ACF
Arctic Climate Forum

WORLD METEOROLOGICAL ORGANIZATION

ARCTIC REGIONAL CLIMATE CENTRE (ArcRCC) Network

12th Arctic Climate Forum (ACF-12)

6 – 7 November 2023, from 16:00 to 19:00 UTC

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GoTo Meeting Logistics

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Welcome Address

Dr. Scott Lindsey

NWS Alaska Region Director

WMO Global Cryosphere Watch-Advisory Group Chair

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Agenda DAY 1

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TIME (UTC)	ITEM	DETAILS/SPEAKERS
16:00 (10′)	**Welcome words and meeting logistics**	Dr. Scott Lindsey - Regional Director, NOAA National Weather Service (NWS) Alaska Region Becki Heim - NOAA
16:10 (15′)	**Introduction to the WMO Regional Climate Centers (RCCs) and ArcRCC Network**	Helge Tangen - ArcRCC network coordinator/MET Norway Valentina Khan - WMO
16:25 (5′)	**ACF-12 Consensus Statement - Explanation**	Vasily Smolyanitsky - AARI
16:30 (50′)	**ArcRCC Regional Climate Overview Briefings** • Temperature, precipitation and sea-ice conditions and extremes for North America, Europe, Northern Eurasia, and Central Arctic • Review of summer 2023 and outlook for winter 2023/2024	Session Chair: Ken Kwok - ECCC North America (15′) • Alaska & Western Canada (Brian Brettschneider - NOAA) • Central & Eastern Canada (Jesse Wagar - ECCC) Northern Europe (15′) • Western Nordic (Kristín Björg) • Eastern Nordic (Cyril Palerme) Northern Eurasia (15′) • Western & Eastern Siberia (Svetlana Emelina) • Chukchi & Bering (Svetlana Emelina) Central Arctic (5′) - (Anna Timofeeva)
17:20 (15′)	**Q&As and Discussion on Climate Overviews**	Moderator: Ken Kwok - ECCC

Introducing the Arctic Regional Climate Centre Network (ArcRCC-N)

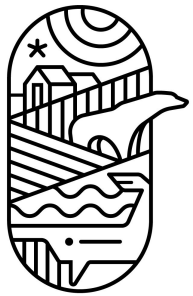
https://www.arctic-rcc.org

Helge Tangen
Norwegian Meteorological Institute
ArcRCC Network Coordinator

Photo: Helge Tangen

Welcome to Arctic Climate Forum #12
ACF-12

- A forum for the Arctic Regional Climate Centre Network to meet stakeholders and users
- Usually: Every spring a face-to-face meeting
- Every fall a virtual meeting - like this one



ACF
Arctic Climate Forum
Weather · Climate · Water

What's the difference?

World Meteorological Organization

Weather • Climate • Water

Weather

- Conditions of the atmosphere over a short period of time
- Reported in terms of hours and days for a city, town, region

It answers these questions

- *What is the temperature right now?*
- *Will I need a coat this afternoon?*
- *Will it rain this weekend?*

Climate

- Average weather of a place over period of many years
- Tells us what's normal for an area.

It answers these questions

- *What is an average winter like in Reykjavik?*
- *Was 2015 the warmest summer on record?*
- *Will Tromsø have above normal temperatures this summer?*

Climate is what you expect, weather is what you get

(sources: NOAA, NSIDC and WMO and websites)

Scale of Weather and Climate Information

Time Scale	Days	Weeks	Months (sub-seasonal)	Seasons (3 months)	Years	Decades	Centuries
Weather or Climate Information	Weather forecasting		Arctic Regional Climate Centre		Satellite and in-situ monitoring	Climate Change Models	
Geographic Scale	Local		← →			Global/Regional	
Sources of Information	National Meteorological Services		filling this gap		• National Meteorological Services • Arctic Report Card	• IPCC assessments • AC Working Group assessments	

ArcRCC products are filling the seasonal gap using

- State of the art modeling for **temperature, precipitation and sea-ice**
- Regional expertise at Meteorological organizations
- By providing operational products for decision-makers every
  - May for the Arctic summer season
  - October for the Arctic Winter season

The Arctic Regional Climate Centre

NATIONAL		REGIONAL		CIRCUMPOLAR
Countries	**Meteorological Organizations**	**Regional Climate Centres (RCCs)**		**Arctic Regional Climate Centre**
United States	NOAA	North American Node	Forecasting	
Canada	ECCC			
Denmark	DMI	Nordic Node	Data Services	
Iceland	IMO			
Norway	NMI			
Sweden	SMHI			
Finland	FMI			
Russia	AARI	Northern Eurasia Node	Monitoring	

Collaboration/Networking across Arctic regional nodes and Meteorological Organizations

ArcRCC Products

produced each May and October

1. Arctic Consensus Statement:

Text and graphics that summarize the temperature, precipitation and sea-ice climate trends for the past season and forecasts for the upcoming season. A collaborative effort by the network in reviewing:

- Trends in the historical monitoring data
- Forecasts from the models
- Using Met/Ice climate expertise, fill gaps in the data

https://arctic-rcc.org/consensus-statements

1. Regional Summaries

- The same information that is in the consensus statement but organized by Arctic region and added information about potential impacts to regional users.

Way forward

- Obtaining Designation from WMO - getting status as a fully operational Regional Climate Centre Network after a successful demonstration phase
  - Probably obtained next spring during WMO Executive Council meetings - after recommendation from SERCOM this winter
- Continue with 2 Arctic Climate Forums per year - to ensure user contact
- Develop new products, built on user needs

World Meteorological Organization

Weather · Climate · Water

Thank you!

Introduction to the WMO Regional Climate Centers (RCCs)

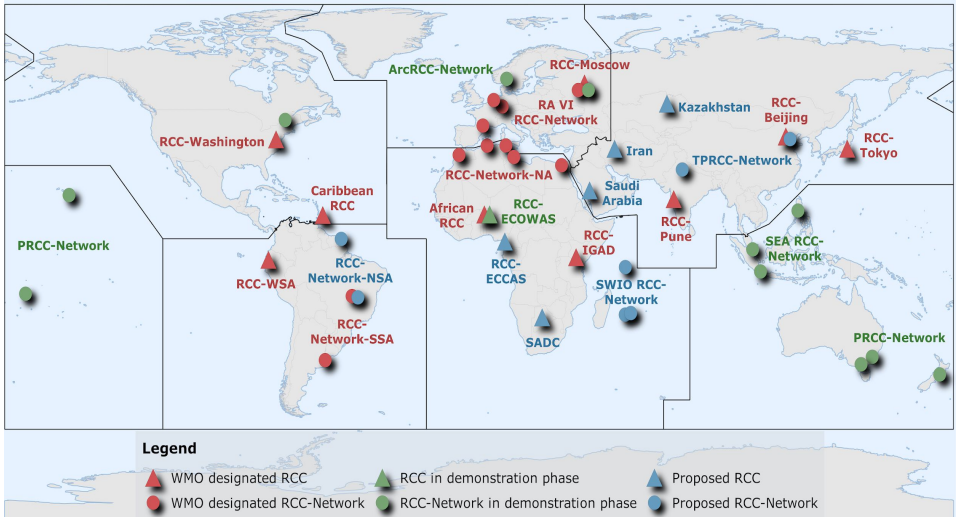
Anahit Hovsepyan
Regional Climate Prediction Services division
Climate Services Branch, Services Department, WMO

Valentina Khan
Hydrometcenter of Russia/NEACC

12 session of Arctic Climate Forum
Hosted by the United States

WMO Regional Climate Centres - Concept

- Centres of Excellence mandated to generate **high-quality regional-scale products**
- Key entities within the **Climate Services Information System** (CSIS)
- Strengthen **capacity of WMO Members** in the delivery of improved climate services to national users
- Facilitating **access to and application** of regional climate products
- Serve **primarily the NMHSs within the RCC's region**, as a backbone for the development and maintenance of NMHSs' climate services
- Can serve **other WMO RCCs and NMHSs** from areas outside an RCC's region of interest
- Regional **cooperation and prioritization** for capacity development



12 Designated WMO RCCs and RCC-Networks
4 RCCs and RCC-Networks in demonstration phase

WMO Regional Climate Centres – Definition

- WMO-RCC: A **multifunctional centre** that fulfils all the required functions of an RCC for the entire region, or for a sub-region to be defined by the regional association
- WMO RCC-Networks: A **group of centres** performing climate-related activities that collectively fulfil all the required functions of an RCC
- WMO RCC-Network Node: a centre in a designated WMO RCC-Network that performs, for the region or sub-region defined by the regional association, **one or several of the mandatory RCC activities**

- The concerned **Regional Association endorses** a proposed RCC structure (implementation plan) to start the demonstration phase

WMO Regional Climate Centres – Functions

Mandatory Functions: Minimum set of functions performed by RCC to be officially designated as a WMO RCC, or a WMO RCC-Network

- Operational Long-Range Forecasts
- Operational Climate Monitoring
- Operational Data Services
- Training

Once this is complied with, each RCC can prioritize its functions and additional activities based on the specific needs of the region, and even give them more importance than the mandatory functions (e.g., surface air temperature over the Antarctic).

Highly Recommended Functions

- Prediction & Projection
- Non-operational Data Services
- Coordination Functions
- Capacity Building
- Research & Development

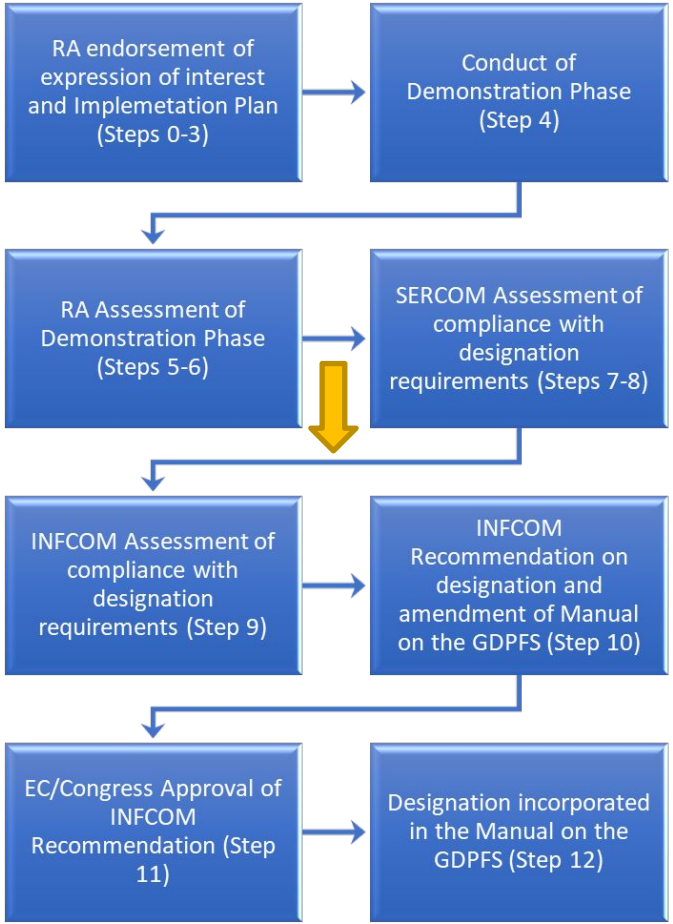
Key milestones in the journey of RCC establishment and role of WMO Technical Commissions

SERCOM/SC-CLI/ET-CSISO

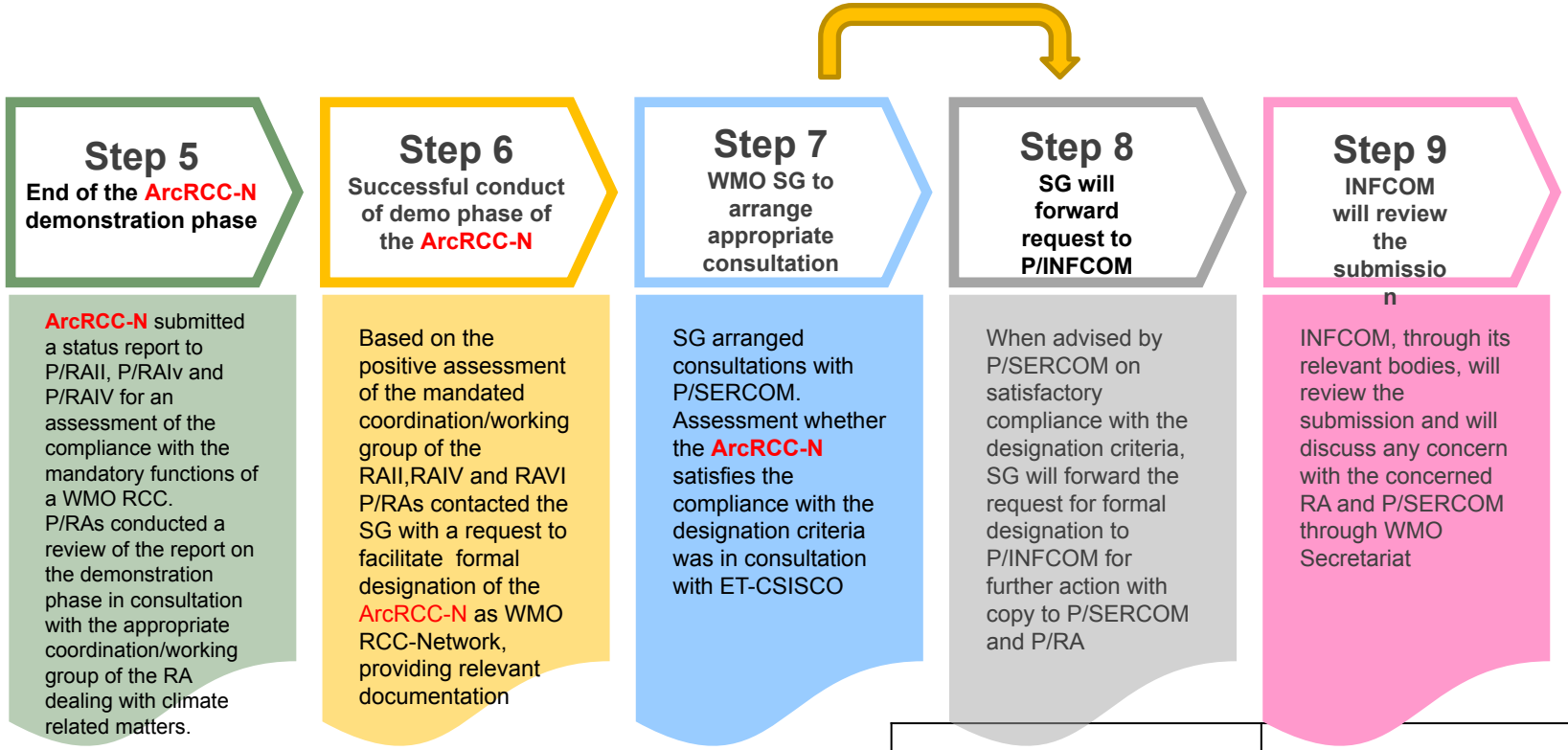
- WMO Guidance on establishment and operation of RCCs
  - Final version under publication
- Assessment of RCC operations and recommendations for designation/evaluation matters working closely with INFCOM/SC-ESMP
  - Implementation of an annual reporting process for RCCs
  - Analysis of annual reports and evaluation reports for each of the designated RCCs and RCCs formally in demonstration phase
  - Assessment of RCC designation proposals and recommendations
  - Review and update of RCC functions (both mandatory and highly recommended), designation criteria/processes

INFCOM/SC-ESMP/ET-OCPS

- Evaluate applications against the designation criteria in the GDPFS Manual and make recommendations to designate new centres to INFCOM
- Liaise with SERCOM to incorporate evolving needs of CSIS into the operational infrastructure



Step-by-step ArcRCC-N designation process 1/2



Step-by-step ArcRCC-N designation process 2/2

Step 10
The ArcRCC-N may be invited by INFCOM to its session (optional)

When appropriate and if required, the ArcRCC-N may be invited by INFCOM to present the proposal for RCC designation at one of its sessions for its decision. This process may also be expedited through the INFCOM Management Group

Step 11
Amendment to the Manual on the GDPFS

Upon the recommendation of the INFCOM, the proposed designation in the form of an amendment to the Manual on the GDPFS will be put up to the Congress or the Executive Council (EC) for approval

Step 12
Final WMO approval

With this final WMO approval, the Manual on the GDPFS will be revised and the RA and the ArcRCC-N will be advised by the Secretariat in writing on their formal designation as a WMO RCC-Network

Thank you

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Arctic Consensus Statement

Summary of Summer 2023 and Outlook for Winter 2023 / 2024

What it is and how it is generated

Vasily Smolyanitsky, Arctic and Antarctic Research Institute (AARI)
ACF-12, November 6-7 2022

Arctic Regional Climate Centre Network

What is the ArcRCC Consensus Statement?

- ❑ The statement is a report synthesizing
  - ✔ trends of the Essential Climate Variables (ECV)
  - ✔ review of the ECVs for the past season
  - ✔ outlooks of the ECVs for the upcoming season
  - ✔ other significant information presented during the Arctic Climate Forums (ACF)
- ❑ It complements other WMO statements of climate in terms of regional details and information of interest for end-users in the Arctic domain
- ❑ Review, forecasts and verification of the forecasts or outlooks are given for surface air temperature, precipitation, sea-ice and other ECVs
- ❑ Additional information usually includes details of impacts and risks of the reviewed and forecasted ECVs based on non-technical and user reports during the forum

How is it produced?

- It is a joint effort by all National Meteorological Services in the ArcRCC
- Climate monitoring and forecasted information is collected from the responsible nodes
- Additional regional information on impacts and risks is based on the non-technical and end-users reports
- Consensus statement document draft is circulated during the forum
- Final version is published shortly after the forum

<table>
<tr><th colspan="2">NATIONAL</th><th colspan="2">REGIONAL</th><th>CIRCUMPOLAR</th></tr>
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<tr><td>Russia</td><td>AARI</td><td>Northern Eurasia Node</td><td>Monitoring</td></tr>
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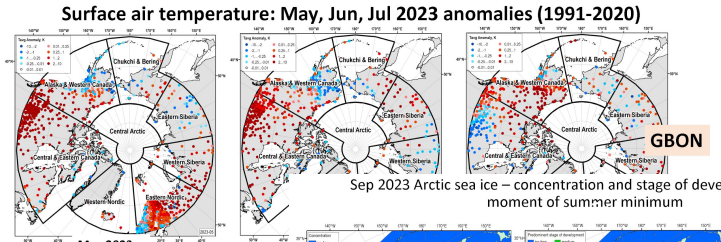
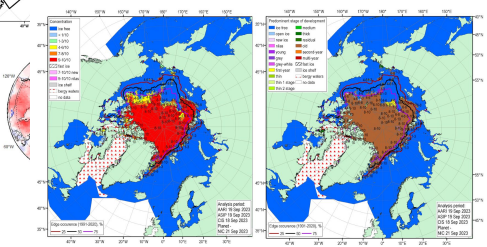
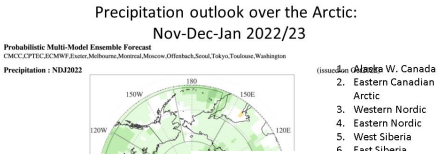
What does it look like?

