



**RAPPORT FRA
3DJE ANTARKTISSEMINARET
6.-7. oktober 2020**



Rapporten er sammenstilt av Christina A. Pedersen og Birgit Njåstad (Norsk Polarinstitut) og Jon Børre Ørbæk og Marianne Johansen (Norges forskningsråd).

Oslo, 26.11.2020

Forsidebildet er tatt av Rudi Caeyers (Norsk Polarinstitut).

Innholdsfortegnelse:

Sammendrag av seminaret.....	s. 3
Program for seminaret.....	s. 5
Oversikt over posterpresentasjoner.....	s. 9
Oppsummering tenketank I: (Nasjonal) forskningsinfrastruktur i sør.....	s. 10
Oppsummering tenketank II: Bruk av drone på Troll og ellers i Antarktis....	s. 11
SCAR presentasjoner.....	s. 13
Deltagerliste for seminaret.....	s. 14
Book of Abstracts.....	s. 17

Antarktiseminaret 2020 – Sammedrag

Forskningsrådet og Norsk Polarinstitut arrangerer 6-7. oktober 2020 et seminar for antarktisforskere i Norge. Dette var det tredje i rekken av Antarktiseminarer der de 2 tidligere ble arrangert i 2016 og 2018. Seminaret var også åpent for norske myndigheter og beslutningstakere med interesser og ansvar i Antarktis.

Seminarene skal være en møteplass for alle Antarktisforskere i Norge hvert annet år. På grunn av koronatiltakene lot det seg ikke gjøre å arrangere et fysisk møte i år da det var innført reiserestriksjoner og begrensninger i antall som kunne møtes fysisk. Møtet ble derfor avholdt som et virtuelt møte på zoom-plattformen. Hovedmålet med årets møte ble dermed justert til å være en arena for formidling av aktiviteter, resultater og annen informasjon. Målsetningen med seminaret var å være en:

- møteplass for nye og etablerte antarktisforskere i Norge innen alle fagområder (naturvitenskap, historie, statsvitenskap, mv.)
- arena for formidling av pågående og nylig avsluttede forskningsprosjekter i og om Antarktis
- arena for formidling av rammer og muligheter for norsk antarktisforskning
- tankesmie for utvikling av nye idéer og strategier knyttet til tverrfaglig antarktisforskning

Muligheten for å bli kjent og mingle ble således ikke mulig og hovedaktivitetene ble konsentrert til formidling av aktiviteter, resultater og annen informasjon.

Programmet gikk over 2 dager med 4 tematiske sesjoner med prosjektpresentasjoner, 2 tenketanker som fokuserte på utnyttelse og tilgang til eksisterende norsk forskningsinfrastruktur og logistikk i Antarktis og planlegging av droneinfrastruktur for tverrfaglig forskning knyttet til Troll, 4 parallelle postersesjoner, samt presentasjon av norsk oppfølging av arbeidet i SCAR (Vitenskapskomiteen for Antarktisforskning). Seminaret startet opp med spennende innledningsforedrag av statsekretær Aase Marthe Hørrigmo i Kunnskapsdepartementet, avdelingsdirektør Christina Abildgaard i Forskningsrådet, og direktør Ole Arve Misund i Norsk Polarinstitut.

Møtet ble gjennomført som et zoom-møte uten tekniske problemer av noen art. I spørreundersøkelsen etterpå var de aller fleste godt fornøyd med seminaret, og det understrekes at det er behov for en møteplass som dette. Flere saker det nærmeste året vil ha betydning for norsk Antarktis-forskning. Dette gjelder ikke minst utlysninger under Forskningsrådets polarprogram og infrastrukturordning med relevans for Antarktis, seilingsplaner for FF Kronprins Haakon, arbeidet og norske deltagelse under EU-PolarNet og EU Polar Cluster prosjektene. Anbefalingene om nasjonal samordning og store satsinger fra oppfølgingskomiteen etter polarevalueringen, der forskningssatsing i Antarktis og etablering av nasjonale forskningsnettverk kommer frem, skal også følges opp.



På grunn av koronatiltakene ble årets Antarktisseminar avholdt som et virtuelt møte på zoom-plattformen. Her ser vi noen av deltakerne.

PROGRAM ANTARKTISSEMINAR 2020

Tirsdag 6. oktober

08:00-09:00	<i>Mulighet for å teste oppkoblingen</i>	
09:00-09:30	Velkommen Chair: Nalan Koc, NP	
	Velkommen fra Norsk Polarinstitutt	Ole Arve Misund, NP
	Velkommen fra Forskningsrådet	Christina Abildgaard, Forskningsrådet
	Velkommen fra Kunnskapsdepartementet	Aase Marthe Horrigmo, statssekretær
09:30-10:00	Utgikk: Nøkkelinledning Antarctic research – priorities and partnerships in a time of pandemic	David Vaughan, Director of Science, BAS
10:00-11:00	Tema I Geologiske prosesser Chair: Ivar Berthling, Forskningsrådet	
10:00-10:15	Extensive cavitation weathering formation through central Dronning Maud Land	Synnøve Ellevold, NP for Ane Engvik, NGU
10:15-10:30	United plates of Dronning Maud Land revealed by Connecting Geology & Geophysics (CGG)	Joachim Jacobs, UiB
10:30-10:45	Magma mingling in post-collisional intrusions in Gjelsvikfjella and Mühlig-Hofmannfjella	Synnøve Ellevold, NP
10:45-11:00	Refleksjoner	
11:00-12:00	Pause	
12:00-13:45	Tema II Fysiske prosesser Chair: Christina A. Pedersen, NP	
12:00-12:15	Physical and optical properties of snow on the high Antarctic plateau	Jean-Charles Gallet, NP
12:15-12:30	Late glacial and Holocene glacier fluctuations at the Sub-Antarctic Island Kerguelen in the Southern Indian Ocean	Jostein Bakke, UiB
12:30-12:45	Long-term landscape evolution and last glacial cycle ice surface variations in western Dronning Maud Land, East Antarctica	Ola Fredin, NGU
12:45-13:00	India-Norway MADICE project: visions, achievements and future plans	Kenichi Matsuoka, NP
13:00-13:15	Utgikk: Air monitoring of organic contaminants at the Trollhaugen Observatory in Antarctica	Pernilla Bohlin-Nizzetto, NILU
13:15-13:30	Første resultater fra det ionosfæriske observatoriet på Troll	Wojciech Miloch, UiO
13:30-13:45	Refleksjoner	
13:45-14:00	Pause	

<p>14:00-14:45</p>	<p>Tenketank I: Nasjonal forskningsinfrastruktur i sør Ansvarlig: Birgit Njåstad, NP</p> <p>Denne tenketanken har to deler: Første del gir en beskrivelse av de nasjonale infrastrukturene i sør som driftes av NP på vegne av Norge, og hvor NP legger til rette for bruk. Disse inkluderer både landbaserte og marine infrastrukturer, samt tilgang til tjenester, logistikkstøtte og internasjonalt nettverk av logistikk. Andre del åpner opp for refleksjoner fra deltagerne og dialog omkring tilgang og bruk.</p>	
<p>14:45-15:00</p>	<p>Pause</p>	
<p>15:00-15:45</p>	<p>Tenketank II: Bruk av drone på Troll og ellers i Antarktis. Ansvarlig: Rune Stolvold, NORCE og Stig Flått, NP</p> <p>Bruk av drone for innsamling av vitenskapelige data med utgangspunkt i Troll, åpner opp for nye muligheter for å studere kryosfæren, atmosfæren, økosystemer og havet i Dronning Maud Land. Gjennom Forskningsrådets infrastrukturutlysning og prosjektsøknaden Troll Observing Network ønsker vi å bygge opp en dronekapasitet på Troll, tett knyttet opp mot nåværende og framtidige observatorier. I denne tenketanken vil NP og NORCE presentere initiale planer for en slik tjeneste og be om innspill fra fagmiljøene i forhold til faglige behov, kapasitet og prioriteringer.</p>	
<p>18:00-20:30</p>	<p>Lokal sammenkomst i Lysgården, Framsentret, for de som befinner seg i Tromsø. Det har vært en separat påmelding for dette. Det vil bli servering av smittesikker tapas og drikke.</p> <p>Svein Østerhus, NORCE, vil kåsere online omkring sin forskning fra 1968 da Kvinge satte ut de første måleriggene i Weddellhavet, fram til dagens store spørsmål om vippepunkt i det Antarktiske klimasystemet.</p> <p>Og det vil bli boklansering av boka <i>Life of the Antarctic ice - from deep inland to the coast</i></p> <p>For de som ikke kan delta i Tromsø, vil kåseriet og boklanseringen strømmes.</p>	

Onsdag 7. oktober

08:00-09:00	<i>Mulighet for å teste oppkoblingen</i>	
09:00-09:45	Presentasjoner fra de norske representantene i SCAR arbeidsgruppene. Chair: Birgit Njåstad, NP	
09:00-09:15	Physical Science	Kenichi Matsuoka, NP
09:15-09:30	Life Science	Bjørn A. Krafft, HI
09:30-09:45	Geoscience	Synnøve Elvevold, NP
09:45-10:05	Refleksjon og betraktninger fra salen: Hva skal til for at norske forskere skal engasjere seg og bidra mer aktivt inn i SCARs arbeid?	
10:05-10:15	Oppsummering: tenketank II	Rune Storvold, NORCE og Stig Flått, NP
10:15-11:00	Digital postersesjon - parallelle sesjoner for hvert temaområde <i>Temaområde 1: Geologiske prosesser</i> <i>Temaområde 2: Fysiske prosesser – marine miljø</i> <i>Temaområde 3: Fysiske prosesser – terrestrisk og atmosfære</i> <i>Temaområde 4: Økosystemprosesser/-forståelse</i> Sesjonene starter med en 1-min presentasjon av hver poster, og etterfølges av samtale/dialog mellom postereierne og deltagerne på sesjonen Hvert tema har et eget zoom møte . Deltagerne kan logge inn i de møtene de ønsker	
11:00-11:15	Pause	
11:15-12:55	Tema III Økosystemprosesser/-forståelse Chair: Jon Børre Ørbæk, Forskningsrådet	
11:15-11:35	Oppblomstringsdynamikken av planteplankton i Kong Håkon VII hav, Sørishavet	Hanna Kauko og Sebastien Moreau, NP
11:35-11:55	Spatial distribution and temporal dynamics of Antarctic krill, from hotspots to populations	Martin Biuw og Thor Aleksander Klevjer, HI
11:55-12:10	Ocean CO2 chemistry, air-sea CO2 fluxes and ocean acidification in the ice-covered Southern Ocean in autumn, near the coast off Dronning Maud Land/Kong Håkon VII Sea	Agneta Fransson, NP
12:10-12:25	Beitestrategi i forhold til sjøisdynamikk påvirker individuell tilstand av Antarktispetreller i hekkeperiode	Arnaud Tarrow, NINA
12:25-12:40	The Ecology of Antarctic Blue Ice: The BIOICE Project	Andy Hodson, UNIS
12:40-12:55	Refleksjoner	

12:55-13:30	Pause	
13:30-15:15	Tema IV Forvaltning og policy <i>Chair: Ellen Øseth, NP</i>	
13:30-13:45	Large scale krill survey in the Southern Ocean	Bjørn A. Krafft, HI
13:35-14:00	West Antarctic Peninsula Mythbusters – Climate change and krill fishing	Andy Lowther, NPI
14:00-14:15	Climate Change and the Management of Antarctic Krill Fisheries	Olav Schram Stokke, UiO
14:15-14:30	The Ross Sea: Exploration – Exploitation - Politics	Bjørn L. Basberg, NHH
14:30-14:45	Revisiting Bioprospecting in the Southern Ocean in the context of the BBNJ-Negotiations	Philipp Nickels, UiT
14:45-15:00	Political Philosophy Looks to Antarctica: Third year review	Alejandra Mancilla, UiO
15:00-15:15	Refleksjoner	
15:15-15:30	Nye muligheter og ambisjoner for Antarktiskforskningen	Jon Børre Ørbæk, Forskningsrådet
15:30-15:45	Avslutning	Nalan Koc, NP

Posterpresentasjoner

Presentasjon av	Tittel	Sesjon
Øyvind Sunde, NP	Hoggestabben – example of mixing processes between magmas	1
Per Inge Myhre, NP	Heat producing elements of the stable continental crust in Dronning Maud Land, Antarctica	1
Angelika Renner, HI	Upper ocean properties around the South Orkney Islands, Antarctica, in two years of contrasting sea ice conditions	2
Svein Østerhus, NORCE	Long-term observing system for the oceanic regime of Filchner-Ronne Ice Shelf, Antarctica (Weddell Watch)	2
Svein Østerhus, NORCE	Tipping Points in Antarctic Climate Components (TiPACCs)	2
Laura de Steur, NP	Ocean-ice shelf Interaction and channelized Melting in Dronning Maud Land (iMelt)	2
Dmitry Divine, NP	Ship's logbooks from Antarctic whaling and research vessels – a goldmine of weather and sea ice data for the pre-IGY 1957 period	2
Wenche Aas, NILU	Air monitoring at the Trollhaugen Observatory in Antarctica	3
Kenichi Matsuoka, NP	Rings4Saga: an ambition to conduct airborne surveys of bed topography all around the entire Antarctic Ice Sheet	3
Kenichi Matsuoka, NP	Quantarctica: Free Antarctic GIS datasets	3
Elisabeth Isaksson, NP	The methanesulphonic acid (MSA) record in snow, firn and ice as a proxy for marine productivity; examples from Fimbulisen in Dronning Maud Land	3
Ashley Morris, NP	Remote sensing of ice shelf basal melting in Dronning Maud Land, Antarctica	3
Anne-Katrine Faber, UiB	Spatial variability of polar moisture transport and relation to ice cores	3
Nina Dehnhard, NINA	Stort overlapp i habitatbruk og diett men forskjeller i flyveadferd til næringsøksområdene hos fulmarine petreller i Antarktis	4
Jesamine Bartlett, NINA	Hvordan å være en vellykket inntrenger: Leksjoner fra en Antarktisk romvesen	4
Rune Øyerhamn, NORCE	Autonomous surface vehicles for (near real-time) monitoring of marine resources in the Antarctic	4
Tore Hattermann, NP	Trollbåten—En ny plattform for forskning i Sørishavet	4

Oppsummering

Tenketank I: (Nasjonal) forskningsinfrastruktur i sør.

