

ANTARKTISSEMINARET 2024



Framsentret, Tromsø, 7.-8. mai 2024

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Tittel	Subglacial lake activity beneath the East Antarctic Ice Sheet in coastal Dronning Maud Land from ICESat-2 laser altimetry
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Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

Active subglacial lakes beneath the Antarctic Ice Sheet influence ice-sheet dynamics and mass balance by potentially draining large volumes of water, lubricating the bed and facilitating fast ice flow. To date, no active subglacial lakes have been recorded north of 73°S beneath the Antarctic Ice Sheet in Dronning Maud Land, meaning understanding of subglacial hydrology dynamics remains lacking in this region. Here, we analyse 5 years of laser altimetry data from the ICESat-2 satellite and 7 years of data from the ICESat-1 satellite to investigate potential subglacial lake activity in the coastal Dronning Maud Land region of East Antarctica. Multi-temporal REMA strips and ICESat-1 data were used to extend the time series of lake drainage activity from 2003-2023. We identify seven new subglacial lakes up to ~40 km² which actively fill and drain over periods of 1-3 years and are linked to channelized subglacial drainage that routes meltwater towards the grounding line. Our results provide improved knowledge of subglacial meltwater dynamics and evolution in this region of East Antarctica and provide new observational data to refine subglacial hydrological models.

Tittel	Toward identifying Antarctic petrel (<i>Thalassoica antarctica</i>) population differentiation
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Medforfattere (navn og institusjon)	Andrea Elvheim (University of Tromsø), Dr. Shripathi Bhat (University of Tromsø), Dr. Kim Praebel (University of Tromsø), Dr. Sébastien Descamps (Norwegian Polar Institute), Dr. Heather Lynch (Stony Brook University), and Dr. Arnaud Tarroux (NINA)
Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input type="checkbox"/> Annet (poster)

Antarctic Southern Ocean ecosystems are expected to be strongly affected by climate change in the coming decade, and Antarctic petrels are well-suited for use as indicators of the ecosystems' changing state. They are in fact one of the indicator species used in the Commission for the Conservation of Antarctic Marine Living Resources' (CCAMLR) Ecosystem Monitoring Program. With an estimated total abundance of 10-20 million individuals, the Antarctic petrel is believed to be among the most numerous of Southern Ocean seabird species, and one of the few to span the entirety of the Antarctic. Already, recent declines in the species' reproductive success (by more than 50% in some areas over the past 30 years) are hypothesized to stem from climate change. Understanding these declines, however, requires a clearer picture of the Antarctic petrel's large-scale population structure. To begin to assess whether Antarctic petrels are a single population spanning the entirety of Antarctica or if migration barriers create separate breeding populations, we have developed a reference genome for a female and a male Antarctic petrel and compared samples collected from two nesting sites located ca. 100 km apart in Dronning Maud Land (DML). To understand whether DML individuals stem from the same genetic population, differences in the specimens' genetic sequences were identified with the Genome Analysis Toolkit pipeline. The differences have been compared using a combination of statistical tests, including Bayesian analysis and AMOVA. DML Antarctic petrels' genomic history has been characterized by estimating effective population size over time via MiSTI (Migration and Split Time Inference) and analyzing inbreeding and heterozygosity-fitness correlations with inbreedR in R Package for Statistical Computing. Understanding the Antarctic petrel's population structure has direct implications for the species' conservation management— population structure is a prerequisite for the Scientific Committee on Antarctic Research and CCAMLR to define conservation units for this species and incorporate them into the design of protected areas— and our understanding of the impacts of large-scale climate change across the Antarctic Southern Ocean.

Tittel	Viewing the glacial Southern Ocean biological pump from above: new insight from the novel snow petrel stomach oil deposit
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Ønsket presentasjonsform (muntlig, poster)	Muntlig.
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input type="checkbox"/> Annet (poster)

Biological and physical processes occurring within the Antarctic coastal sea ice zone are important for the global carbon cycle and Southern Ocean ecosystems. Today this is an area of large air-sea gas exchange and a high primary productivity, however due to few areas of preserved marine sediments in the coastal Antarctica, how these regions reacted and acted during the last glacial-interglacial transition is poorly understood. Here we present a centennial to millennial resolved summer record of organic carbon ($\delta^{13}\text{C}_{\text{org}}$) and nitrogen ($\delta^{15}\text{N}_{\text{org}}$) stable isotopes from a novel snow petrel stomach oil deposit spanning the last 40 ka, allowing us to disentangle the environmental driving forces behind the coastal biological pump. We report a highly coupled $\delta^{13}\text{C}_{\text{org}}$ and $\delta^{15}\text{N}_{\text{org}}$ variability up until the Last Glacial Maximum, controlled by the upwelling of carbon and nitrate rich Circumpolar Deep Water. During the last deglaciation there is 5000-yr interval where $\delta^{13}\text{C}_{\text{org}}$ and $\delta^{15}\text{N}_{\text{org}}$ become decoupled. The $\delta^{13}\text{C}_{\text{org}}$ decline (2.5 ‰) during Heinrich Stadial 1, is in line with records of Dissolved Inorganic Carbon $\delta^{13}\text{C}$, Southern Ocean circulation changes and global atmospheric CO_2 . While $\delta^{15}\text{N}_{\text{org}}$ decline (4‰) in line with Southern Ocean winter sea ice extent, indicating that coastal nitrogen cycle is sensitive to a stratified surface ocean. The presence of continuously accumulated stomach oil deposits over the last 40 ka suggests open water was continuously present during summer South of 65°S pre, during and after the Last Glacial Maximum. The close correlation of $\delta^{13}\text{C}_{\text{org}}$ and $\delta^{15}\text{N}_{\text{org}}$ to Sub-Antarctic surface marine records strongly indicates that these regions were dynamically linked to the surface Sub-Antarctic through Circumpolar Deep Water and not isolated oasis' as previously assumed. Our data has large implications for how we view the glacial high latitudes, as well as modelling of air-sea gas exchange and global carbon cycle over glacial-interglacial time scales.

Tittel	Which organic compounds can we see in Antarctica? Nontarget analysis of air and water samples from Antarctica by high-resolution mass spectrometry.
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Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

Among other activities, NILU is starting to apply nontarget chemical analysis in different sample matrices from Antarctica. This presentation will show some results of chemical analysis of particulate matter (PM10) collected at the Troll sampling station as well as describing a recent project in collaboration with Griffith University and The University of Queensland (aiming at identifying organic compounds in water and air samples from different places in Antarctica). The PM10 samples showed a clear difference between samples collected in summer and samples collected in winter indicating the high impact atmospheric conditions can have on the fate of primary organic aerosols and the formation of secondary aerosols. High-resolution instruments allowed us to go beyond suspect screening and library search with rigorous workflows to assign molecular formula and predict the molecular structure of unknowns. As a new researcher at NILU my involvement in these projects shows the willingness of the institute to conduct new and innovative research projects in Antarctica. Potential application and limitations of nontarget chemical analysis in Antarctica will be discussed.

Tittel	Troll station: on the equatorward side of the auroral oval
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Ønsket presentasjonsform (muntlig, poster)	Oral presentation (muntlig)
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input type="checkbox"/> Annet (poster)

Space weather has an increasing impact on our lives, affecting the positioning accuracy of Global Navigation Satellite Systems (GNSS), as well as the navigation and communication of ships and aircraft especially in high-latitude regions. Physical processes in the polar regions, as well as the variability of ionospheric plasma, are strongly related to complex coupling between the ionosphere and the magnetosphere. Various physical processes lead to the formation of irregularities in the plasma that can lead to degradation or even complete loss of the radio signal. The Norwegian Research station Troll in Queen Maud Land, Antarctica has a ground-based GNSS Ionospheric Scintillation and TEC Monitor (GISTM) installed in December 2017. This instrument tracks signals from GNSS (such as GPS, GLONASS, and GALILEO). The phase and amplitude measurements provide information about the environment along the signal path from the satellite to the receiver on the ground. It allows us to infer the state of the ionosphere and to study the dynamics of the ionosphere. The data from the collocated all-sky camera allows us to study the impact of particle precipitation on the formation of small-scale plasma structures during auroral events. The peculiarity of the station's location on the equatorward side of the quiet auroral oval sheds light on the understanding of physics in this region and gives more insight into space weather effects in the southern hemisphere.

Tittel	How analysing icequakes can lead to a better understanding of glaciers
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Ønsket presentasjonsform (muntlig, poster)	muntlig
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

In 2012, a broadband seismological station was installed at Troll. The station records amongst others icequakes, i.e. signals that are related to glacial processes. Using only three representative icequakes as templates, we ran a correlation detector over the 12 years of continuous recordings at Troll and detected several thousands of events. The statistical analysis of these detections shows a seasonal pattern of the seismic activity, with some icequakes being mainly recorded in winter while others are predominant in summer. Moreover, the correlation with other data reveals that these icequakes are almost exclusively recorded at night when the temperature drops. With a single station, the icequakes cannot be precisely located, although their direction can be estimated. The installation of nine new stations in a seismic array during the next austral summer will allow for a much more detailed analysis of the icequake activity, which could in turn contribute to get an improved knowledge of the motion of surrounding glaciers.