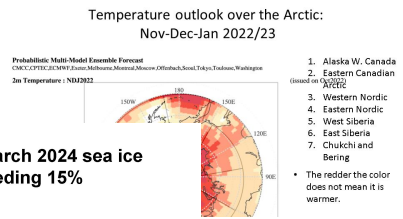
Graphics and text describing past and forecasted variability for the major Arctic Climate Variables based on observations and numerical analysis

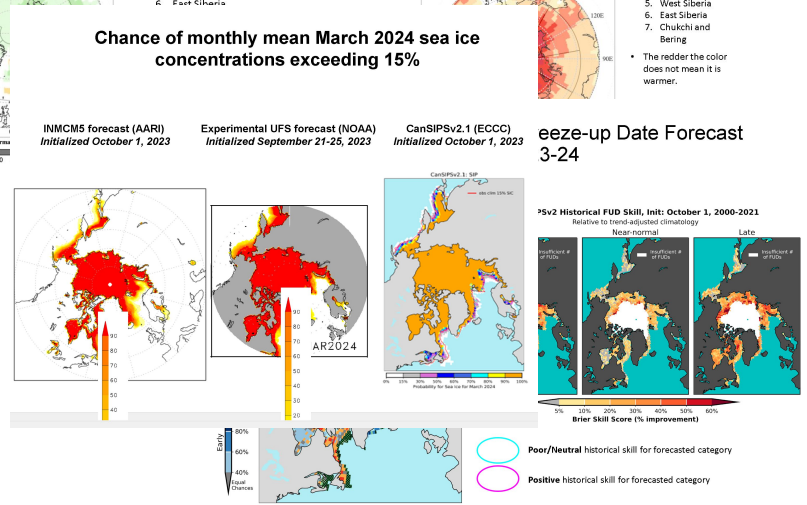




- Observed in September 2022 12th in row summer Arctic ice cover minimum as well as general ice conditions are very similar to the 2021 and second time in row significantly differ from 2019 or 2020
- While Eurasian Barents, Kara (that is opposite to 2021) shelf seas were completely ice free with the ice edge significantly northward of Svalbard, the ice conditions in parts of the Laptev, ESS, Beaufort Seas were close to 40 years normal with both the NW passage and the NSR formally remaining blocked in the transit straits which is again opposite to last pentade
- Area and thickness of both residual and second year ice in September this year for the Arctic Basin was similar as in 2021 as recorded during summer cruise on "Akademik Treoshnikov"

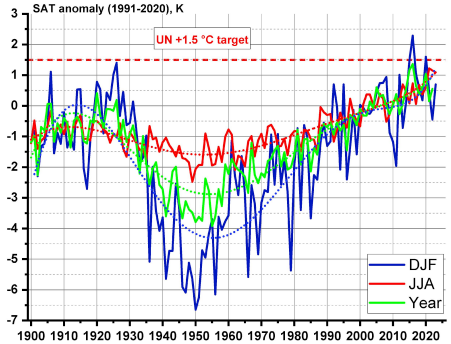






What does it contain ?

1) Highlights of trends, review and outlooks



HIGHLIGHTS

Temperature: For the whole Arctic strong and extremely positive SAT anomalies absolutely dominated during May – September 2023. Preliminary resulting rank for JJA 2023 for the land Arctic is the 3rd consecutive in summer from 1950, though large regional and inner season variations and changes in anomaly sign continue to occur. In general, lesser scale of anomalies as well as some negative anomalies are observed for the Artic regions with a greater share of the sea are – the Western Nordic and Chukchi-Bering. For the upcoming winter season (NDJ 2023/2024) high probability of above normal temperatures is forecasted for most of the marine and land Arctic with close to normal temperatures expected only for some areas east of Greenland.

Precipitation: During the summer 2023 drier conditions dominated over parts of Western Nordic, Eastern Siberia, Chukchi and Western Canada regions with wetter conditions over parts of Eastern Nordic, Western Siberia, Alaska and Greenland regions. Close to normal conditions were estimated for the Central Arctic. For the upcoming winter season (NDJ 2023/2024) over a larger part of the Arctic Circle high expectancies are for above normal precipitation. Chances for low than normal precipitation are forecasted for small areas within Western Nordic, Alaska and Bering and Chukchi regions.

Sea-ice: The annual sea ice minimum occurred near 17th September 2023. The value close to 4.4 million square kilometers was the 8th lowest in the satellite era since 1979. Significant negative anomalies were most prominent in the areas of Eurasian and Canadian Arctic though some residual sea ice remained in both the Northern Sea Route and the North Western Passage lanes till the time of freeze-up. The maximum sea ice extent for 2023 was reached in early March 2023. The value close to 14.9 million square kilometers was the 7th lowest in the in the satellite era since 1979, which is opposite to drastic drop of Antarctic winter ice this year. An early than normal freeze-up is forecasted for the Barents, Greenland, northern part of Labrador and parts of the Okhotsk Seas. A near normal freeze-up is forecasted for Baffin Bay, Bering and Chukchi Seas, Hudson Bay, eastern part of Kara Sea and southern part of Labrador Sea. A late than normal freeze-up is forecasted for the southern part of the Beaufort Sea.

What does it contain ?

2) Review of the climate for the previous season for temperature, precipitation, sea-ice, land hydrology and weather severity

TEMPERATURE

Summary for May - September 2023

Following analysis of the observations at the polar stations, during s
June) extremely positive anomalies of the surface air temperature (S
Central and Eastern Canada (1st – 2nd consecutive in row), strong po
Nordic, Western and Eastern Siberia, Alaska and Western Canada
Western Nordic and Chukchi-Bering regions remaining close to non
4). During mid-summer (July-August) similar extremely positive ano
Eastern Nordic, Siberia and Alaska and Canada (1st – 4th conse
exceptions lesser positive anomalies for the Western Nordic and Cl
and blue colors in figure 4). By the end of summer 2023 extremel
observed over Eastern Nordic, Western Siberia and Central and E
consecutive in row) with much lesser positive or negative anoma
Eastern Siberia, Alaska regions (red and blue in figure 4).Conclus
(due to lack of in-situ observations) were based on reanalysis(not sh
conditions in May 2023, close to normal in June – August and warm

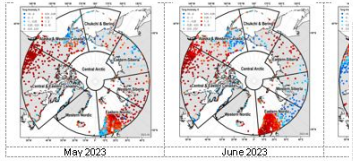


Figure 4a: May - September 2023 SAT anomalies (ref. 1991-2020) for WMO polar stations. Maps produced by the AARI.

For the whole Arctic strong and extremely positive SAT anomalies absolutely dominated during May – September 2023 with consecutive ranks varying from the record 1st (May, August) to 9th (July). Preliminary resulting rank for JJA 2023 for the land Arctic is the 3rd consecutive in summer from 1950 (red color in figure 5, left), though large regional and inner season variations and changes in anomaly sign continue to occur. In general, lesser sc of anomalies as well

PRECIPITATION

Precipitation Summary for May – September 2023

In general, during the summer season drier conditions dominated over parts of Western Nordic, Eastern Siberia, Chukchi and Western Canada regions (figure 8 left, light and dark blue areas). Wetter conditions dominated over parts of Eastern Nordic, Western Siberia, Alaska and Greenland regions (figure 8 left, light and read areas). Somewhat wetter / close to normal conditions are estimated for the Central Arctic (figure 8 left, light read and white areas).
Impacts of wetter/drier conditions and evaporation were reflected in the summer 2023 Arctic rivers discharge (only overall JJA data is for Ob', Lena (June, September), Macke than normal was seen during summer 202 (July), Mackenzie (May, September), Yuk situation this summer is opposite for Eura similar for American sector for the last two

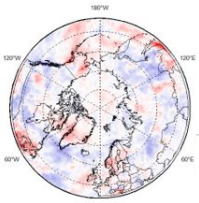


Figure 8: Summer 2023 (June – August) (Left) Surfac anomalies (ref. 1991-2020). Data source: AARI. Maps pro

POLAR OCEAN

Polar Ocean Summary for May – Septembe

Prominent negative 15m upper ocean layer estimated in the Greenland, Northern Laptev anomaly in the Barents, Kara, southern Lapt Due to lesser ice extent Chukchi, Beaufort, pa higher than in past stormy conditions with calm is similar to 2022 (not shown here). For the show both positive pH anomalies (Arctic Basin Hudson Bay) and negative pH anomalies (& 2020 period, which is in gene negative anomalies may poin data.

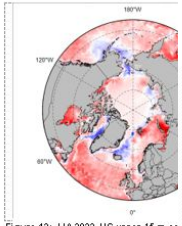


Figure 12: JJA 2023 HC upper 15 m oc AARI. Data source: CCCS MEMS.

SEA ICE

Summary for May – September 2023

Negative and close to normal ocean heat capacity (HC) anomaly (to 1993-2(during May-June 2023 for most of the Arctic slowed ice melt in these region in 2021-2022 with exceptions in Barents and western part of the Kara Seas. dominance of positive surface air temperature anomalies over Western Western part of the Eastern Siberian Sea, Beaufort Sea, Hudson Bay and Archipelago stimulated ice melt, though opposite negative or zero anomal cover in parts of Laptev, Eastern Siberia Seas and Canadian Arctic. Resultin September 2023 resembled the previous year situation including the amou extent and presence of residual ice on the NSR lanes
Minimum summer 2023 ice extent equal to ~4.4 million square km occurred n 2023 (actual values depend on algorithm, technique and source used) and w in row for satellite era since 1979 (figure 14 left). That is well within the scale variability since 2007. Maximum Arctic (Northern Hemisphere) winter 20 consecutive in row, was equal to ~14.9 million square km and occurred nea which is also close in time to climatic date and scale since 2007 but is oppc drop of Antarctic winter ice this year. Though both winter maximums and s are generally diminishing, quasi-cyclicity of 2-6 years continue to occur and rough estimates of the ice extent changes for the next years (figure 14 right).

Observed in September 2023 summer Arctic ice cover minimum as well as general ic conditions though lighter but are in general similar to 2021 and 2022 (figure 15). While Eurasia Barents, Kara, parts of Eastern Siberian Sea, Chukchi, Beaufort Seas were completely ice fre with the ice edge in significant northward position, the ice conditions in the Laptev, eastern pa of the Eastern Siberian Sea, Greenland Seas were close to 40 years median with both the North West passage and the Northern Sea Route formally remaining blocked in the transi straits.

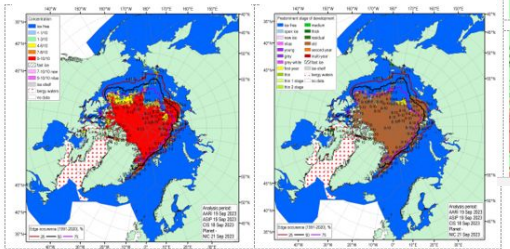


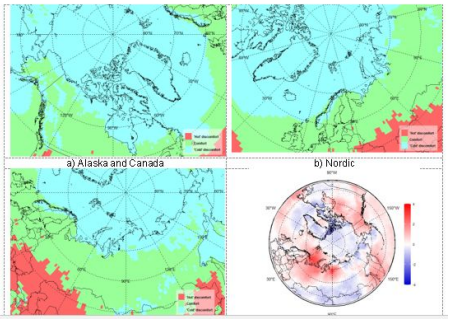
Figure 15: Blended Arctic sea-ice chart (AARI, ASIP, CIS, NIC) for 18-21 September 2023 and sea-ice edge occurrences for 16-20 September for 1991-2020 reference period. Left: total concentration, right: predominant stage of development. Graphics produced by the AARI.

BIOCLIMATIC INDEXES *(experimental product)*:

Estimates of the weather comfort or bioclimatic indexes are commonly done for the mid-latitude, sub-polar and polar regions using either the Bodman's weather severity index developed specifically for the Arctic cold season which is a derivative of the surface wind speed and air temperature and varies from slightly severe to extremely severe, or the effective temperature ET (year-round) which is a derivative of surface air temperature and relative humidity and varies from comfort to extremely discomfort.

Summary for summer 2023:

During June, July, August 2023 the "cold" discomfort zone (blue areas in figure 19a-c) spread over sea areas, Greenland, Canadian Arctic Archipelago, Hudson Bay with some land area around and Northern-East Siberia from Taymyr to Chukchi Peninsula). Comfort zone dominated in the land areas (green color in figure 19a-c) and the "hot" discomfort zone (red color in figure 19a-c) was located southward in mid-latitudes. From climatic aspect during summer 2023 there were more severe conditions (blue color in figure 19d) in the Central Arctic, Greenland, Canadian Arctic Archipelago, Davis Strait and Labrador Sea, eastern part of the NSR, Bering Sea and in the southern parts of Siberia and East Canada. Milder conditions were in the Western Canada and Alaska, Okhotsk Sea (light red color in figure 19d), and most prominent mild anomalies (red color in figure 19d) were in Barents Sea, North of European Russia and northern part of Yenisei basin. Summer 2023 was quite similar to 2022 with exceptions in Canadian Arctic Archipelago and Eastern Canada where positive anomalies changed to negative in 2023.



What does it contain ?

3) Verification of the previous and outlooks for the next season - temperature, precipitation, sea-ice, snow water equivalent, sea surface temperature, bioclimatic indexes

Verification of summer 2023 forecast

The FMA 2023 temperature forecast was verified by subjective comparison betw
forecast (Figure 6, left) and re-analysis (Figure 6, right), region by region. A reana
produced using dynamical and statistical techniques to fill gaps, where meteor
observations are not available
Above normal temperatures v
Nordic regions with lesser acc
Canada regions where mostly
The areas with moderate and
Nordic and in particular the Ch
near normal and in some plac
previous seasonal forecast. C
more than 60%.

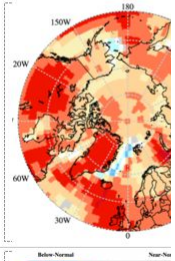


Figure 6: (Left) Multi-model ensemble
Three categories: below normal (blue),
in white. Source: www.wmolc.org. (Ri
Reanalysis (CFSR) for air temperature

Outlook for the first part of winter 2023/2024:

For the November-December 2023 and January 2024 (NDJ
of 60% or more that temperatures will be above normal in n
Nordic, Western and Eastern Siberia, Eastern and Central Ca
in figure 7, table 1). Lesser probability of 40-60% above norr
– Chukchi, Alaska and Western Canada and parts of the \
areas in figure 7, table 1). Close to normal temperatures are
Greenland (white areas in figure 7, table 1).

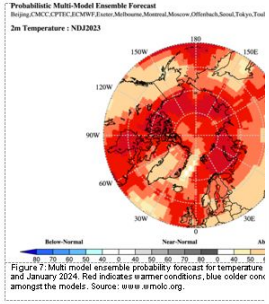


Figure 7: Multi model ensemble probability forecast for temperature
and January 2024. Red indicates warmer conditions, blue colder con
amongst the models. Source: www.wmolc.org.

Table 1. November, December 2023 and Janu
regional forecasts for Arctic tempera

Region (see Fig.2)	MME Temperature Forecast Agreement	MME Temperature Forecast
Alaska and Western Canada	Low (in southern part), Moderate (northern part)	Above normal
Central and Eastern Canada	High	Above normal
Western Nordic	Low (western part, Greenland water), high (eastern part)	Near normal (weste Greenland water), a (eastern part)
Eastern Nordic	High	Above normal
Western Siberia	High	Above normal

Outlook for the first part of winter 2023/2024:

For the November-December 2023 and January 2024 (NDJ23/24) period over a larger part of the Arctic Circle, there are 50-60% chance expectancies for above normal precipitation (Figure 10: light and green areas; Table 2). This means that the MME Forecast is decisive in any of the three probability categories. The indecisive forecast for this period above normal precipitation is showing in most of the Nordic, Chukchi and Bering and Western and Alaska regions. High chances for low than normal precipitation are forecasted for small areas within Western Nordic, Alaska and Bering and Chukchi regions (orange areas Figure 10, Table 2).

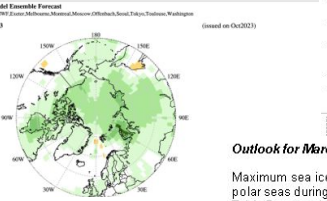


Figure 10: Multi-model ens
conditions, orange

Outlook for the first part of winter 2023/2024:

Snow Water Equivalent (SWE) calibrated probabilistic
Seasonal to Interannual Prediction System (CanSIPS
Alaskan, western and eastern Canada, Svalbard region
there is a probability of 50% or more for an above aver
most of the other areas of the Arctic below normal snc
(at least 50-60% probability) is forecasted (orange are
for the Greenland, parts of the Central Siberia and wes

Table

Region (see Fig.2)	
Alaska and Western Canada	Lo
Central and Eastern Canada	Lo
Western Nordic	Lo
Eastern Nordic	Lo
Western Siberia	Lo
Eastern Siberia	Lo

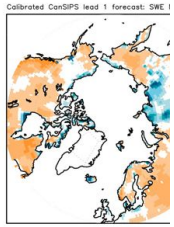


Figure 11: Canadian Seasonal to Interannual Prediction system

Outlook for winter 2023/2024 sea ice freeze-up

Sea ice freeze-up is defined as the date when the ice concentration rises above 50%). The outlook for winter freeze-up shown in Figure 17 left displays the sea ice freeze-up anomaly from CanSIPSv2 based on the nine-year climatological period from 2014-2024. The qualitative 3-category (high, moderate, low) confidence in the forecast is based on the historical model skill (Figure 17, right). A summary of the forecast for the winter 2023/2024 sea-ice freeze-up for the different Arctic regions is shown in Table 4.
An early than normal freeze-up dates (blue areas, figure 17 left; Table 4) is forecasted for the
Barents, Greenland, northern part of Labrador and parts of the Okhotsk
freeze-up (light blue and light-yellow areas, figure 17 left, Table 4) is fore
Bering and Chukchi Seas. Near normal to late freeze-up (light yellow areas
4) is forecasted for Hudson Bay, eastern part of Kara Sea and southern p
A late than normal freeze-up is forecasted for the southern part of the Be

Outlook for March 2024 Maximum Sea Ice Extent

Maximum sea ice extent is achieved each year for the Northern Hemisphere sub-po
polar seas during the month of March (more precisely between the late February – mid
Table 5 categorizes the sea ice extent forecast confidence and relative extent (i.e., near
below normal, above normal) with respect to a 2014-2022 climatology for the Arctic regi
forecast for March 2024 maximum sea ice extent is presented on figure 18. The below
March ice extent is forecasted for Bering and Labrador Seas (Table 5), near normal –
Barents, Greenland and Okhotsk Seas, above normal – for the northern part of the Bal

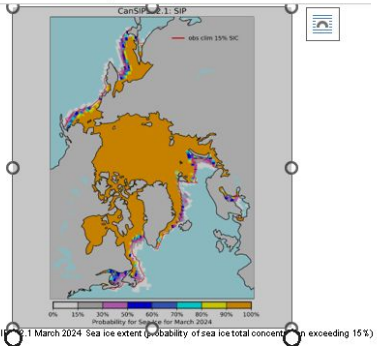


Figure 18: CanSIPS v2.1 March 2024 Sea ice extent (probability of sea ice total concentration exceeding 15%)

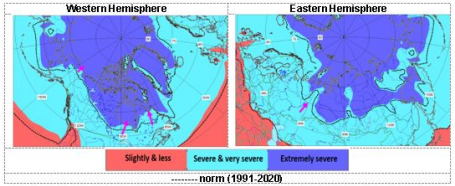


Figure 20: Bodman's weather severity index forecast for December 2023, January and February 2024. Maps produced by the Dydrometcenter Russia. Data source: Institute of Numerical Mathematics Russian Academy of Science.