Ansvarlig: Birgit Njåstad, NP

Formålet med Tenketank I var å gi en beskrivelse av de nasjonale infrastrukturene i sør som driftes av NP på vegne av Norge og hvor NP legger til rette for bruk - både landbaserte og marine infrastrukturer - samt tilgang til tjenester, logistikkstøtte og internasjonalt nettverk av logistikk. Videre ble det åpnet for refleksjon og dialog rundt tilgang og bruk av denne infrastrukturen.

Følgende infrastruktur ble beskrevet;

- **Forskningsstasjonen Troll** som er plattform for overvåking og nærfelt og utgangspunkt for fjernfelt. Troll kan benyttes for alle godkjente/finansierte prosjekter fra alle norske (og internasjonale) forskningsmiljøer
- Tilrettelegging for **fjernfeltaktivitet**, inkl. transekter, flyaktivitet, feltleirer, sikkerhet i felt. Aktører oppfordres til å gå i dialog med NP om tilrettelegging av logistikk for fjernfeltaktivitet på så tidlig tidspunkt som mulig
- **Forskningsskipet Kronprins Haakon**. Planlegges regelmessig tokt, ca. hvert 5 år. Vil være tilgjengelig for finansierte prosjekter.
- **Forsyningsskip** som forskningsplattform. NP vil sørsommeren 2020-2021 gjennomføre et pilotprosjekt for å teste muligheter og begrensninger ved å benytte forsyningsskipet til Troll som forsknings-/overvåkingsplattform. I fremtiden vil det være mulig med bredere tilgang, dog begrenset av kapasitet.
- **Frakt av gods** til Troll. Antarktisk er utfordrende og kostbart. Aktører oppfordres til å ta kontakt med NP/OLA for veiledning tidlig.
- **Internasjonal logistikkplattformer**. NP har et bredt nettverk blant de nasjonale antarktiskprogrammene og kan bistå med kontakt og dialog når planlagt aktivitet skjer utenfor NPs geografiske virkeområde.

Hovedmomenter som ble trukket frem i refleksjonsdelen inkluderte:

- Mulig verdi i å i fremtiden utnytte infrastrukturen til å tenke større, flerårige feltbaserte kampanjer som tekker en bredde av fagfolk og fagfelt. NP som nasjonal operatør vil kunne legge til rette for logistikk-plattform for store internasjonale prosjekter. Troll har en unik lokalitet som kan gi mange muligheter, bl.a. inngangsport som gir tilgang til platået og til kysten av DML.
- Den vedvarende utfordring knyttet til tilrettelegging og finansiering av tokt for det bredere forskningsmiljøet. Dette er en overordnet og strategisk utfordring som må diskuteres nærmere av primært NFR og NP mhp. fremtidig håndtering.

Oppsummering

Tenketank II: Bruk av drone på Troll og ellers i Antarktis.

Ansvarlig: Rune Storvold, NORCE og Stig Flått, NP

Bruk av drone for innsamling av vitenskapelige data med utgangspunkt i Troll, åpner opp for nye muligheter for å studere kryosfæren, atmosfæren, økosystemer og havet i Dronning Maud Land. Gjennom Forskningsrådets infrastrukturutlysning og prosjektsøknaden Troll Observing Network ønskes det å bygge opp en dronekapasitet på Troll, tett knyttet opp mot nåværende og framtidige observatorier.

I denne tenketanken presenterte NP og NORCE initiale planer for en slik tjeneste og ba om innspill fra fagmiljøene i forhold til faglige behov, kapasitet og prioriteringer.

Tenketanken hadde godt oppmøte og stort engasjement fra en bredde av fagfolk.

Mulige dronebaserte observasjonstjenester basert på tilbakemeldinger om behov fra forskermiljøet i tenketanken:.

Kryosfære

- Kartlegging av regional nedbørsfordeling siste 200 i DML ved bruk av UWB GHz radar sounder på MALE drone
- Kartlegging av bedrock og bunnlinje topografi langs kysten av DML med VHF radar på MALE drone
- Bathymetry under iskapen med gravimeter

Geologi

- Geologisk kartlegging med hyperspectral sensor og/eller magnetometer
- Forvittringsprosesser med Lidar eller SfM fotogrammetri

Atmosfære

- Profilering av meteorologiske parametre gjennom boundary layer (VTOL drone)
- Skyegenskaper, LWC, IWC, dråpe og is partikkel konsentrasjon og størrelsesfordeling, (i.e. CPI på drone)
- CCN og IN konsentrasjoner, vannisotopmålinger,
- Energibalanse (Både VTOL og MALE drone målinger interessante.
- Aerosol egenskaper
- Ønske om helårlig kapasitet (VTOL).

Havet

- Se ned i øvre vannkolonne for konsentrasjon av f.eks krill, plankton – Lidar? Hyperspektralt
- Primærproduksjon langs iskanten (Hyperspektral sensor på MALE drone)
- Data mule, droppe triggere for å utløse bunn festede kommunikasjons system når isfritt.

Viktige egenskaper

- Lang rekkevidde på MALE drone
- VTOL må kunne opereres av stasjonspersonell for å sikre helårlig tilgjengelighet
- Øke utholdenhet på VTOL med hybrid løsning interessant spesielt ved operasjon fra båt
- Mulig med operasjon fra andre stasjoner i DML regionen
- Fjernstyring fra Norge på lange mission og sanntids mulighet for forskere å følge operasjonen og data fangst i sanntid (Sikrer optimal datakvalitet)

SCAR presentasjoner

De tre SCAR presentasjonene som ble lagt frem på Antarktisseminaret ligger [her](#)

Deltagerliste Antarktisseminaret 6.-7.10.2020

Etternavn	Fornavn	Institusjon
Abildgaard	Christina	Norges forskningsråd
Ahonen	Heidi	Norsk Polarinstitut
Andersen	Geir	Norsk Polarinstitut
Assmann	Karen	Havforskningsinstituttet
Bakke	Jostein	Universitetet i Bergen
Bartlett	Jesamine	Norsk institutt for naturforskning (NINA)
Basberg	Bjørn L.	Norges Handelshøyskole
Biuw	Martin	Havforskningsinstituttet
Blanchet	Marie-Anne	Norsk Polarinstitut
Blévin	Pierre	Akvaplan niva
Bohlin-Nizzetto	Pernilla	NILU - Norwegian Institute for Air Research
Bælum	Karoline	Svalbard Science Forum
Campbell	Karley	UiT Norges arktiske universitet
Chierici	Melissa	Havforskningsinstituttet
Dahle	Salve	Akvaplan niva
Damm-Johnsen	Thale	Durham University
De Lucia	Vito	Norwegian Center fr the Law of the Sea, UiT
de Steur	Laura	Norsk Polarinstitut
Dehnhard	Nina	Norsk institutt for naturforskning (NINA)
Descamps	Sebastien	Norsk Polarinstitut
Divine	Dmitry	Norsk Polarinstitut
Domaas	Christel	UiT - Universitetsbiblioteket
Elvevold	Synnøve	Norsk Polarinstitut
Faber	Anne-Katrine	Universitetet i Bergen
Falk-Petersen	Stig	Akvaplan niva
Flått	Stig	Norsk Polarinstitut
Fransson	Agneta	Norsk Polarinstitut
Fredin	Ola	Norges Geologiske Undersøkelse/NTNU
Gallet	Jean-Charles	Norsk Polarinstitut
Gerland	Sebastian	Norsk Polarinstitut
Glück-Teigland	AK	Sydpolen 2022
Goodwin	Harvey	Norsk Polarinstitut
Grafsrønningen	Stig	Aker BioMarine AS
Griffith	Gary	Norsk Polarinstitut
Guldahl	John E	Norsk Polarinstitut
Halvorsen	Svein Tore	Klima- og miljødepartementet
Hattermann	Tore	Norsk Polarinstitut
Haug Khoury	Runa	Aker BioMarine AS
Henaug	Cathrine	Norsk institutt for naturforskning (NINA)
Hodson	Andy	UNIS

Hoem	Nils	Aker BioMarine AS
Hollænder	Anna	Havforskningsinstituttet
Horrigmo	Aase Marthe	Kunnskapsdepartementet
Hudson	Stephen	Norsk Polarinstitutt
Husum	Katrine	Norsk Polarinstitutt
Isaksson	Elisabeth	Norsk Polarinstitutt
Jacobs	Joachim	Universitetet i Bergen
Johansen	Marianne	Norges forskningsråd
Jones	Elizabeth	Havforskningsinstituttet
Jørgensen	Evy	Norsk Polarinstitutt
Kauko	Hanna	Norsk Polarinstitutt
Klevjer	Thor Aleksander	Havforskningsinstituttet
Koc	Nalan	Norsk Polarinstitutt
Kovacs	Kit	Norsk Polarinstitutt
Krafft	Bjørn A.	Havforskningsinstituttet
Langebroek	Petra	NORCE & Bjerknes Centre for Climate Research
Lauber	Julius	Norsk Polarinstitutt
Lauknes	Tom Rune	NORCE
Lidström	Sven	Norsk Polarinstitutt
Lie	Bente	Kunnskapsdepartementet
Lith	Aniek	Norsk Polarinstitutt
Lorentsen	Svein-Håkon	Norsk institutt for naturforskning (NINA)
Lowther	Andy	Norsk Polarinstitutt
Lunder	Chris	NILU - Norwegian Institute for Air Research
Mancilla	Alejandra	Universitetet i Oslo
Marthinsen	Ingvild	Norges Forskningsråd
Matsuoka	Kenny	Norsk Polarinstitutt
Merkel	Benjamin	Akvaplan niva
Miloch	Wojciech	Universitetet i Oslo
Misund	Ole Arve	Norsk Polarinstitutt
Moholdt	Geir	Norsk Polarinstitutt
Moreau	Sebastien	Norsk Polarinstitutt
Morris	Ashley	Norsk Polarinstitutt
Myhre	Per Inge	Norsk Polarinstitutt
Nakken	Jorunn	Kunnskapsdepartementet
Nickels	Philipp	UiT Norges arktiske universitet
Njåstad	Birgit	Norsk Polarinstitutt
Nortvedt	Phillip	Dialogos
Nyborg	Marit	Klima- og miljødepartementet
Paulsen	Steinar	UiT Norges arktiske universitet
Pedersen	Christina A	Norsk Polarinstitutt
Rapp	Mariam	Troms og Finnmark KrF Kvinner
Renaud	Paul	Akvaplan niva

Renner	Angelika	Havforskningsinstituttet
Salo	Anja Kristine	Norsk Polarinstitutt
Schweitzer	Johannes	NORSAR
Sidhu	Maan Singh	Innovation Norway, India
Skogrand	Pål	Aker BioMarine AS
Skuland	Brita	Norges Forskningsråd
Solberg.	Lars Vegard	Nord universitet
Stokke	Olav Schram	Universitetet i Oslo
Storvold	Rune	NORCE
Strømseng	Jon Hugo	Norsk Polarinstitutt
Sunde	Øyvind	Norsk Polarinstitutt
Tarroux	Arnaud	Norsk institutt for naturforskning (NINA)
Tronstad	Stein	Norsk Polarinstitutt
V. Ardelan	Murat	NTNU
Vaughan	David	British Antarctic Survey
Vijay Mahagaonkar	Anirudha	Norsk Polarinstitutt
von Quillfeldt	Cecilie	Norsk Polarinstitutt
Wang	Cheng-Cheng	Universitetet i Bergen
Zhou	Qin	Akvaplan niva
Ørbæk	Jon Børre	Norges Forskningsråd
Øseth	Ellen	Norsk Polarinstitutt
Østerhus	Svein	NORCE
Øyerhamn	Rune	NORCE
Aas	Wenche	NILU - Norwegian Institute for Air Research

Antarktisseminaret 2020

Book of Abstracts

Table of Contents

Aas, Wenche	3
Bakke, Jostein	4
Bartlett, Jesamine	5
Basberg, Bjørn L.	6
Biuw, Martin	7
Biuw, Martin/Klevjer, Thor	8
Bohlin-Nizzetto, Pernilla	9
Denhard, Nina	10
Divine, Dmitry	11
Elvevold, Synnøve	12
Engvik, Ane K.	13
Faber, Anne-Katrine	14
Fransson, Agneta	15
Fredin, Ola	16
Gallet, Jean-Charles	18
Hattermann, Tore	19
Hodson, Andrew	20
Isaksson, Elisabeth	22
Jacobs, Joachim	23
Jacobs, Joachim	24
Kauko, Hanna	25
Klevjer, Thor	26
Krafft, Bjørn A.	27
Lindbäck, Katrin	28
Lowther, Andy	29
Mancilla, Alejandra	31
Matsuoka, Kenichi	32
Matsuoka, Kenichi	33
Matsuoka, Kenichi	34
Matsuoka, Kenichi	35
Matsuoka, Kenichi	36
Miloch, Wojciech	37
Moreau, Sebastien	38
Morris, Ashley	39
Myhre, Per Inge	40
Nickels, Philipp	41
Pedersen, Geir	42
Renner, Angelika	43
de Steur, Laura	44
Stokke, Olav Schram	45
Tarroux, Arnaud	46
Østerhus, Svein	48
Østerhus, Svein	49

Tittel	Air monitoring at the Trollhaugen Observatory in Antarctica
---------------	--

Innsenders fornavn	Wenche
Innsenders etternavn	Aas
Epost	waa@nilu.no
Forfatterliste (Fornavn Etternavn)	Wenche Aas, Sabine Eckhardt, Nikolaos Evangeliou, Markus Fiebig, Georg Hansen, Chris Lunder, Cathrine Lund Myhre, Pernilla Bohlin-Nizzetto, Katrine Aspomo Pfaffhuber, Stephen Platt, Norbert Schmidbauer, Sverre Solberg, Tove Svendby, Karl Espen Yttri.
Institusjon (affiliations)	NILU – Norsk Institut for Luftforskning

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

The Atmospheric Observatory is located at Trollhaugen mountain, not far from the Norwegian research station Troll in Dronning Maud Land, Antarctica. The Troll observatory was established in January 2007, initially near the main station, but was moved to the mountain Trollhaugen in February 2014. The observatory is unperturbed by local activity, and its location at 1553 masl. between the Antarctic plateau and the coast is unique on the continent. Trollhaugen is one of the few observatories that has continuous year-round monitoring in Antarctica. The following are measured at Trollhaugen:

- Mercury
- Ground-level ozone
- Aerosols (physical and optical properties)
- UV radiation and total ozone
- Organic environmental pollutants (POPs)
- Hydrocarbons, CFCs, HCFCs and HFCs
- CO₂ and CO

Similar observations are also being conducted in the Arctic at the Zeppelin Observatory in Svalbard. By comparing measurement results from the two polar stations, one may acquire important new knowledge about transport and effects related to pollution on a global scale.