Tittel	Elev av trolltransekten – 4 år av læring
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Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

The polar Southern Ocean (waters south of 50°S) accounts for approximately 25% of global oceanic uptake of atmospheric carbon dioxide, despite representing only 10% of total ocean surface area. The disproportionate influx of atmospheric carbon dioxide into the Southern Ocean is in part facilitated by the biological pump, which is driven by photosynthetic microorganisms. Photosynthetic microorganisms in the Southern Ocean are broadly categorized as two phenological types: i) phytoplankton, which live in pelagic environments; ii) and sympagic (ice-associated) sea ice algae, which thrive at the bottom of sea ice and within its liquid brine inclusions. Using data from all four years of the Norwegian Polar Institute's annual Trolltransekt monitoring program, I will present results which aim to characterize the biogeochemical growth conditions for photosynthetic microorganisms in the King Haakon VII Sea. The first two years of these data are being used in my master's thesis (to be completed May 2024), with a manuscript using data from the 2020-21 cruise currently in review for publication. Following completion of my master's, I intend to pursue a PhD in Tromsø and continue working with projects such as I-CRYME and IC3, in addition to the Trolltransekt program, to further my understanding of biogeochemistry and primary production in the Southern Ocean.

Tittel	Sea ice reconstructions using paleogenomics: progress in the Arctic and Antarctic
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Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

Climate change is affecting the Polar regions faster than the rest of the globe. A consequence of this is shifts in components of the Earth system, including sea ice extent and thickness. A rapid reduction in sea ice has been observed over the last decades for the Arctic, and in recent years the Antarctic has seen the lowest maximum recorded sea ice. Such changes will influence the organisms that live in, on and around the sea ice.

Better knowledge on organisms that are associated with certain environmental conditions can be used as biological proxies to reconstruct past climate conditions. Sedimentary ancient DNA (aDNA) is a novel biological proxy which provides information on the genetic biodiversity preserved in marine sediments. By using single-species quantitative DNA detection methods, which target specific phytoplankton taxa with known ecological niches (e.g., the sea-ice-associated *Polarella glacialis*), we can extract information about the distribution of specific organisms in modern sediments. When combined with aDNA from sediment cores, we can reconstruct past climatic and ocean conditions. In modern Arctic surface sediments *P. glacialis* shows a strong association to regions with seasonal sea ice. In a sediment core from the Yermak Plateau in the Arctic Ocean, *P. glacialis* is detected back to ~34 000 years, and its abundance by digital droplet PCR is associated with other sea ice proxies (e.g., IP₂₅). Demonstrating the use of quantitative DNA methods as a valid sea-ice proxy. Preliminary data from the Weddell Sea shows potential for this approach in Antarctica.

While we currently focus on sea ice reconstruction, using our growing number of genetic proxies this will allow a wider array of environmental conditions to be demonstrated (i.e., warming and sea ice-ice shelf variability in the Antarctic and Atlantification in the Arctic).

Tittel	Regional Ocean Responses to Coordinated Multi-Model Meltwater Perturbation Experiments: Insights from the SOFIA Initiative
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Medforfattere (navn og institusjon)	Tore Hattermann, Norsk Polarinstitut
Ønsket presentasjonsform (muntlig, poster)	muntlig
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

The increase in meltwater release from the Antarctic ice sheet and ice shelves, driven by climate change, can significantly impact ocean circulation and global climate dynamics. However, the key processes driving this melt and the coupling between ice sheet models and ocean models are inadequately represented in state-of-the-art earth system models participating in the Coupled Model Intercomparison Project phase 6 (CMIP6). Prior modeling efforts, which imposed input of Antarctic meltwater, have shown regional impacts on Southern Ocean stratification, circulation patterns, sea ice dynamics, and remote changes in atmospheric circulation and global temperature. However, these studies have utilized widely varying rates of freshwater forcing, employed different models and configurations, and have arrived at divergent conclusions regarding the magnitude of meltwater-climate feedbacks. In this study, we present findings from a new coordinated initiative known as "The Southern Ocean Freshwater Input from Antarctica" (SOFIA), which consists of a multi-model ensemble of CMIP6 models perturbed with a consistent meltwater addition. The addition of meltwater leads to enhanced stratification of the water column and subsequent warming of the subsurface. Our focus is on the regional aspects of the subsurface ocean response, examining its potential to reach the continental shelf and investigating this potential ocean feedback on the ice sheet. Specifically, we assess the presence of the slope front in these models and analyze its response to additional meltwater input. Initially, we compare the mean state of these climate models to observational data and assess their ability to capture various shelf regimes around the Antarctic continent. Subsequently, we investigate the potential for warming on the continental shelf in response to additional meltwater and examine the relationship between different anomalies and each model's respective mean-state climatology and physics.

Tittel	Extensive presence of active subglacial lakes and related water routing patterns towards Fimbul Ice Shelf revealed by Sentinel-1 satellite radar interferometry (InSAR)
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Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

About 15% of the planet's liquid fresh water is generated, stored, and transported beneath the Antarctic Ice Sheet. Subglacial lakes, situated at the interface between the ice and bedrock, play a crucial role in this extensive hydrological system, with water accumulating both permanently and temporarily. Across Antarctica, over 675 lake locations have been identified, and among them, approximately 140 are classified as active, meaning they fill and drain repeatedly.

Utilizing satellite interferometric synthetic aperture radar data (InSAR) from the Copernicus Sentinel-1 (S1) mission, we present over 600 instances of elevation anomalies, indicative of active subglacial lakes, landward of Fimbul Ice Shelf. The S1 Extra Wide swath mode timeseries, spanning 2016-2021 with a 6-day observation frequency, additionally enables the possibility to trace the movement of water from upstream towards the grounding line, unveiling hydrological routing and pinpointing outlet locations of subglacial meltwater. We cross-checked the InSAR-derived water routing to hydrological modelling output (Shreve, 1972) to explain the observed patterns in more detail. Validation methods of lake presence include cross-referencing with surface height anomalies from ICESat-2 satellite altimetry and differential analysis with the REMA digital elevation model.

Taking a future perspective, we stress the importance of combining various satellite, airborne and ground-based remote-sensing measurements with hydrological modeling to further our understanding of the subglacial processes, their quantities and routing patterns. As the volume of available observations continues to grow, and considering the complexity of physical models, the role of artificial intelligence (AI) techniques becomes increasingly crucial. Yet, meaningful integration of physical modelling, multi-modal observations and AI poses challenges that call for innovative approaches, a topic extending well beyond the domain of Antarctic glaciology.

Tittel	Mapping spatial variability and quantifying bed elevation uncertainty at the Antarctic Ice Sheet margin
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Ønsket presentasjonsform (muntlig, poster)	muntlig
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

The Antarctic Ice Sheet margin zone where ice flows into the ocean is critically important for constraining current and future contributions to global sea level. Bedrock topography and ice thicknesses constrain ice mass lost as it flows over the grounding line, where grounded ice is discharged to a floating ice shelf. Near-margin topography will be crucial for projecting future mass loss as the grounding line retreats inland. Our assessments of radar data availability reveal major data gaps across Antarctica, and in eastern Dronning Maud Land and Enderby Land, over 60% of the grounding line is 5 km or more from the nearest survey. Commonly used interpolation methods such as kriging lead to vastly underestimated regional topographic variability due to smoothing effects in data gaps, limiting predictions of threshold-type ice-flow features and rates of future ice sheet retreat. Here, we implemented geostatistical simulation algorithms to produce bed topography grids with realistic roughness between survey profiles based on the roughness of nearby measurements. We used this method earlier at the outlet of Recovery Glacier and near Dome Fuji to derive an empirical relationship between topographic uncertainty and distance from measurements for varying degrees of basal roughness. Using this relationship, we are able to suggest survey spacing requirements to constrain uncertainty within a tolerance level, for example, near Dome Fuji radar profile spacings of 0.7 – 1.2 km are required to constrain bed elevation within 50 m. We upscaled this methodology and simulated bed topography in Dronning Maud Land, and are currently simulating an ensemble for the entire Antarctic Ice Sheet margin zone. Simulated bed facilitates uncertainty-constrained estimates of contemporary and future ice margin discharge, subglacial water routing and outlet locations, as well as mapping out and quantifying topographic uncertainty which can help to plan future radar campaigns.