Table 6: Regional comparison of Bodman's weather severity index for winter 2023/2024

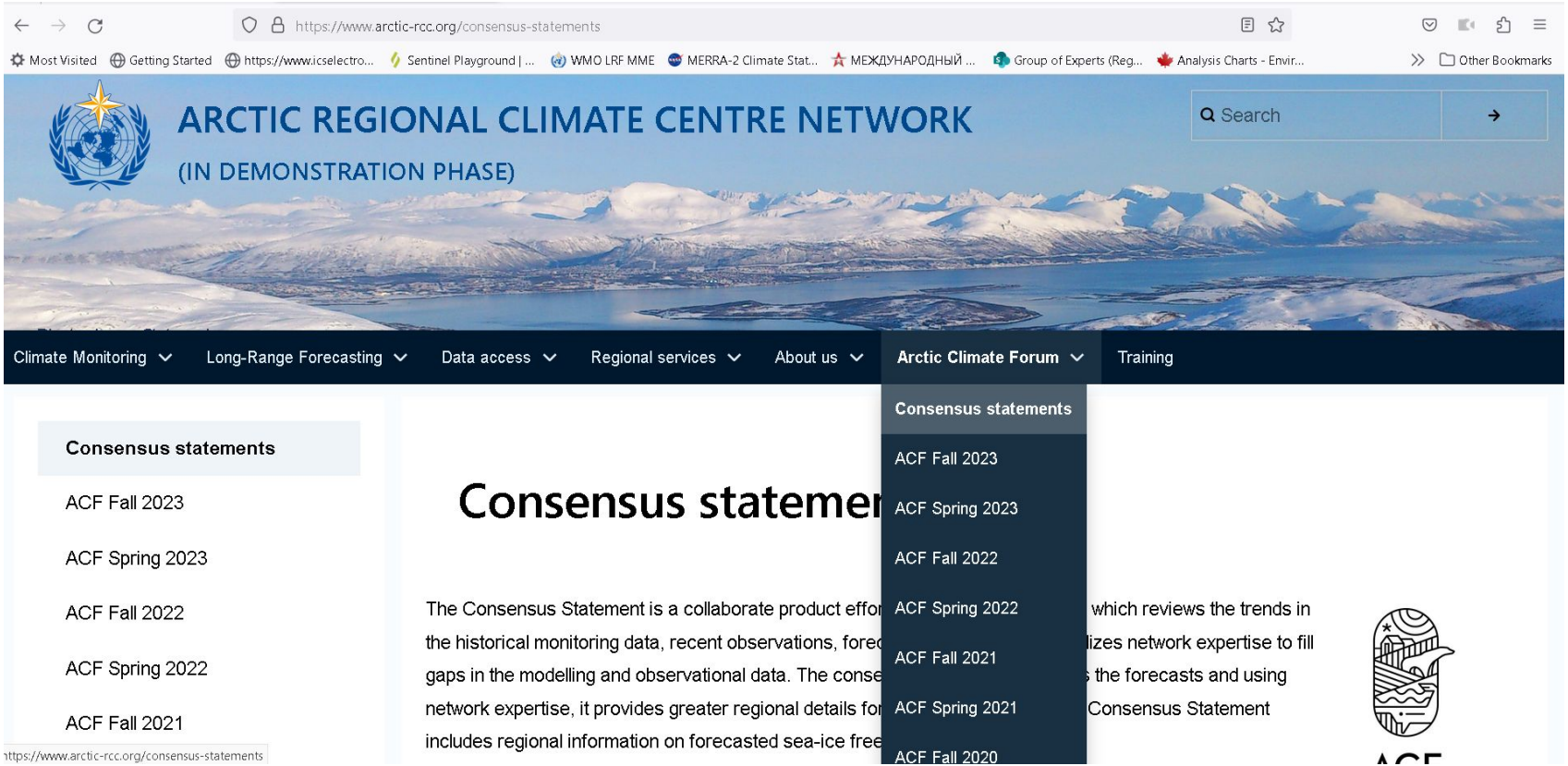
Regions	Winter	Dec	Jan	Feb
Alaska and Western Canada	less severe	less severe	less severe	less severe
Central and Eastern Canada	less severe	less severe	less severe	less severe
Western Nordic	less severe	less severe	less severe	less severe
Eastern Nordic	less severe	less severe	less severe	less severe
Western Siberia	less severe	less severe	less severe	less severe
Eastern Siberia	less severe	less severe	less severe	less severe
Chukchi and Bering	less severe	less severe	less severe	less severe
Central Arctic	less severe	less severe	less severe	less severe

Notes: less severe – relative to average climatic values of Bodman's index (to 1991-2020), but in the same gradation, ***less severe*** (with gradient) – reduction of cold load on the body by one gradation relative to 1991-2020.

Where is it published?

ArcRCC website: https://www.arctic-rcc.org/consensus-statements

temporal link to the ACF12 draft: http://wdc.aari.ru/prcc/meetings/acf12/Consensus_Statement_ACF12_draft.pdf



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Thank you for attention !

vms@aari.aq

Arctic Regional Climate Centre Network

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WORLD METEOROLOGICAL ORGANIZATION

TIME (UTC)	ITEM	DETAILS/SPEAKERS
16:00 (10′)	**Welcome words and meeting logistics**	Dr. Scott Lindsey - Regional Director, NOAA National Weather Service (NWS) Alaska Region Becki Heim - NOAA
16:10 (15′)	**Introduction to the WMO Regional Climate Centers (RCCs) and ArcRCC Network**	Helge Tangen - ArcRCC network coordinator/MET Norway Valentina Khan - WMO
16:25 (5′)	**ACF-12 Consensus Statement - Explanation**	Vasily Smolyanitsky - AARI
16:30 (50′)	**ArcRCC Regional Climate Overview Briefings** • Temperature, precipitation and sea-ice conditions and extremes for North America, Europe, Northern Eurasia, and Central Arctic • Review of summer 2023 and outlook for winter 2023/2024	Session Chair: Ken Kwok - ECCC North America (15′) • Alaska & Western Canada (Brian Brettschneider - NOAA) • Central & Eastern Canada (Jesse Wagar - ECCC) Northern Europe (15′) • Western Nordic (Kristín Björg) • Eastern Nordic (Cyril Palerme) Northern Eurasia (15′) • Western & Eastern Siberia (Svetlana Emelina) • Chukchi & Bering (Svetlana Emelina) Central Arctic (5′) - (Anna Timofeeva)
17:20 (15′)	**Q&As and Discussion on Climate Overviews**	Moderator: Ken Kwok - ECCC

12th Arctic Climate Forum
November 2023

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Regional Overview

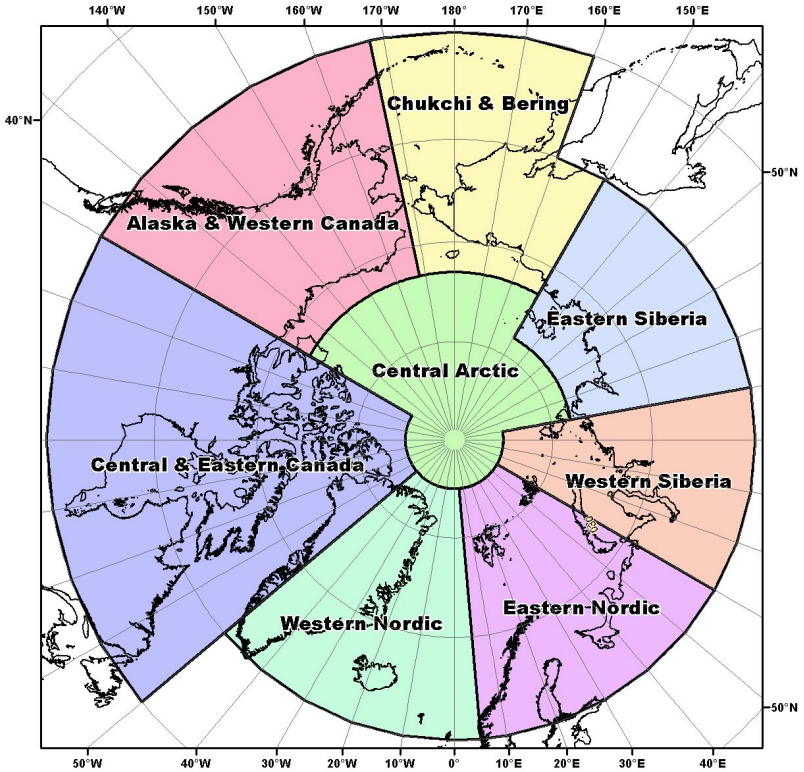
Summary of Summer 2023 and

Outlook for Winter 2023/24

Arctic Regional Climate Centre Network

World Meteorological Organization

Terrestrial Regions covered



North American Node

- **Alaska & Western Canada**: Includes Alaska, and the Yukon and the Northwest Territories in Canada
- **Central & Eastern Canada**: Central and Eastern Canada and Western Greenland

Northern European Node

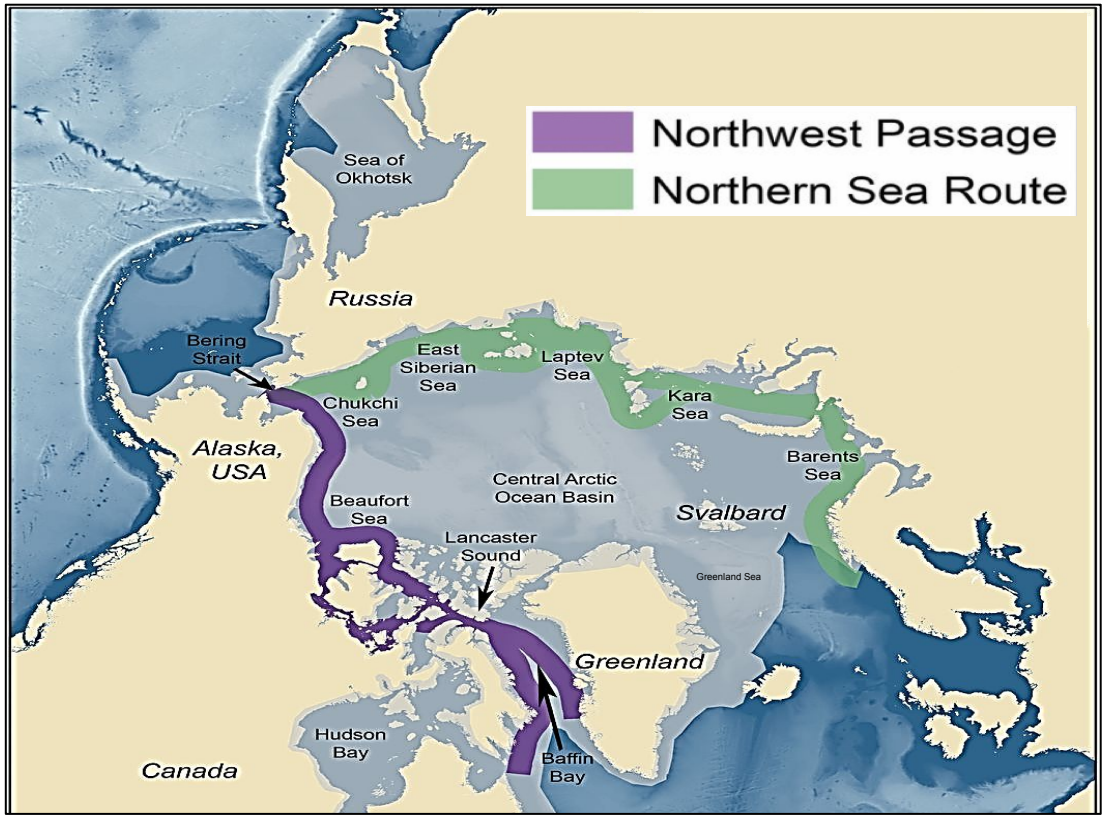
- **Western Nordic**: Eastern Greenland, Iceland
- **Eastern Nordic:** Svalbard and Scandinavia

Eurasian Node

- **Western Siberia**
- **Eastern Siberia**
- **Chukchi & Bering**

Central Arctic

Sea-Ice Navigational Regions



Sea-Ice Regions. Map Source: Courtesy of the U.S. National Academy of Sciences.

How this summary was developed

Available observations

+

State of the art modeling for temperature, precipitation and sea-ice

+

Arctic regional climate expertise from National meteorological organizations*

+

Information about potential impacts for regional users

*As a result, the regional outlooks may not always match the model output

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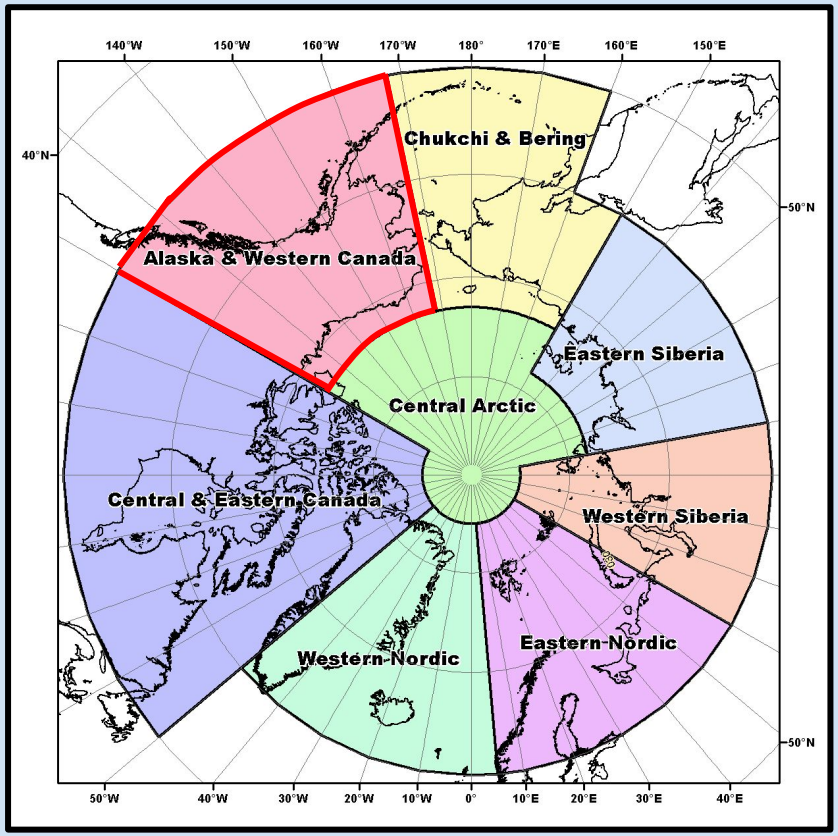
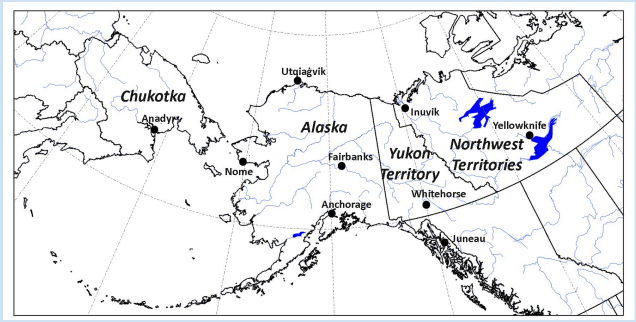
North American Node

- Alaska and Western Canada
- Central and Eastern Canada

Arctic Regional Climate Centre Network

Alaska and Western Canada

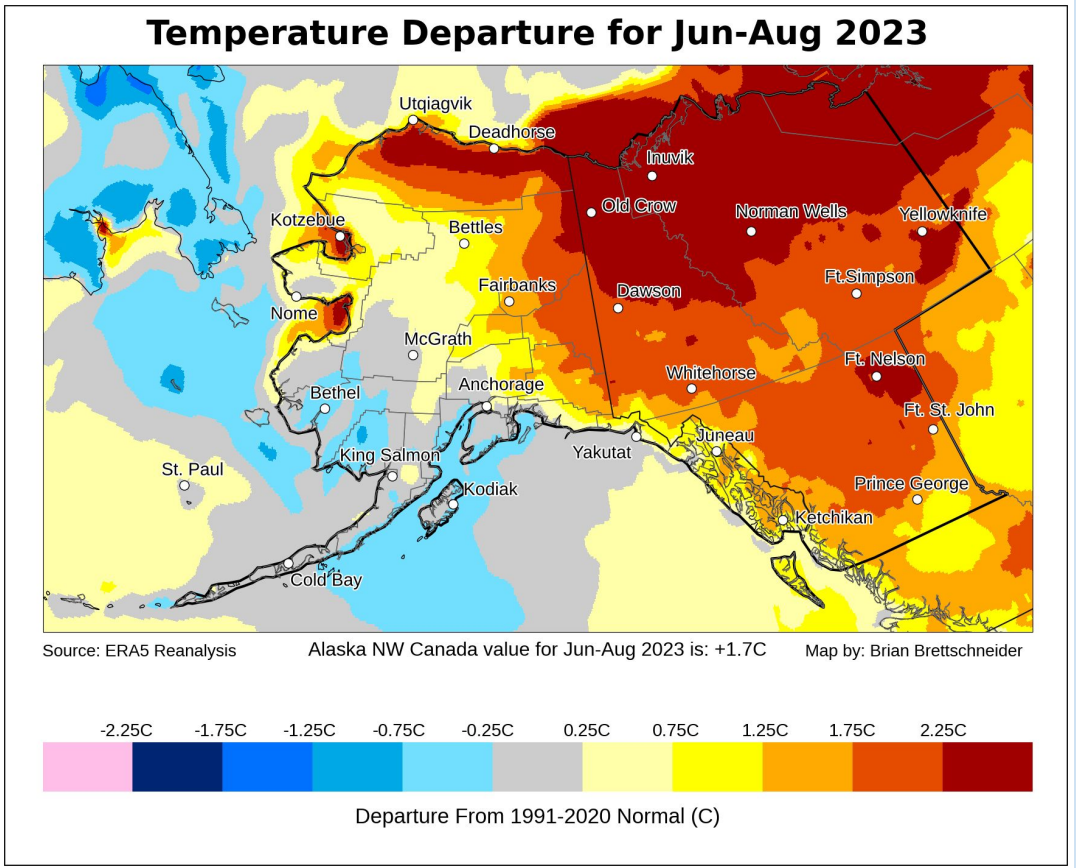




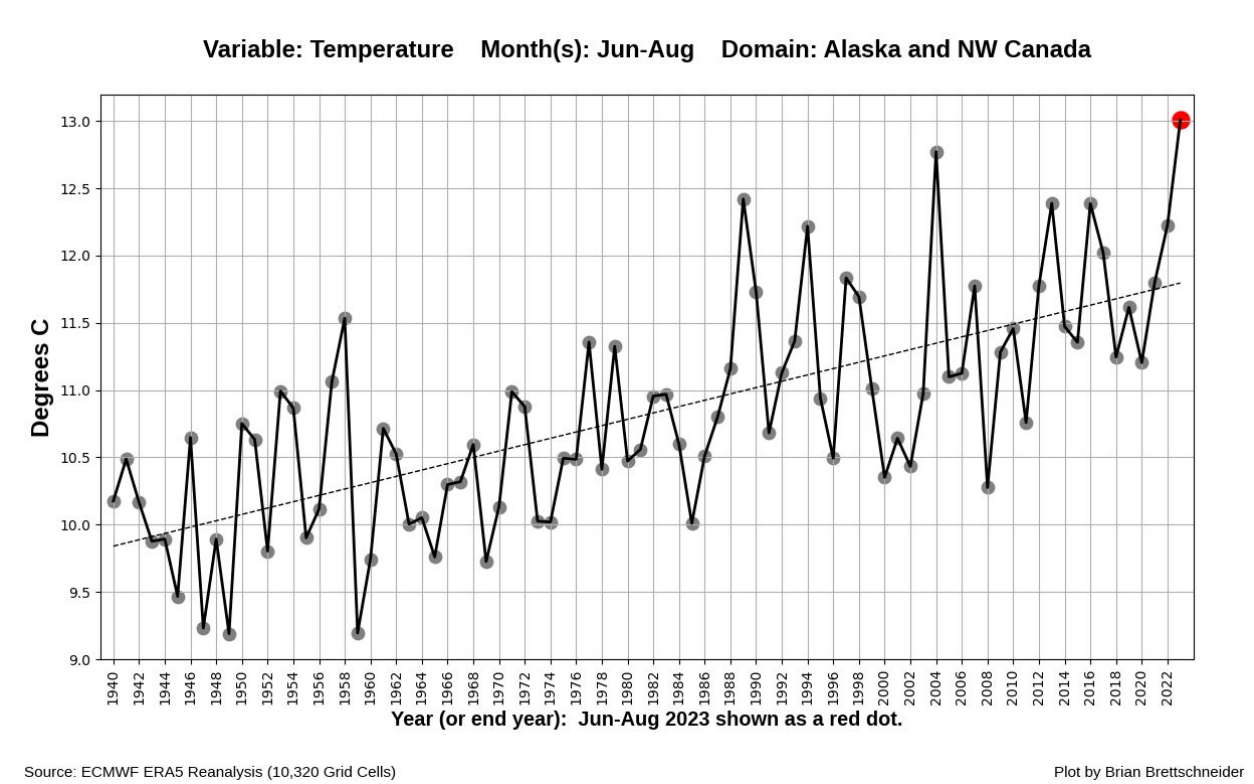
Alaska and Western Canada

Seasonal Summary: Summer 2023			
Observations above (+) and below (-) climatological normal			
Temperature Normal 1991-2020	The Jun-Aug normal temperature for Alaska and NW Canada is +11.3C.	Western Canada and the northwest part of Alaska had their warmest Jun-Aug on record in 2023. The regional average was +13.0C (1.7C warmer than normal).	[The coolest summer since 1940 was +9.2C in 1959. The warmest summer was 2023 with a value of +13.0C.
Precipitation Normal 1991-2020	The Jun-Aug normal precipitation for Alaska and NW Canada is 24.34 cm.	The Jun-Aug 2023 value was 101% of the 1991-2020 normal.	The driest year since 1940 was 2004 (18.2 cm) and the wettest year was 2020 (30.0 cm).]
Sea-Ice Normal 1991-2020 Ice extent rank since 1979	Se ice in both the Chickchi and Beauufor seas was far below normal - particularly in the Chukchi Sea.	Values in the Chukchi Sea ccasionally dropped below 100,000 square kilometers. The Beaufort Sea ice extent was approximately equal to 2019 (second lowest extent on record). Only 2012 was lower in the Chukchi Sea.	