This poster presents an overview of all the atmospheric observations at Trollhaugen, trends and discussion of where the pollution is coming from and compared to observations in the Arctic when relevant.

Tittel	Late glacial and Holocene glacier fluctuations at the Sub-Antarctic Island Kerguelen in the Southern Indian Ocean
---------------	--

Innsenders fornavn	Jostein
Innsenders etternavn	Bakke
Epost	Jostein.Bakke@uib.no
Forfatterliste (Fornavn Etternavn)	Jostein Bakke ¹ , Fabien Arnaud ² , Philip Deline ² , Charline Guiguet-Covex ² , Henriette Linge ¹ , Ludovic Ravel ² , Eivind Støren ¹ and Willem van der Bilt ¹
Institusjon (affiliations)	¹ Department of Earth science and Bjerknes Centre for Climate Research, University of Bergen ² Environnements, Dynamiques et Territoires de la Montagne (EDYTEM), CNRS, Université Savoie Mont Blanc

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktissemnaret 2020.

The Southern Hemisphere's westerly winds play a critical role in regulating Earth's climate by shielding Antarctica from low-latitude heat, driving global ocean circulation and regulate the uptake of CO₂ in the Southern Ocean. Both strength and position of this globally significant atmospheric pattern are rapidly shifting in the face of ongoing global warming. A string of recent studies links these developments to dramatic coupled changes in temperature, precipitation, sea-ice coverage and glacier extent that unfold across the Southern Ocean region. Critically, a lack of baseline information restricts our ability to understand the causes and patterns of these shifts and represent them robustly in the future projections that underpin climate policies. To help do so, we utilize the sensitivity of glaciers to atmospheric climate change and the potential of glacier-fed lake sediments to record this signal through time. For this purpose, we integrate emerging sedimentological, geochemical and glacier modelling tools in a new method framework to reconstruct changes in glacier extent, temperature and precipitation on human-relevant timescales. To do so, we rely on a number of novel sedimentological and geochemical approaches. These include biomarker-based temperature reconstructions, exposure dating of moraines and the use emerging non-destructive scanning techniques (e.g. Computed Tomography – CT) to fingerprint depositional pathways. Our study area in this cross-disciplinary project is the poorly investigated sub-Antarctic Kerguelen Archipelago, well-situated in the core southern westerly wind belt. During an extensive 2019 field campaign, we collected 130 meters of sediment cores from six lakes, 110 rock samples for exposure dating and numerous catchment samples.

Tittel	Hvordan å være en vellykket inntrenger: Leksjoner fra en Antarktisk romvesen
---------------	---

Innsenders fornavn	Jesamine
Innsenders etternavn	Bartlett
Epost	Jesamine.bartlett@nina.no
Forfatterliste (Fornavn Etternavn)	Jesamine Bartlett, Peter Convey, Kevin Hughes, Luis Pertierra, Scott Hayward.
Institusjon (affiliations)	NINA – terrestrisk naturmangfold

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Stigende temperaturer og økt menneskelig aktivitet skaper en 'perfekt storm' for å muliggjøre introduksjon og kolonisering av fremmede arter i Antarktis. En art har vist seg å være en utmerket modell å studere for å øke kunnskapen om spredningsveier, spredning, fysiologiske og økologiske effekter av en enkelt art. Fjærmyggen *Eretmoptera murphyi*, er en aseksuell ikke-flyvende mygg introdusert til Antarktis via menneskelig aktivitet på 1960-tallet. Siden har den utvidet utbredelsen sin til å omfatte nær 1 km² med tettheter så høye som 100,000 individer per m². I løpet av de siste årene har vi oppdaget at arten sannsynligvis er spredt via sålene på tursko. Der den forekommer kan den endre tilgjengelig nitrogen i jorden opptil 3-5 ganger. Gjennom studier av artens fysiologi, vet vi at den kan overleve et visst nivå av global oppvarming, men at den vil trives i kaldere naturtyper på det antarktiske kontinentet. Videre vet vi at nåværende biosikkerhetstiltak er ineffektive mot dette, og til tross for at arten er lever på land, har kapasitet til å tilbringe uker til sjøs. Gjennom denne arten fremhever vi omfanget av innflytelse en tilsynelatende ubetydelig fremmede art kan ha i disse miljøene, og viser hvordan slike studier kan begynne å påvirke diskusjoner og endringer av politikk.

Tittel	The Ross Sea: Exploration – Exploitation - Politics
---------------	--

Innsenders fornavn	Bjørn L.
Innsenders etternavn	Basberg
Epost	Bjorn.basberg@nhh.no
Forfatterliste (Fornavn Etternavn)	
Institusjon (affiliations)	Norges Handelshøyskole / Norwegian School of Economics

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

The Ross Sea: Exploration – Exploitation – Politics

After the discovery by Sir James Clark Ross in 1842, this deep cut into the Antarctic continent became significant for the further development of the region. The Ross Sea became the preferred gateway for the explorers that ventured into the continent itself, eventually reaching the South Pole. The large stocks of whales that Ross sighted, attracted whalers who employed new technology and initiated what was to become known as pelagic whaling. This development of the industry again initiated territorial claims, and from 1923 The Ross Sea Dependency was established by British Order, under the administration of the New Zealand Government.

This paper analysis the human and cultural history of the Ross Sea where exploration, science, commercial exploitation, politics and adventure are highly interlinked and interwoven. The sources are expedition accounts and the extensive literature on Antarctic history and politics. The archives of the Norwegian whaling company A/S Rosshavet, established in 1922, will be a key source. The period around the founding year and first whaling season highlights and illustrates the tension between commerce, territorial claims and international politics.

Tittel	Trends or cycles? A re-analysis of the KRILLBASE dataset
---------------	--

Innsenders fornavn	Martin
Innsenders etternavn	Biuw
Epost	Martin.biuw@hi.no
Forfatterliste (Fornavn Etternavn)	Martin Biuw, Ulf Lindstrøm, Andrew Lowther & Bjørn Krafft
Institusjon (affiliations)	Havforskningsinstituttet (1,2,4); Norsk Polarinstitutt (3)

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktissemiaret 2020.

Antarctic krill is a key species in the marine ecosystem throughout most of the Southern Ocean and represents an increasingly important commercial resource. We discuss an ongoing debate about the existence of a climate driven stock reduction and poleward shift in their distribution within the South Atlantic sector. Recent papers using the KRILLBASE global krill survey dataset differ substantially in terms of screening/filtering and subsequent analyses. While one paper concludes that there is no evidence for a consistent trend in krill distribution or density over time, two other articles describe an apparent dramatic southward range shift and a reduction in krill density over the past four decades. We discuss some potential pitfalls in analysing this type of agglomerated dataset and point out some of the reasons why current analytical approaches are problematic for this dataset. We show how opposing conclusions can be almost entirely attributed to differences in data transformations. Given recent statistical modeling advances which explicitly account for non-gaussian density distributions, we argue that such transformations are both unnecessary and problematic. We describe one recent and appropriate modeling approach that also explicitly models complex spatial, temporal and spatiotemporal dependencies in the data. This approach explains a much greater proportion of the overall variation in the krill data, and it is also more appropriate for examining potential biomass changes and range shifts. Our re-analysis of the data suggests substantial cyclicality (~5-year pulses) in the dynamics of krill densities, but aside from a small number of biomass peaks during the 1970s and 1980s, there is no clear downward trend from the 1990s onwards. While there are also substantial variations in the spatial distribution of krill throughout the time period, there are no indications of a poleward shift. Sound management relies on sound analytical approaches, requires attention to detail in data treatment.

Tittel	Spatial distribution and temporal dynamics of Antarctic krill, from hotspots to populations
---------------	---

Innsenders fornavn	Martin / Thor
Innsenders etternavn	Biuw / Klevjer
Epost	martin.biuw@hi.no / thor.klevjer@hi.no
Forfatterliste (Fornavn Etternavn)	Martin Biuw, Thor Klevjer, Angelika Renner, Ulf Lindstrøm & Bjørn Krafft
Institusjon (affiliations)	Havforskningsinstituttet/ Havforskningsinstituttet

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktiseminaret 2020.

Antarctic krill is a key species in the marine ecosystem throughout most of the Southern Ocean and represents an increasingly important commercial resource. Currently there is an vigorous debate about the existence of climate driven stock reduction and poleward shift in krill distribution within the South Atlantic sector, based on the net-based KRILLBASE circum-Antarctic krill dataset. While some analyses conclude that there is no evidence for a consistent trend in krill distribution or density over time, others purport to describe an apparent dramatic southward range shift and reduction in krill density over the past four decades. We discuss some potential pitfalls in analysing this type of agglomerated dataset and point out some of the reasons why current analytical approaches are problematic for this dataset. Using a recently developed and more appropriate approach that explicitly models complex spatial, temporal and spatiotemporal dependencies in the data, we are able to explain a much greater proportion of the overall variation in the KRILLBASE data. This method is also more appropriate for examining potential biomass changes and range shifts in the dataset. Based on the reanalysis, we see no clear downward trend from the 1990s onwards, and while there are also substantial variations in the spatial distribution of krill throughout the time period, there are no indications of a poleward shift. The KRILLBASE dataset is however based on net catches, which have well known issues when it comes to describing the distribution of highly aggregated organisms. Focusing on the aggregative aspects of krill behaviour, we compare the KRILLBASE data with other available datasets on krill abundance and distribution. The comparison shows that KRILLBASE density estimates are not significantly higher than net estimates from the North Atlantic, whereas acoustic estimates of aggregated macroplankton are clearly higher in the Antarctic. The acoustic results support the canonical understanding of the Antarctic as a more "krill-centric" ecosystem than the North Atlantic, whereas the net data do not. These results highlight that the coupling between KRILLBASE net catches and the stock size of Antarctic krill is currently unknown: will a trend in the krill population, which is predominantly found in aggregation, be reflected in the net catch (i.e. KRILLBASE) data? Sound management relies on sound analytical approaches, requires attention to details in both data collection and treatment.

Tittel	Air monitoring of organic contaminants at the Trollhaugen Observatory in Antarctica
---------------	--

Innsenders fornavn	Pernilla
Innsenders etternavn	Bohlin-Nizzetto
Epost	pbn@nilu.no
Forfatterliste (Fornavn Etternavn)	Pernilla Bohlin-Nizzetto, Anne Karine Halse, Wenche Aas
Institusjon (affiliations)	NILU – Norsk Institutt for Luftforskning

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

The Trollhaugen Atmospheric Observatory in Antarctica is located in Dronning Maud Land at the Nunatek area of Jutulssessen glacier, about 235 km south from the Antarctic coast. An observatory was originally established at Troll and put into operation in 2007 but was then moved to Trollhaugen in 2014. The observatory is driven in close collaboration between the Norwegian Institute for Air Research (NILU) and the Norwegian Polar Institute (NPI). A continuous long-term atmospheric monitoring programme for persistent organic pollutants (POPs) was established at the Observatory in 2007. The programme collects gas- and particle phase by high volume active air samples on a weekly basis (~50 samples per year) to evaluate levels and temporal variability (seasonal, year-to-year). In total, 46 individual POPs have continuously been monitored since the beginning of 2007, including polychlorinated biphenyls (PCBs), chlordanes (CHLs), α - and γ -hexachlorohexanes (HCHs), dichlorodiphenyl-trichloroethane/dichlorodiphenyldichloroethylene (DDT/DDE) and hexachlorobenzene (HCB). In addition, polybrominated diphenyl ethers (PBDEs) have been monitored in periods and new organic contaminants such as chlorinated paraffins and current-used pesticides (CUPs) have been measured in case-studies. The POP data from the air samples is stored in the ebas database. This long-term continuous monitoring of POPs at Troll/Trollhaugen is unique as other measurements of POPs in Antarctic air have been conducted over limited time frames and therefore are unsuitable for temporal trend studies and global monitoring plan (GMP). In this presentation, we will show data on POPs from the long-term monitoring at Troll/Trollhaugen and compare the data to a similar air monitoring program of POPs in the Arctic for the same time period to evaluate differences in trends and distribution between the northern and southern hemisphere. We will also show data on new organic contaminants and results from suspect screening analysis of air samples from Trollhaugen.