Tittel	Late Holocene glacier advances on the sub-Antarctic Kerguelen islands: evidence from a 1200 yr sediment core from a glacial threshold basin
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Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fag økt	<input checked="" type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input type="checkbox"/> Annet (poster)

The climate of the Southern Ocean is undergoing rapid changes due to the effects of global warming, which are further compounded by shifts in the Southern Hemisphere (SH) westerly winds (SHW). The SHW forms a continuous belt of high-speed surface winds. These fast-moving air masses are globally relevant for ocean carbon sequestering (Saunders et al., 2018), the uptake of excess heat (Frölicher et al., 2015) and the movement of storm tracks (Thompson et al., 2011) across the Southern Ocean. However, our understanding of the past behaviour and therefore future development of this climate regulator, within the context of an increasingly warming planet, is limited. As such, the need for more regional palaeoclimate time series is readily apparent. Natural variations in the strength and latitudinal position of the SHW are closely related to phase changes in the Southern Annular Mode (SAM) – the leading mode of natural SH climate variability. Stable positive SAM in recent decades, characterized by a southward shift of the SHW, are linked to the rapid retreat of mountain glaciers across the mid-latitude SH (Favier et al., 2016). Therefore, reconstructions of regional glaciers may yield valuable knowledge regarding the long-term behaviour of the coupled SHW-SAM system. Using glacial threshold basins is a robust method to accurately date the duration of past glacier extents. The production and deposition of rock flour, the fine-grained minerogenic matter evacuated by proglacial rivers has a distinct signature compared to normal background sedimentation and is possible to quantify in lacustrine sediments using a multi-proxy approach. Here, we reconstruct glacier advances from the outlet glacier Chamonix based on a dated 1200 yr sediment core from Lake Aphrodite, a glacial threshold basin located on the sub-Antarctic Kerguelen (49°S, 69°E) islands. Based on shifts between relatively organic and minerogenic mud we identify glacier advances between 1150 – 850, 820 – 620, 500 – 250 and 160 – 90 cal a BP. Based on coinciding advances in other regions of the SH such as South Georgia we argue these are related to fluctuations in the SAM-SHW system and that negative SAM-like conditions dominated much of the last millennium.

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Tittel	Long-distance transport of pollen captures Holocene changes in the position of the Southern Hemisphere Westerlies over the Kerguelen Islands
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Ønsket presentasjonsform (muntlig, poster)	muntlig
Fagøkt	<input checked="" type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

The Southern Hemisphere Westerlies (SHW) play an important role in the global climate system. Among others, the SHW affect the exchange of CO₂ and heat between the atmosphere and the Southern Ocean through wind driven upwelling. Changes in the position and strength of the SHW core belt can greatly affect the intensity of these processes through invigoration of the Antarctic Circumpolar Current. Understanding the SHW's natural variability is therefore crucial to anticipate its future behaviour, but long-term changes in its variability remain a subject of ongoing work. We reconstruct changes in the SHW through a tested method with unique application: using the accumulation rate of long-distance transported (LDT) pollen grains and charcoal from the main continental landmass of southern Africa to the sub-Antarctic island of Kerguelen. Unlike the vast majority of previous pollen studies where LDT pollen fluxes are interpreted as a measure of SHW strength, the position of Kerguelen relative to Africa allows us to use our data to infer changes in zonal position of the SHW core belt. In addition, a combination of palynological and stratigraphic evidence is used to reconstruct local Holocene climate. Our results show that there have been substantial changes in local and regional climate variability on millennial to centennial timescales throughout the Holocene. The timing of events suggests that these changes might be driven by Northern Hemisphere climate events. We propose that the use of LDT pollen as tracers of atmospheric circulation might also be applied on other sub-Antarctic islands to further constrain the timing and meridional extend of SHW variability.

Tittel	Global relevance of atmospheric observations in the Antarctica
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Ønsket presentasjonsform (muntlig, poster)	muntlig
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input checked="" type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

NILU runs an observatory at Trollhaugen mountain at 1553 meters above sea level in the Antarctic. Year-round monitoring since 2007 delivers important data on the background of greenhouse gases, persistent organic pollutants, aerosols and other trace gases. In addition to the ground based data, instruments probing the atmospheric columns are installed, where the latter in particular are used for satellite validation, e.g. the ESA-NASA Pandora instrument. All data collected is distributed through public databases and some are reported to the national monitoring programs. We will present observations from the Trollhaugen station, discuss their importance for determining global trends and show examples of atmospheric transport events, e.g. for methane, affecting Antarctica.

Tittel	Isvolumforandring i Dronning Maud Land de siste 20,000 år og mulige forandringer til år 2300
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Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input checked="" type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input type="checkbox"/> Annet (poster)

Jeg har vært aktiv i prosjektet *MAGIC-DML*, som mottok støtte fra NPI/NARE i perioden 2015-2018. Dette prosjektet har deltakere fra flere land - Norge, Sverige, Danmark, Storbritannia, USA og Tyskland, med støtte fra forskningsrådene i de respektive landene. Prosjektet har gjennomført tre feltsesonger i Dronning Maud Land (DML).

Målet med prosjektet har vært å kartlegge, måle og modellere hvordan isdekket i DML har variert de siste 3 millioner årene, med et spesielt fokus på de siste 20,000 årene. Undersøkelsesområdet er fra Jutulstraumen, og vestover til Riiser-Larsenishelfen. Vi har prøvetatt *kosmogene isotoper* fra nunataker som stikker opp gjennom innlandsisen. Her har vi målt når isdekket har vært tykkere eller tynnere enn det er i dag. Disse målingene har vi koblet til numeriske modeller som simulerer innlandsisens respons på klima- og havnivåendringer. Artikler og avhandlinger har blitt publisert basert på dette arbeidet, inkludert flere artikler i *Nature Communications*. Viktige funn er at innlandsisen, særlig i kystnære områder, er følsom for klima- og havnivåendringer og har variert overraskende mye både på kort og lang tidshorisont. Områder lenger inne på innlandsisen, har variert mindre.

Vi startet med utgangspunktet at Østantarktis og DML er dårlig undersøkt. Moderne satellittmålinger viser en nåværende trend med økt isvolum i DML, samtidig som vi ikke visste hvordan isvolumet i DML har variert over geologisk tid. Prosjektet har arbeidet tverrfaglig, fra feltmålinger til matematiske modeller og vitenskapskommunikasjon. Dette har vært avgjørende for suksessen!

Vi jobber nå med et nytt ambisiøst prosjekt som skal videreføre arbeidet, ved å kombinere feltdata fra land, dyphavet, shelfisen, fra satellitt og mange andre komponenter. Målet er å forstå hvordan DML vil forandres til år 2300. Vi har søkt og fått foreløpig logistisk støtte fra Svensk Polarforskningssekretariat, og er i gang med å søke forskningsmidler og å planlegge feltarbeid og tokt i årene 2025-2030.

Tittel	The Krill Centric Ecosystem of the Antarctic – an IMR perspective.
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Medforfattere (navn og institusjon)	Bjørn A. Krafft
Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input checked="" type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

The Antarctic krill (*Euphausia superba*) biomass is estimated to be between 300 and 500 million tons, which is arguably more than any other multicellular wild species. The marine ecosystem of the Antarctic is often termed Krill Centric due to the krill's crucial role in the Antarctic food web and energy flow from primary producers to higher trophic levels. Key krill consumers are whales, seals, fish, penguins, flying birds and of course a range of invertebrate predators including squid.

Since approximately 2008 the Institute of Marine Research has been directly involved in *at sea* research and monitoring activities in the Antarctic. This effort includes a large-scale survey conducted in 2008 and the Norwegian lead international 2018–19 Area 48 Survey, that also were supported by national surveys performed by the U.S., China, Republic of Korea, Norway, and the U.K. For comparison purposes the survey design of this survey initiative followed the transects determined by the Commission for the Conservation of Antarctic Marine Living Resources, the CCAMLR synoptic survey, carried out in 2000.

A Norwegian important national initiative is the annual South Orkney regional survey that has been undertaken nearly every year since 2011.

Key goals of all these surveys are to determine the distribution, abundance and biomass of the Antarctic krill and its population characteristics using acoustics and net sampling. Following an ecosystem approach, along track observations of whales, seals and penguins are recorded along with phytoplankton (Chl *a*) and herbivore zooplankton. Experimental work *in situ*, and deployment of advanced instrumentation like echosounders (WBATS's), CTD's and ADCP's are essential to address scientific issues like animal behavior, krill swarming, predator-prey interactions, krill flux and understanding impact of climate change.