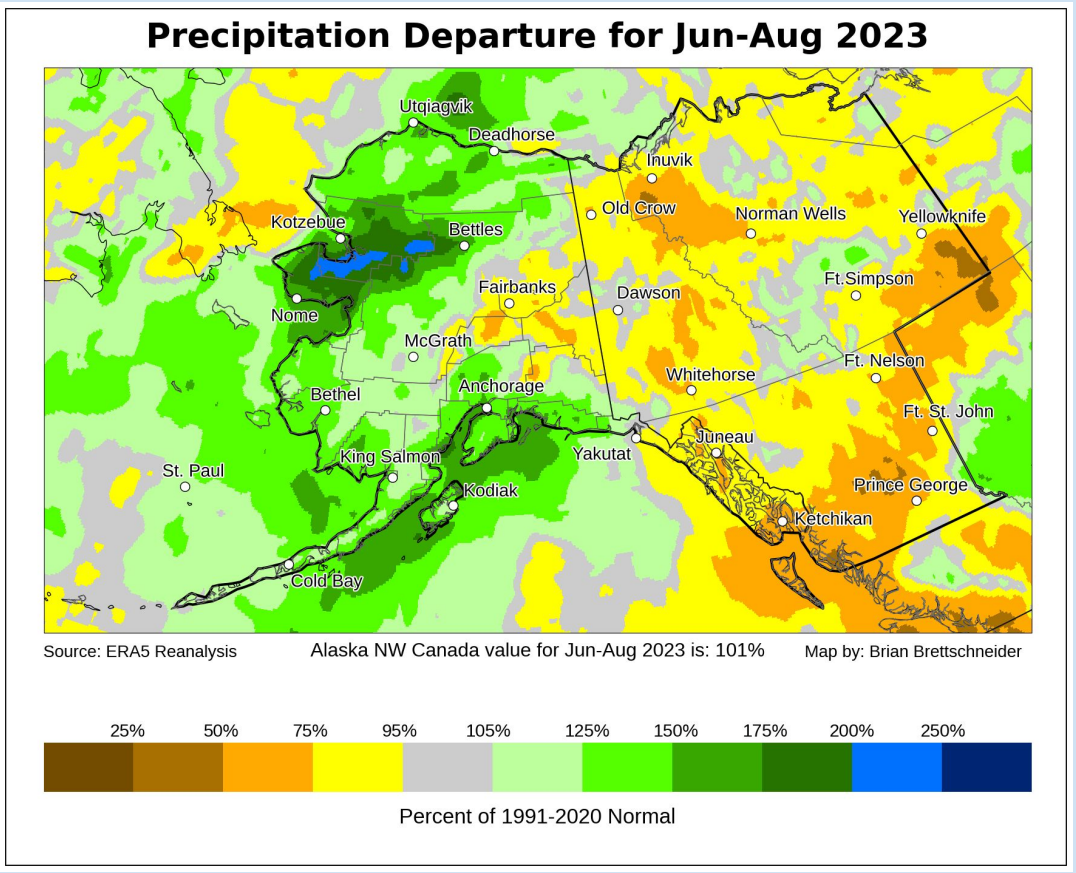
Alaska and Western Canada



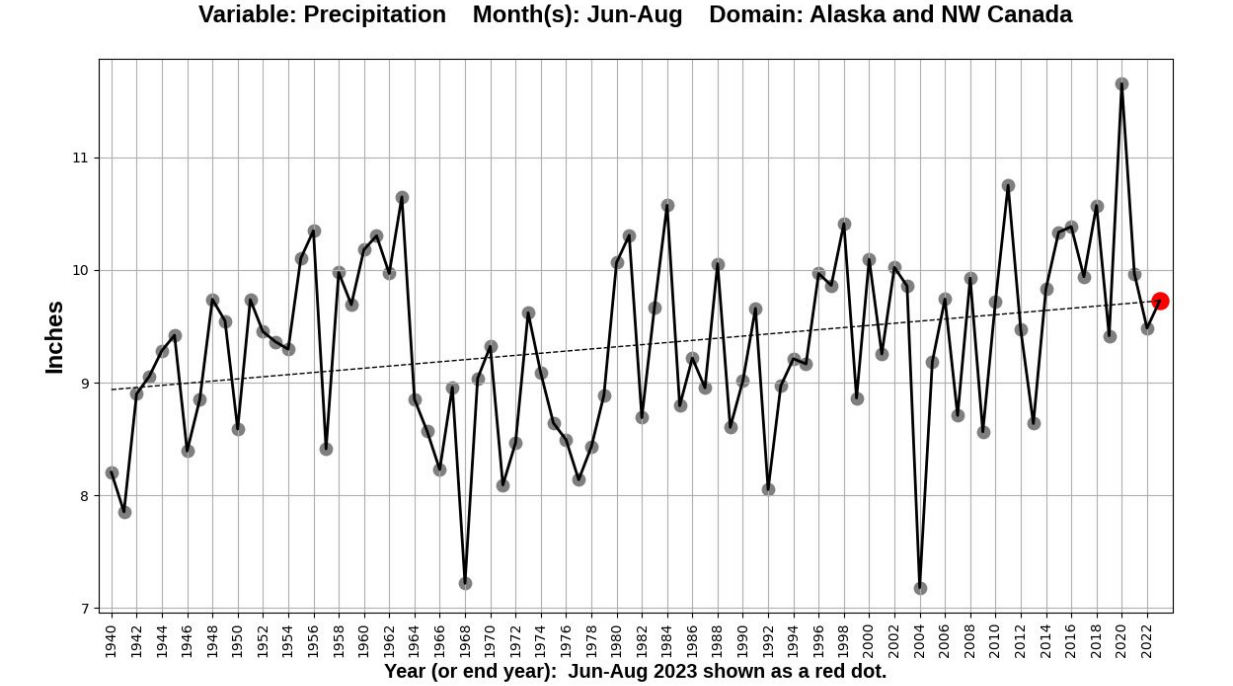
Alaska and Western Canada



Alaska and Western Canada



Alaska and Western Canada



Alaska and Western Canada

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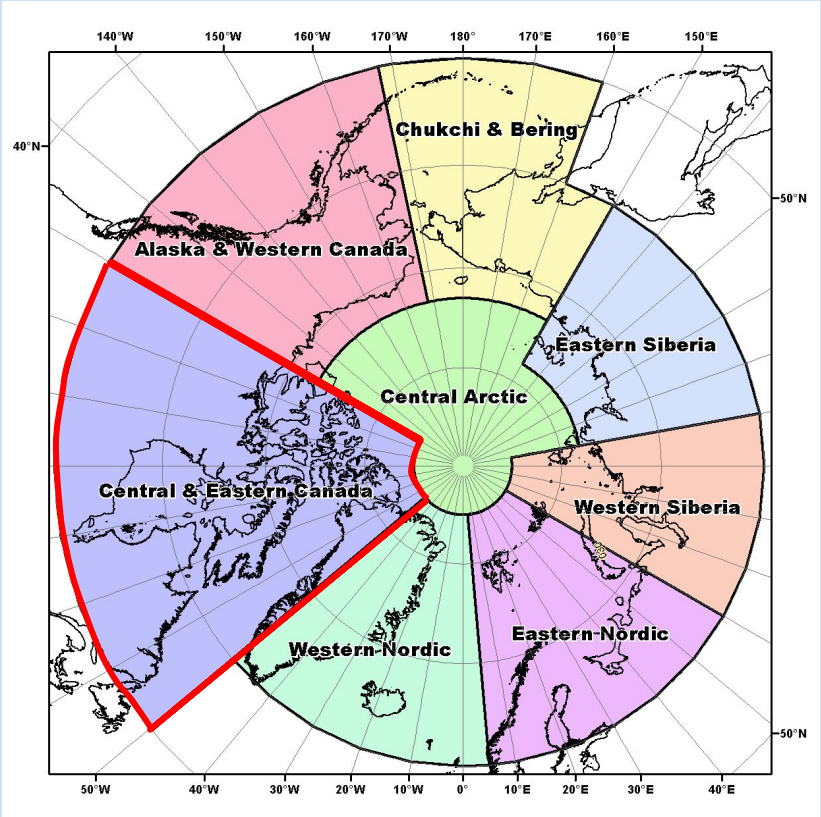
Seasonal Outlook: Winter 2023				Multi Model Agreement			
Climatological variables			Forecast relative to climatological normal	High	Moderate	Low	No
Temperature	Alaska		Above normal everywhere	✓			
	NW Canada			✓			
Precipitation	Alaska		Below (NMME=Dry;CS3=Wet)			✓	
	NW Canada					✓	
Sea-Ice	Freeze-up	Chukchi at Bering Strait	Late	✓			
	Maximum Ice Extent March 2023	Chukchi at Bering Strait	Sea ice is expected to be below normal.			✓	
Snow Water Equivalent	Alaska		Below		✓		
	NW Canada		Below		✓		

Alaska and Western Canada

Potential societal and environmental impacts		
Economy sector/ Livelihood conditions	**Relevant variables from the Seasonal Outlook**	**Impacts associated**
Commercial Fisheries	Below normal sea ice and above normal sea surface temperatures.	Ongoing significant disruptions to crab and other winter fisheries.
Ice-based subsistence activities.	Below normal sea ice along north and west coasts of Alaska.	Subsistence hunters and gathers will face delays to to start of their activities and unsafe conditions due to the thinness of the ice.
Ice-based travel over land.	Much above normal temperatures.	River travel along ice will be delayed and unsafe due to expected warm conditions.

Central & Eastern Canadian Arctic



Central & Eastern Canadian Arctic

Seasonal Summary: Summer 2023

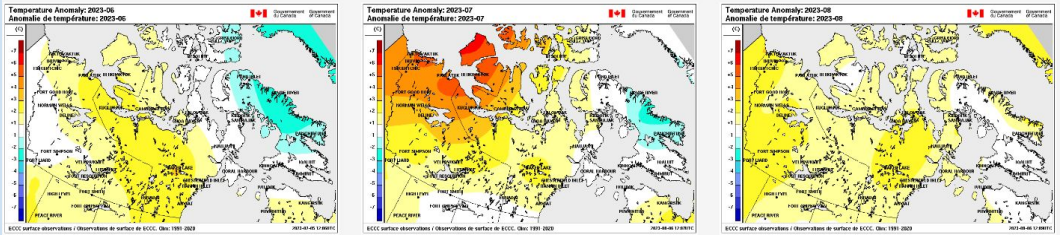
Observations above (+) and below (-) climatological normal

Temperature Normal 1981-2010	+2°C **Warmer than normal – western, central Nunavut and the ISR** Iqaluit near normal conditions Cooler than normal over northern Baffin Island	**Record warmest - Arviat, Baker Lake and Inuvik (1st warmest)**, Cambridge Bay and Rankin Inlet (2nd warmest)	Record coldest - none
Precipitation Normal 1981-2010	Isolated areas of near normal and drier than normal conditions	**Wetter** Some parts of Baffin Island Pangnirtung – 200% of normal	**Drier** **Resolute (2nd driest summer)** received 24% of normal Summer precipitation Central and western Nunavut: 30-60 % of normal
Sea-Ice Normal 1991-2020 Ice extent rank since 1979	**Break-up**: late spring break-up in **Chukchi and Bering Seas**, early break-up observed in **Beaufort Sea**, and early break-up occurred in **Canadian Arctic Archipelago** and **Hudson Bay**	September minimum sea ice extent in the Arctic was the 5th lowest since 1979 ● **Chukchi Sea**: sea ice extent below 1991-2020 median and below last decade median ● **Beaufort Sea:** sea ice extent below 1991-2020 median and below last decade median ● **Canadian Archipelago**: Southern route of the Northwest Passage (NWP) ice free; northern route of the NW	

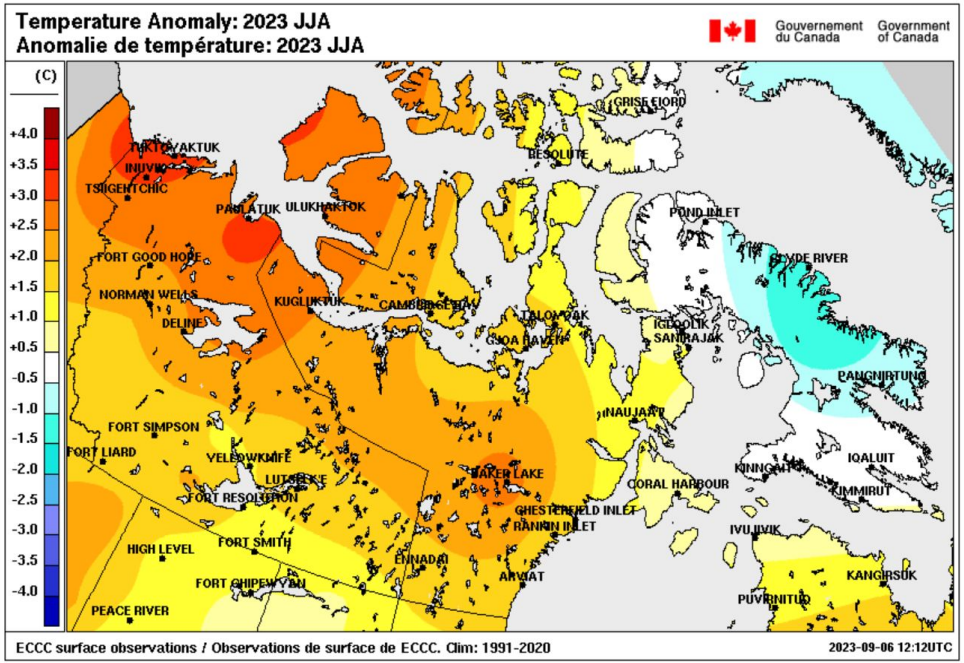
Central & Eastern Canadian Arctic

Summer 2023 Mean Temperature Anomalies

June 2023 | July 2023 | August 2023



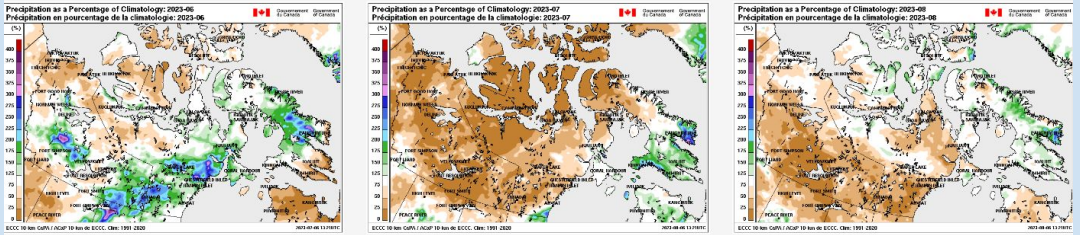
Summer 2023



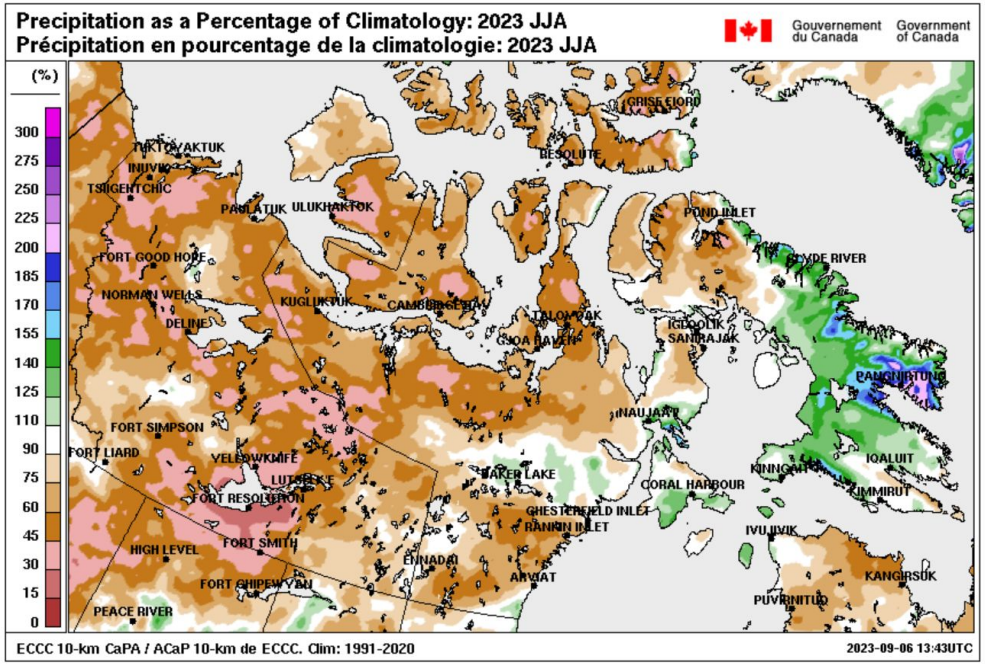
Central & Eastern Canadian Arctic

Summer 2023 Precipitation Anomalies

June 2023 | July 2023 | August 2023



Summer 2023



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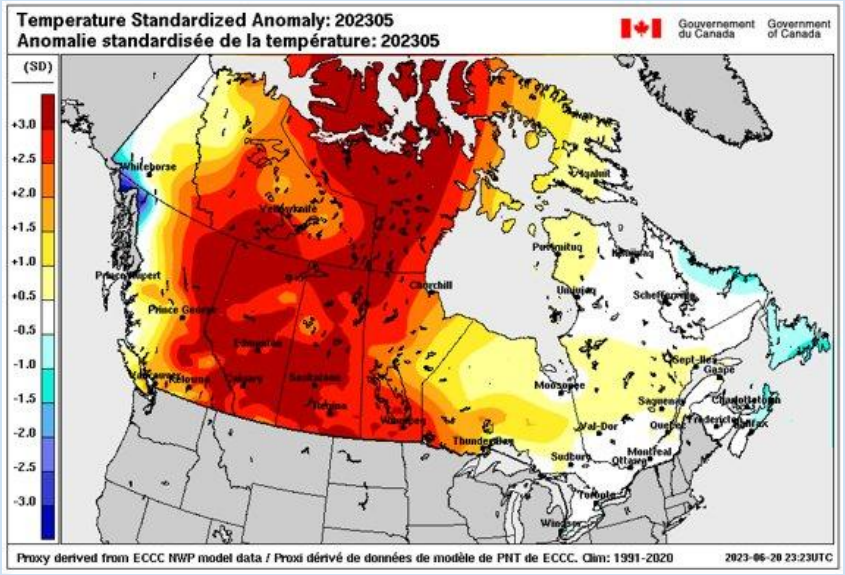
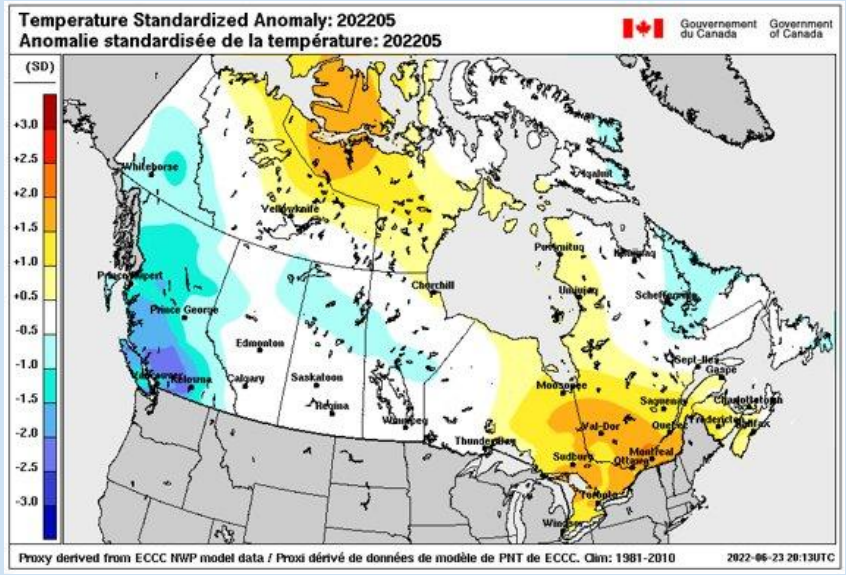
May 2023 Mean Temperature Anomalies

