



Arctic Science Summit Week 2021

19-26 March | Online, Portugal

*Theme B: The Changing Arctic Ocean
Dynamics and Impacts*

Detailed session program



ID:02 - Changing Arctic Coasts

The Changing Arctic Ocean: Dynamics and Impacts

25 March 2021 | 15:30 - 17:30 GMT | Room B

25 March 2021 | 18:00 - 20:00 GMT | Room B

Conveners:

Hugues Lantuit | Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research

Leneisja Jungsberg | Nordregio

Benjamin Jones | University of Alaska Fairbanks

The Arctic coast is undergoing dramatic physical, biogeochemical and socio-economical changes. Environmental factors such as warming air temperatures, declining sea ice, permafrost thaw and increased forcing events (storminess) are critical drivers accelerating these changes. Increasing erosion rates lead to the release of large amounts of organic matter and contaminants to the nearshore zone and the upper shelf, transforming the ecosystem and altering trophic systems. It is also putting new pressures on Arctic coastal dynamics with the loss of landscapes and cultural heritage sites as well as damages on infrastructure creating stress and uncertainty in local communities. The aim of this session is to bring together researchers, indigenous partners and community members who are studying, predicting, modelling and living with these dramatic coastal and nearshore changes across the Arctic. This session will ultimately provide critical information to support future planning, mitigation and adaptation measures of these changing permafrost coastal landscapes. This session is co-organized by the EU H2020 Nunataryuk and the NSF PerCS-Net project and is a contribution to the coastal processes action group of T-MOSaIC.

25 March 2021 | 15:30 - 17:30 GMT | Room B | Oral Presentations

Time	Title	Presenting author
15:30	Introduction by the conveners	
15:35	Abiotic environment characterization and influencing factors of microphytobenthic community abundance	Claude-Eric Souquieres
15:50	Assessment of intra-seasonal permafrost bluff dynamics in the Beaufort Sea Coast using TerraSAR-X imagery	Gonçalo Vieira
16:05	Beaufort Sea Coastal Dynamics - complex issues, complex impacts and solutions	Dustin Whalen
16:20	Coastal communities' adapting to permafrost thaw in Northwest Greenland	Leneisja Jungsberg
16:35	Impact of River Forcing on Simulated Ocean-Sea Ice Coupling in the Arctic Mackenzie Shelf (South-Eastern Beaufort Sea)	Clément Bertin
16:50	Multi-disciplinary Site Investigations for improved infrastructure design North Greenland	Thomas Ingeman-Nielsen
17:05	Open discussion on orals and posters	

25 March 2021 | 18:00 - 20:00 GMT | Room B | Oral Presentations

Time	Title	Presenting author
18:00	Introduction by the conveners	
18:05	Protection of Arctic coastlines by nearshore and shorefast ice	Lucia Hosekova
18:20	Record high Pacific Arctic seawater temperatures and delayed sea ice advance in response to episodic atmospheric blocking	Tsubasa Kodaira
18:35	Release of Bioavailable Dissolved Organic Matter into the Arctic Coastal Zone: Simulating Coastal Permafrost Soil Erosion	Anders Dalhoff Bruhn Jensen
18:50	Sea spray deposition in Svalbard snow – depending dependence on topography: ? Lessons learned from two projects in the Hornsund area	Krystyna Koziół
19:05	Sea-level rise floodmapping using hydrodynamic and bathtub water-level models over UAV and LiDAR DSMs in Tuktoyaktuk, Northwest Territories, Canada	Daniel Pinheiro
19:20	Projections of Arctic coastal erosion and consequent carbon fluxes	David Marcolino Nielsen
19:35	Open discussion on orals and posters	

E-Posters | View in the conference platform and discussion in the session

	Title	Presenting author
	A shelf in disequilibrium: how Arctic continental shelves may respond to climate-driven changes in sea states	John Malito
	A slab of ice the size of Manhattan just broke free from Ellesmere Island: what else have we lost?	Myriam Labbé
	Fluxes investigation of organic matter in the delta of the Mackenzie River with satellite imagery.	Bryère Philippe
	Morphodynamics and sedimentary processes in arctic transitional environments: Dicksonfjorden, Svalbard	Dohyeong Kim
	Remote sensing analysis of recent coastal change and its controlling factor in Tuktoyaktuk Peninsula (Beaufort Sea Coast, Canada)	Bernardo Costa
	Remote sensing analysis of recent coastal change and its controlling factors in the Darnley Bay region (Beaufort Sea Coast, Canada)	Rodrigue Tanguy
	Synergistic use of remote sensing and field observations for assessing recent changes along the Canadian Beaufort coast	Gonçalo Vieira