Tittel	Advancing Coupled Ice Sheet-Ocean Modelling: The Accelerated Forcing Approach for Improving Computational Efficiency and Challenges in Fine-Resolution Coupling
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Ønsket presentasjonsform	muntlig
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input checked="" type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning

Understanding ice sheet-ocean interactions is crucial for projecting the Antarctic Ice Sheet's response to a warming climate. These interactions include tightly coupled processes, where feedback mechanisms between ice and ocean play an important role. Coupled ice sheet-ocean models are increasingly being developed to quantify the mechanisms and incorporate the feedback, thus reducing uncertainties in sea level rise projections. However, applying the fully coupled ice-ocean models to long-term simulations is heavily constrained by the timescale discrepancy challenges between ice and ocean dynamics. This discrepancy, combined with the high computational cost of ocean models due to their finer temporal resolution, limits the time frame that can be modeled. To address the timescale discrepancy and thus improve computational efficiency in a framework designed to couple evolving ice geometry to ice shelf cavity circulation, we propose an "accelerated forcing approach". With this approach, the period for which the ocean model is run represents a longer period, depending on a prescribed acceleration factor. This approach is based on the assumption that the ocean adjusts faster to imposed changes than the ice sheet, with the ocean viewed as being in a slowly varying quasi-steady state over timescales of ice geometry change. Our evaluation experiment results suggest that the accelerated forcing approach can yield comparable melting responses to those under regular forcing when the model is subjected to steady far-field ocean conditions or time-varying conditions with timescales much shorter than the cavity residence time. However, it is not suitable when the timescale of the accelerated ocean conditions is not significantly different from the cavity residence time. When used carefully, the accelerated forcing approach can be a useful tool in coupled ice sheet-ocean modelling.

Furthermore, we will share preliminary results and challenges when pioneering the application of fine-resolution coupled ice sheet-ocean models to investigate the positive feedback mechanism between the growth of basal channels and the entrapment of Warm Deep Water beneath the Fimbul ice shelf.

Last, we will present an outlook on the recently initiated project 'From Climatic Drivers to Antarctic Ice Sheet Response: Improving Accuracy in Sea Level Rise Projections (CLIM2Ant)'. This project aims at i) assessing future ocean-induced Antarctic mass loss more accurately and efficiently and thus its contribution to sea level rise more accurately and ii) providing improved projections for ice mass balance and ice sheet movement for Dronning Maud Land using fine-resolution coupled ice sheet-ocean models.

Tittel	Hvorfor er det viktig å studere fortidens Antarktispolitikk?
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Medforfattere (navn og institusjon)	
Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input checked="" type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input type="checkbox"/> Annet (poster)

Hvorfor er det viktig å studere fortidens antarktispolitikk? Til tross for at historien noen ganger beskrives som en rekke lærdommer som benyttes for å unngå feil i fremtiden er det meget vanskelig å trekke konkret veiledning fra fortiden. Men hvis historien ikke byder med svar på nøyaktige spørsmål, kan det bevise at nåtidens (og fremtidens) verden kunne godt ha vært annerledes. Historikerens oppgave – å analysere hvordan og hvorfor endring er hendt gjennom tiden – kan vise at en viss vei ikke nødvendigvis er den eneste. Dette er særlig viktig når det gjelder Antarktis. Forhandlingene som førte til at CRAMRA ble erstattet med Madrid-protokollen handlet i minst like høy grad om å forsikre økonomisk likhet enn å forsikre at det antarktiske miljø ble fredet fra inngrep. Løsningen kom ikke fordi «riktige» eller «ekte» verdier ble prioritert, men fordi partiene til forhandlingene besluttet at det var den mest passende løsning med hensyn til tidens utfordringer. Madrid-protokollen representerer derfor et nytt kapittel i Antarktishistorien minst like mye som en fortsettelse av epoken som begynte med Antarktistraktaten. Det er viktig å fokusere mer på hvordan deltakere i ATS forholder seg til utfordringer og mindre på hvordan ATS sitt regelverk kan stille svar i seg selv. Dette er særlig viktig når det gjelder forholdet mellom miljøvern og naturvitenskap – noe som anses som svært viktig i «the continent for science» men var langt fra åpenbart i 1990, og som bør ses på som et forhold som må forhandles.

Tittel	Observing subglacial conditions to determine a sliding law for glaciers and ice streams: lessons learned from the MAMMAMIA project
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Førsteforfatters institusjon	Universitetet i Oslo
Medforfattere (navn og institusjon)	The MAMMAMIA consortium (1,2) (1) Department of Geosciences, University of Oslo, Norway (2) partners from: Norwegian Polarinstitute, Tromsø, Norway Centre for Biorobotics, TalTech, Estonia ILTS, Hokkaido University Sapporo, Japan NORSAR, Oslo, Norway UNIS, Svalbard, Norway University of Bergen, Norway Université Grenoble Alpes, France
Ønsket presentasjonsform	muntlig
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input checked="" type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning

Glaciers display a wide variety of different velocity variations, spanning from slow creep of cold ice to sliding-dominated surges, ice-streaming and even avalanche-like detachments. In light of global sea-level rise, a potential climate control on acceleration of ice-discharge from glaciers and ice-sheets into the sea is of particular concern. Assessments of future ice discharge are highly sensitive to the form of the used sliding law but are subject to large uncertainty because available theoretically-derived relations yield different behavior. Better understanding of the sliding motion is therefore urgently needed.

The RCN-funded MAMMAMIA project (Multiscale-multimethod analysis of mechanisms causing ice acceleration) aims at collecting and analyzing a dataset that is suited to shed light on the sliding relation over a variety of spatial and temporal scales.

We report of a field study on the surge-type glacier Kongsvegen in vicinity of Ny Ålesund, that displays seasonal and shorter velocity variations, superimposed to an increasing trend, suggesting that a new surge may be imminent. We combine seismic records and borehole measurements, along with model simulations to get a comprehensive overview of involved processes and their significance during periods of ice-flow acceleration. We developed novel instruments permitting the simultaneous measurement of hydro-mechanical conditions at the glacier base and in the underlying till layer. These observations are complemented using state-of-the-art geophysical methods based on radar and cryo-seismology. So far, the records cover about three years and we witnessed an interesting evolution that we interpret to result from a self-enhancing, hydro-mechanical feedback where increased sliding leads to opening of crevasses that then provide access for meltwater to the base where it further reduces friction, thus enhancing sliding. In the presentation, we discuss transferability of our approach to Antarctica to better assess potential implications of climate change for ice sheet stability.

Tittel	Antarctic Ice Sheet modelling – the needs, challenges, and opportunities for Norwegian Antarctic research
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Medforfattere (navn og institusjon)	Heiko Goelzer, Michele Petrini, David Chandler (NORCE & BCCR)
Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input checked="" type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

Antarctic Ice Sheet mass loss accounts for the largest uncertainties in global sea level projections. Antarctic meltwater and iceberg calving, together with changes in sea ice, also impact global ocean circulation, carbon uptake, and ecosystems. To understand, quantify and predict these changes and impacts, we employ climate and ice sheet models.

Over the past 5+ years the Norwegian polar research community has been building up expertise in Antarctic ice sheet modelling. In this presentation I aim to highlight our recent progress, and to identify our future needs, challenges, and opportunities.

An example of recent progress is our work on simulating ocean – ice sheet interactions (recently finished EU project TiPACCs). This work revealed that abrupt changes in the ice sheet can occur, but that we have likely not crossed these tipping points – yet.

Our latest science focusses on (1) the impact of Antarctic meltwater on ocean circulation (e.g. EU project OCEAN:ICE), (2) linkages between ice sheets and the global heat budget and carbon cycle (e.g. SFF iC3), and (3) Antarctic Ice Sheet projections (e.g. ISMIP). I will make suggestions for the tools we need to (continue) to be a world player in Antarctic ice sheet modelling.

On a national level, there is a strong will to collaborate on Antarctic modelling, especially linking Bergen and Tromsø researchers (e.g. SFF iC3, RCN CLIM2ANT). This brings great opportunities, especially if we acknowledge and overcome the (potential) challenges that collaboration brings.

Making Antarctic research ideas and outcomes easily accessible to a wide Norwegian audience is important. Not only for informing, but also for building a sustainable and solid Antarctic research basis in Norway. If time permits, I am happy to share some examples of outreach projects where art and comic books made our, sometimes heavy, Antarctic research interesting for a general audience.