May 2023, T standardized anomaly in °C



May 2022, T standardized anomaly in °C



Central & Eastern Canadian Arctic

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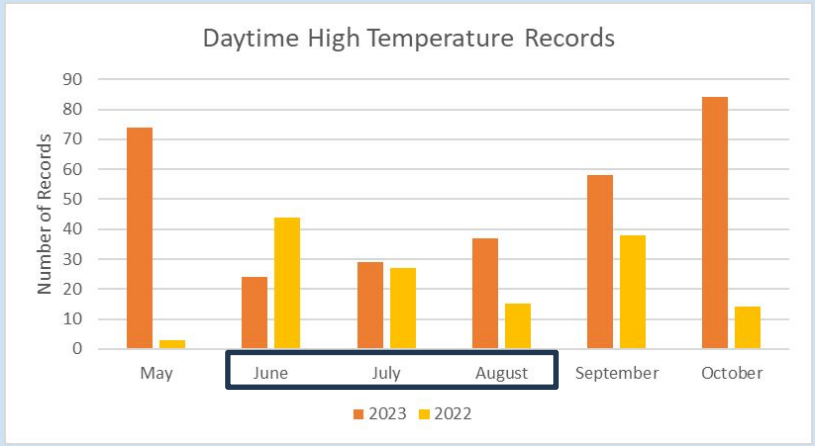
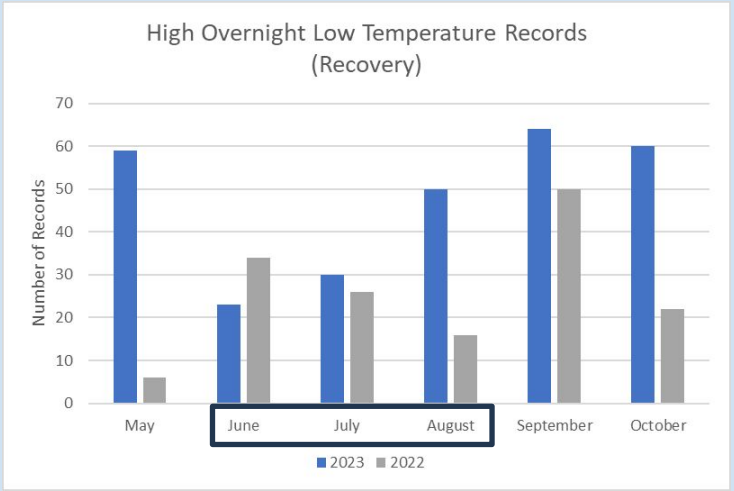
Number of Temperature Records Broken in Nunavut

*Daytime High Temperature and High Overnight Low Temperature Records





Central & Eastern Canadian Arctic

Observed extreme climate events
Summer 2023

Category	Location	Rarity	Impacts associated with event
High Temp	Northwest Territories	Inuvik - all-time record high temperature of 33C, ranks 1st warmest for July and for the summer season	Polar bear attacks - "Climate change has made it difficult to predict wildlife in that region" "It's well known among traditional hunters that sea mammal meat at this time of year can be bad" - warmer weather earlier means botulism risk is higher during non-traditional times
	Nunatsiavut	Happy Valley-Goose Bay ranked 3rd warmest summer on record	
	Nunavut	End of July, very warm – Resolute had July temperature of 18.9C, close to breaking its all-time record	
Hot and Dry - Wildfires	West-Central NU – Bathurst Inlet	Extremely rare tundra fire	First territorial state of emergency for wildfire in Nunavut's history Evacuation of a small seasonal community
	Nunavik	Wildfires	Wildfire smoke traveled across Nunavut including Baffin Island – first time in memory. Air quality alerts issued for Igloolik
Sea Ice	ISR, NU	Early break-up	Adjustments to traditional hunting and fishing activities Large increase in SAR calls

Central & Eastern Canadian Arctic

SEASONAL OUTLOOK: WINTER 2023-24				Multi Model Agreement			
Climatological variables			Forecast relative to climatological normal	High	Moderate	Low	No
Temperature	Nunavut – northern regions		Above Normal	✓			
	Nunavut – southern regions; Nunatsiavut				✓		
	Hudson Bay, Davis Strait; Nunavik			✓			
	Baffin Island; Baffin Bay and Labrador Sea				✓		
	Western Greenland					✓	
Precipitation	Nunavut – central regions, Nunavik; Hudson Bay, Davis Strait		Above Normal		✓		
	Nunavut – northern regions, Ellesmere Island, Baffin Bay					✓	
	Nunavut – southern regions, Nunatsiavut; Labrador Sea					✓	
Sea-Ice	Freeze-up	Baffin Bay	Near Normal	✓			
		Hudson Bay / Labrador Sea	Near normal to late		✓		
		Beaufort Sea	Late	✓			
		Canadian Arctic Archipelago	Late			✓	
	Maximum Ice Extent [March, 2024]	Labrador Sea	Below normal		✓		
Snow Water Equivalent	Nunavut – northern regions		Above Normal			✓	
	Nunavut – southern regions		Below Normal			✓	

Central & Eastern Canadian Arctic

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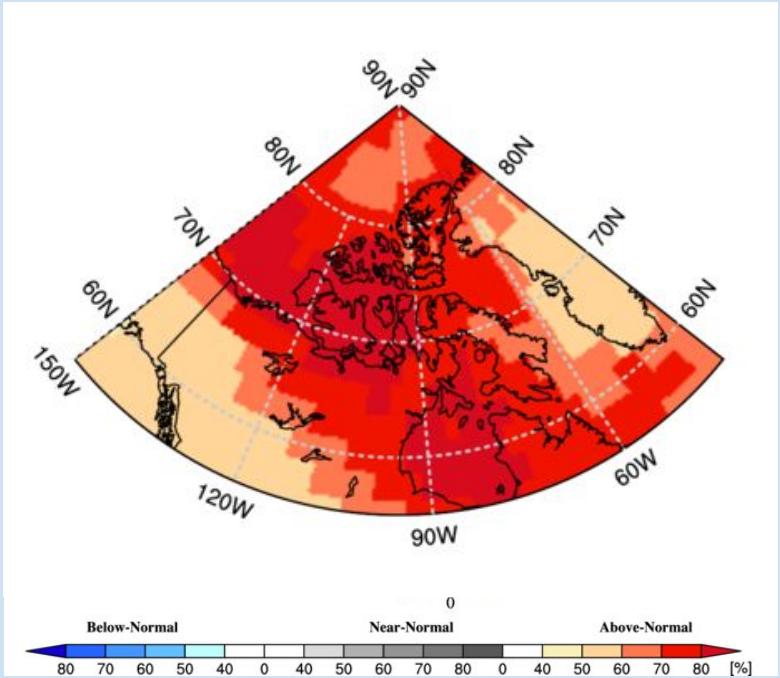
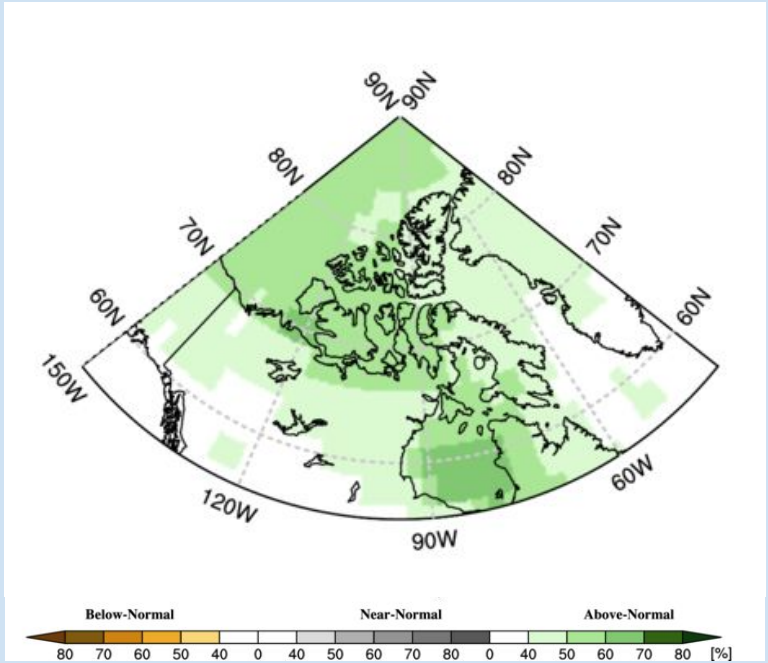
NDJ Multi-Model Temperature Outlook



NDJ Multi-Model Precipitation Outlook



Central & Eastern Canadian Arctic

Potential societal and environmental impacts		
Economy sector/ Livelihood conditions	**Relevant variables from the Seasonal Outlook**	**Impacts associated**
Subsistence fishing/hunting	Higher than normal temperatures, late sea ice freeze up	Delayed sea ice formation Delayed subsistence fishing/hunting Unpredictable shift in fresh water availabilit

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Northern European Node

- **Western Nordic**
- **Eastern Nordic**

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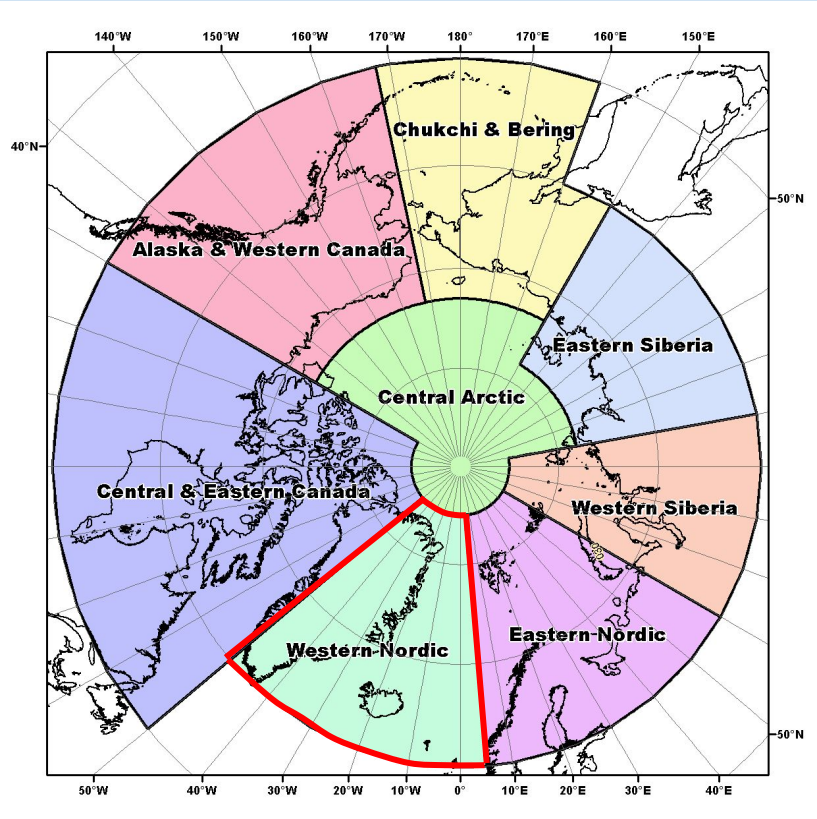
Western Nordic



Western Nordic

Seasonal Summary: Summer 2023 (JJA)			
Observations above (+) and below (-) climatological normal			
Temperature Normal 1991-2020	• Temperature in generally above normal for the region • **+0.4°C** above normal in Iceland	Warmest year in region was 2010 (+1.4˚C)	Coldest year in region was 1983 (-2.6˚C)
Precipitation Normal 1991-2020	• Drier than normal in Iceland • Wetter than normal in Greenland	Wettest year in region was 1984(+99%)	Driest year in region was 1963 (-49%)
Sea-Ice Normal 1991-2020 Ice extent rank since 1979	• Sea ice extent east of Greenland (at the minimum in September) was below the 1991-2020 average, except for small limited area in the Greenland sea.		

Western Nordic

Observed extreme climate events
Summer 2023

Category	Location	Rarity	Impacts associated with event
Wind	Iceland, May	Unusually cold and windy weather at the end of May	Vegetation damage, trees and shrubs lost much of their leaves
Temperature	Iceland, Northeast and East, June	Warmest June on record in Northeast and East Iceland	None
Precipitation, drought	Iceland, South and west, July	It was unusually dry in July and part of August in South and West Iceland. In many places the driest July on record.	Rivers dried up and challenges for agriculture
Extreme precipitation	Iceland, East fjords and part of the North, 18-19th September	Extreme precipitation. Highest daily precipitation amount on record at several weather stations in the North	Several houses in the town of Seyðisfjörður were evacuated due to landslide risk Landslides caused some road damages in these areas

Western Nordic

Temperature anomalies

- The summer (JJA) in generally warmer than normal, except in the sea north and east of Iceland
- Warmest June on record in Northeast and East Iceland

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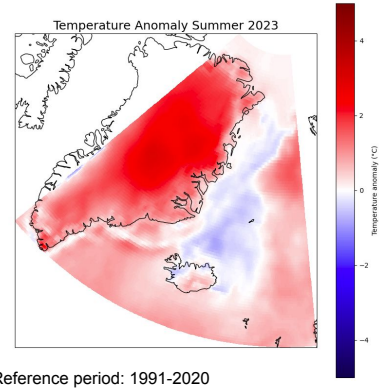
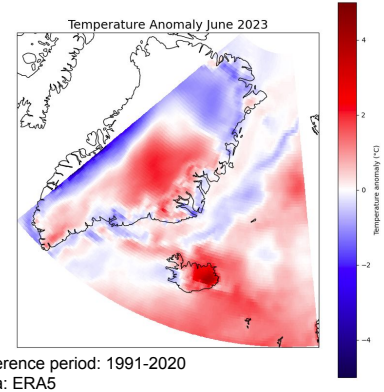
Summer (JJA)



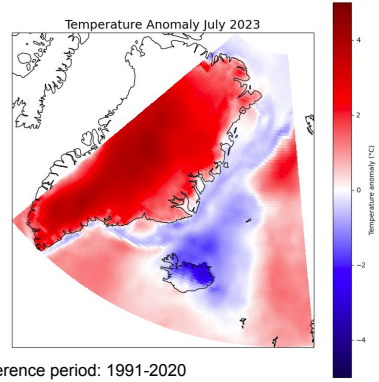
Reference period: 1991-2020
Data: ERA5

June



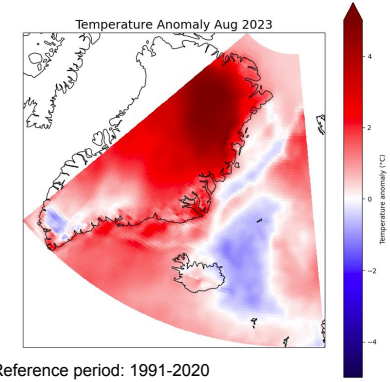
Reference period: 1991-2020
Data: ERA5

July



Reference period: 1991-2020
Data: ERA5

August



Reference period: 1991-2020
Data: ERA5

Western Nordic
Precipitation

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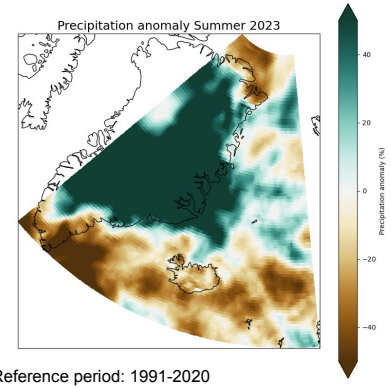
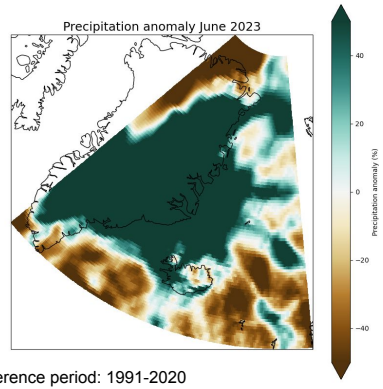
- The summer (JJA) was relatively dry in Iceland
- July unusually dry in South and West Iceland. In many places the driest July on record.
- Relatively wet in Greenland

Summer (JJA)



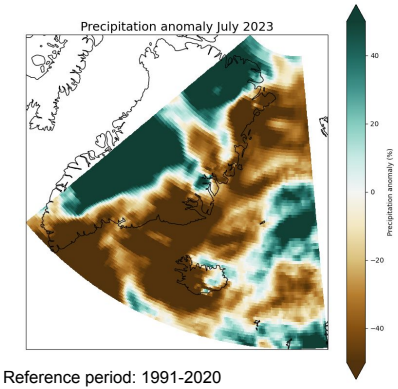
Reference period: 1991-2020
Data: ERA5

June



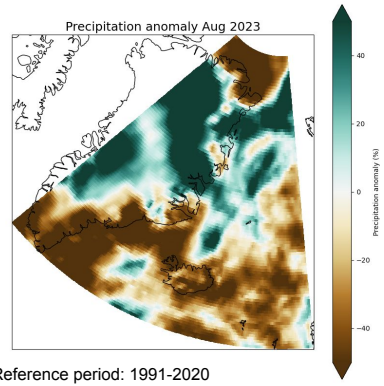
Reference period: 1991-2020
Data: ERA5

July



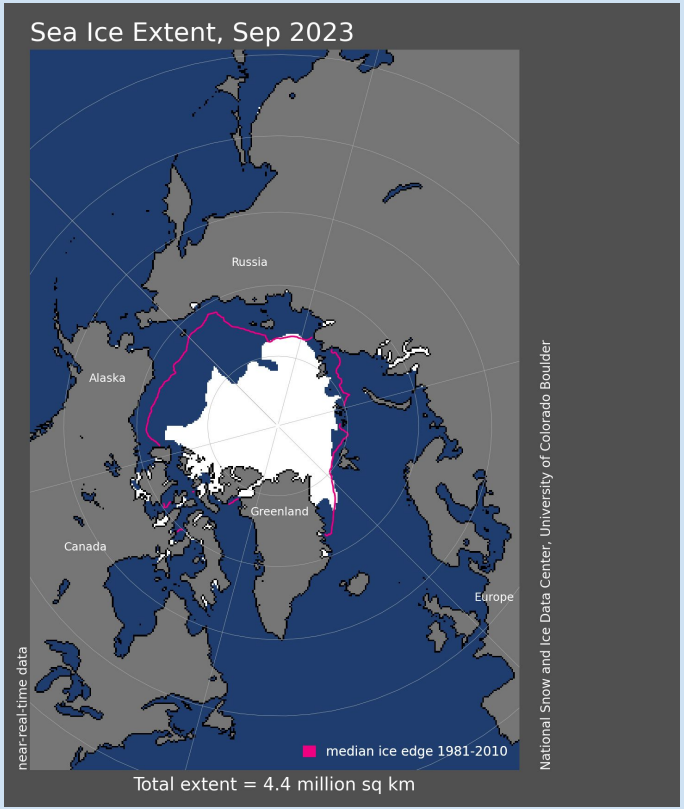
Reference period: 1991-2020
Data: ERA5

August



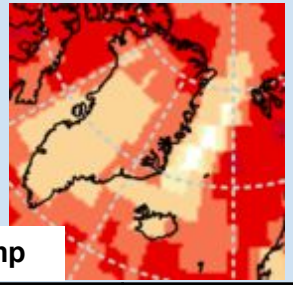
Reference period: 1991-2020
Data: ERA5

Western Nordic

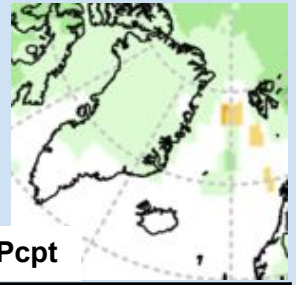


- For the entire Arctic, the minimum sea ice extent was low, the 6th lowest annual minimum in the satellite era.
- In the Western Nordic region, sea ice extent east of Greenland was below average, except for small limited area in the Greenland sea.