Tittel	Stort overlapp i habitatbruk og diett men forskjeller i flyveadferd til næringssøksområdene hos fulmarine petreller i Antarktis
---------------	---

Innsenders fornavn	Nina
Innsenders etternavn	Dehnhard
Epost	Nina.Dehnhard@nina.no
Forfatterliste (Fornavn Etternavn)	Andrew Klekociuk, Louise Emmerson
Institusjon (affiliations)	Norsk Institutt for Naturforskning (NINA), University of Antwerp, Belgium, Australian Antarctic Division, Australia

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Fulmarine petreller i Antarktis, som alle stormfugler, er avhengige av vind og vindmønstre over marine områder for en mest mulig energibesparende flukt. Fysiske lover regulerer flyvehastigheter, og dermed kostnader under næringssøk, under varierende vindhastigheter og retninger. Artsvise forskjeller i belastning på vingene (kroppsmasse per overflateareal) kan ytterligere påvirke flyatferden. Globale klimaendringer forventes å endre vindmønstre og fordelingen av sjøis, viktige beiteområder for fulmarine petreller. Identifikasjon av de viktigste beiteområdene og artenes diettvalg og hvordan varierende vindforhold påvirker flyvemønstre til og fra beiteområdene vil være viktig for å predikere framtidige utbredelsesmønstre.

Gjennom den australske sommeren 2015/16 ble beiteområdebruk hos sørlig havhest (*Fulmarus glacialisoides*), antarktispetrell (*Thalassoica antarctica*) og flekkpetrell (*Daption capense*) i Prydz Bay-regionen (Øst-Antarktis) i ungeperioden sporet ved bruk av GPS-loggere. Diettoverlapp hos artene ble undersøkt ved hjelp av stabile isotoper. De tre artene viser en gradient i masse- og vingebelastning, der sørlig havhest er omtrent dobbelt så tunge som flekkpetreller, mens antarktispetreller har den høyeste vingebelastningen.

De tre artene viste en høy overlapp i bruken av beiteområder, trofisk næringsnivå (diett) samt tidspunktet for næringssøk. Vindretning i forhold til flyveretningen, og hvorvidt de opplevde mot- eller medvind påvirket ikke hvor langt borte fra kolonien de søkte etter mat. Vindhastigheter og vindretning hadde imidlertid tydelige effekter på flyvehastighet for de tre artene, der antarktispetrell oppnådde de høyeste hastighetene. Alle tre artene oppnådde høyere flyvehastighet under medvind, spesielt til og fra beiteområdene, da belastningen på vingene økte siden fuglene bar mat til ungene.

Tittel	Ship's logbooks from Antarctic whaling and research vessels – a goldmine of weather and sea ice data for the pre-IGY 1957 period
---------------	--

Innsenders fornavn	Dmitry
Innsenders etternavn	Divine
Epost	dmitry.divine@npolar.no
Forfatterliste (Fornavn Etternavn)	D.V.Divine and E.Isaksson
Institusjon (affiliations)	Norsk Polarinstitut

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

There is a substantial gap in our knowledge of the climate in the Southern Ocean and Antarctica before the IGY-1957 when the first observational network in the region was established. Compared with a relative abundance of instrumental climate data from the Northern Hemisphere, the Antarctic region is still largely underrepresented suffering from paucity and shortness of available instrumental series. This limits the skills of climate reanalysis products and climate models for the region with implications for understanding the signature and effects of possible future anthropogenic warming in the Antarctic region.

Complementary data sources such as ships' logbooks have proven to be a successful tool in reconstructing past marine climate. Although recent years have seen significant efforts in the recovery of information from ships logbooks, data from the Antarctic region are largely yet to be recovered and analyzed. In contrast to logbooks from infrequent Antarctic expeditions, accounts from commercial vessels are much more abundant and represent a promising source of valuable climate information. Economic activity in the region started as early as in the late 19th century. A growing number of vessels from different national whaling fleets have been active in the area during austral late spring to early fall until the introduction of restrictions on the SO whaling in the late 1960s. The Norwegian fleet operated in the region since the late 19th century with tens of vessels annually present in the whaling grounds of the Southern Ocean. This poster presents some of the available accounts from Norwegian vessels, demonstrating a potential of these data sources for climate studies.

Tittel	Magma mingling in post-collisional intrusions in Gjelsvikfjella and Mühlig-Hofmannfjella
---------------	--

Innsenders fornavn	Synnøve
Innsenders etternavn	Elvevold
Epost	elvevold@npolar.no
Forfatterliste (Fornavn Etternavn)	Ane K. Engvik, Per Inge Myhre, Joachim Jacobs
Institusjon (affiliations)	Norsk Polarinstitutt, Norges geologiske undersøkelse, Universitetet i Bergen

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

The bedrock of central Dronning Maud Land gives us a glimpse into the nature of the largely subglacial Antarctic continent. Near the Norwegian Troll station the exposed rocks consist of a series of granitoid magmatic rocks emplaced in high-grade metamorphic host rocks. The magmatic suite comprises granite, charnockite, monzonite, syenite and gabbro, as well as several generations of dikes ranging in composition from granitic to gabbroic/dioritic. The magmatic rocks intruded and crystallized at mid-crustal levels during a late stage of the Pan-African orogeny in the Cambrian (540-495 Ma).

Observations during field work in Gjelsvikfjella and Mühlig-Hofmannfjella have revealed different types of interaction between coeval felsic and mafic magmas. The principle types of exchange between coexisting magmas are thermal, chemical and mechanical interaction. Chemical mixing between two magmas will form a magma of a composition somewhere between the two end-member magmas. Mechanical interaction, known as magma mingling, will result in a visible blend of two rocks types where the original magmas partially retain their identities. We will present a variety of macroscopic evidence for magma mingling in the form of mafic magma enclaves and composite dikes.

Further studies, including U-Pb geochronology, major and trace element analyses and whole-rock Sr-Nd-Hf isotopic analyses, will be performed in order to evaluate the petrogenesis and the genetic links between the felsic and mafic magmas.

Tittel	Extensive cavitation weathering formation through central Dronning Maud Land
---------------	---

Innsenders fornavn	Ane K.
Innsenders etternavn	Engvik
Epost	ane.engvik@ngu.no
Forfatterliste (Fornavn Etternavn)	Ane K. Engvik ¹ , Synnøve Elvevold ² , Per Inge Myhre ² og Joachim Jacobs ³
Institusjon (affiliations)	1 Norges geologiske undersøkelse 2 Norsk Polarinstitut 3 Institutt for geovitenskap, Universitetet i Bergen

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Cavitation weathering, a rock weathering structure named tafone, are natural small-scale, ellipsoid bowl-shaped cavities on bedrock surfaces. They occur typical in groups and vary in size up to about one meter. In central Dronning Maud Land, we document tafoni over a wide geographical area of the frigid desert area from Jutulsessen in Gjelsvikfjella and eastwards through Mühlig-Hofmannfjella. In a selected area of Jutulsessen we show more detailed documentation of its frequency and extension. Cavernous weathering is developed on steep, exposed cliffs, on flat-lying surfaces as well as on oblique rock surfaces. The tafoni are formed in a wide range of rock types such as granite, charnockite and migmatite, which are medium- to coarse grained. The size and shape of the tafoni varies. Most cavities are round to oval shaped and are decametric in size. The largest caves appear on vertical or near-vertical rocks surfaces and can be up to 1.5 m in diameter and 1 m deep. Its formation mechanism is discussed with regards to mechanical processes in the extreme climate conditions. The wide Antarctica continent shows many relevant factors for the development of tafoni; a frigid desert climate, long exposure time of rock surface in nunataks, and locally strong wind facilitating mechanical weathering. In addition, the bed rock has an impact on the tafone development with respect to lithology, mineralogy, textural and structural control in macro and micro scale.

Tittel	Spatial variability of polar moisture transport and relation to ice cores
---------------	--

Innsenders fornavn	Anne-Katrine
Innsenders etternavn	Faber
Epost	akfaber@uib.no
Forfatterliste (Fornavn Etternavn)	Harald Sodemann, Hans Christian Steen-Larsen
Institusjon (affiliations)	Bjerknes Centre for Climate Research, Geophysical Institute, University of Bergen

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktissemnaret 2020.

Spatial variability of polar moisture transport and relation to ice cores.

Understanding the polar moisture transport is vital for describing the processes affecting the energy and surface mass balance of the Ice sheets. In addition, the interpretation of isotope records from Antarctic and Greenland ice cores signal relies on the knowledge on the underlying moisture transport and variability hereof.

The combination of backward trajectories and moisture source diagnostics can be used to identify moisture sources for both precipitation and near-surface vapor for the polar ice sheets.

Here we explore the spatiotemporal variability of moisture sources for polar ice sheets. Further, we evaluate moisture transport in relation to ice core isotopic composition observations of snow and ice and explore how moisture sources of precipitation and near-source vapor can differ.

Availability of water vapor, formation of clouds and precipitation are all essential for shaping the radiative and hydrological conditions of the Polar climate system. Therefore analysis of drivers of polar moisture transport provide an important contribution to the understanding on how moisture variability influences the energy budget and surface mass balance of the polar ice sheets.

Ocean CO₂ chemistry, air-sea CO₂ fluxes and ocean acidification in the ice-covered Southern Ocean in autumn, near the coast off Dronning Maud Land/Kong Håkon VII Sea

Agneta Fransson¹, Melissa Chierici², Margret Ogundare³, Tore Hattermann¹, Warren Joubert⁴, Hanna Kauko¹, Murat Ardelan⁵, Pedro Monteiro⁴, Sebastien Moreau¹, Thato Mtshali⁴, Thomas Ryan-Keogh⁴, Alakendra Roychoudhury³, Asmita Singh³, Laura de Steur¹, Nicholas Sanchez⁵, Sandy Thomalla⁴

¹Norwegian Polar Institute, Fram Centre, Tromsø, Norway

²Institute for Marine Research, Fram Centre, Tromsø, Norway

³Stellenbosch University, Stellenbosch, South Africa

⁴Southern Ocean Carbon and Climate Observatory, Council for Scientific and Industrial Research (CSIR), Cape Town, South Africa

⁵Norwegian University of Science and Technology, Trondheim, Norway

The ocean CO₂ system, air-sea CO₂ fluxes and ocean acidification (OA) state were investigated in the ice-covered Southern Ocean, Atlantic sector, during the Ecosystem cruise in 28 Feb-11 April 2019, using the Norwegian ice-going research vessel *RV Kronprins Haakon*. Data was obtained during autumn conditions, with storms, newly formed sea ice and exported older sea ice, from water-column samples of dissolved inorganic carbon (DIC), total alkalinity (A_T), pH, dissolved oxygen, which were analysed onboard. Data on nutrients (nitrate, phosphate, silicic acid) and dissolved oxygen isotopic ratio ($\delta^{18}\text{O}$) was obtained from post-cruise analyses and used in the estimates of drivers of the variability in the CO₂ system and air-sea CO₂ fluxes. Surface-water measurements of partial pressure of CO₂ ($p\text{CO}_2$), salinity, temperature, fluorescence and oxygen were continuously recorded.

We present results from two ice-covered regions from near the Antarctic coast; the Astrid Ridge and 6°E transect N-S. As a contrast to the ice-covered regions, we compare the results with the Maud Rise region (open water). The three regions showed large variability in physico-chemical properties due to different water masses and processes. Strong winds in autumn may have caused vertical mixing of sub-surface water containing high $p\text{CO}_2$ and nutrients, to the surface. The relatively high $p\text{CO}_2$ in the surface water relative to atmospheric $p\text{CO}_2$ (~410 μatm) caused outgassing of CO₂ to the atmosphere (CO₂ source). A late bloom caused decrease in $p\text{CO}_2$ and ocean uptake of atmospheric CO₂ (CO₂ sink).

Part of the work was carried out within the Norway - South Africa collaboration, SANOCEAN project SOPHY-CO₂.

Tittel	Long-term landscape evolution and last glacial cycle ice surface variations in western Dronning Maud Land, East Antarctica
---------------	--

Innsenders fornavn	Ola
Innsenders etternavn	Fredin
Epost	ola.fredin@ngu.no
Forfatterliste (Fornavn Etternavn)	Ola Fredin ^{1,2} Jane L. Andersen ³ Jennifer C. Newall ⁴ Sarah E. Sams ⁵ Derek Fabel ⁶ Alexandria J. Koester ⁵ Finlay M. Stuart ⁶ Marc W. Caffee ⁵ Brent Goehring ⁷ Nathaniel A. Lifton ⁵ Keir N. Nichols ⁷ Robin Blomdin ^{4,8} Neil F. Glasser ⁹ Yusuke Suganuma ¹⁰ Irina Rogozhina ² Jon M. Harbor ¹¹ Arjen P. Stroeven ⁴
Institusjoner (affiliations)	1. Geological Survey of Norway. 2. Norwegian University of Science and Technology. 3. Aarhus University. 4. Stockholm University. 5. Purdue University. 6. Scottish Universities Environmental Research Centre. 7. Tulane University. 8. Geological Survey of Sweden. 9. Aberystwyth University. 10. National Institute of Polar Research. 11. Purdue University Global

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Vennligst marker eposten med Antarktisseminaret 2020.

The East Antarctic Ice Sheet (EAIS) is generally assumed to have been relatively insensitive to Quaternary climate change. However, recent studies have shown potential instabilities in coastal, marine sectors of the EAIS. In addition, long-term climate reconstructions and modelling experiments indicate the potential for significant changes in ice volume and ice sheet configuration since the Pliocene. Hence, more empirical evidence for ice surface and ice volume changes is required to discriminate between contrasting inferences.

MAGIC-DML is an ongoing Swedish-US-Norwegian-German-UK collaboration focused on improving ice sheet models by filling critical data gaps that exist in our knowledge of the timing and

pattern of ice surface changes along the western Dronning Maud Land (DML) margin and combining this with advances in numerical techniques. Here, we report data on multiple cosmogenic nuclides from bedrock and erratics from 72 sites in nunatak ranges of the inland escarpment and along the Penck-Jutulstraumen ice stream troughs in western Dronning Maud Land. The sample locations span elevations between 741-2437 m a.s.l., and record apparent exposure ages between <2 ka and >5 Ma.

The highest bedrock samples indicate continuous exposure since >2 -5 Ma, with erosion rates as low as 15 ± 3 cm Ma^{-1} . These results indicate that the ice sheet has not extensively buried and eroded these mountain ranges since at least the Pliocene.