Tittel	AGATA – nytt vitenskapelig program under SCAR som en mulighet for norsk forskning innen atmosfære og det nære verdensrommet
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Ønsket presentasjonsform (muntlig, poster)	muntlig
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input checked="" type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input type="checkbox"/> Annet (poster)

AGATA – Antarctic Geospace and Atmosphere Research er et planlagt forskningsprogram som i skal lanseres sommeren 2024 under Scientific Committee on Antarctic Research, SCAR. AGATAs mål er å fremme dagens kunnskap om Antarktis atmosfære og det nære verdensrommet, også i interhemisfærisk kontekst. AGATA vil bidra til å svare på de utestående vitenskapelige spørsmålene knyttet til koblingen av hele atmosfæren, romværets rolle og effekter, og hele atmosfærens respons på klimaendringer. Disse spørsmålene vil bli behandlet med en tverrfaglig og multi-instrument tilnærming, og ved å bringe sammen forskergrupper som studerer den polare atmosfæren og det nære verdensrommet. Forskere som trenger atmosfæriske korreksjoner for sine målinger vil også bli involvert. AGATA vil dra nytte av eksisterende og planlagt forskningsinfrastruktur i Antarktis, og den vil ta sikte på koordinert forskningsinnsats og datautveksling. Den vil også ta hensyn til nye resultater fra Arktis. Mens forståelsen av fysikken til den nøytrale og ioniserte atmosfæren har blitt betydelig forbedret ved å bruke både bakkebaserte og rombaserte radiosonderinger, må de ubesvarte spørsmålene tas opp med en synergistisk tilnærming. Dette krever aktiv involvering av flere forskningsgrupper med forskjellig ekspertise. Vi vil presentere konseptet bak AGATA og diskutere hvordan norske forskere kan bli aktive, bidra til og dra nytte av det nye forskningsprogrammet under SCAR, med hensyn til både instrumentering og forskningsinitiativer.

Tittel	Phytoplankton dynamics and carbon export in the Kong Haakon VII Hav, Southern Ocean
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Førsteforfatters institusjon	Norwegian Polar Institute
Medforfattere (navn og institusjon)	
Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input checked="" type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

In this presentation, I intend to present the results of recent years of research in biological oceanography led by the Norwegian Polar Institute in the Kong Haakon VII Hav. Key biological features have been observed in various part of the Kong Haakon VII Hav from the productive open waters and sea mounts such as Maud Rise to the Continental Shelf Break where high biological carbon export has recently been observed. Future oceanographic cruises led by the Norwegian Polar Institute and recently funded research projects will allow us to study more in depth these marine ecosystems and the role of the melting cryosphere.

Tittel	Using seismic and infrasound data to characterize the dynamics in ice shelf movements
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Førsteforfatters institusjon	NORSAR
Medforfattere (navn og institusjon)	Johannes Schweitzer, Anna Maria Dichiarante, Andreas Köhler, Nadege Langet, NORSAR
Ønsket presentasjonsform (muntlig, poster)	Muntlig
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input checked="" type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

We propose to better integrate new and upcoming earth science data collection with already existing data repositories like atmospheric data or remote sensing to better understand the dynamics of ice shelves. Close to the Troll station in Antarctica, a seismic and infrasound array will be installed through the TONe Research Infrastructure project. This is a unique opportunity to bridge the gap between local point measurement datasets such as drilling and local surveying and large-scale satellite monitoring. In addition, the seismic and infrasound methods provide real-time and continuous information and are as such ideal to provide new insights on the dynamics of ice shelf movements. We foresee that this new infrastructure, in combination with already existing infrastructure, and the integration with data from neighboring observatories will provide new means for future Antarctic research.

Tittel	Ships of opportunity and Citizen Science in Antarctic
Førsteforfatters navn	Bert van Bavel
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Førsteforfatters institusjon	Norwegian Institute for Water Research
Medforfattere (navn og institusjon)	Andrew King, Amy Lusher Norwegian Institute for Water Research
Ønsket presentasjonsform (muntlig, poster)	Oral presentation
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input checked="" type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input type="checkbox"/> Annet (poster)

Through collaboration with shipping companies including ferries and cruise (expedition) vessels, the NIVA group has built up an infrastructure network that continuously monitors wide variety of oceanographic parameters (FerryBox) through the NORSOOP project. This includes sensors to measure temperature, salinity, oxygen, chlorophyll, colored dissolved organic matter (cDOM), turbidity, phycocyanin, partial pressure of carbon dioxide (pCO₂), and acidity (pH). In addition, advanced samplers housing a continuous microplastic sampler were installed on several vessels.

Three of the ships with a FerryBox (Hurtigruten M/S Road Amundsen, M/S Viking Octantis, M/S Viking Polaris) and the microplastic sampler are operating in the Antarctic during the Antarctic summer. Since they operate for longer periods of time and repeat transects, this makes them an excellent research platform in the Antarctic for oceanographic research.

In addition, these cruise expedition vessels are used for citizen science, not only gathering data on climate change and ecosystem variables, but also plastic litter in this remote area including passengers actively take part in research activities on microplastic in a fully equipped microplastic lab on board. The citizen science activities are followed up by discussing several measures to reduce plastic pollution including the Plastic Treaty and the implementation of a ban on single use plastic on board and if the experiences on board have changed their behavior back on land.

Citizen science offers unique possibilities to sustain research in Antarctica by engaging citizens in science, providing valuable data for researchers, and fostering public understanding of climate change and pollution by enhancing collaboration between the scientific community and the general public.

Tittel	Comprehensive characterization of cold-adapted bacteria from Antarctic temporary meltwater ponds
Førsteforfatters navn	Volha Akulava
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Førsteforfatters institusjon	NMBU
Medforfattere (navn og institusjon)	Volha Shapaval, Achim Kohler, Uladzislau Miamin, Leonid Valentovich
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

Temporary meltwater ponds (TMPs) in polar regions, abundant in Antarctica, remain understudied despite their prevalence, dynamic nature, and significant microbial activity. The aim of our study was to characterize twenty-nine fast-growing bacteria isolated from nine TMPs located in East Antarctica, Tala Hills Oasis, Enderby Land. Bacteria were identified by 16S rRNA sequencing. Physiological characterization included screening for growth temperature flexibility, enzymatic activity and for susceptibility to 25 antibiotics. Vibrational spectroscopy methods (HTS-FTIR and FT-Raman) were used to perform fingerprinting of all main chemical components (lipids, proteins, polysaccharides, and pigments) of the bacterial cells and to do explorative analysis for identifying biotechnologically interesting compounds and evaluating cellular responses to under optimal growth and stress conditions, such as high and low temperatures.

Isolated bacteria from Antarctic samples related to Proteobacteria, Actinobacteria, Firmicutes, and Flavobacteria phyla. The majority are psychrotolerant, thriving between 4°C and 37°C, with some exhibiting extracellular enzymatic activity at 18°C across various enzymes. All isolated bacteria showed resistance to at least one antibiotic, with some showing multiply resistance to 10-15 different antibiotics.

A distinct change in fatty acid profiles for different Gram-groups was detected. Gram-negative bacteria adjusted unsaturation and acyl chain length, while Gram-positive bacteria adjusted methyl branching, chain length, and unsaturation. Fourier-transform infrared spectroscopy (FTIR) highlighted temperature-triggered alterations in lipids, proteins, and polysaccharides with the most pronounced changes detected in the polysaccharide region.

*High-throughput screening via FT-Raman identified seven Antarctic meltwater isolates capable of pigment production. Pigment profiles were species-specific, with blue light inducing pigment production in most isolates. Photostability testing revealed variable degradation rates, with *Arthrobacter agilis* BIM B-1543 exhibiting the lowest degradation rate. FT-Raman proved effective in assessing pigment content and profile using a spectral library of pigment standards.*

Tittel	Using paleogenomics to document the modern and past cryosphere and biodiversity
Førsteforfatters navn	Stijn De Schepper
Førsteforfatters epost	stde@norce-research.no
Førsteforfatters institusjon	NORCE Norwegian Research Centre and Bjerknes Centre for Climate Research
Medforfattere (navn og institusjon)	Nele M. Vollmar, <u>Kyle Mayers</u> , Tristan Cordier, Agnes Weiner, Aud Larsen (NORCE) Juliane Müller, Wee Wei Khoo, Oliver Esper, Johann Klages (AWI-Bremerhaven) Linda Armbrrecht (University of Tasmania)
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisk forskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisk forskning <input checked="" type="checkbox"/> Annet (poster)

Ice shelves are a crucial tipping element of the West Antarctic Ice Sheet (WAIS) because their thinning and possible collapse can lead to abrupt global sea level rise. Today, several major ice shelves extend from the WAIS into the Weddell Sea. The sea ice in front of these ice shelves is essential for upholding the density structure that protects the ice shelves from warm water intrusions and subsequent melting. To date, knowledge on the interaction between the sea ice and ice shelves and their variability over geological time scales remains limited, because established methods to document this are scarce.