Western Nordic



Temp



Pcpt

SEASONAL OUTLOOK: WINTER 2023/2024 (NDJ)				Multi Model Agreement			
Climatological Variables			Forecast relative to climatological	High	Moderate	Low	No
Temperature	Northern, southern and continental Greenland		Warmer		✓		
	Iceland		Warmer		✓		
	North Atlantic		Warmer	✓			
	Greenland Sea		Warmer			✓	
Precipitation	Northern and continental Greenland		Wetter			✓	
	Sothern Greenland, Iceland, Northern Atlantic		No model agreement				✓
Sea-Ice	Greenland Sea	Freeze-up	Early	✓			
		Maximum Ice Extent [March 2024]	Near normal	✓			

Eastern Nordic

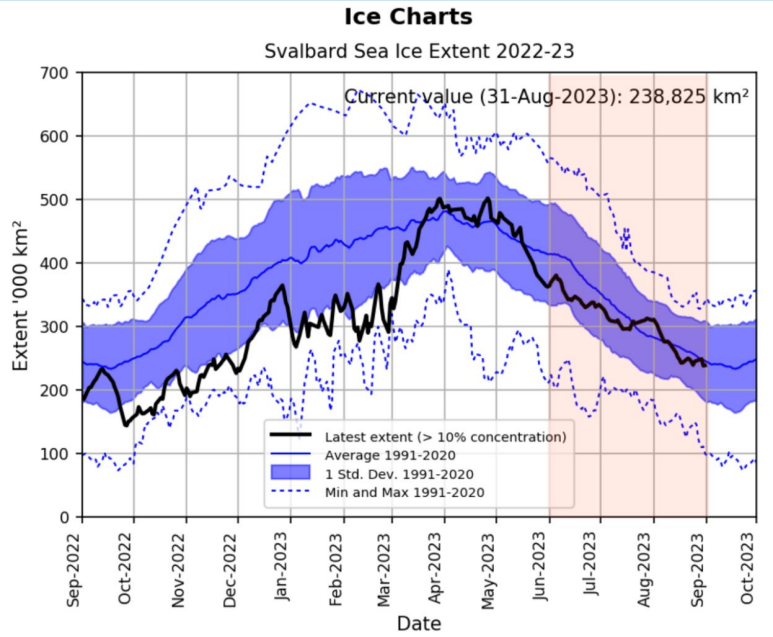
Eastern Nordic

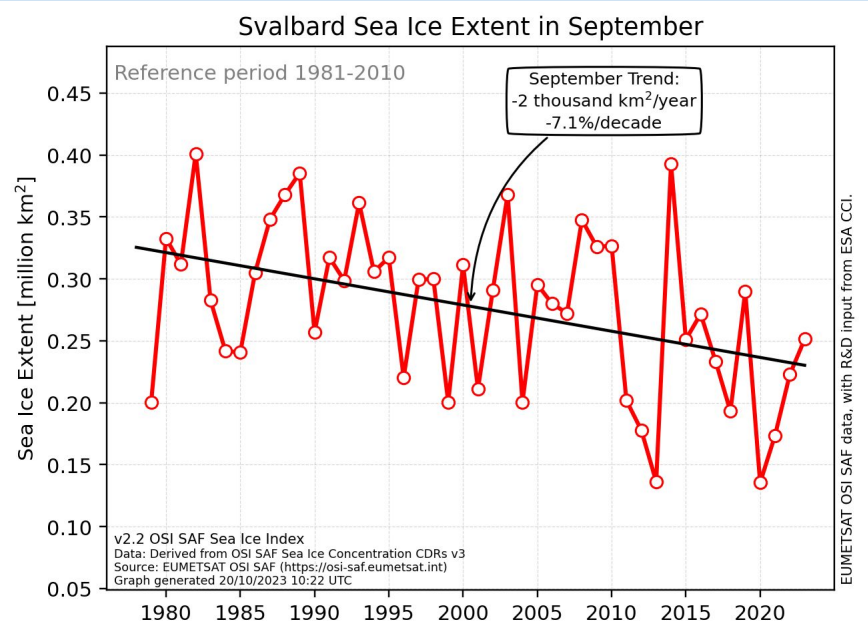
Seasonal Summary: Summer 2023			
Observations above (+) and below (-) climatological normal			
Temperature Normal 1991-2020	May-September 2023: **+ 0.93 ℃**	Warmest year: 2002	Coldest year: 1949
Precipitation Normal 1991-2020	June-July-August 2023: wetter than normal in southern Scandinavia, and close to normal in northern Scandinavia and Svalbard		
Sea-Ice Normal 1991-2020 Ice extent rank since 1979	Sea ice extent slightly lower than the climatology (1991-2020) in June and July 2023, and close to the climatology in August and September 223		

Eastern Nordic

Observed extreme climate events Summer 2023			
Category	**Location**	**Rarity**	**Impacts associated with event**
Temperature	Troms (Norway)	8-9 August 2023 Warmest night ever recorded in Troms (24.7°C in Lyngen, Norway), and second warmest night ever recorded in August in Norway.	
Sea ice	Fram Strait	Very high sea ice extent throughout June in the northern Fram Strait.	This has resulted in the re-routing of planned research cruises due to the sea ice thickness encountered to the north of the area.
Icebergs	Svalbard	Multiple large calving events with associated iceberg outbreaks from Nordaustlandet from mid August, the largest event since 2015 occurred 17-24th August likely in response to a week of warm weather that preceded it.	No reported incidents

Eastern Nordic

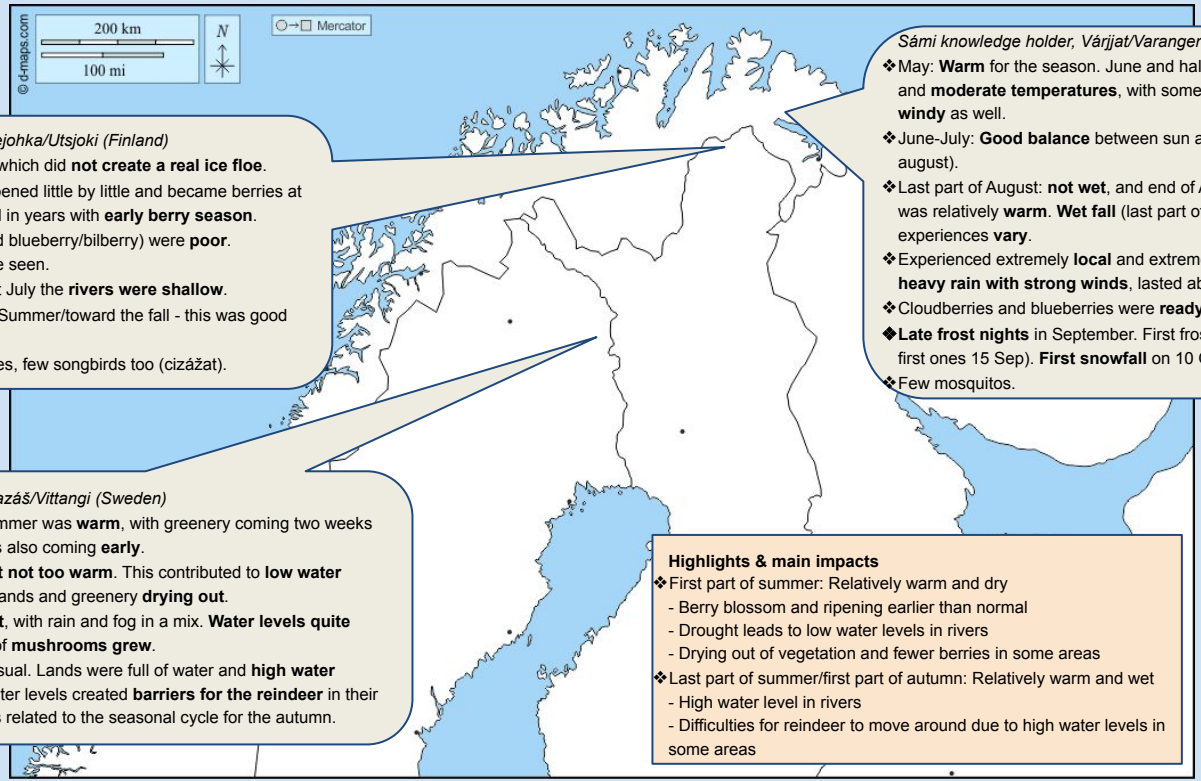




Eastern Nordic

Indigenous Sámi communities feedback

Summer 2023 (June-September)



Sámi knowledge holder, Ohcejohka/Utsjoki (Finland)

- ❖The ice on the rivers melted, which did **not create a real ice floe**.
- ❖The cloudberry blossom happened little by little and became berries at the end of July, which is usual in years with **early berry season**.
- ❖Other berries (lingonberry and blueberry/bilberry) were **poor**. Crowberries were barely to be seen.
- ❖Early summer and throughout July the **rivers were shallow**.
- ◆**Rain in the autumn** - end of Summer/toward the fall - this was good for rivers and the fish.
- ◆**Few mosquitos** and black flies, few songbirds too (cizážat).

Sámi knowledge holder, Várjjat/Varanger (Norway)

- ❖May: **Warm** for the season. June and half way into July - **very dry,** and **moderate temperatures**, with some very warm days. Some say **windy** as well.
- ❖June-July: **Good balance** between sun and rain (mid July to mid august).
- ❖Last part of August: **not wet**, and end of August/ early September was relatively **warm**. **Wet fall** (last part of August/September), but experiences **vary**.
- ❖Experienced extremely **local** and extremely short and extremely **heavy rain with strong winds**, lasted about 1 minute (August 3).
- ❖Cloudberries and blueberries were **ready** already at the end of July.
- ◆**Late frost nights** in September. First frost during night (or among the first ones 15 Sep). **First snowfall** on 10 October.
- ❖Few mosquitos.

Sámi knowledge holder, Vazáš/Vittangi (Sweden)

- ❖June: The beginning of summer was **warm**, with greenery coming two weeks **earlier**, followed by insects also coming **early**.
- ❖July: First part was **dry but not too warm**. This contributed to **low water levels** in streams and wetlands and greenery **drying out**.
- ❖Late July-August: **Very wet**, with rain and fog in a mix. **Water levels quite high** in streams and a lot of **mushrooms grew**.
- ❖September: **Wetter** than usual. Lands were full of water and **high water levels** in streams. High water levels created **barriers for the reindeer** in their natural movement patterns related to the seasonal cycle for the autumn.

Highlights & main impacts

- ❖First part of summer: Relatively warm and dry
  - Berry blossom and ripening earlier than normal
  - Drought leads to low water levels in rivers
  - Drying out of vegetation and fewer berries in some areas
- ❖Last part of summer/first part of autumn: Relatively warm and wet
  - High water level in rivers
  - Difficulties for reindeer to move around due to high water levels in some areas

Eastern Nordic

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SEASONAL OUTLOOK: WINTER (NDJ) 2023-2024			Multi Model Agreement			
Climatological variables		Forecast relative to climatological normal	High	Moderate	Low	No
Temperature	Svalbard, Barents sea	Warmer	✓			
	Murmansk/White Sea/Continent	Warmer	✓			
	Scandinavia, Norwegian Sea	Warmer	✓			
Precipitation	Svalbard, Barents sea	Wetter		✓		
	Murmansk/White Sea/Continent	Wetter		✓		
	Scandinavia, Norwegian Sea	Near normal			✓	

Sea-Ice	Freeze-up	Barents sea	Early	✓		
	Maximum Ice Extent March 2024	Barents sea	Near normal	✓		
Snow Water Equivalent	Eastern Nordic		Below		✓	

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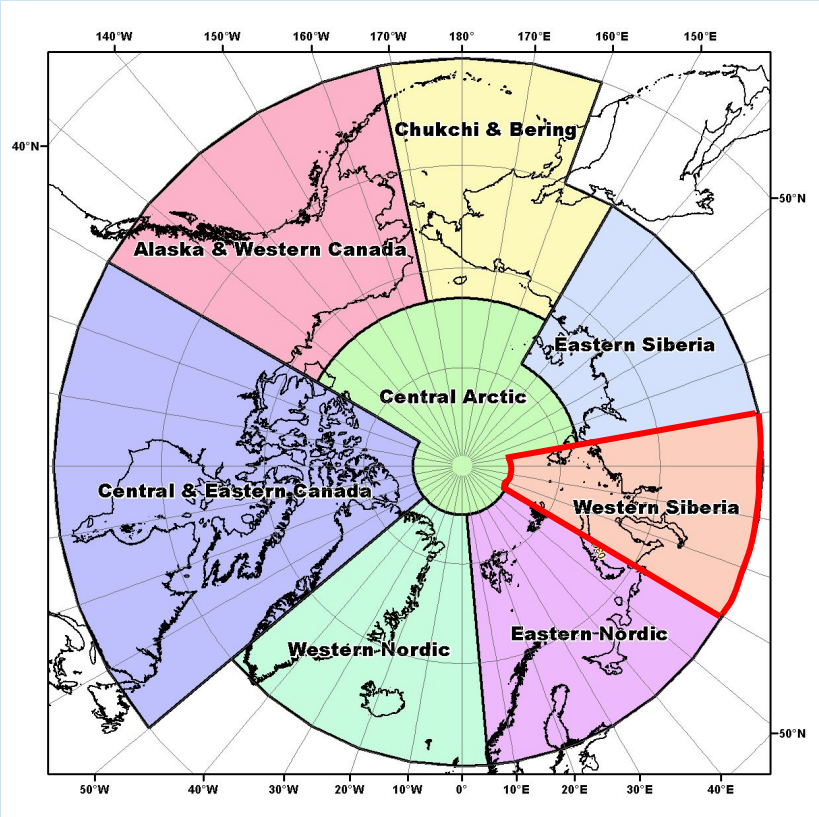
Eurasian Node

- **Western Siberian**
- **Eastern Siberian**
- **Chukchi & Bering**

Arctic Regional Climate Centre Network

Western Siberia



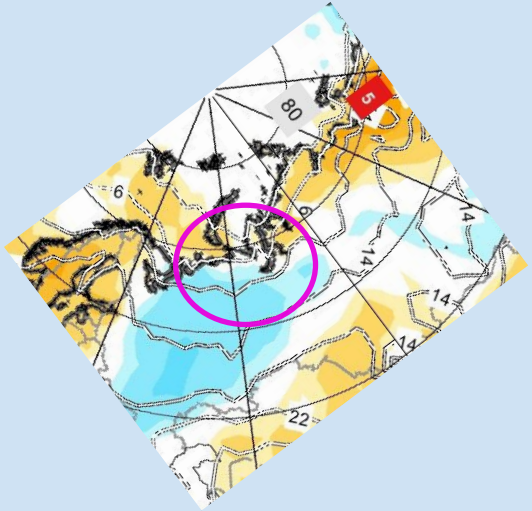
Western Siberia

Seasonal Summary: Summer 2023			
Observations above (+) and below (-) climatological normal			
Temperature Normal 1991-2020	**1.89**°C warmer than normal in JJA **2th** warmest year on record	Warmest year was 1915	Coldest year was 1968
Precipitation Normal 1991-2020	Wetter on the coast Dryer/close to normal in continental areas	Wettest year was 2002	Driest year was 1946
Sea-Ice Normal 1991-2020 Ice extent rank since 1979	Kara Sea: Early break-up in the west; Late break-up in the east	Kara Sea: Above normal sea-ice extent	

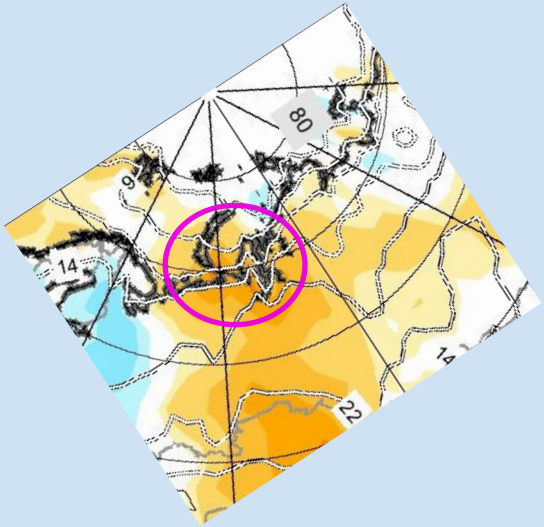
Western Siberia

Air temperature anomalies
(norm 1991-2020)

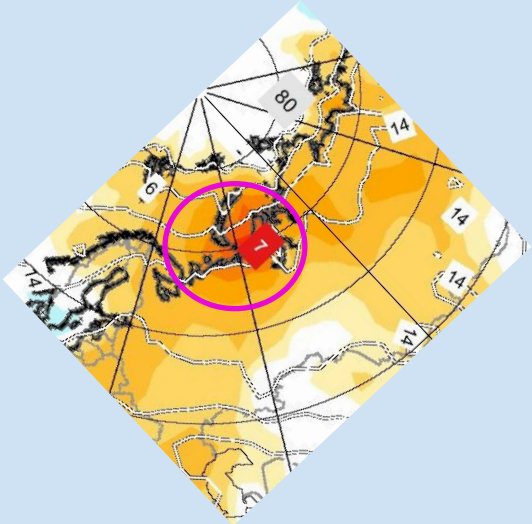
JUNE 2023

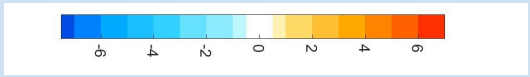


JULY 2023



AUGUST 2023





Western Siberia

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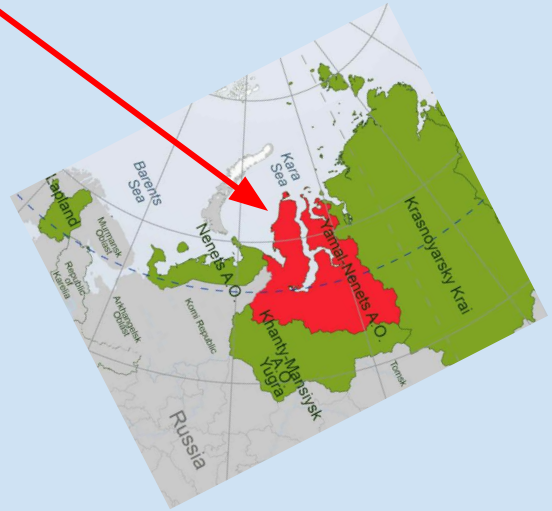
Maximum air temperature and the number of days with temperatures > +25°C at stations of the Yamalo-Nenets District



Western Siberia

Observed extreme climate events Summer 2023			
Category	**Location**	**Rarity**	**Impacts associated with event**
Temperature	Yamalo-Nenets And Khanty-Mansyisk Districts	Three heat waves in Salekhard: • 1-7 July (t> 33°) • 2-8 Aug (t ~ 30°) • 8-15 Sep (six records of MAX daily air temperature)	Increase in the number of ambulance calls
Temperature & Precipitation	Yamalo-Nenets Districts	Due to warm and wet weather, mosquitoes and midges were more active in July. In June, due to the cold weather, the situation was calm.	Many complaints from local residents on social networks, many cases of child bites in Salekhard
Temperature & Precipitation	Pastures Yamalo-Nenets Districts	Heavy precipitation and warm weather on July	Problems with reindeer grazing: • heavy rains flooded pastures; • due to the abundance of midges, deer required constant additional treatment from insects

Western Siberia

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SEASONAL OUTLOOK: WINTER 2023/2024			Multi Model Agreement			
Climatological variables		Forecast relative to climatological normal	High	Moderate	Low	No
Temperature	Over the Kara Sea and in the north of the Yamal Peninsula South of 66 North latitude	Above normal (warmer)	✓			
	North and center of the Yamalo-Nenets Okrug		✓			
	South of the Yamalo-Nenets district and the north of the Khanty-Mansiysk			✓		
Precipitation	West of the Kara Sea	Above Normal (wetter)		✓		
	East of the Kara Sea and continental areas				✓	
Sea-Ice	Freeze-up	Kara sea	Near normal	✓			
	Maximum Ice Extent March 2024	Kara sea	Near normal	✓			
Snow Water Equivalent	Almost the entire region		Below Normal			✓	
	The Novaya Zemlya Archipelago and the northern Yamal Peninsula		Above Normal		✓		

