to thank all the staff at AWI, IPEV and the Norwegian Kings Bay AS, without whom the stay at this location would not have been possible. They take care of the logistics and make the research and work at this remote location possible. Thanks to the many technicians from IMPRES and other institutes for their active support. Thanks are due to my long-time partner Sarah Huber, who visited me at the station for two weeks each in spring and autumn. She had to endure the time spent designing the book.



The Author

René Bürgi, born in 1975 in Gachnang, Switzerland, loves snow, ice and the barren nature. He enjoys travelling in the mountains in his free time. René came to this position through a job advert from the Alfred Wegener Institute for Polar and Marine Research. He acquired the necessary technical knowledge as a physics student, measurement engineer at Rieter Maschinenfabrik AG and as a student and employee in the optics department at the Zurich University of Applied Sciences in Winterthur. René mainly takes photographs in the mountains and when travelling, where his camera is a faithful companion. These photos were mostly taken with a Nikon D750, but some were also taken with Canon compact cameras. René now lives in Bern with his partner Sarah.





Picture Credits

Sarah Huber: S. 4, 168

Sina Löschke, AWI: S. 4

Steven Franke: S. 7

Sigvald Moa, Kings Bay Kull Company: S. 10

Norwegische Nationalbibliothek: S. 10

Verena Mohaupt/Thomas Dupeyron: S. 75

Martin Künsting, AWI: S. 104

Jürgen Gräser, AWI: S. 108

Shade Barka Martins, Kings Bay AS: S. 154

Ingrid: S. 218

Kristian Bårseth: S. 382

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Kyrre Reymert, Ny-Ålesund - the world's northernmost mining town (2016). ISBN 978-82-91850-45-0

H. M. Ingebrigtsen, H. M. Midtun, S. Spjelkavik, Longyear Flora - a basic field guide (2010). ISBN 978-82-93009-04-7

Kit M. Kovacs & Chr. Lydersen, Birds and Mammals of Svalbard (2006). ISBN 978-82-7666-231-3

Winfried K. Dallmann, Geoscience Atlas of Svalbard (2015). ISBN 978-82-7666-312-9

Norwegian Centre for Climate Services (NCCS), Climate in Svalbard 2100 (1/2019)

Off to the Arctic for a year! What initially sounds like a dream becomes reality for René. For 15 months, he has swapped his familiar surroundings in north-east Switzerland for a temporary position on Spitsbergen. As part of a team of three, he looks after the observatory of the German-French research station AWIPEV in the small settlement of Ny-Ålesund. This illustrated book gives an impression of life and work in this remote, harsh, but also incredibly beautiful place far beyond the Arctic Circle.