Within the RCN project “Late Quaternary Antarctic Cryosphere Interactions” (ARCHIE, 2021-2025) we use paleogenomics, geochemistry and sedimentology to unravel the Late Quaternary sea ice evolution of the Weddell Sea. Our team at NORCE established a DNA-based approach for sea ice reconstructions in the Arctic (www.agensi.eu), and we now apply this in the Antarctic. Specifically, we link our DNA-based assessment of the microbial communities in sea floor sediments to the modern sea ice conditions in the Weddell Sea. Subsequently, we use these relationships to understand the sea ice evolution over the last ~160,000 years using the sedimentary ancient DNA stored in a Weddell Sea sediment core. Pilot work documents the presence of ancient DNA back to 160,000 years, and a diverse ecosystem community with amongst others diatoms, dinoflagellates, radiolaria, but also metazoa.

While our approach is currently focused toward sea ice reconstructions, our environmental and ancient DNA data also contains a huge amount of information on the past and modern marine biosphere. Because we also recover DNA from organisms that do not fossilize (no cysts, shells or bones), our data can bring substantial new insights into biodiversity assessments of the Weddell Sea, and in fact the entire Southern Ocean.

Tittel	Tracking the warm current's response to strong wind events into the Filchner Trough
Førsteforfatters navn	Vår Dundas
Førsteforfatters epost	var.dundas@uib.no
Førsteforfatters institusjon	Geophysical Institute, University of Bergen
Medforfattere (navn og institusjon)	Elin Darelius (Geophysical Institute, University of Bergen), Kjersti Daae (Geophysical Institute, University of Bergen), Markus Janout (Alfred Wegener Institute), Jean-Baptiste Sallée (LOCEAN-IPSL, Sorbonnes Université), Svein Østerhus (NORCE)
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input checked="" type="checkbox"/> Annet (poster)

The southward flow of Warm Deep Water into the Filchner Trough can affect the basal melt rates of the Filchner Ice Shelf in the southeastern Weddell Sea. Weak winds and strong stratification let the warm water flood the northern part of the region in summer, but this warm water does not necessarily flow south to the ice shelf cavity. But what if a storm hits? Previous observations and modeling efforts indicate that sudden strong wind events can enhance this southward warm current and bring it far south toward the ice shelf cavity (Darelius et al., 2016; Dundas et al., 2024, in review). We use a network of temporally overlapping moored observations to further investigate the effect of strong wind events on the warm current. The observations span three to four years and capture conditions upstream of the Filchner Trough sill, on the sill, and roughly halfway south into the trough. We attempt to track the storm response in the current southward into the Filchner Trough throughout the seasons and identify criteria for observed strong storm responses in the warm current.

Tittel	Pole-to-pole atmospheric monitoring of POPs – the Troll Observatory, Antarctica
Førsteforfatters navn	Helene Lunder Halvorsen
Førsteforfatters epost	hlu@nilu.no
Førsteforfatters institusjon	NILU
Medforfattere (navn og institusjon)	William Hartz (NILU, Örebro University), Pernilla Bohlin-Nizzetto (NILU), Maja Nipen (NILU), Anne Karine Halse (NILU)
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

Persistent organic pollutants (POPs) are a group of man-made chemicals often used as industrial chemicals, pesticides and flame retardants. POPs are of international concern due to their toxicity and potential to bioaccumulate. They are spread to all global regions due to their high persistence and long-range transport potential. The Stockholm Convention is a global treaty to protect human health and the environment from POPs, and national and regional monitoring networks provide data under the Global Monitoring Plan.

The atmosphere represents an important pathway for the long-range transport of POPs to remote areas. Polar regions are of particular interest because POPs can be transported by successive volatilisation and deposition steps from temperate regions towards cooler regions, where they tend to deposit. Despite the geographical isolation and limited local sources, both the Arctic and Antarctica are affected by POPs from populated/industrialised regions, in the northern and southern hemispheres, respectively. Hence, atmospheric monitoring of POPs in polar regions aims to improve the understanding of their long-range transport and assess temporal trends. For more than 15 years, numerous POPs have been monitored in air at the Zeppelin Observatory, located at Svalbard in the Arctic, and the Troll Observatory at Dronning Maud land in Antarctica. Air samples have been collected using similar air sampling strategy, and are analysed at the same laboratory (NILU).

The pole-to-pole atmospheric monitoring enables comparison of the long-term trends and effectiveness of regulatory actions between southern and northern hemispheres. The data from Zeppelin contributes to the Arctic Monitoring and Assessment Programme (AMAP). The continuous monitoring of POPs at Troll is unique and highly valuable for the scientific and regulatory community. Just recently (Aug 2023), the Antarctic Monitoring and Assessment Programme (AnMAP) was established under SCAR (the Scientific Committee on Antarctic Research). In the coming years, Norway's contribution towards the long-term monitoring of the Antarctic atmosphere within AnMAP will therefore be highly important.

Tittel	The Troll Observing Network marine observatories.
Førsteforfatters navn	Tore Hattermann
Førsteforfatters epost	Tore.hattermann@npolar.no
Førsteforfatters institusjon	NP
Medforfattere (navn og institusjon)	Elin Darelus (UiB), Peter Davis (BAS), Sebastien Moreau (NP), Agneta Fransson (NP), Geir Moholdt (NP)
Ønsket presentasjonsform (muntlig, poster)	poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

The Troll Observing Network (TONE) is a comprehensive research infrastructure network located around the Norwegian permanent research base in central Dronning Maud Land in East Antarctica. As part of eight distinct observatories, the Fimbulisen Ice-shelf Observatory (FIO) monitors oceanographic conditions under the ice shelf since 2010, linking a sudden shift toward sustained warm inflow since mid-2016 to large-scale changes in Southern Ocean climate. Additional instrumentation has been maintained on top of the ice shelf since 2017, monitoring basal melting, ice dynamics and surface mass balance, to provide process insights and ground truth for modeling and remote sensing. In 2023/24 the observatory a large TONE-supported hot-water-drilling campaign was completed to successfully renew and extend the ice shelf cavity moorings for future data collection. Efforts on the ice shelf are complemented by an open ocean Multidisciplinary Ocean Moored Observatory (MOMO) that is operative at the Antarctic continental margin north of the Fimbulisen ice front since 2019. Initial data from those moorings showed how processes in the seasonal ice zone modulate the Antarctic Slope Front and slope current dynamics, also linking to water mass exchanges with the ice shelf cavity. The moorings are serviced as part of the TrollTransect cruises, together with water samples and profiling data and sea ice stations that are routinely collected from the Troll station supply vessel that visits coast on an annual basis. Several national and international research projects are currently associated with these initiatives and TONE is committed to wide and free access to data from the observatories and drone service to the entire national and international research community. In the horizon of the proposed international Antarctic InSync initiative, an extension with autonomous platforms, such as under-ice gliders, as well as dedicated campaigns, also using the Norwegian ice breaking research vessel Kronprins Haakon is envisioned.

Tittel	Searching for the oldest ice at Little Dome C
Førsteforfatters navn	Elisabeth Isaksson
Førsteforfatters epost	elisabeth.isaksson@npolar.no
Førsteforfatters institusjon	NPI
Medforfattere (navn og institusjon)	Hans Christian Steen-Larsen, University of Bergen
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input checked="" type="checkbox"/> Annet (poster)

At an altitude of 3,233 meters above sea level, over 1,000 km away from the coast, in one of the harshest places on the planet, the project Beyond Epica-Oldest Ice (BE-OI) is hoping to find ice as old as 1.5 million years. At this remote ice coring drill site, Little Dome C, glaciologists, engineers, and technicians have over the past several field seasons drilled to a depth of 1,836 m. The hope is to be able to reach the bottom at about 2,700 m by the end of next season. BE-OI started in 2019 and was funded by the European Commission, with significant financial and in-kind contributions from the participating institutions from twelve nations, among them, NPI. The campaign represents an unprecedented effort in paleoclimatology studies, as its intent is to extract a climate record going further back in time than 800,000 years of the previous Epica ice core from Dome C. The new ice core will reveal invaluable information on temperature and the concentration of greenhouse gases in the atmosphere covering the Mid Pleistocene Transition and beyond, where glacial/interglacial cycles changed from a 40,000 to a 100,000 year cyclicity.

Tittel	The Institute of Marine Research activities at South Orkney Islands 2011-2024
Førsteforfatters navn	Bjørn A. Krafft
Førsteforfatters epost	Bjorn.krafft@hi.no
Førsteforfatters institusjon	Havforskningsinstituttet
Medforfattere (navn og institusjon)	
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

Since 2011, the Institute of Marine Research have carried out regular annual monitoring on meso-scale of krill distribution and demographic distribution, as well as systematic density measures of whales and penguins at the South Orkney Islands. This is made possible through a collaboration with the Norwegian commercial fishing companies, which facilitates a vessel with crew annually to carry out a scientific survey. This activity is one of the obligations that the fishing industry must fulfill to obtain a fishing license from the Norwegian authorities. Also, in order to grant market access to some commercial markets, they need to document promotion of research relevant for sustainable management of the krill resources in the Southern Ocean. This research-platform has enabled the implementation of a number of scientific projects that facilitate the work of establishing a new management for the krill fishery in the Arctic Ocean. A synopsis of the most important work through these years will be presented.