Moreover, and in contrast to some other studies in eastern Dronning Maud Land, we record clear indications of a thicker-than-present ice sheet within the last glacial cycle, with a thinning of ~ 35 -120 m along several nunatak slopes flanking the Penck-Jutulstraumen troughs during the Holocene (~ 2 -11 ka). These results clearly indicate glacial cycle ice-surface fluctuations of several hundred meters between the current grounding line and the edge of the polar plateau.

Tittel	Physical and optical properties of snow on the high Antarctic plateau
---------------	--

Innsenders fornavn	Jean-Charles
Innsenders etternavn	Gallet
Epost	gallet@npolar.no
Forfatterliste (Fornavn Etternavn)	² Aoki T., ¹ Moholdt G., ² Fujita S. and ¹ Isaksson E.
Institusjon (affiliations)	¹ Norwegian Polar Institute, Tromsø, Norway ² National Institute of Polar Research, Tachikawa, Japan

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Snow is a vital but complex component of the climate system. It is the primary contributor to accumulation on glaciers and ice caps and strongly affects their surface energy budgets, by reflecting incoming solar radiation and insulating the underlying ice from temperature variations. Both of these properties, snow's albedo and thermal conductivity, are sensitive to the snow pack's structure, e.g. grain size and shape at different depths. These properties evolve over time through snow metamorphism, which has different effects depending on the environmental conditions.

During the austral summer 2018-2019, Japan and Norway organized a joint expedition to Dome Fuji (77° 19' S, 39° 42' E, 3810 m a.s.l.) in Dronning Maud Land. The purpose was to study the physical and optical properties of snow for climate model and remote sensing validation. The expedition was joint with the Beyond-Epica Oldest Ice project, which aims at determining a potential new deep ice coring site in Antarctica.

We will present the preliminary results obtained from the snow measurements and compare them with relevant satellite data and comparable field data from the 2008-2009 austral summer campaign to Dome C (75° 06' S, 123° 20' E, 3220 m a.s.l.). Both Domes are some of the most remote places on Earth with very low precipitation and no snow melting. In the current global warming, it is essential to better understand the metamorphism of snow in the polar areas and the complex climate feedbacks in which snow is playing a critical role.

Tittel	Trollbåten—En ny plattform for forskning i Sørishavet
---------------	--

Innsenders fornavn	Tore
Innsenders etternavn	Hattermann
Epost	Tore.hattermann@npolar.no
Forfatterliste (Fornavn Etternavn)	Sebastien Moreau, Agneta Fransson, Sebastian Gerland, m. fl.
Institusjon (affiliations)	Norwegian Polar Institute

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Hvert år fraktes utstyr og forsyningsvarer til kysten av Antarktis for å drifte den norske helårsstasjonen Troll i Dronning Maud Land. Transporten gjennomføres i regi av Norsk Polarinstitutt med bruk av moderne isgående fartøy fra den danske Royal Arctic Line, som også tilbyr forsyning og transport langs Grønlandskysten. Mens det nye FF Kronprins Haakon ikke vil tilby årlige tokt til Sørishavet, er prosessen nå satt i gang for å integrere forskningsvirksomhet på de regelmessige transekt-toktene mellom Sør-Afrika og Fimbulisen. Et første pilotprosjekt som planlegges for januar 2021 skal videreføre plarinstituttets langtidsovervåking av kyststrømmen i Kong Håkon VII havet. Målet er å etablere transekt-toktet som en varig plattform som også er åpen for andre aktører for forskning i havet og på isen i sør. Foredraget vil gi en oversikt over status av pilotprosjektet og pågående forskning knyttet til dette, samt formidle muligheter og begrensninger av denne plattformen per i dag og fremtiden.

Tittel	The Ecology of Antarctic Blue Ice: The BIOICE Project
---------------	--

Innsenders fornavn	Andrew
Innsenders etternavn	Hodson
Epost	Andrew.Hodson@unis.no
Forfatterliste (Fornavn Etternavn)	Aga Nowak ¹ , Andy Hodson ^{1,2} , Stephen Hudson ³ , Elisabeth Isaksson ³ , Arwyn Edwards ⁴ , David Pearce ⁵ , Sara Rassner ⁴
Institusjon (affiliations)	¹ Arctic Geology, University Centre in Svalbard (UNIS), Longyearbyen, Norway. ² Department of Environmental Science, Western Norway University of Applied Sciences, Sogndal, Norway. ³ Norwegian Polar Institute, Framsenteret, Tromsø, Norway ⁴ Institute of Biological, Environmental & Rural Sciences, Aberystwyth University, Aberystwyth, UK ⁵ Department of Applied Sciences, Northumbria University, Newcastle upon Tyne, United Kingdom.

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

This presentation describes new studies into the microbial ecosystems found in Blue Ice Areas (BIA) around the periphery of the Antarctic Ice Sheet. These habitats are located on the Antarctic fringe, often at high elevation, and therefore represent the first opportunity for cells entombed in old glacier ice advected from Antarctic interior, to be revived by the increased availability of energy and water.

Our study is the first to consider how BIAs host two different habitats; those associated with nunataks or mountain ranges, and those associated with ice surfaces only. The difference between them is the availability of debris and water for microbial processes. In the former scenario, debris is blown onto the blue ice from local sources to provide a source of both microorganisms and energy. In the latter case, the lack of an external debris source is compensated by the possibility subsurface melting due to the optical properties of blue ice. In these systems a far greater proportion of the cells are liberated from ancient glacier ice.

We visited high elevation (c.1200m) BIAs in Dronning Maud Land to collect microbial and biogeochemical samples from both debris-free and debris-rich BIAs, as well as shallow ice

cores of different ages. In addition, we explored a variety of so-called “cryoconite holes” formed by debris entombed within the blue ice. Our results show that BIAs ecosystems are characterized by tremendous heterogeneity between cryoconite holes. While some show signs of photosynthesis, others are dominated by bacterial production. Furthermore, optical properties of the BIA and physical properties of the ice itself (fracturing) control subsurface meltwater production and water movement, influencing the sub-ice ecosystems and their biogeochemistry. The presentation will describe how we will further examine the revival of these ice bound organisms on their way from the Antarctic Ice Sheet interior towards the coast.

Tittel	The methanesulphonic acid (MSA) record in snow, firn and ice as a proxy for marine productivity; examples from Fimbulisen in Dronning Maud Land
---------------	--

Innsenders fornavn	Elisabeth
Innsenders etternavn	Isaksson
Epost	elisabeth.isaksson@npolar.no
Forfatterliste (Fornavn Etternavn)	Carmen Vega ¹ , Elisabeth Isaksson ² , Dmitry Divine ² , Elisabeth Schlosser ³ , Tonu Martma ⁴ , Anja Eichler ⁵ , Margit Schwikowski ⁵
Institusjon (affiliations)	¹ Subdepartamento de Climatología y Meteorología Aplicada, Dirección Meteorológica de Chile, Dirección General de Aeronáutica Civil, Portales 3450, Santiago, Chile ² Norwegian Polar Institute, N-9296 Tromsø, Norway ³ Institute of Atmospheric and Cryospheric Sciences (ACINN), University of Innsbruck, Innsbruck, Austria ⁴ Institute of Geology, Tallinn University of Technology, Tallinn, Estonia ⁵ Paul Scherrer Institute, 5232 Villigen PSI, Switzerland

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Methanesulfonic acid (MSA) is an atmospheric oxidation product of dimethyl sulfide, produced by marine biota and therefore often attempted to be used as a proxy for sea ice and marine productivity in ice cores studies. In this work we are presenting results from snow, firn and ice cores from coastal Antarctica hoping to improve our understanding for using these records as proxy for past environments.

MSA records from snow pits and 20-m firn cores retrieved from three ice-rises located on the Fimbul Ice Shelf in Dronning Maud Land, Antarctica, present a marked sub-annual pattern with higher (lower) concentration values in the spring-summer (winter) months (Vega *et al.*, 2016). The clear MSA seasonality captured in these cores suggests that MSA could be potentially used as a proxy of sea ice extent and biological activity in the vicinity of the drilling sites. We will compare our high resolution MSA records with new remote sensing products and discuss the subannual MSA signal and implications for interpretation of biogenic records from both coastal Antarctica.

References

Vega, C. P., et al. 2016. *The Cryosphere*, 10, 2763-2777, doi:10.5194/tc-10-2763-2016, 2016

Tittel	United plates of Dronning Maud Land revealed by <u>C</u>onnecting <u>G</u>eology & <u>G</u>eophysics (CGG)
---------------	---

Innsenders fornavn	Joachim
Innsenders etternavn	Jacobs
Epost	Joachim.jacobs@uib.no
Forfatterliste (Fornavn Etternavn)	Jacobs, J. ¹ , Läufer, A. ² , Ruppel, A. ² , Eagles, G. ³ , Jokat, W. ³ , Elburg, M.A. ⁴ , Wang, C.-C. ¹ , Elvevold, S. ⁵
Institusjon (affiliations)	¹) Department of Earth Science, University of Bergen, PB 7803, N-5020 Bergen, Norway ²) Federal Institute for Geosciences and Natural Resources (BGR), Stilleweg 2, 30655 Hannover, Germany ³) Alfred-Wegener-Institute Helmholtz-Zentrum für Polar und Meeresforschung, 27570 Bremerhaven, Germany ⁴) Department of Geology, University of Johannesburg, Auckland Park 2006, Johannesburg, South Africa ⁵) Norwegian Polar Institute, Fram Centre, N-9296 Tromsø, Norway

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Little is known about the geology of East Antarctic, because of major ice-coverage. However, integrating geophysics with geology, and specifically geochronology, reveals the complex tectonic history of Dronning Maud Land, a major part of East Antarctica, and a crucial element for Rodinia and Gondwana supercontinent reconstructions. Major outcrops along the rift margin escarpment in Dronning Maud Land allow for ground truthing of geophysical data, but the geology of this mountain range is only patchily investigated. So far, we recognise three major tectonic provinces: a westernmost part with Kalahari, Africa, affinities and an easternmost part from about 35°E with Indo-Antarctic affinities; sandwiched in between these two blocks, is an extensive region with juvenile Neoproterozoic crust (ca. 990-900 Ma), the Tonian Oceanic Arc Super Terrane (TOAST) that shows very limited signs of a pre-Neoproterozoic history. We have tested the spatial extent of the TOAST by a regional moraine study that confirm the lack of older material inland. The TOAST records 150 Ma of almost continuous tectono-metamorphic reworking at medium- to high-grade metamorphic conditions between ca. 650 to 500 Ma. This long-lasting overprinting history is thought to record protracted accretion of ocean island arc terranes and the final amalgamation of East Antarctica along the major East African-Antarctic Orogen. There is no sign of significant metamorphic overprint immediately after the formation of TOAST. Therefore, these island arcs may have formed independent of, or peripheral to Rodinia and may reveal major accretionary tectonics outboard of Rodinia. The TOAST offers unique insights into the Mozambique Ocean. The contact relationships to older rocks with African affinities on the one hand and those of Indo-Antarctic affinities on the other are very little investigated so far and await their exploration.

Tittel	Reconstruction of the extent, thickness and erosion of Jurassic continental flood basalts of western Dronning Maud Land, East Antarctica: a low-T thermochronological approach
---------------	---

Innsenders fornavn	Joachim
Innsenders etternavn	Jacobs
Epost	Joachim.jacobs@uib.no
Forfatterliste (Fornavn Etternavn)	Sirevaag, Hallgeir ¹ , Jacobs, Joachim ¹ , Ksienzyk, Anna K. ¹ , Dunkl, István ² , Marschall, Horst R. ³
Institusjon (affiliations)	¹ Department of Earth Science, University of Bergen, PB 7803, N-5020 Bergen, Norway ² Federal Institute for Geosciences and Natural Resources (BGR), Stilleweg 2, 30655 Hannover, Germany ³ Alfred-Wegener-Institute Helmholtz-Zentrum für Polar und Meeresforschung, 27570 Bremerhaven, Germany ⁴ Department of Geology, University of Johannesburg, Auckland Park 2006, Johannesburg, South Africa ⁵ Norwegian Polar Institute, Fram Centre, N-9296 Tromsø, Norway

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

The Dronning Maud Land Mountains form a c. 1500 km long, coast-parallel escarpment resulting from the rifting between East and West Gondwana in Jurassic times. Contemporaneous to the rifting, considerable amounts of continental flood basalts (CFB), associated with the Karoo mantle plume, were emplaced at c. 183 Ma. While the basalts are still widespread in South Africa, making up elevated topography, they are only preserved as smaller remnants in western Dronning Maud Land. To quantify the original thickness, extent and erosion of the Jurassic CFBs in western Dronning Maud Land, low-temperature thermochronological methods have been applied to 40 samples. Thirty-four apatite fission track ages rang from c. 310 to 90 Ma, 31 apatite (U–Th)/He ages span from c. 400 to 50 Ma and, and 9 zircon (U–Th)/He ages between c. 650 and 200 Ma. Thermal modelling of 26 samples indicates variable thickness of the Jurassic basaltic cover. The greatest basaltic thicknesses are recorded in Heimefrontfjella, Gjelsvikfjella and H.U. Sverdrupfjella, where c. 1.5-1.8 km are estimated. Thicknesses at Kirwanveggen, Hochlinfjellet, Midbresrabben and Ahlmannryggen range from c. 100 m to 800 m. Thickness variations are attributed to the proximity to the emplacement zone, possible pre-existing topography and syn-volcanic rift flank uplift. Two phases of post-CFB enhanced cooling have been documented: 1) A Jurassic-Cretaceous cooling phase is attributed to the initial rifting and opening of the South Atlantic and enhanced chemical weathering and deep erosion due to a Jurassic temperate-subtropical climate. 2) The Late Paleogene cooling is attributed to the transition from green house to ice-house conditions at the Eocene-Oligocene boundary. Post-Jurassic denudation of at least 1.8 km is suggested, much of which probably resulted from glacial erosion from 35 Ma onwards.