Western Siberia

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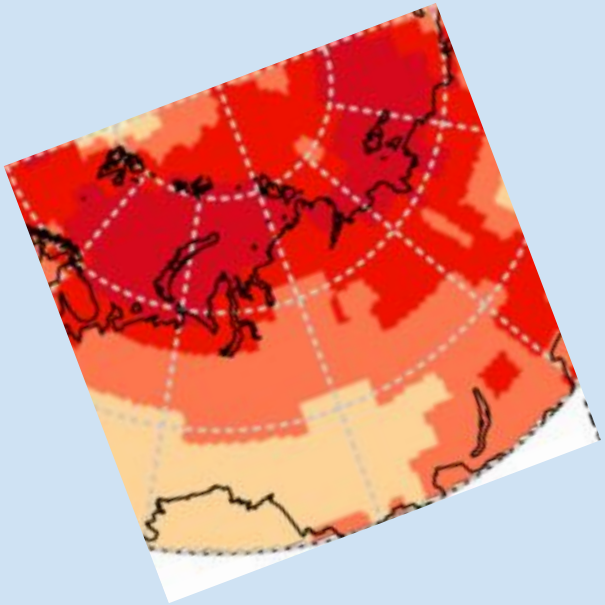
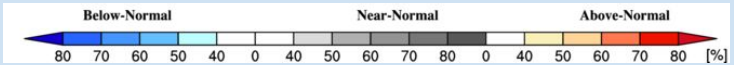
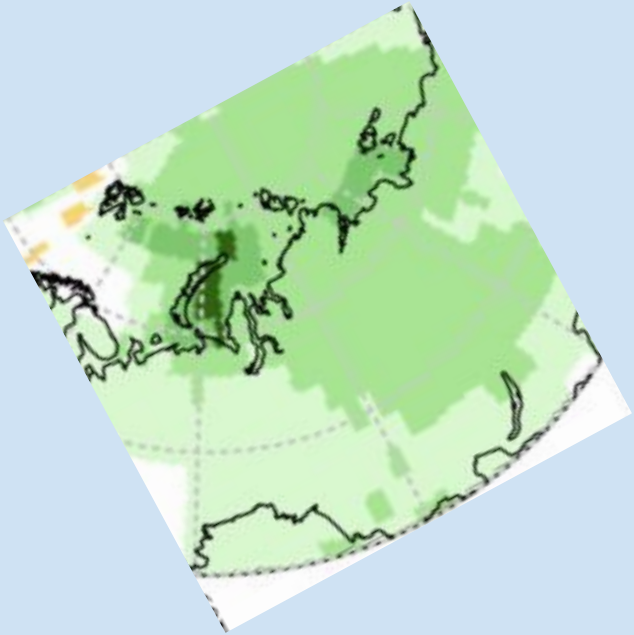
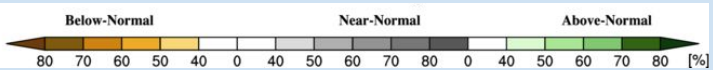
NDJ 23/24 Multi-Model Temperature Outlook





NDJ 23/24 Multi-Model Precipitation Outlook

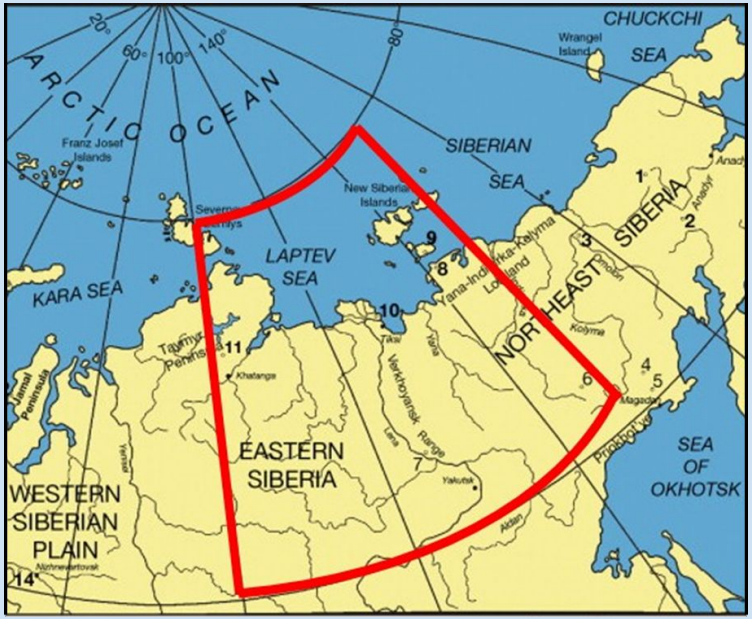




Western Siberia

Potential societal and environmental impacts		
Economy sector/ Livelihood conditions	**Relevant variables from the Seasonal Outlook**	**Impacts associated**
Mining industry	Temperature above normal	continuation of the slow melting of permafrost, which can cause accidents in mining areas
Local life, transport	Temperature & precipitation above normal	Potentially difficult conditions for transport and hunting for local residents

Eastern Siberia



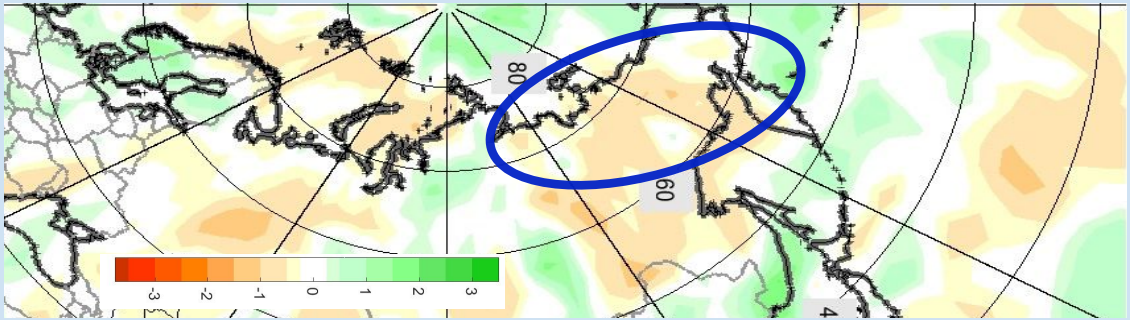
Eastern Siberia

Seasonal Summary: Summer 2023			
Observations above (+) and below (-) climatological normal			
Temperature Normal 1991-2020	**1.04**°C warmer than normal in JJA **3**th warmest year on record	Warmest year was 1906	Coldest year was 1972
Precipitation Normal 1991-2020	Wetter in the west Dryer in the east	Wettest year was 1988	Driest year as 1967
Sea-Ice Normal 1991-2020 Ice extent rank since 1979	Laptev sea: Normal break-up Eastern Siberian sea: Late to near normal break-up	Laptev sea: above normal sea-ice extent Eastern Siberian sea: below normal sea-ice extent	

Eastern Siberia

Fire danger class (red-extreme, pink – high level of danger)
10 July 2023

Precipitation sigma-anomalies
JJA 2023



Eastern Siberia

Observed extreme climate events Summer 2023			
Category	**Location**	**Rarity**	**Impacts associated with event**
Precipitation (snow)	Norilsk	Snowfall on 12 July 2023 (before that, «summer snow» in Norilsk in July fell on July 21, 2018 and July 20, 1992)	The snow cover did not form and the snow melted quickly. No consequences reported
Precipitation (heavy rains)	Taymir	Heavy rains in Norilsk August 20-25, 2023	Heavy rains caused flooding and interruptions in public transport. The rains were accompanied by thunderstorms that were unusual for Norilsk
Temperature & Precipitation	Yakutia (Sakha)	Dry and hot weather throughout the season	Fire danger from moderate to extreme in the northwest and northeast of Yakutia in July and August

Eastern Siberia

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SEASONAL OUTLOOK: WINTER 2023/2024				Multi Model Agreement			
Climatological variables			Forecast relative to climatological normal	High	Moderate	Low	*No*
Temperature	Coastal areas of the Laptev Sea, Anjou Islands, northern Tamyr Peninsula		**Above normal (warmer)**	✓			
	Northeast of Krasnoyarsk Territory and west of Yakutia				✓		
	Central districts of the Krasnoyarsk Territory				✓		
Precipitation	Coastal areas of the Laptev Sea		**Above Normal (wetter)**		✓		
	the entire region (except coastal areas of the Laptev Sea)					✓	
Sea-Ice	**Freeze-up**	Laptev sea	Near normal	✓			
		East Siberian Sea	Late	✓			
	Maximum Ice Extent March 2024	Laptev sea, East Siberian Sea	Near normal	✓			
Snow Water Equivalent	Most of the region		**Above Normal**		✓		

Eastern Siberia

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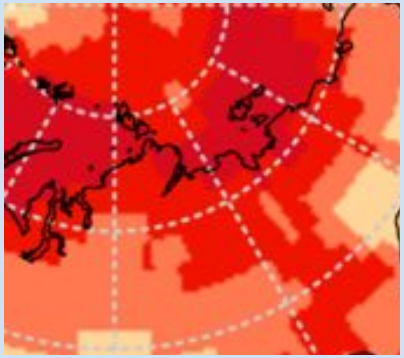
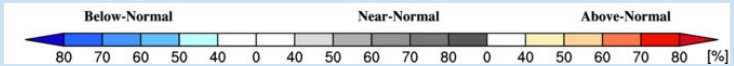
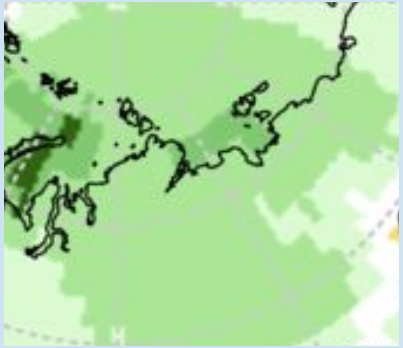
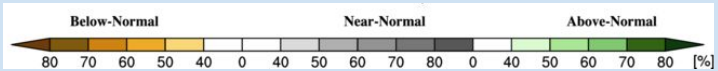
NDJ 23/24 Multi-Model Temperature Outlook





NDJ 23/24 Multi-Model Precipitation Outlook

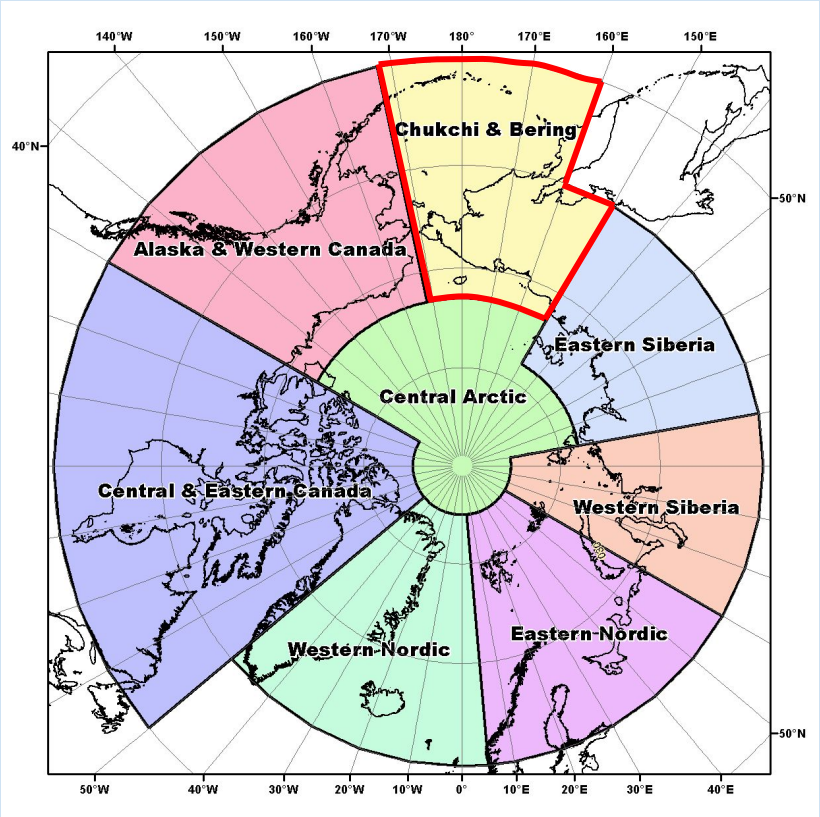




Eastern Siberia

Potential societal and environmental impacts		
Economy sector/ Livelihood conditions	**Relevant variables from the Seasonal Outlook**	**Impacts associated**
Local life, rescue services	Precipitation & snow water equivalent above norm	Such conditions can cause large-scale floods in the spring on the Yana River, where many local settlements are located
Local life, medical services	Temperature & precipitation above normal	Warm and humid weather often causes influenza, SARS, and pneumonia. What is due to pressure on medical services that need to travel to remote areas in severe cases.

Chukchi and Bering



Chukchi and Bering

Seasonal Summary: Summer 2023			
Observations above (+) and below (-) climatological normal			
Temperature Normal 1991-2020	**0,11**°C warmer than normal in JJA 18th warmest year on record	Warmest year was 1910	Coldest year was 1930
Precipitation Normal 1991-2020	Wetter in the west Dryer in the east and on the coast	Wettest year was 1954	Driest year was 1982
Sea-Ice Normal 1991-2020 Ice extent rank since 1979	Chukchi Sea, Bering Sea, Okhotsk Sea: late break-up	Chukchi Sea: Below normal sea-ice extent	

Chukchi and Bering

Observed extreme climate events Summer 2023			
Category	**Location**	**Rarity**	**Impacts associated with event**
Late sea-ice break-up	Chukchi	Due to late ice break-up, summer navigation in ports began later. In the port of Anadyr on June 29, 2023 (in 2022 - June 13).	From the port of Anadyr food and fuel are delivered to hard-to-reach areas

Chukchi and Bering

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Seasonal Outlook: Winter 2023/2024				Multi Model Agreement			
Climatological variables			Forecast relative to climatological normal	High	Moderate	Low	No
Temperature	North Chukchi Sea, southeast Bering Sea		Above normal (warmer)	✓			
	Coastal areas of the Chukotka Peninsula				✓		
	Chukotka Peninsula					✓	
	North of the Kamchatka Peninsula, coast of the Sea of Okhotsk						✓
Precipitation	West of the Chukotka Peninsula East of the Chukotka Peninsula and north of Kamchatka		Above Normal (wetter)		✓		
	East of the Chukotka Peninsula and north of Kamchatka					✓	
Sea-Ice	Freeze-up	Chukchi sea	Near normal	✓			
		Bering Sea	Near normal			✓	
		Sea of Okhotsk	Near normal to early			✓	
	Maximum Ice Extent March 2024	Bering Sea, Sea of Okhotsk	Below normal		✓		
Snow Water Equivalent	Coast of the Chukchi Sea and northern Kamchatka		Above Normal			✓	
	Rest of territory		Below Normal			✓	

Chukchi and Bering

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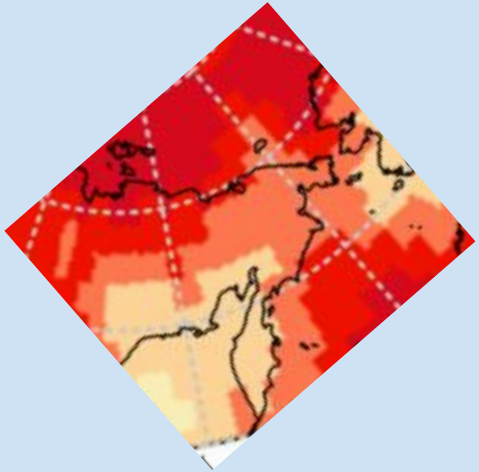
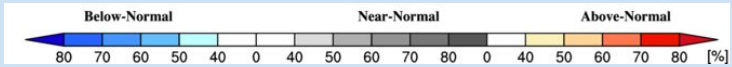
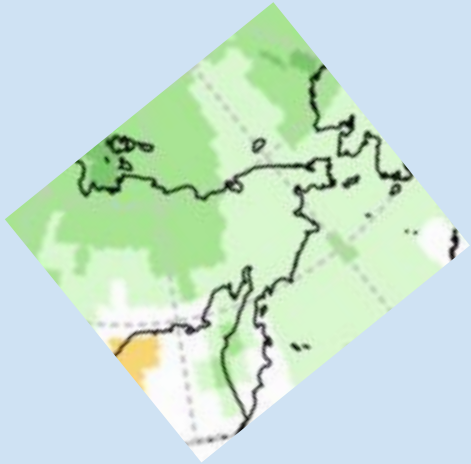
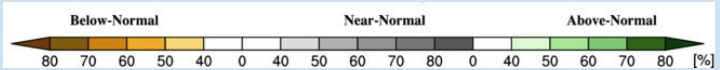
NDJ 23/24 Multi-Model Temperature Outlook





NDJ 23/24 Multi-Model Precipitation Outlook





Chukchi and Bering

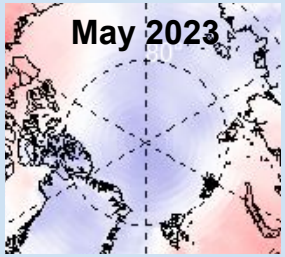
Potential societal and environmental impacts		
Economy sector/ Livelihood conditions	**Relevant variables from the Seasonal Outlook**	**Impacts associated**
Local life	Early than normal freeze-up in Okhotsk sea	Earlier start of winter under-ice fishing for local residents

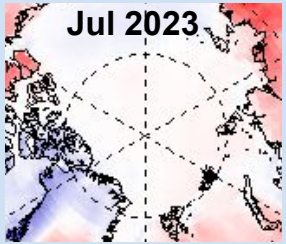
Central Arctic

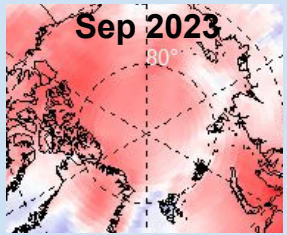
Central Arctic

ACF
Arctic Climate Forum

SAT anomalies



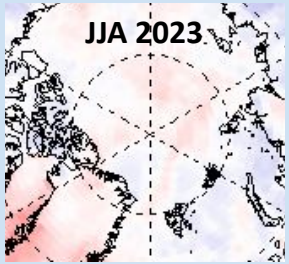




Seasonal Summary: Summer 2023

Observations above (+) and below (-) climatological normal	
Temperature Normal 1991-2020	partly colder conditions in May 2023, close to normal in Jun – August and warmer in September 2023.
Precipitation Normal 1991-2020	wetter / close to normal
Sea-Ice Since 1979	Minimum summer 2023 ice extent, 8th in row, ~4.4 mln km^2 (by 0.4 mln km^2 less than in 2022,12th in row, but is well within the scale of Arctic ice extent variability since 2007) Maximum Arctic (NH) winter 2023 ice extent, 7th in row, ~14.9 mln km2 (~15,2 in 2022, 14th in row) was reached 4-5 March 2023, is close in time to climatic date and scale since 2007

Precipitation anomalies



Outlook: Winter 2023/2024

Forecast			Multi Model Agreement: High	Moderate	Low
Temp	Norther parts of Beaufort and Chukchi, East Siberian Sea	**Above normal\ near normal**	✓		
	North pole, Laptev and Kara Seas	**Above normal**		✓	
Precip	All regions	**Above normal**		✓	
Sea-Ice	**Freeze-up**	**In process, 1-2 weeks later then norm**			