Tittel	Bouvetøya: tracing the longest-lived mantle plume in the southern hemisphere
Førsteforfatters navn	Alexander Minakov, Carmen Gaina, Jan Inge Faleide
Førsteforfatters epost	alexamin@uio.no
Førsteforfatters institusjon	Department of Geosciences, University of Oslo
Medforfattere (navn og institusjon)	
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

The Bouvet Hotspot has been associated with several volcanic provinces in the southern hemisphere on the Antarctic and African plates during the last 200 million years and can be considered the surface expression of the longest-lived mantle plume on our planet. It may have led to the break-up of the youngest supercontinent - Pangea - in the Early Jurassic (Gaina et al., 2013), and triggered the Toarcian (183 ± 1.5 Ma) global warming event (Svensen et al., 2007). The ca. 180 million years Karroo dyke swarms on the African continent, the Ferrar magmatism in Antarctica and dyke swarms on the Falkland Islands, indicate the presence of a powerful mantle anomaly that may have weakened south Pangea's lithosphere and led to continental breakup. Paleogeographic reconstructions suggest that the Ferrar sill complex in Antarctica extends for more than 4100 km from the proposed site of the Bouvet Island (Elliot and Fleming, 2000), which would make this mantle plume not only the longest lived, but maybe also the most powerful mantle plume.

The future research will build on the work we have carried out as advisors to Norwegian authorities in UN Law of the Sea and the geophysical data analysis supporting the claim of Norway for an extended exclusive economic zone around Bouvet Island. The main objective of the follow-up study is to get a better understanding of the "Bouvet depth anomaly" in a geodynamic context since the shape and extent of this depth anomaly, forming a pedestal of Bouvetøya and adjacent Shaka Ridge, was mainly determined by the hotspot activity. The Bouvet hotspot connects to the Karroo volcanics in South Africa through the Shaka Ridge and Agulhas Basin. In this work, we will bring together new results from IODP Expedition 392 from the Agulhas Plateau and discuss implications of the future research for the environment and mineral exploration.

Tittel	Studying Antarctic ice shelf response to ocean tides and atmospheric pressure variations using satellite interferometry
Førsteforfatters navn	Anna Odh
Førsteforfatters epost	aod018@uit.no
Førsteforfatters institusjon	UiT the Arctic University of Norway
Medforfattere (navn og institusjon)	Supervisors: Jelte van Oostveen, NORCE. Malin Johansson, UiT.
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input checked="" type="checkbox"/> Annet (poster)

Ice shelves, fringing the majority of the coast of Antarctica, are vital for the stability of the ice stored inland. They experience vertical movement driven by ocean tides and atmospheric pressure gradients. The ice shelf response to these external forcings can be complex as associated surface displacements depend on both properties of the ice and the geographical setting. Regional tide models optimized for Antarctica, like CATS2008a, are useful when studying ice shelf behavior and in correcting satellite remote sensing measurement but uncertainties can be significant dependent on knowledge of bathymetry, ice thickness and more. Satellite SAR interferometry (InSAR) is a technique that can measure mm-cm surface displacements while covering large areas (up to 400 km), and is therefore well suited to study large-scale ice shelf behavior in addition to tidal modelling.

This master thesis aims to investigate if all the signals prevalent in triple/quadruple-differential InSAR data (QDInSAR) over Fimbulisen, East Antarctica, can be sufficiently explained by the regional tide model CATS2008a and ECMWF ERA5 reanalysis surface pressure data . By using Extra Wide swath mode SAR data timeseries (2019) from the ESA/Copernicus Sentinel-1 satellites, the entire ice shelf can be studied at once. The influence of ocean tides and atmospheric pressure is subtracted from the T/QDInSAR images to look for any remaining signals. Preliminary results show effective corrections over the main cavity of Fimbulisen, but more localized patterns remain in most of the dataset. Remaining effects vary locally, especially where Fimbulisen is protruded by ice rises (2-6 degr. East), as well as the outermost freely floating part of Trolltunga. The latter experiences interferometric patterns that point to local sea level height differences, that we hypothesize are driven by additional processes, like for example swells or currents. This will be further investigated in future work.

Tittel	Project 'Losseplassen': Monitoring ice shelf stability at Troll Station loading bays using spaceborne InSAR
Førsteforfatters navn	Jelte van Oostveen
Førsteforfatters epost	jeoo@norceresearch.no
Førsteforfatters institusjon	NORCE
Medforfattere (navn og institusjon)	Geir Moholdt, NPI Harvey Goodwin, NPI
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

In September 2021, an iceberg unexpectedly calved at the Norwegian Troll station ship-to-shore loading bay on the edge of Fimbul ice shelf at 5 degrees East (5E), posing logistical challenges for the Antarctic season 2021/2022. This prompted a costly last-minute relocation of operations to a different site further west along the calving front. To anticipate on future ice shelf changes impacting logistics and safety, the logistics department of the Norwegian Polar Institute seeks to systematize and extend the monitoring of the ice shelf edge covering the past, current and other potential loading sites.

We present first results of a pilot project exploring the feasibility of utilizing Interferometric Synthetic Aperture Radar (InSAR) techniques for operational monitoring of various loading bay locations. InSAR has proven to be useful for ice shelf crack propagation analysis (Libert et al. 2021), and shows potential for continuous monitoring with the Copernicus Sentinel-1 (S1) satellites and their planned follow-up missions. InSAR has the advantage over optical remote-sensing methods by being able to detect rift propagations that are not directly visible at the surface, whilst able to operate day and night and being insensitive to cloud cover. We use a timeseries of S1 Extra Wide swath mode data, spanning 2014-2021, with a special focus on crack identification, propagation and any other signals as early- warning indicators for iceberg calving. Using both pair-wise InSAR and triple differential combinations, we detected a crack at 5E as early as 2014, with irregular propagation until the final calving in fall 2021. These findings indicate that InSAR can be employed as a suitable technique for long-term monitoring of ice-dynamical stability.

Tittel	POLARIN – tilgang til polar forskningsinfrastruktur
Førsteforfatters navn	Christina A. Pedersen
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Førsteforfatters institusjon	Norsk Polarinstitutt
Medforfattere (navn og institusjon)	
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input checked="" type="checkbox"/> Annet (poster)

Polar Research Infrastructure Network – POLARIN – er et EU-prosjekt som skal gi forskere tilgang til forskningsinfrastrukturer i både Arktis og Antarktis. Prosjektet koordineres av AWI, og har 50 partnere deriblant fire norske; Norsk Polarinstitutt, NILU, SIOS og UiT Norges arktiske universitet.

POLARIN-prosjektet skal fremme tverrfaglig forskning i polarområdene innenfor alle fagdisipliner og tilbyr altså tilgang til 64 ulike arktiske og antarktiske forskningsstasjoner, forskningsfartøy og isbrytere ved begge polene.

Polarinstituttet tilbyr tilgang til våre polare infrastrukturer – både Troll forskningsstasjon i Antarktis og Ny-Ålesund forskningsstasjon-Sverdrup på Svalbard, tillegg til forskningsskipet Kronprins Haakon gratis for forskere som vinner fram i utlysningene.

Denne posteren presenterer mulighetene som ligger i POLARIN prosjektet.

Tittel	Troll Observasjonsnettverk – hvordan kan du benytte deg av data eller tjenester derifra
Førsteforfatters navn	Christina A. Pedersen
Førsteforfatters epost	Christina.pedersen@npolar.no
Førsteforfatters institusjon	Norsk Polarinstitutt
Medforfattere (navn og institusjon)	Birgit Njåstad (NP) og resten av TONe partnergruppa (NILU, NORSAR, NORCE, UiO, UiB)
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

Troll observasjonsnettverk er et norsk infrastrukturprosjekt som tar mål av seg å fylle datahullene innenfor alle delene av jordsystemet i et geografisk område rundt Troll forskningsstasjon. Gjennom prosjektet skal det etableres 8 observatorier innenfor atmosfære, jordfysikk, kryosfære og det marine system, en dronetjeneste som komplementerer datainnsamlingen fra observatoriene og et dataforvaltningssystem som tilgjengeliggjør all innsamlet data til hele det nasjonale og internasjonale forskningsmiljøet.

På denne postene vil vi presentere hva som etableres og hvordan det kan komme til nytte for alle forskere i Antarktis.

Tittel	TONE: Plans and Status of the Seismic and Infrasound Arrays
Førsteforfatters navn	Johannes Schweitzer
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Førsteforfatters institusjon	NORSAR
Medforfattere (navn og institusjon)	Jon Magnus Christensen, Sindre Stokkan
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

In 2022, the Research Council of Norway granted in context with the infrastructure project TONE the extension of the seismic station to a seismic array and the additional installation of an infrasound array at Troll in Donning Maud Land, Antarctica.