Tittel	Oppblomstringsdynamikken av planteplankton i Kong Håkon VII hav, Sørishavet
---------------	--

Innsenders fornavn	Hanna
Innsenders etternavn	Kauko
Epost	Hanna.kauko@npolar.no
Forfatterliste (Fornavn Etternavn)	Hanna Kauko ¹ , Tore Hatterman ¹ , Thomas Ryan-Keogh ² , Asmita Singh ² , Laura de Steur ¹ , Agneta Fransson ¹ , Melissa Chierici ³ , Sebastien Moreau ¹
Institusjon (affiliations)	¹ Norsk Polarinstitut, Tromsø, Norge ² Southern Ocean Carbon and Climate Observatory, Council for Scientific and Industrial Research (CSIR), Cape Town, Sør-Afrika ³ Havforskningsinstituttet, Tromsø, Norge

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Primærproduksjonen i Sørishavet er viktig både i et klima- og økosystemperspektiv. Fotosyntese av planteplankton bidrar til karbonfangst, men den danner også næringsgrunnlaget for marine næringsnett. Vårt studieområde, Kong Haakon VII hav, er lite studert, og følgelig vet vi lite om planteplanktondynamikken i området. Pelagisk primærproduksjon kjennetegnes av en relativt kort, men intensiv periode av høy biomasse og primærproduksjon, kalt oppblomstring. Når oppblomstringen starter og varigheten av den er bestemt av miljøforhold som tilgang til næringsalter og sollys, som igjen kontrolleres av faktorer som havsirkulasjon og havisdekket. I denne studien bruker vi data fra vårt forskningstokt til området i mars 2019, samt fjernmålingsdata for å forstå hvordan primærproduksjonen kontrolleres av disse forholdene. Våre resultater viser at de forskjellige geografiske områdene – Astridryggen, Maud rise og det åpne havet imellom – har forskjellige regimer mhp. oppblomstringsdynamikk. Foreløpige resultater tyder på at begynnelsen av oppblomstringen blir i stor grad bestemt av når isdekket blir borte på våren, mens styrken (gjennomsnittlig og maksimum konsentrasjon av biomasse) påvirkes av næringssalttilføringen av havstrømmene. Bunntopografien spiller her en avgjørende rolle, ved at den omdirigerer havstrømmene og bidrar til oppstrømning av næringsrikt vann fra dybden. Den økte forståelsen av hvordan primærproduksjonen kontrolleres i området hjelper oss å forstå hele økosystemet og å peke ut områdene med høyest relevans for karbonsyklusen, dyreplankton og andre beitedyr, og i siste instans forvaltning.

Tittel	SWARM: Ecology of Antarctic krill in a hotspot
---------------	---

Innsenders fornavn	Thor
Innsenders etternavn	Klevjer
Epost	Thor.klevjer@hi.no
Forfatterliste (Fornavn Etternavn)	Thor Klevjer, Georg Skaret, Angelika Renner, Tor Knutsen, Bjørn Krafft.
Institusjon (affiliations)	Havforskningsinstituttet

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

In the global ocean krill are often described as plankton, with horizontal distribution governed primarily by environmental factors. The largest amounts of biomass of Antarctic krill, *Euphausia superba*, is however concentrated in physically small, dense aggregations, suggesting that the aggregative behaviour of the krill themselves is what controls the horizontal distribution, at least on smaller (e.g. 10's of km) scales. Meanwhile, krill predators (including the fishery) congregate in geographically restricted “hotspots”, suggesting that in these locations access to krill is enhanced. The SWARM project has been studying the interactions between the hydrography and krill behaviour in a regional hotspot that is important to both the natural krill predators as well as the krill fishery. Results document trophic interactions between krill and krill predators, including a previously undocumented horizontally migrating fish component, in the hotspot, and show that the intensity of these interactions vary predictably over the year, with peak predator krill demand during summer months. Results also show the large natural variability in krill aggregation characteristics and behaviour over the annual cycle, and novel data show how krill aggregations behave in relation to the local advective field. Output from the project is expected to provide important input to the implementation of multi-species or ecosystem based management of Antarctic krill resources.

Tittel	Large scale krill survey in the Southern Ocean
---------------	---

Innsenders fornavn	Bjørn A.
Innsenders etternavn	Krafft
Epost	Bjorn.krafft@hi.no
Forfatterliste (Fornavn Etternavn)	Se under – passet ikke inn i denne malen..
Institusjon (affiliations)	Havforskningsinstituttet

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktissemnaret 2020.

Bjørn Krafft, Kjell Bakkeplass, Terje Berge, Martin Biuw, Julio Erices, Elizabeth Jones, Tor Knutsen, Rokas Kubilius, Merete Kvalsund, Ulf Lindstrøm, Gavin John Macaulay, Angelika Renner, Alina Rey, Rasmus Skern, Henrik Søiland and Rupert Wienerroither, Heidi Ahonen, Jade Goto , Nils Hoem, Magdalena Huerta, Juan Höfer, Oda Iden, William Jouanneau, Lucas Kruger, Håvard Liholt, Andy Lowther, Azwianewi Makhado, Mireia Mestre, Audun Narvestad, Chris Oosthuisen, Jose Rodrigues, Øyerhamn

The primary objective for this krill research activity was twofold 1) to conduct a survey that provides updated estimates of the biomass and distribution of krill which are used in models to estimate sustainable yield in CCAMLR Area 48 and 2) to develop knowledge on the marine environment essential for the implementation of a Feed-Back Management (FBM) system. The survey follows a similar design as a survey initiated by CCAMLR in year 2000 for comparative purposes, but in addition focuses on high krill-density areas, contains state-of-the art methods and employs modern technology for the research topics currently in focus. In terms of FBM, Marine Protected Area (MPA) development in CCAMLR Planning Domain 1 encompasses the major krill fishing grounds. Thus, data supporting FBM are critical if the fishery is to be managed by an empirical understanding of krill density, distribution, availability and predator needs as opposed to purely conservation-based measures. A future developed FBM system, requires acoustic data to be collected, processed and reported continuously during the fishing season as a measure of the available prey field. This information can be integrated with finer-scale knowledge of krill predator feeding strategies and updated through specific scientific studies at regular (multiyear) intervals. The survey and coupled FBM process studies took place during the Austral summer 2018-2019. The work was coordinated by Norway and involved collaborative international efforts as well as vessels from Norway, Association of Responsible Krill fishing companies (ARK) and the Norwegian fishing company Aker BioMarine AS, China, Korea, Ukraine and United Kingdom. The results so far from the ongoing analyses of the data from this coordinated effort will be presented.

Tittel	Basal melt observations at Fimbulisen ice shelf, Dronning Maud Land, East Antarctica
---------------	---

Innsenders fornavn	Katrin
Innsenders etternavn	Lindbäck
Epost	katrin.lindback@npolar.no
Forfatterliste (Fornavn Etternavn)	Darelius, Elin Moholdt, Geir de Steur, Laura
Institusjon (affiliations)	Norsk Polarinstitut

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

The Antarctic contribution to global sea level rise has increased substantially in the past two decades. Over 80% of the grounded ice in Antarctica drains out into floating ice shelves, which hold back the ice mass on land. In this study, we present a time series of melting under an ice shelf at a unique temporal resolution for East Antarctica, derived from an autonomous phase-sensitive radar. These records show daily variations of basal melting in 2017 and 2018 at Fimbulisen, the largest ice shelf in central Dronning Maud Land. We compare our results with similar measurements at Nivlisen ice shelf farther to the east, as well as relevant records of climatic and oceanographic conditions. We find that intrusion of warm deep-ocean water most likely increases the basal melting of Fimbulisen in winter and fall. Warming of surface waters in front of the ice shelf in summer has at present a limited effect on melting at this location, 50 km from the ice shelf front. Further, we discuss the influence of a trough under the ice shelf on the derived melt and strain rates. The instruments are still collecting data in the field; continuous in situ monitoring of Antarctic ice shelves is important to understand the long-term and complex mechanisms involved in ice shelf–ocean interactions.

Tittel	West Antarctic Peninsula Mythbusters – Climate change and krill fishing
---------------	--

Innsenders fornavn	Andy
Innsenders etternavn	Lowther
Epost	Andy.Lowther@pm.me
Forfatterliste (Fornavn Etternavn)	Odd Aksel Bergestad ² , Martin Biuw ² , Cesar Cardenas ³ , Kit Kovacs ¹ , Bjørn Krafft ² , Lucas Kruger ³ , Ulf Lindstrom ² , Christian Lydersen ¹ , Azwianewi Makhado ⁴ , Chris Oosthuizen ⁵
Institusjon (affiliations)	¹ Norwegian Polar Institute, Norway ² Havforskningsinstitutt, Norway ³ Instituto Antártico Chileno; Chile ⁴ Department of Environmental Affairs, South Africa ⁵ Nelson Mandela Metropolitan University; South Africa

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

The western Antarctic Peninsula (WAP) is one of the busiest regions in Antarctica and hosts several “Antarctic records”, including the longest climatological time series, the largest fishery and the greatest number of tourists. There are 36+ research stations operated by more than 15 countries within the region, which has often been labeled as the most rapidly warming part of Antarctica. However, since 2008 both marine productivity and sea ice duration and extent in the southern and central WAP have been increasing. Multi-jurisdictional governance in terms of fisheries and conservation management is undertaken by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) region in the Southern Ocean. CCAMLR is regularly described as a world leader in Ecosystem Based Fisheries Management (EBFM) through its regulation of the Antarctic krill fishery, despite a widespread belief that overfishing is leading to declines in krill predator populations. Because of these concerns (and a lack of data creating the situation where myths arise) the fishery itself has voluntarily excluded a large portion of the WAP from fishing effort. Since 2015, we have conducted a number of evidence-based “mythbusting” studies across a suite of upper trophic marine predators in the Antarctic Peninsula. Specifically, we present research outputs that simultaneously challenges the perceptions of overfishing impacts, the utility of year-round spatial protection and the appropriateness of the current krill fishery management regime. We also outline three research programs that will commence this year focused on improving our understanding of the linkages between ocean physics, primary productivity and higher trophic levels and that will develop an appropriate EBFM system using a suite of animal-borne and autonomous sensor platforms and a multi-species approach. Contributing these data to the international efforts in the region will improve

our predictive understanding of upper trophic biology and how to manage it in the face of direct (fishing, tourism) and indirect (climate change) effects.

Tittel	Political Philosophy Looks to Antarctica: Third year review
---------------	--

Innsenders fornavn	Alejandra
Innsenders etternavn	Mancilla
Epost	Alejandra.mancilla@ifikk.uio.no
Forfatterliste (Fornavn Etternavn)	Alejandra Mancilla
Institusjon (affiliations)	HF, Universitetet I Oslo

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Abstrakt: In the course of three years, the project “Political Philosophy Looks to Antarctica” has looked, on the one hand, at the status of territorial claims and claims over natural resources in the continent and, on the other, at the moral legitimacy of the Antarctic Treaty. Regarding the first point, we have re-evaluated the critique that Antarctica was and is a colonial sight, and have suggested ways in which it should be decolonized. At the same time, we have explored how the same arguments that justify decolonizing Antarctica may be used to question the territorial claims of certain states over their peripheries. Regarding the second point, we are constructing a framework to evaluate the moral legitimacy of the Antarctic Treaty, starting from the idea of non-domination. This same framework may be used and adapted, we expect, to evaluate the moral legitimacy of other international bodies.

Tittel	Constraining geothermal flux and recent surface mass balance in the Dome Fuji region: new insights and their impacts on the Oldest Ice locations
---------------	--

Innsenders fornavn	Kenichi
Innsenders etternavn	Matsuoka
Epost	kenichi.matsuoka@npoar.no
Forfatterliste (Fornavn Etternavn)	Kenichi Matsuoka, Brice Van Liefferinge on behalf of the Japan-USA-Norway and Germany-Belgium-Norway collaborative teams
Institusjon (affiliations)	Norwegian Polar Institute

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

A large fraction of the Antarctic Ice Sheet has thawed bed, so ancient ice has already melted at most locations. It means that the useful “Oldest Ice” to study the mid-Pleistocene climate transition can possibly be present if the ice is only moderately thick so that heat is taken enough to keep the bed frozen and that the ice core has enough temporal resolutions for climate research. The threshold ice thickness that gives frozen or thawed conditions depends on geothermal flux (GF) and surface mass balance (SMB). Here, we present our ongoing work to constrain spatial patterns of SMB and GF using ice-penetrating radar data. We discovered that SMB is largely correlated with local surface slopes over a few hundreds of meters. We argue that these SMB anomalies have occurred at fixed locations in the past and thus SMB-induced anomalous layer thicknesses of deeper ice can be possibly used as trajectory markers to examine past ice-flow directions and migration of the dome positions. Local SMB variations we found are not evaluated in regional climate models, and would alter estimates of Antarctic contribution to the sea level. Separately, we analyzed deep-sounding airborne radar data to constrain basal conditions using radio-wave attenuation models and a one-dimensional ice-flow model. We tested a hypothesis that higher bed reflectivity is found in model-predicted thawed bed, whereas lower bed reflectivity is found in frozen bed by alternating regionally-uniform input GF to the models. We found that this hypothesis is valid only when GF is less than $\sim 55 \text{ mW/m}^2$ in this region. This method cannot be used to constrain the lowest possible GF. Therefore, we argue that representative GF in the study area is as high as $\sim 55 \text{ mW/m}^2$. For this case, more than two thirds of the study area has the frozen bed.

Tittel	India-Norway MADICE project: visions, achievements and future plans
---------------	---

Innsenders fornavn	Kenichi
Innsenders etternavn	Matsuoka
Epost	kenichi.matsuoka@npoar.no
Forfatterliste (Fornavn Etternavn)	Kenichi Matsuoka ¹ , Thamban Meloth ² , Geir Moholdt ¹ , C. M. Laluraj ² , Katrin Lindback ¹ , Bhanu Pratap ² , Vikram Goel ² , Chris Borstad ³
Institusjon (affiliations)	1: Norwegian Polar Institute, 2: National Center for Polar and Ocean Research, 3: University Center in Svalbard.