ID:09 - Ocean Biogeochemistry in the Rapidly Changing Arctic: Research and Impacts

The Changing Arctic Ocean: Dynamics and Impacts

25 March 2021 | 08:00 - 10:00 GMT | Room B

25 March 2021 | 11:30 - 13:30 GMT | Room B

Conveners:

Darren Pilcher | University of Washington, Joint Institute for the Study of Atmosphere and Ocean

Agneta Fransson | Norwegian Polar Institute, Fram Centre

Takuhei Shiozaki | Atmosphere and Ocean Research Institute, The University of Tokyo

The Arctic is undergoing rapid environmental changes, such as the loss of sea ice and changes in freshwater content. These shifts have impacts on biogeochemical cycling in the rest of the Arctic system, including impacts on carbon dioxide, methane and oxygen. This session will address what the future Arctic biogeochemical system may look like and how the ocean observing community can both capture these expected changes and use these studies to co-design decision support tools with impacted communities and industries. We invite contributions from a variety of studies that use observations, models, and community sampling efforts to address the past, present, and future biogeochemistry of the Arctic. We encourage submissions that focus on the relationship between biogeochemistry and broader patterns of variability in the Arctic and beyond, such as changes in the Arctic carbon sink; new links between coupled atmosphere-sea ice-ocean processes; and biogeochemical impacts on Arctic food webs, including human communities.

25 March 2021 | 08:00 - 10:00 GMT | Room B | Oral Presentations

Time	Title	Presenting author
08:00	Introduction by the conveners	
08:05	The next decade of Ocean Acidification Research in the Bering Sea: What we learned, where 2020 fits, and what's coming next	Jessica N. Cross
08:20	Seasonal responses of arctic marine organisms to ocean acidification	Allison Bailey
08:35	Modern estimation of the carbon dioxide flux in the Kara Sea	Alexander Polukhin
08:50	Nutrients in the European Arctic: trends and limits to primary production	Pedro Duarte
09:05	Sources and sinks of methylmercury in the water column of the East Siberian Sea	Seunghee Han
09:20	Temporal variability of heavy metal concentrations in sediments of two Arctic fjords	Paulina Rudnicka
09:35	Open discussion on orals and posters	

25 March 2021 | 11:30 - 13:30 GMT | Room B | Oral Presentations

Time	Title	Presenting author
11:30	Introduction by the conveners	
11:35	Dissolved organic matter seasonality across the land-sea transition zone in the Mackenzie River - Beaufort Sea region	Bennet Juhls
11:50	Studying changing carbonate chemistry in the Arctic Ocean using satellite Earth observation	Hannah Green
12:05	Variability and drivers of pelagic carbonate fluxes in the Arctic Ocean: the contribution of planktonic foraminifera	Franziska Tell
12:20	Glacial meltwater and carbonate minerals impact the sea-ice and seawater carbonate chemistry, CO ₂ fluxes, ocean acidification and drivers in Svalbard fjords	Agneta Fransson
12:35	Changes in CO ₂ sink of the western Arctic Ocean over 1994 to 2019	Zhangxian Ouyang
12:50	Budgeting air-sea CO ₂ fluxes during the ice melt season in an Inland Arctic Shelf Sea	Mohamed Ahmed
13:05	Open discussion on orals and posters	

E-Posters | View in the conference platform and discussion in the session

	Title	Presenting author
	Distribution of hydrocarbons in the Barents Sea a	Ekaterina Koltovskaya
	Hydrological and hydrochemical structure in the St. Anna Trough (Kara Sea)	Anna Kostyleva
	Ocean carbon exchange and drivers from winter to summer in the Atlantic water inflow to the Arctic Ocean	Maria Vernet
	Summer pCO ₂ dynamics in eastern Bering Sea and Chukchi Sea based on autonomous surface vehicles and underway measurements from 2017 to 2019	Hongjie Wang

ID:14 - Linkages and impacts of sea ice conditions and changes in the central Arctic

The Changing Arctic Ocean: Dynamics and Impacts

24 March 2021 | 16:30 - 18:30 GMT | Room B

24 March 2021 | 19:00 - 21:00 GMT | Room B

Conveners:

Marcel Nicolaus | Alfred-Wegener-Institut Helmholtz-Zentrum

Jessie Creamean | Colorado State University

Melinda Webster | University of Alaska Fairbanks, Geophysical Institute

A better understanding of the causes and consequences of the changing Arctic sea-ice cover is essential for evaluating and predicting the changes in the Arctic environment and their global impacts. New and improved parameterizations of key processes and interactions between the atmosphere, snow, sea ice, and ocean are needed for advancing forecasting capabilities. As an integrator of energy, momentum, and mass fluxes between the atmosphere and ocean, the sea-ice cover is a unique and central feature of the polar oceans. Most of these linkages underlay a strong seasonality with the sea ice and are affected by its long-term trend. We expect that changes in the Arctic sea-ice system have cascading effects on the marine ecosystem and biogeochemical pathways therein. In order to answer pressing questions regarding the roles of Arctic atmosphere-ice-ocean interactions in a warming climate, the international MOSAiC (Multidisciplinary drifting Observatory for the Study of Arctic Climate) was initiated as year-long, field program in the central Arctic. Field observations were performed with immediate involvements of remote sensing, airborne and modelling studies, creating a wide range of opportunities for synthesizing disciplines and techniques. While the MOSAiC program is outstanding for observing and analyzing the full annual cycle of key parameters and processes, many other initiatives and projects also directly contribute to bridging the scales from localized, process-oriented studies and analyses of synoptic events to basin-wide conclusions. Here, we invite presentations from all the different coordinated sea ice, ocean, and atmospheric projects that work across disciplines in the Central Arctic. We invite contributions that investigate linkages within the coupled Arctic system or show approaches to elevate our process understanding. Model and in-situ studies (incl. airborne and satellite programs) on the central Arctic energy budget and its seasonal and long-term changes are welcome as much as comparisons of time-series measurements with climatological conditions. These studies may range from micro-structures and microbiological exchanges to hemispheric analyses and improved forecasts.

24 March 2021 | 16:30 - 18:30 GMT | Room B | Oral Presentations

Time	Title	Presenting author
16:30	Introduction by the conveners	
16:35	Atmospheric processes in the Central Arctic during MOSAiC	Matthew Shupe
16:50	Overview of the MOSAiC expedition – Snow and Sea Ice	Marcel Nicolaus
17:05	A full year of extreme sea-ice and atmosphere conditions in the Eurasian Arctic: the OCEAN environment during MOSAiC	Benjamin Rabe
17:20	MOSAic Ecosystem research – implementation and first field observations from the year-long ice drift in the Central Arctic	Allison A. Fong
17:45	Biogeochemistry in the MOSAiC Coupled-System Drifting Observatory	Brice Loose
18:00	Annual Snow Cycle on Arctic Sea Ice	Amy Macfarlane
18:15	Open discussion on orals and posters	

24 March 2021 | 19:00 - 21:00 GMT | Room B | Oral Presentations

Time	Title	Presenting author
19:00	Introduction by the conveners	
19:05	Arctic sea ice as an important source for organic bromine compounds during polar sunrise	P. Simões Pereira
19:20	Enhanced Late-season Arctic Sea-ice Growth Following Early-season Atmospheric Warming: A Key Role for Snow	An Nguyen
19:35	Thermal sea ice classification during the MOSAiC expedition	Linda Thielke
19:50	Wind amplifies the polar sea ice retreat	Ramdane Alkama
20:05	Tracking ice nucleating particles in the central Arctic during the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAic) experiment	Kevin R. Barry
20:20	The Arctic, Russia and Freedom of Navigation: the importance of the Law as a means of moral coercion	Viktoriya Nikitina
20:35	Open discussion on orals and posters	

E-Posters | View in the conference platform and discussion in the session

	Title	Presenting author
	Improving bio-physical characterization of Arctic sea ice habitats using an Underwater Hyperspectral Imager	Benjamin A. Lange
	Probabilistic Forecasts of Sea Ice Trajectories in the Arctic: Impact of Uncertainties in Surface Wind and Ice Cohesion	Sukun Cheng
	Record low Russian Arctic seas ice extent in 2020.	Denis Frolov
	Seasonal variation in organic matter sources related to Arctic sea ice extent	Jong-Ku Gal

ID:55 - System of knowledge production for the Central Arctic Ocean: a model for the region and the globe

The Changing Arctic Ocean: Dynamics and Impacts

26 March 2021 | 08:00 - 10:00 GMT | Room B

26 March 2021 | 11:30 - 13:30 GMT | Room B

Conveners:

Hyoung Chul Shin | Korea Polar Research Institute, Republic of Korea

Alfred Jakobsen | Oceans North Greenland, Greenland

Ingeborg Mulder | Wageningen Marine Research, Netherlands

Conservation of the newly opening Central Arctic Ocean demands information to obtain from joint research and monitoring as well as knowledge available only from local and indigenous wisdom. This is a major emphasis in the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean, which will enter into force soon. There are significant ongoing efforts to collect information and produce knowledge in the CAO, such as field research programs, literature based assessments and policy level dialogues. However, facilitated discussion among different actors alone will not meet the current and future demands for the CAO. A system to consolidate information from a range of sources and to deliver critical knowledge is a must and also a real challenge, apart from the paucity of information. Defining management objectives, identifying the utility of different sets of information and developing the process to link them will be equally important and require contributions from both suppliers and users of knowledge. Such models can be lessons for management and governance beyond the Arctic.

26 March 2021 | 08:00 - 10:00 GMT | Room B | Oral Presentations

Time	Title	Presenting author
08:00	Introduction by the conveners	
08:05	Implications of Bering Summer Water on the zooplankton community in the Northern Chukchi Sea	Jee-Hoon Kim
08:20	Passive acoustic monitoring combined with local and indigenous knowledge of the Arctic coastal communities; a case of cooperation between modern science and indigenous wisdom	Dong-Gyun Han
08:35	A Step-Wise Progression to Fisheries Ecosystem Science in the Central Arctic	Franz Mueter
08:50	The knowledge production and sharing mechanisms for the Central Arctic Ocean management: What the different stakeholders have in common	Yunjin Kim
09:05	Open discussion on orals and posters	

26 March 2021 | 11:30 - 13:30 GMT | Room B | Oral Presentations

Time	Title	Presenting author
11:30	Introduction by the conveners	
11:35	Interesting Aspects of Interesting Aspects of the Central Arctic Ocean Fisheries Agreement	Peter Harrison
11:50	Inuit Knowledge, Indigenous Rights and the co-production of knowledge	John Crump
12:05	Inuvialuit Settlement Region Beluga Tagging Program: A community and co-management driven success story	Lisa Loseto
12:20	Inclusive Knowledge Production to Ensure Multiple Sustainable Ocean Uses with Changing Ecosystems	Candace Nachman
12:35	Towards a shared understanding and agreeable mechanism of knowledge co-production in the Central Arctic Ocean: A non-coastal Signatory perspective	Jihoon Jeong
12:50	What Role for the Arctic Council in Central Arctic Ocean Management?	Jeehye Kim
13:05	Open discussion on orals and posters	

E-Posters | View in the conference platform and discussion in the session

	Title	Presenting author
	Labrador Shelf freshening linked to Beaufort Gyre freshwater release	Jiaxu Zhang

ID:74 - Plankton Microbial Communities and its Functions in a Changing Arctic

The Changing Arctic Ocean: Dynamics and Impacts

26 March 2021 | 15:30 - 17:30 GMT | Room B

Conveners:

Catarina Magalhães | CIIMAR-Interdisciplinary Centre of Marine and Environmental Research
Pedro Duarte | NPI – Norwegian Polar Institute
Maria Paola Tomasino | CIIMAR-Interdisciplinary Centre of Marine and Environmental Research

Arctic sea ice is undergoing rapid retreat triggered by climate change. The highly interactive planktonic microbial communities respond to these dramatic changes with already documented impact in the whole biogeochemical compartments of the Arctic ocean. These changes are very complex although crucial to understand because plankton microbial communities sustain Arctic primary production and are the basis of the Arctic food webs. In this session, we welcome papers addressing the impact of the Arctic climate change trends on bacterioplankton, phytoplankton and microplankton-mediated key processes as primary production and biogeochemical cycles. We are especially interested in long term and large spatial scale studies, covering coastal and open ocean areas, to improve our understanding on the emerging risks of ongoing changes to human communities and to help defining appropriate mitigation and adaptation actions.

26 March 2021 | 15:30 - 17:30 GMT | Room B | Oral Presentations

Time	Title	Presenting author
15:30	Introduction by the conveners	
15:35	Impacts of glacial meltwater discharge on the spatial distribution of microprotist and mesozooplankton communities in Bowdoin Fjord, northwestern Greenland	Toya Hazumi
15:50	A comparative approach between metabarcoding and microscopy analysis to study the Arctic Ocean Eukaryotic Microbiome	Marta Sousa
16:05	Climate change induced shifts in polar phytoplankton nutrient content: species, community and trophic implications.	Rebecca Duncan
16:20	The types of prokaryotic rarity in the Arctic Ocean	Francisco Pascoal
16:35	Effects of nitrogen availability on phytoplankton photophysiology in the Chukchi Sea in summer	Eunho Ko
16:50	Links between Arctic microbial taxonomy and nitrogen functional traits Across the Svalbard Shelf	Catarina Magalhães
17:05	Open discussion on orals and posters	