Planned instrumentation, configuration, status of the installation work and problems to be solved before building of this new infrastructure will be presented.

Tittel	Stochastic Simulations of Bed Topography Constrain Geothermal Heat Flow and Subglacial Drainage near Dome Fuji, East Antarctica
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Ønsket presentasjonsform (muntlig, poster)	poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

Topographic variability beneath ice sheets regulates ice flow, basal melting, refreezing processes, and meltwater drainage. The preservation of old ice layers and basal ice stratigraphy is sensitive to these subglacial processes, and Dome Fuji, inland East Antarctica, is one of only few regions where 1.5-Ma old ice can be preserved for investigating a major climatic change that occurred in the mid-Pleistocene. We used stochastic simulation methods and radar data to generate an ensemble of simulated bed topography with the continuous, realistic roughness necessary to assess basal conditions. Ensemble analysis reveals the magnitude and spatial distribution of topographic uncertainty, facilitating uncertainty-constrained assessments of subglacial drainage and topographic adjustments to geothermal heat flow. We find that topographic variability can lead to widespread local geothermal heat flow variations of $\pm 20\%$ the background value, which aggregate to raise the regional value and suggest previously underestimated distributions and rates of basal melting. We also find that survey profile spacing has an increasing influence on topographic uncertainty for rougher bed, deriving an empirical relationship that could guide future survey planning based on uncertainty tolerance.

Tittel	Decoding Oceanic Mysteries: The Observational Pyramid for Insights into the Physical and Biogeochemical Changes in the Remote Polar Oceans
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Ønsket presentasjonsform	poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input checked="" type="checkbox"/> Annet (poster)

The advent of autonomous sampling platforms has revolutionized and refined our comprehension of various oceanographic phenomena. These platforms, deployed in the open ocean, provide invaluable in situ measurements, encompassing both physical and biogeochemical aspects. Their impact is particularly pronounced for remote environments such as polar regions, where traditional shipboard observations are constrained by limited timeframes. The temporal limitation poses a challenge in demystifying the seasonal variability in biogeochemical process, and inadvertently hinders accurate predictions in current models. To bridge this gap, we introduce the concept of the 'Observational Pyramid'. This framework integrates traditional in situ measurements with autonomous sampling platforms and satellite-based remote sensing technologies. At the forefront of this transformative research is the Norwegian University of Science and Technology (NTNU). Leveraging cutting-edge tools such as our proprietary hyperspectral nanosatellite, HYPSON, autonomous surface ocean samplers like the Autonaut, the PhytoPlankton Sampler (PPS), the Remote Access Sampler (RAS), as well as aerial and other surface vehicles, our capacity to monitor critical physical and biogeochemical parameters will be enhanced. These technologies offer higher spatial and temporal resolution, crucial for modelling and predicting future events amidst a changing climate. Collaborating with local and international research partners, NTNU aims for a holistic understanding of real-time oceanic changes. Our focus extends to under-studied seasons in remote regions such as the Arctic and the Southern Ocean. The data generated through this collaboration holds the key to nuanced insights, informing better policy decisions in the face of climate challenges.

Tittel	Troll Observing Network Drone Service
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Medforfattere (navn og institusjon)	Andreas Tøllefsen ¹ , Stian Solbø ¹ , Stig Flått ² , Kenichi Matsuoka ² , Christina Pedersen ² ¹ NORCE Norwegian Research Centre ² Norwegian Polar Institute
Ønsket presentasjonsform (muntlig, poster)	Poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktisforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktisforskning <input checked="" type="checkbox"/> Annet (poster)

The TONe infrastructure consists of eight science observatories and a drone service that will extend the geophysical and environmental data collection capabilities in Dronning Maud Land and based out of the Norwegian Troll base in Antarctica. The Drone Service is based on advanced instrumented drones that will on request serve scientist with need of airborne data in Dronning Maud Land. The drone service will consist of two new long range Remotely Piloted Aircraft Systems with a range of about 1000 km and endurance up to 10 Hrs as well as smaller electric multirotor and fixed wing drones will be deployed as part of the service as needed based on requests from the scientific community. The drone service is set up to serve research projects in datacollection that the projects otherwise would not be able to conduct on their own. Yearly deployments serving multiple projects will reduce costs for individual projects as well as reducing risk through the use of professional operators with experience of conducting drone operations in polar environments.

Primary these drones will be equipped with, basic meteorological sensors, hyperspectral imagers, aerial cameras, broadband radiometers, and VHF and UWB microwave radar sounding systems to support the Troll Integrated Cloud Observatory, Fimbulisen Ice Shelf Observatory, Seabird Monitoring Observatory and the Ocean Moored Observatory, as well as other research projects conducted in Dronning Maud Land. Plan is to start deployments in Antarctica starting in the 2026/27 season.

In this presentation we will present the infrastructure capabilities and planned measurements and datasets and the opportunities the infrastructure will offer researchers. We hope this capability will inspire new research projects that will benefit from the drone service at Troll.

Tittel	Shaping the future of polar research
Førsteforfatters navn	Sarah Marie Strand
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Førsteforfatters institusjon	Association of Polar Early Career Scientists (APECS) & UiT The Arctic University of Norway
Medforfattere (navn og institusjon)	Axel Schlindwein, Association of Polar Early Career Scientists (APECS) & UiT The Arctic University of Norway
Ønsket presentasjonsform (muntlig, poster)	poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

The Association of Polar Early Career Scientists (APECS) is an international and interdisciplinary organization for early career individuals with interests in the polar and alpine regions and the wider cryosphere. APECS aims to: (1) create a network of polar researchers across disciplines and national boundaries to meet, share ideas and experiences, and develop new research directions and collaborations, (2) provide career development opportunities in both traditional and alternative polar-, alpine- and cryosphere-related professions, and (3) promote education and outreach as an integral component of polar research and to stimulate future generations of polar leaders. APECS is constantly growing and currently has approximately 30 National Committees and over 5000 members from more than 80 countries.

The APECS International Directorate is currently hosted by UiT The Arctic University of Norway, the Norwegian Polar Institute and the Fram Centre and is physically located at UiT's Campus Breivika in the University Library – Culture and Social Sciences. Although APECS is currently based in the Arctic, it is a truly polar organization with numerous members and activities having an Antarctic focus. APECS welcomes all self-identifying early career individuals in the polar arena to join the network, direct APECS' activities and shape the future of polar research.

Tittel	Weddell Watch and The Ghost of Antarctica
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Ønsket presentasjonsform (muntlig, poster)	poster
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

Ved denne poster standen presenterer vi vår Antarktiskforskning, vårt framtidsretta observasjonssystem og korleis vi formidlar kunnskap om kva som skjer i Antarktis og Sørishavet.

Tittel	Seasonal acoustic presence of marine mammals at the South Orkney Islands, Scotia Sea
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Førsteforfatters institusjon	Havforskningsinstituttet
Medforfattere (navn og institusjon)	Heidi Ahonen (Polar Instituttet) Andrew Lowther (Polar Instituttet) Sebastian Menze (Havforskningsinstituttet) Bjørn Krafft (Havforskningsinstituttet) Ulf Lindstrøm (Universitetet i Tromsø & Havforskningsinstituttet)
Ønsket presentasjonsform (muntlig, poster)	Poster presentasjon
Fagøkt	<input type="checkbox"/> Tema 1: Antarktiskforskning er min fremtid <input type="checkbox"/> Tema 2: Min forskning i en bredere sammenheng <input type="checkbox"/> Tema 3: Fremtidssikring av norsk antarktiskforskning <input checked="" type="checkbox"/> Annet (poster)

Increased knowledge about marine mammal seasonal distribution and species assemblage from the South Orkney Islands waters is needed for the development of management regulations of the commercial fishery for Antarctic krill (*Euphausia superba*) in this region. Passive acoustic monitoring (PAM) data were collected during the autumn and winter seasons in two consecutive years (2016, 2017), which represented highly contrasting environmental conditions due to the 2016 El Niño event. We explored differences in seasonal patterns in marine mammal acoustic presence between the two years in context of environmental cues and climate variability. Acoustic signals from five baleen whale species, two pinniped species and odontocete species were detected and separated into guilds. Although species diversity remained stable over time, the ice-avoiding and ice-affiliated species dominated before and after the onset of winter, respectively, and thus demonstrating a shift in guild composition related to season. Herein, we provide novel information about local marine mammal species diversity, community structure and residency times in a krill hotspot. Our study also demonstrates the utility of PAM data and its usefulness in providing new insights into the marine mammal habitat use and responses to environmental conditions, which are essential knowledge for the future development of a sustainable fishery management in a changing ecosystem.