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

India-Norway joint project MADICE started in 2016 has examined mass balance, dynamics, and climate of the central Dronning Maud Land coast. We have conducted three field campaigns from Maitri Station to Nivlisen Ice Shelf and two promontory ice rises bounding the ice shelf. Radar and GNSS profiling revealed topographic characteristics and englacial ice stratigraphy. Both ice rises have distinct Raymond Arches in their ice stratigraphy, indicating sustained divide flow from ice rise's summits in the past few millennia. Three ice cores drilled at these summits show significant temporal variations in surface mass balance (SMB) and differential surface melt features. The latter is presumably associated with the elevation difference between the two summits. These ice cores were also used to date radar reflectors in the top ~30 m and to map SMB over the past three decades. We found that regional climate models replicate SMB very well over the ice shelf, despite a large model-cell size (5-10 km). However, SMB over ice rises are hardly resolved with the models, probably due to complicated topography not well represented in the model. Phase-sensitive radar was used to measure vertical strain rates over ice rises and basal melting rates over the ice shelf. We found that the seasonality in basal melt rates near the calving front is caused by summer-warmed ocean surface water pushed by wind beneath the ice shelf front. A different melt regime was found further inland, where basal melt is much smaller, nearly uniform regardless of the season but largely correlated with tidal cycles. We are currently analyzing phase-sensitive radar data over ice rises to constrain flow law parameters so that Raymond Arches can be unequivocally interpreted using ice-flow models in terms of evolution of the ice rises, and eventually infer histories of regional mass balance.

Tittel	Quantarctica 3: current status and future updates
---------------	---

Innsenders fornavn	Kenichi
Innsenders etternavn	Matsuoka
Epost	kenichi.matsuoka@npoar.no
Forfatterliste (Fornavn Etternavn)	Kenichi Matsuoka, Anders Skoglund, Yngve Melvær, and Stein Tronstad
Institusjon (affiliations)	Norwegian Polar Institute

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Quantarctica (quantarctica.npolar.no) is a free GIS data package for Antarctic research, education, operation, and environment managements. It works on free GIS software QGIS standalone, so it can be used at remote field camps and during cruises without Internet access. Its version 3 was released with a large range of data disciplines, including atmosphere, glaciology, geology, oceanography, and biology, on the top of scale-dependent base map layers, topographic layers, and satellite images. We present some user applications, recent updates and discuss future update plans.

Tittel	Quantarctica: Free Antarctic GIS datasets
---------------	---

Innsenders fornavn	Kenichi
Innsenders etternavn	Matsuoka
Epost	Kenichi.matsuoka@npolar.no
Forfatterliste (Fornavn Etternavn)	Kenichi Matsuoka, Anders Skoglund, Yngve Melvær, and Stein Tronstad
Institusjoner (affiliations)	Norwegian Polar Institute

Quantarctica (quantarctica.npolar.no) is a free GIS data package for Antarctic research, education, operation, and environment managements. It works on free GIS software QGIS standalone, so it can be used at remote field camps and during cruises without Internet access. Its version 3 released in 2018 expanded its geographical coverage to 40S and data coverage into climatology, biology, oceanography, social science and more. We are working to release a new version 3.2 by the end of this year, which is fully compatible with the latest QGIS version 3.10 families. Also, we will soon conduct a community survey to define Quantarctica version 4.

Tittel	Rings4Saga: an ambition to conduct airborne surveys of bed topography all around the entire Antarctic Ice Sheet
---------------	---

Innsenders fornavn	Kenichi
Innsenders etternavn	Matsuoka
Epost	kenichi.matsuoka@npoar.no
Forfatterliste (Fornavn Etternavn)	Kenichi Matsuoka, Geir Moholdt, and Sven Lidstrom
Institusjon (affiliations)	Norwegian Polar Institute

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Antarctic sea-level contribution is estimated as a small difference between two large numbers, mass input and output. To constrain the out-flowing mass flux, we need to know both ice flow speed and ice thickness. However, ice thickness remains poorly constrained, because (1) no satellites can do it, and (2) existing ice-penetrating radar data cover only 20% of Antarctic grounding line. Using recently published work, we estimate that mass flux uncertainties associated with the limited thickness data can be about 100 Gt/year, which is more than a half of annual Antarctic mass deficit (183 Gt/year). To precisely monitor Antarctic contribution to the sea level rise in the future, it is absolutely necessary to have comprehensive bed elevation data. Stitching numerous small datasets collected for various purposes is not good enough for IPCC AR7. Once bed topography is known, temporal changes in ice thickness can be estimated from ice elevation changes detected by satellite altimetry and thus we can precisely monitor Antarctic mass outflow using satellite data (velocity and elevation).

Tittel	Første resultater fra det ionosfæriske observatoriet på Troll
---------------	--

Innsenders fornavn	Wojciech
Innsenders etternavn	Miloch
Epost	w.i.miloch@fys.uio.no
Forfatterliste (Fornavn Etternavn)	Arnlaug H. Skjæveland, Daria Kotova, Wojciech J. Miloch
Institusjon (affiliations)	Fysisk Institutt, Universitetet i Oslo

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

I de polare områdene er ionosfæren, som er det ytterste og delvis ioniserte laget av atmosfæren, direkte koblet til jordens magnetosfære og plasma i verdensrommet. Denne koblingen er veldig dynamisk og avhenger av solens aktivitet. Prosesser i ionosfæren er en viktig del av det komplekse romværsystemet som er stadig viktigere for menneskelige aktiviteter. Ett eksempel er radio kommunikasjon og satellittbasert navigasjon som kan bli påvirket av strukturer i det turbulente ionosfæren.

I nærheten av de magnetiske polene kan ladete partikler fra rommet danne spektakulære lys, som vi kaller for sørlys (aurora australis) og nordlys (aurora borealis). Disse partiklene kan bidra til turbulens og irregulareteter i ionosfæren. Det er en viss grad av asymmetri i dynamikken av jordens ionosfære i de polare områdene i nord og i sør, og det er behov for bedre forståelse av disse prosessene som vil gi et grunnlag for gode modeller for romvær i de polare områdene.

Det ionosfæriske observatoriet ved forskningsstasjon Troll ble etablert i perioden 2018-2019. Den inkluderer instrumenter for forskning på sørlyset, på irregulareteter og turbulens i ionosfæren, og på kvalitet på signaler fra satellitter over Drønnings Maud Land. Vi presenterer de første resultatene fra Troll, hvor vi ser på dynamikken av irregulareteter i de lokale og globale kontekstene, ved å inkludere også data fra instrumenter ved forskningsstasjonene SANA IV og Neumayer i Drønnings Maud Land og flere stasjoner i den nordlige hemisfæren. Vi viser en viss grad av både symmetri og asymmetri i dynamikken. Vi diskuterer også statistiske studier av ionosfæriske scintillasjoner over Drønnings Maud Land. Videre presenterer vi planer og muligheter for ytterligere utvidelse av instrumentparken ved Troll som vil øke kapasitet for detaljerte studier av prosesser i ionosfæren, samt bidra til et sterkere internasjonalt samarbeid i forskning på ionosfære over Antarktis.

Tittel	Large phytoplankton bloom in the open Southern Ocean during fall
---------------	---

Innsenders fornavn	Sebastien
Innsenders etternavn	Moreau
Epost	Sebastien.moreau@npolar.no
Forfatterliste (Fornavn Etternavn)	Full author list will be provided later
Institusjon (affiliations)	Norwegian Polar Institute, Norway

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

The Weddell Sea is recognized as a significant carbon sink due to intense primary productivity in open waters. During the 2019 DML tokt, we observed a large phytoplankton bloom in fall in the open waters of the eastern Weddell Sea. The bloom was overly dominated by one pennate diatom, *Chaetoceros dichaeta*, which represented up to 60% of all phytoplankton throughout the bloom. The bloom followed the deep bathymetry (3,500 to 4,000 m), suggesting that it was driven by the large scale circulation of the Weddell Gyre, possibly the upwelling of Circumpolar Deep Water (CDW). We discuss here the possible bloom drivers and the ecosystem implications.

Tittel	Remote sensing of ice shelf basal melting in Dronning Maud Land, Antarctica
---------------	--

Innsenders fornavn	Ashley
Innsenders etternavn	Morris
Epost	Richard.ashley.morris@npolar.no
Forfatterliste (Fornavn Etternavn)	Geir Moholdt, Tore Hattermann, Katrin Lindbäck, Laura de Steur
Institusjon (affiliations)	Norsk Polarinstitutt

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Around half of the ablation from the Antarctic ice sheet results from the basal melting of the floating ice shelves which fringe most of the continent. Ice shelves provide buttressing to the inland ice; as a result, thinning through basal melt or retreat through iceberg calving may lead to dynamic changes of ice streams, increasing the ice sheet's contribution to global sea level rise. Melting beneath ice shelves is not uniformly distributed but localized near the grounding line, calving front, and within channels incised into the ice shelf base. The largest changes in ice shelf volume have occurred along the Amundsen and Bellingshausen Sea coasts of the West Antarctic ice sheet, where warm Circumpolar Deep Water can reach ice shelf cavities, and in the Antarctic peninsula where a loss of firn pore space, surface melt ponding and hydrofracture led to rapid collapse of several ice shelves. The ice shelves of the East Antarctic ice sheet have exhibited smaller changes, though are of key importance because they buttress the largest grounded ice volume. Here, we use remote sensing techniques to study the basal melting of Fimbulisen and Nivlisen ice shelves, as part of a larger research project "Ocean-ice shelf interaction and channelized melting in Dronning Maud Land" (iMelt) which brings together glaciologists and oceanographers using field data, remote sensing, and modeling to study ice-ocean interaction in East Antarctica. We use high resolution Reference Elevation Model of Antarctica (REMA) DEMs, validated against ICESat-2 laser altimetry to estimate the ice shelf thickness, basal topography and reveal the location of basal channels. Using ice thickness estimates separated by several years and an ice velocity map, we then compare elevations in a moving reference frame, to map the spatial pattern of basal melting and freezing.

Tittel	Heat producing elements of the stable continental crust in Dronning Maud Land, Antarctica
---------------	--

Innsenders fornavn	Per Inge
Innsenders etternavn	Myhre
Epost	Myhre@npolar.no
Forfatterliste (Fornavn Etternavn)	Synnøve Elvevold, Trond Slagstad
Institusjon (affiliations)	PIM; SE: NP. TS: Geological Survey of Norway, NGU

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Ice sheets are heated from below by bedrock itself, making up one important governing factor of their stability. Geothermal heat flow has a large effect on the thermal structure of the east Antarctic ice sheet (EAIS), but its magnitude and spatial variation is not well known.

Geothermal heat flow at the bedrock surface is the sum of contributions from the mantle, lower crust and heat generated by upper crustal rocks. Not only is there a large variability in rock types and hence heat production in upper crustal rocks, also the radioactive and heat producing elements U, Th and K tend to become concentrated here relative to lower crust and mantle by geochemical differentiation associated with continental evolution. These surface rocks are the focus of geological mapping, and are routinely surveyed directly at outcrops. We present a compilation of published geochemical data for rocks of the East Antarctic stable continent and the associated heat production values given by the abundances of radioactive elements.

The abundance of these elements in rocks is unequivocally related to surface heat flow. To go from this to reliable surface heat flow values, however, is not straightforward. The simplest approach is to compute heat flow by assuming a length scale (thickness) for the near-surface heat producing units, but studies from other continents have shown that this does not give very accurate estimates.

Dronning Maud Land is one of the bedrock regions in Antarctica that lacks such a data compilation. Along with a recently developed geological map, it is possible to lay out some conceptual models on how the surface heat flow might vary in space. A future and more elaborate estimation of the surface heat flow should combine collection of new geological data, geophysical modelling and estimates of bed temperature from ice sheet studies.

Tittel	Revisiting Bioprospecting in the Southern Ocean in the context of the BBNJ-Negotiations
---------------	--

Innsenders fornavn	Philipp
Innsenders etternavn	Nickels
Epost	philipp.nickels@uit.no
Forfatterliste (Fornavn Etternavn)	Philipp Nickels
Institusjon (affiliations)	Norwegian Centre for the Law of the Sea, UiT – The Arctic University of Norway

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Abstract

In my presentation, I will present a forthcoming article titled ‘Revisiting Bioprospecting in the Southern Ocean in the context of the BBNJ-Negotiations’, which was written as part of the project ‘BIOS-POLAR: Legal Frameworks for Bioprospecting and Bio-Innovation in Polar Regions’. The article revisits the issue of marine bioprospecting in the Southern Ocean in the context of the efforts to develop an internationally legally binding instrument (ILBI) under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction (BBNJ). After briefly introducing the Antarctic Treaty System (ATS), the article examines to which extent the ILBI will likely spatially overlap with the ATS. As the next step, it is highlighted that future provisions on Marine Genetic Resources in the ILBI might substantively differ from the way the ATS currently regulates bioprospecting. Based on that, the final section reflects on how the ILBI will normatively and institutionally relate to the ATS.

Tittel	Autonomous surface vehicles for (near real-time) monitoring of marine resources in the Antarctic
---------------	---

Innsenders fornavn	Geir
Innsenders etternavn	Pedersen
Epost	gepe@norceresearch.no
Forfatterliste (Fornavn Etternavn)	Geir Pedersen, Rune Øyerhamn, Gaute Øverås Lied, Inge Kristian Eliassen, Rune Storvold
Institusjon (affiliations)	NORCE Norwegian Research Centre AS

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Sufficient monitoring of vulnerable ecosystems in harsh and remote areas require new technologies and methods. Additionally, monitoring of harvestable resources require data to be transmitted in near-real time for decision making processes.