E-Posters | View in the conference platform and discussion in the session

	Title	Presenting author
	Monitoring the diversity of eukaryotic phytoplankton communities in the surface waters of the Beaufort Sea	Victoria Jackson

ID:93 - Climate change and the Arctic Ocean

The Changing Arctic Ocean: Dynamics and Impacts

24 March 2021 | 08:00 - 10:00 GMT | Room B

24 March 2021 | 10:30 - 12:30 GMT | Room B

Conveners:

Annica Ekman | Stockholm University

Marius Årthun | University of Bergen

William Perrie | Bedford Institute of Oceanography, Canada

In recent decades, global warming has been amplified in the Arctic region, and sea ice is disappearing at unprecedented rates. Mechanisms for climate change on the regional scale need to be better understood in order to predict future changes in parameters such as temperature, currents, winds, salinity, surface waves and mixing, which are important drivers of ecosystem parameters like productivity. Furthermore, the warming Arctic causes changes in the ocean and atmosphere that can influence clouds, weather and climate in the Arctic region and beyond. Understanding these processes is important for many societal concerns, including those critical to Arctic countries like marine infrastructure and resource development, and industries and communities across the Northern hemisphere. The session proposes to bring together researchers from diverse disciplines and projects focused on the Arctic Ocean. Particular interest is in high-resolution Arctic climate change projections, related to sea ice, cloud dynamics, freshwater release, tracer transport, circulation and ocean dynamics (temperature, waves, currents, etc.) and relevant ecosystem studies. Overall, the session aims to enhance the scientific community understanding of the state of knowledge around the influence of the Arctic Ocean on climate change and provide a forum to discuss future research needs.

24 March 2021 | 08:00 - 10:00 GMT | Room B | Oral Presentations

Time	Title	Presenting author
08:00	Introduction by the conveners	
08:05	Nordic Seas Heat Loss, Atlantic Inflow, and Arctic Sea Ice cover over the last century	Lars H. Smedsrud
08:20	Arctic ocean and sea ice seen from CMIP6 models	Muyin Wang
08:35	Present and future drivers of regional Arctic winter sea-ice variability	Jakob Dörr
08:50	Mechanisms of Arctic amplification triggered by the sea ice loss	Vladimir Ivanov
09:05	The Response of Arctic Cyclones to Historical and Future Climate Change	Chelsea Parker
09:20	Verification of regional climate model simulations over Arctic sea ice in late winter using in-situ and remote sensing data	Günther Heinemann
09:35	Open discussion on orals and posters	

24 March 2021 | 10:30 - 12:30 GMT | Room B | Oral Presentations

Time	Title	Presenting author
10:30	Introduction by the conveners	
10:35	Heat uptake of the Arctic climate system and of the MOSAiC area	Leopold Haimberger
10:50	Structure of the freshened surface layer in the Eastern Arctic during ice-free periods	Alexander Osadchiev
11:05	New properties of the Eurasian Arctic ocean surface layer from in situ and satellite data	Anastasiia Tarasenko
11:20	Modelling phytoplankton dynamics in the Arctic's marginal ice zone	Fabian Große
11:35	Shifting food sources change Arctic benthic faunal behaviour and ecosystem functioning	Adam Reed
11:50	Methane surges in Arctic coastal seas: risks to humanity and ecosystems, and methods of mitigation	Peter Wadhams
12:05	Open discussion on orals and posters	

E-Posters | View in the conference platform and discussion in the session

	Title	Presenting author
	Atmosphere momentum 'window' for Beaufort Gyre variability during the Arctic rapid changes	Shuhao Tao
	Influence of SST in the tropical Atlantic on the inflow of Atlantic water and freshwater balance in the Arctic Ocean	Genrikh Alekseev
	Interannual variability of temperature in an Arctic fjord, Kongsfjorden and its possible connection with large scale atmospheric circulation	Subeesh M. P
	The Arctic Subpolar gyre sTate Estimate (ASTE): a data-constrained, dynamically consistent ocean-sea ice estimate for 2002–2017	An T. Nguyen
	The IsA time series- a high Arctic model system for climate change	Cheshtaa Chitkara
	Variability of Underwater Sound in the East Siberian Sea during 2017-2018	Dong-Gyun Han