Recent developments in autonomous platforms, low power sensors, and modes of transmitting data to shore or other vessels has made this possible, although the possibilities are still largely unexploited for data collection in the Antarctic. The Sailbuoy wind driven autonomous surface vehicle, originally developed at CMR (now NORCE) and commercialized through Offshore Sensing AS, is one example of such autonomous platform. The Kongsberg Maritime Simrad WBT Mini echosounder is an example of a new generation low power sensor enabling deployment on autonomous platforms.

However, high volume data from echosounders are still limited by the low bandwidth communication available at sea (Iridium satellite link), requiring the autonomous platforms to be retrieved for data transfer and processing. Echosounders are an important tool for collecting information about marine ecosystem and its link to terrestrial systems, in the Antarctic the distribution and abundance of krill in relations to seabirds and marine mammals.

Through several research and development projects a system for on-board processing of echosounder data, suitable for deployment on autonomous surface vehicles, has been developed. This technology enables long duration missions in the Antarctic with transfer of information from the echosounder on autonomous vehicles to scientists and commercial users, through low bandwidth communication channels.

The concept and examples from deployment in the Antarctic during the 2018/2019 krill focused survey with RV Kronprins Haakon is presented, in addition to experiences from deployments in the Arctic and Antarctic in 2020.

Tittel	Upper ocean properties around the South Orkney Islands, Antarctica, in two years of contrasting sea ice conditions
---------------	---

Innsenders fornavn	Angelika
Innsenders etternavn	Renner
Epost	angelika.renner@hi.no
Forfatterliste (Fornavn Etternavn)	Angelika H. H. Renner, Sebastian Menze, Elizabeth M. Jones, Emma F. Young, Sally E. Thorpe, H. Sjøiland, Eugene Murphy
Institusjon (affiliations)	Institute of Marine Research, Tromsø, Norway Institute of Marine Research, Bergen, Norway British Antarctic Survey, Cambridge, UK

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktissemnaret 2020.

The South Orkney Islands and the surrounding plateau, situated in the Weddell Scotia Confluence between the Antarctic Circumpolar Current and the Weddell Front, are a highly productive and important region for the ecosystem in the Atlantic sector of the Southern Ocean. A hotspot for Antarctic krill, the region is a key fishing ground for the commercial krill fishery. Processes influencing the advection and retention of krill around the South Orkneys have impacts not only locally, but across a wider region downstream. The circulation around the South Orkney Plateau is dominated by a topographically steered boundary current which transports surface and intermediate water masses along the shelf break. In this study, we present observations from two hydrographic surveys across the plateau in 2016 and 2019. These two years were characterized by opposing patterns in the sea ice coverage prior to the surveys, and the large-scale climate state linked to El Niño. We analyse water mass properties and transformations along the pathway of the boundary current and explore linkages to sea ice and the atmosphere through freshwater input from ice melt and sea surface temperature anomalies. Particular focus is on the northern edge of the plateau and a canyon situated on the northwest of the plateau, in which large krill aggregations frequently occur.

Tittel	Ocean-ice shelf Interaction and channelized Melting in Dronning Maud Land (iMelt)
---------------	---

Innsenders fornavn	de Steur
Innsenders etternavn	Laura
Epost	Laura.de.Steur@npolar.no
Forfatterliste (Fornavn Etternavn)	Elin Darelius, Tore Hattermann, Geir Moholdt, Ashley Morris, Katrin Lindbäck
Institusjon (affiliations)	Norwegian Polarinstitut, University i Bergen

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

The recent increase in the Antarctic contribution to global sea-level rise is a major concern given that the majority of the world's population lives along the coastlines. This increase, which is now thought to be irreversible in West Antarctica, is triggered by ocean-induced melting beneath the floating parts of the ice sheet known as ice shelves. Most basal melting occur near the ice-sheet grounding lines and the ice-shelf fronts, as well as within basal channels underneath the ice shelves.

iMelt will quantify the processes and importance of ocean-ice shelf interactions and channelized basal melting in Dronning Maud Land, East Antarctica. The main focus will be on Fimbulisen ice shelf which has a complex network of basal channels in the central part of the ice shelf and a tongue that extends seaward of the continental shelf. Data from ocean temperature and velocity from under Fimbulisen, the largest ice shelf in Dronning Maud Land, have been collected since 2010. In 2019, the project iMelt kicked off with recovery of two more years of under-ice shelf data, and two open ocean moorings were installed along the coast of Dronning Maud Land in 2019. The combination of these unique observations will allow us to investigate ocean processes outside the ice shelf. Three autonomous radars are also deployed on Fimbulisen and Nivlisen ice shelves to monitor ice-shelf basal melting directly.

The project will quantify the relationship between far-field ocean dynamics, ocean-ice interactions and basal melt rates through these concurrent oceanographic and under-ice shelf measurements. This interdisciplinary research combines in-situ measurements, satellite remote sensing, and high-resolution modeling of interaction in Dronning Maud Land and will provide fundamental new knowledge on processes related to basal melting, essential for a better understanding of the stability of the Antarctic ice sheet.

Tittel	Climate Change and the Management of Antarctic Krill Fisheries
---------------	--

Innsenders fornavn	Olav Schram
Innsenders etternavn	Stokke
Epost	o.s.stokke@stv.uio.no
Forfatterliste (Fornavn Etternavn)	Olav Schram Stokke
Institusjoner (affiliations)	Department of Political Science, University of Oslo

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Vennligst marker eposten med Antarktisseminaret 2020.

What challenges does climate change pose to effective management of fisheries for Antarctic krill – and is the international management system dimensioned to meet those challenges? The combination of rising levels of sea temperature, acidification and ultraviolet radiation in the Southern Ocean is expected to induce a poleward shift in distribution of the Antarctic krill stock, which is by far the world's biggest marine stock. Our knowledge about krill biology, inter-species interaction and oceanographic conditions in the Southern Ocean suggests that a poleward shift would most probably imply significant reduction of habitats suitable for krill spawning, hatching, larval survival and juvenile growth. This paper reviews the institutional framework for managing krill fisheries, then examines CCAMLR's ability to adapt conservation measures to ongoing and future climate-driven changes in the distribution and abundance of this species. The focus is placed on the need for risk assessment based on monitoring of ecosystem components potentially affected by krill fisheries and a feedback management system that links agreed conservation measures to the best available information on the status of Antarctic krill and its predators. Progress towards such a system has been impeded by inadequate monitoring activities and lack of consensus on how to allocate catch limits among management units that are small enough to account for differential predator needs. Achieving krill regulations with finer spatial resolution than in the current conservation measures will require consensus among CCAMLR members – which in turn is likely to require accommodation by both sides in the controversies of the past decade over how to balance the protection and the rational-use parts of CCAMLR's objective. This paper identifies several institutional, political and economic factors likely to promote such mutual accommodation.

Tittel	Beitestrategi i forhold til sjøisdynamikk påvirker individuell tilstand av Antarktisk petreller i hekkeperiode
---------------	---

Innsenders fornavn	Arnaud
Innsenders etternavn	Tarroux
Epost	Arnaud.tarroux@nina.no
Forfatterliste (Fornavn Etternavn)	Arnaud Tarroux ^{a,b} , Yves Cherel ^c , Per Fauchald ^b , Akiko Kato ^c , Oliver P Love ^d , Yan Ropert-Coudert ^c , Gunnar Spreen ^{a,e} , Østein Varpe ^f , Henri Weimerskirch ^c , Nigel G Yoccoz ^g , Sandrine Zahn ^h , Sébastien Descamps ^g
Institusjon (affiliations)	^a Norwegian Polar Institute, Fram Centre, Tromsø, Norway ^b Norwegian Institute for Nature Research, Fram Centre, Tromsø, Norway ^c Centre d'Etudes Biologiques de Chizé (CEBC), UMR 7372 du CNRS-La Rochelle Université, France ^d Department of Biological Sciences, University of Windsor, Ontario, Canada ^e University of Bremen, Institute of Environmental Physics, Bremen, Germany ^f University Centre in Svalbard, Longyearbyen, Norway & Norwegian Institute for Nature Research, Bergen, Norway ^g Department of Arctic and Marine Biology, University of Tromsø - The Arctic University of Norway ^h Université de Strasbourg, Institut Pluridisciplinaire Hubert Curien, UMR7178 CNRS, Strasbourg, France

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Abstrakt (243 ord)

Innen dyrepopulasjoner er individer forskjellige fra hverandre, og kan dermed påvirkes av miljøforholdene på ulike måter. Individuelle forskjeller, for eksempel i forhold til beiteadferd, kan på lang sikt påvirke demografiske parametere. Det derfor viktig å bedre forstå til hvor stor grad individer

skiller seg fra hverandre. Vi undersøkte effektene av individuelle strategier i beitedferd på den fysiologiske tilstanden til en langtrekkende sjøfugl som er godt tilpasset sjøis, Antarktiske petrell *Thalassoica antarctica*, i hekketiden. Vi var spesielt interessert i påvirkningen av sjøishabitatet, et karakteristisk, men skjørt trekk av polare marine økosystemer som Sørishavet.

For det første, ved bruk av GPS-sporing og bevegelsesmodellering, testet vi for forekomsten av distinkte beitedferd i vår studiepopulasjon (strategier). Vi fant stor variasjon i bevegelsesmønstre og beitedferd, og avgrensede distinkte strategier langs en gradient fra beiting i tett sjøis til åpent hav.

For det andre, testet vi om fysiologisk tilstand til fuglene ved retur av en beitetur var korrelert med disse strategiene. Vi kombinerte sporingsdata med morfometriske data (vekt og størrelse) og med en rekke fysiologiske målinger på flere plasmametabolitter, for å få et generelt bilde av fuglenes individuelle tilstand.

Resultatene våre indikere at beite strategier ikke påvirker energibalansen, men kan påvirke andre aspekter av Antarktisk petreller sin individuell tilstand. Beiting i tettere sjøisområder var korrelert med mindre økning i vekt tidlig i hekkeperiode. Generelt sett kunne den store individuelle heterogeniteten i bestander av Antarktisk petrell øke deres motstandskraft mot miljøendringer, spesielt i forhold til det forventede tapet av sjøis.

Tittel	Tipping Points in Antarctic Climate Components (TiPACCs)
---------------	--

Innsenders fornavn	Svein
Innsenders etternavn	Østerhus
Epost	svos@norceresearch.no
Forfatterliste (Fornavn Etternavn)	Petra Langebroek og Svein Østerhus
Institusjon (affiliations)	NORCE og BCCR

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Recently, several of the West Antarctic ice shelves have experienced thinning driven by ocean-induced basal melting. The consequent reduction in buttressing of the Antarctic ice sheet causes an increase in the discharge of the grounded ice into the ocean.

In our new Horizon 2020 project “Tipping Points in Antarctic Climate Components” (TiPACCs) we address these processes by assessing the possible switch from “cold” to “warm” Antarctic continental shelf seas (tipping point 1) and the possible shift in the stability regime of the Antarctic ice sheet from a stable to an unstable configuration (tipping point 2). Investigating the coupled ocean-ice system, the tipping points and their feedbacks, will provide insight into the threat of abrupt and large sea-level rise. In TiPACCs we use a suite of state-of-the-art ocean circulation and ice sheet models, in stand-alone and coupled set-up. The proximity of the simulated tipping points will be determined by existing remote sensing and in-situ observations. The possibility that the tipping points were crossed during the Last Interglacial will be investigated and allow for a better understanding of how the ocean-ice system works during warmer than present-day conditions.

Tittel	Long-term observing system for the oceanic regime of Filchner-Ronne Ice Shelf, Antarctica (Weddell Watch)
---------------	--

Innsenders fornavn	Svein
Innsenders etternavn	Østerhus
Epost	svos@norceresearch.no
Forfatterliste (Fornavn Etternavn)	Svein Østerhus
Institusjon (affiliations)	NORCE og BCCR

Jeg foretrekker: muntlig eller poster, poster.

Abstraktet skal skrives i font Calibri eller Times New Roman 11pt. Abstraktet kan ikke overstige 300 ord og skal være kun tekst.

Send inn abstraktet innen 15. februar til mjo@rcn.no. Vennligst marker eposten med Antarktisseminaret 2020.

Long term observations of the flow of dense waters from their area of formation to the abyss of the World Ocean, and the return flow of warm waters, are central to climate research. For the Weddell Sea an important component of such a system entails monitoring the formation of High Salinity Shelf Water (HSSW) on the continental shelf north of Ronne Ice Front, the transformation to Ice Shelf Water (ISW) beneath the floating Filchner-Ronne ice shelf, and the flux of ISW overflowing the shelf break to the deep Weddell Sea. Equally important is the return flow of warm water toward the Filchner-Ronne Ice Shelf system.

We operate a number of monitoring stations in the southern Weddell Sea. The systems build upon techniques and methods developed over several decades and have a proven record of high data return. Here we present plans for extending, integrating and operating the existing long-term observatories to increase our knowledge of the natural variability of the ocean-ice shelf system, and to allow early identification of possible changes of regional or global importance.

The S2 observatory at the Filchner sill was established in 1977 and continues to deliver the longest existing marine time series from Antarctica. As a key site for monitoring the ISW overflow. The existing S2 observatory consists of sub-surface mooring carrying sensors for current velocity, temperature, salinity and dissolved oxygen measurements.

Site 5 at the Ronne Ice Shelf was first established in 1999 and in 2014/15 austral summer the site was reoccupied and three instrumented moorings for long term monitoring of the circulation beneath Ronne Ice Shelf were deployed. In addition, three phase sensitive radars (ApRES) were deployed at the snow surface to monitor the melting/freezing rate at the ice shelf base. Some of the systems transmit in real-time and are designed to operate for more than 10 years. In addition to Site-5, AWI, BAS and NORCE have deployed five observatories on Filchner Ice Shelf.

The Filchner-Ronne Ice Shelf and S2 observatories provide the first ever concurrent observations from the ice-shelf cavity where ISW is formed, and the sill where it starts its descent towards the deep Weddell Sea, and have provide a unique dataset allowing us to link processes and variability within the cavity directly to overflow properties and deep water formation.

RAPPORT FRA 3DJE ANTARKTISSEMINARET, 6.-7. oktober 2020