Central Arctic

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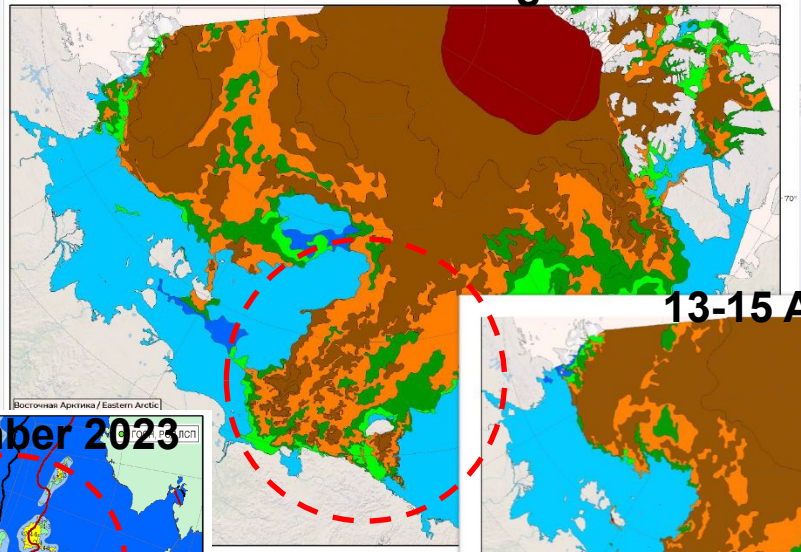
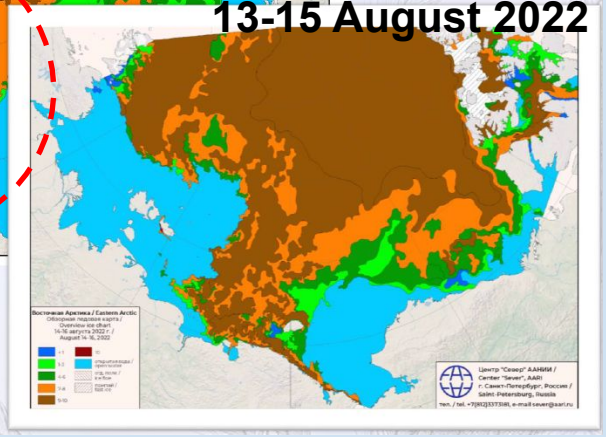
SEA	Ice Massif	Anomaly, %
KARA	Novozemelsky	-1
	Severozemelsky	-2
	Northern Kara	22
LAPTEV	Taimyrsky	18
	Yansky	-2
ESS	Novosibirsky	-7
	Ayonsky	-21
CHUKCHI	Nortern Chukchi	-5
	Vrangel	6

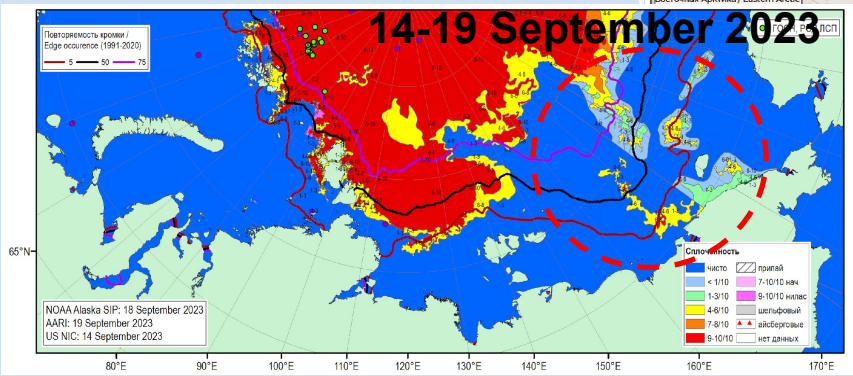
13-15 August 2023



13-15 August 2022

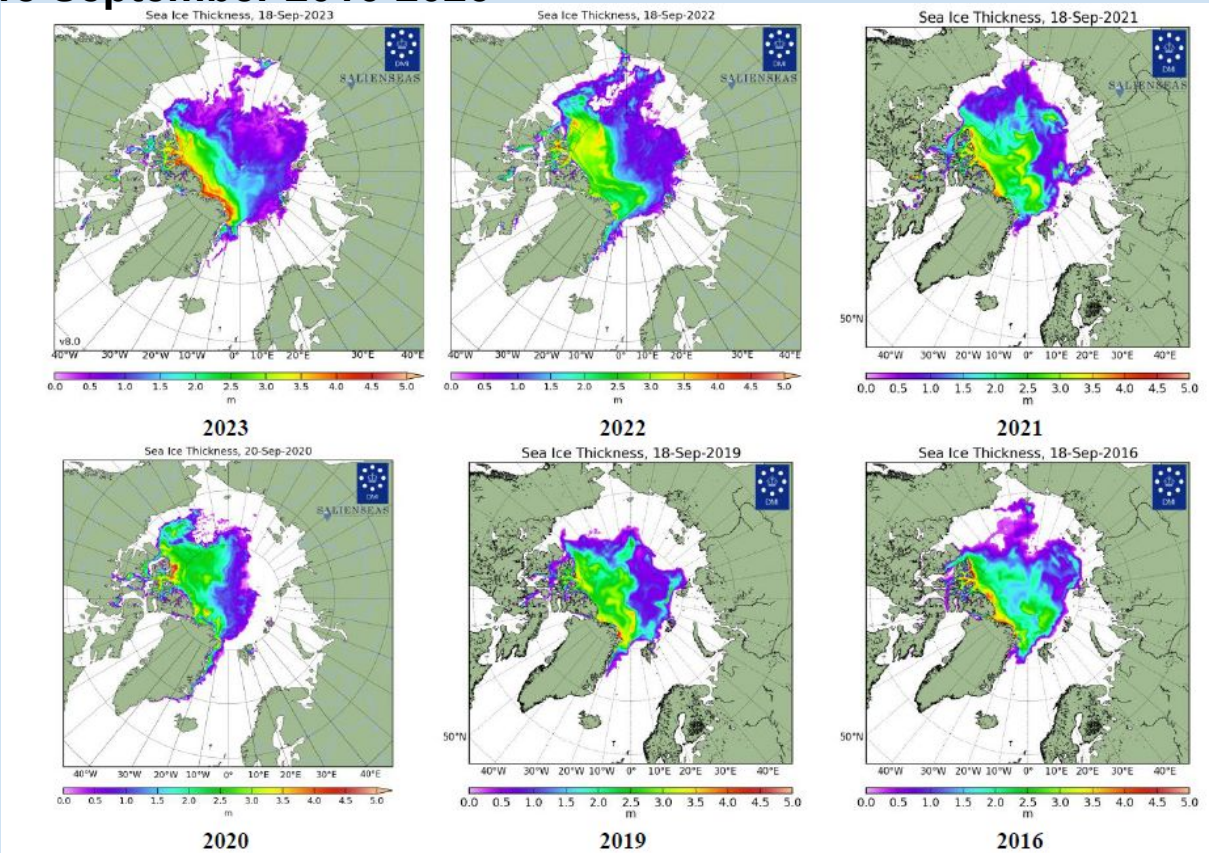


14-19 September 2023



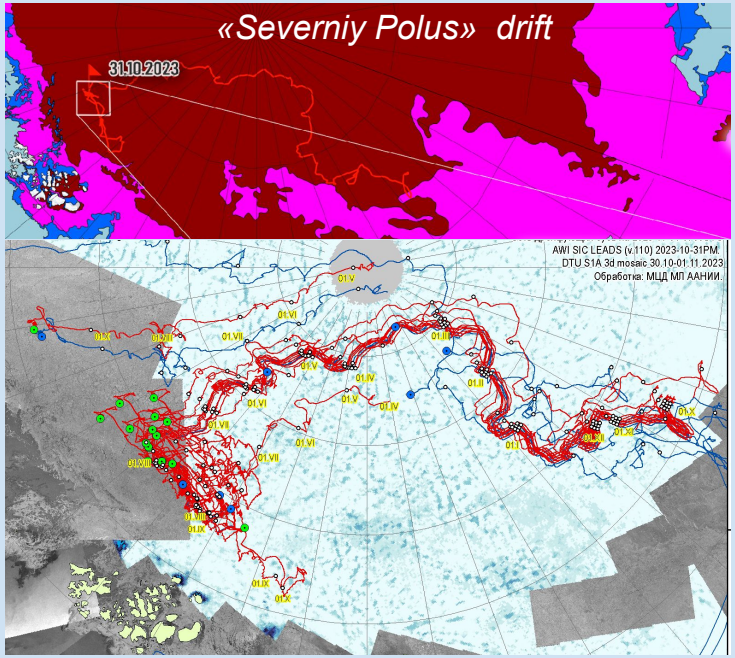
Central Arctic

18 September 2016-2023



Other events in Central Arctic:

❖ the platform «Severniy Polus» continues to drift since 02 October 2022



distributed network (DN) of *buoys drift*

❖ in August 2023 the second rotation of participants was carried out in the Arctic Basin with a help of “Akademik Tryoshnikov”.

Thank you for your attention!

ACF
Arctic Climate Forum

WORLD
METEOROLOGICAL
ORGANIZATION

Break 15min
Please be back at 17:45 UTC

ACF
Arctic Climate Forum

17:50 (45')	**Seasonal to Subseasonal Climate Support Presentation Session** 1. Meeting Forecast Service Needs in the Canadian North (15') 2. NWS Alaska Supporting Regional Subsistence Users (15') 3. Sea Ice for Walrus Outlook (SIWO) & Seasonal to Subseasonal Outreach Work in Alaska (15')	Session Chair: Stephen Baxter - NOAA 1. Jesse Wagar - ECCC 2. Brian Brettschneider - NOAA 3. Mary-Beth Schreck - NOAA - Alaska Sea Ice Program

Environment and Climate Change Canada | Environnement et Changement climatique Canada

MEETING FORECAST SERVICE NEEDS IN THE CANADIAN NORTH

Jesse Wagar
A/Warning Preparedness Meteorologist – North
Meteorological Service of Canada
Environment and Climate Change Canada

Jesse.wagar@ec.gc.ca

OVERVIEW

ECCC's Official Forecast Program in Canada's North

Current Gaps

Filling Gaps – Public

Filling Gaps – Government

Future Plans

ECCC'S OFFICIAL FORECAST PROGRAM

- 24/7/365
- Weather forecasts
- Alerts

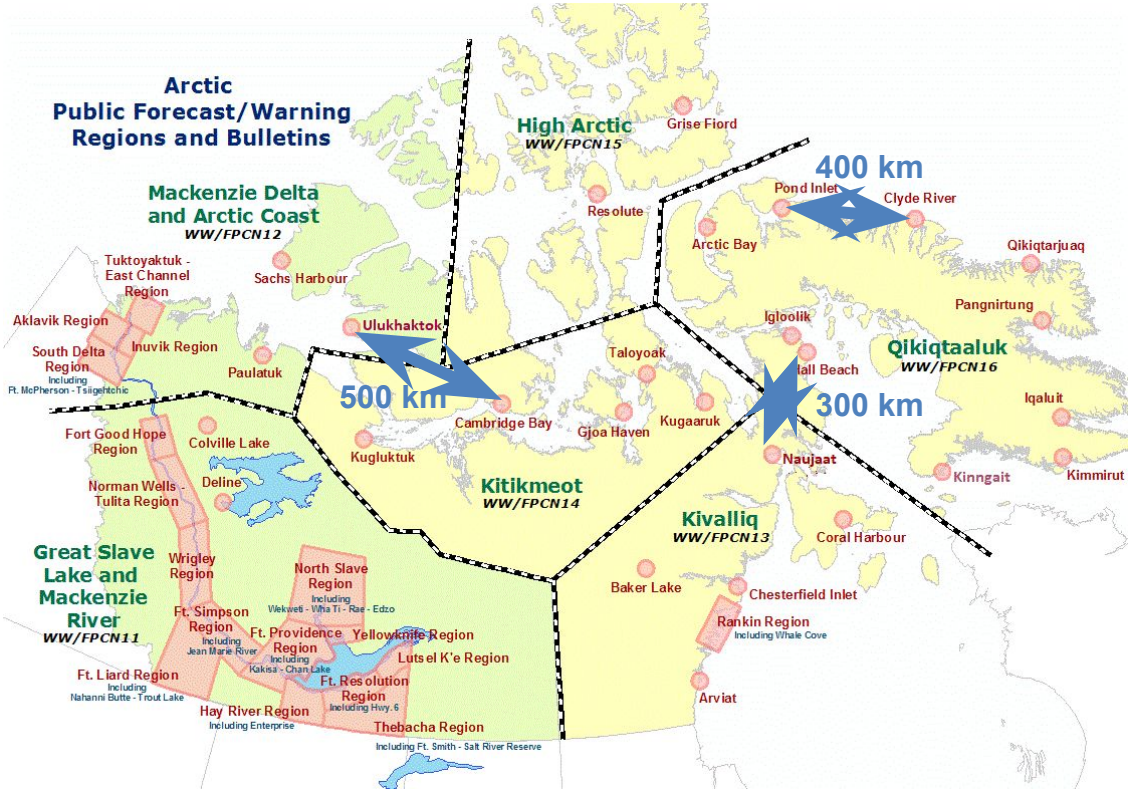
- Weather
- Marine
- Air Quality

ECCC'S OFFICIAL FORECAST PROGRAM

OFFICIAL FORECAST PROGRAM

CURRENT GAPS

- Community forecasts and alerts only



WHAT WE DO NOW

Public Audience

- Location Specific
- Social media posts
- Direct, targeted information

Government Audience

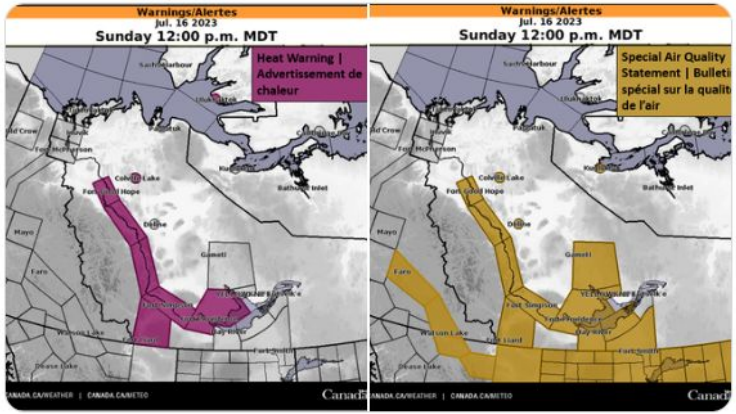
- Comprehensive
- Graphical products
- Briefings
- Dedicated support during crises

WHAT WE DO NOW – PUBLIC - SOCIAL MEDIA

ECCC Weather Northwest Territories
@ECCCWeatherNT

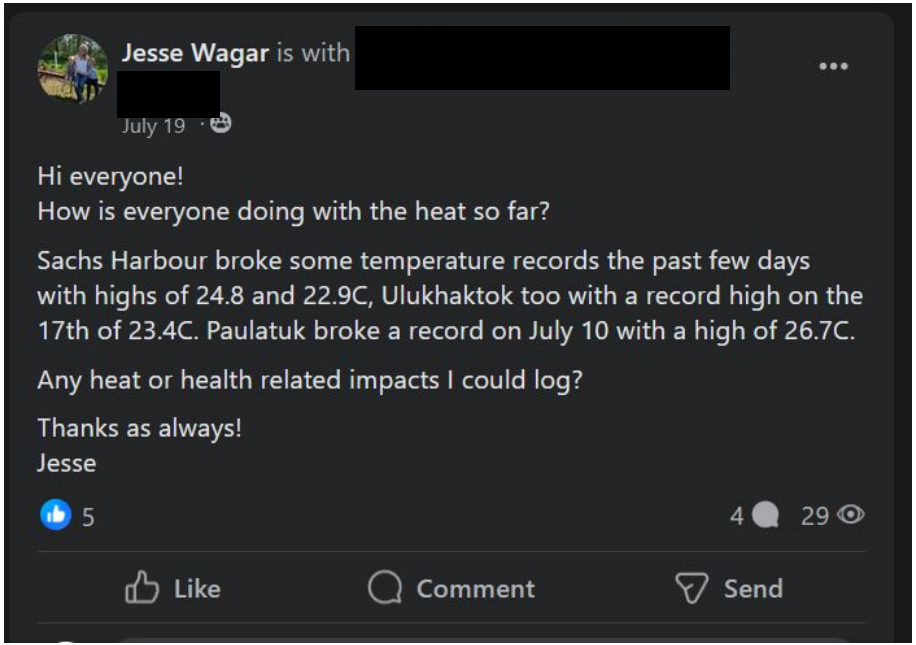
Heat and smoke are no joke! Warnings and statements remain in effect as this long-duration event persists. Continue to take actions to protect your health, reduce exposure to smoke, and stay hydrated 😷 #NTstorm

To learn more: ow.ly/BxqJ50PcoRe & ow.ly/r74E50PcoRc



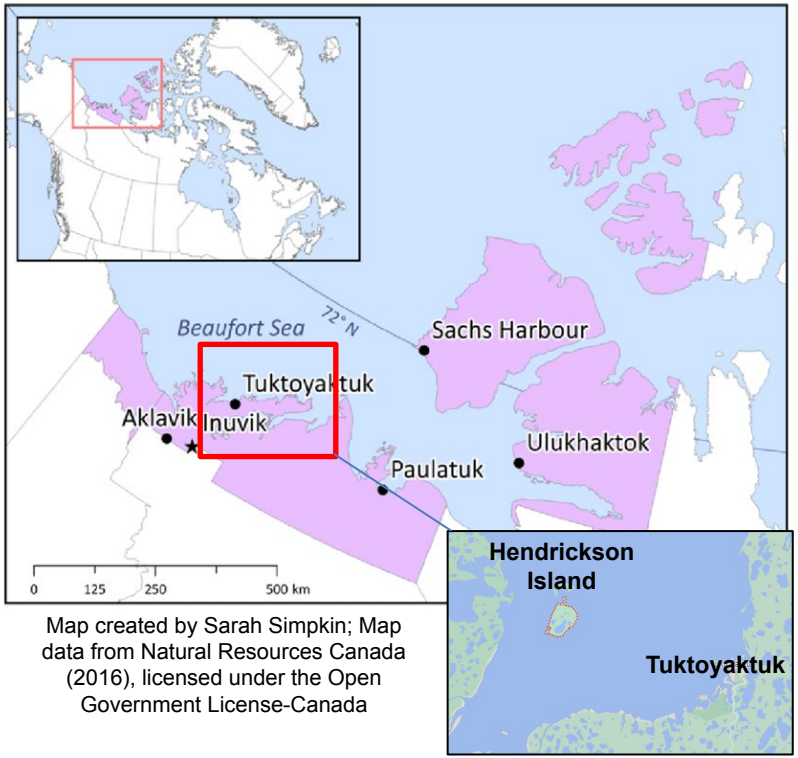
12:23 PM · Jul 16, 2023 · **142** Views

4



Follow us on “X” @ECCCWeatherNT & @ECCCWeatherNU!

ISR – BELUGA WHALE HUNT



Map created by Sarah Simpkin; Map data from Natural Resources Canada (2016), licensed under the Open Government License-Canada

- Sustenance fishing
- Migratory pattern of Beluga whales – ISR from May to September
- Tuktoyaktuk – June & July

Jesse Wagar
September 7, 2022 ·

here is the wind forecast for your area for tonight through Monday September 12. This is the last scheduled forecast for the summer whale hunt season in Tuktoyaktuk.

Forecast summary:

- Light and variable from this evening until Thursday evening
- Strong southeasterly winds, up to 25 KT by Friday evening
- Light and variable Sunday evening until Monday evening
- Strong southeasterly winds, potentially up to 30 KT Tuesday, Wednesday and potentially into Thursday.

Details:

Northwesterly winds will switch to northeasterly 5-10 KT this evening and are expected to continue until Thursday evening around 9pm where winds will switch to easterly and begin to increase. 10-15 KT from the east-southeast, with the strongest winds expected closer to the community of Tuktoyaktuk. These winds will continue to increase and by 7am Friday morning, winds will likely be 15-20 KT, 20 KT by 3 pm and 25 KT by 9 pm Friday. Winds begin to weaken early Saturday morning and will switch back to easterly at 10-15 KT by Saturday at 9am. This continues until Sunday at noon, winds will then switch to 10 KT from the northeast and then become light and variable by Sunday around 3 pm. Light and variable winds continue until Monday around 6pm to 10-15 KT. Increasing, strong southeasterly winds are expected for several days, until at least Thursday, potentially up to 30 KT.

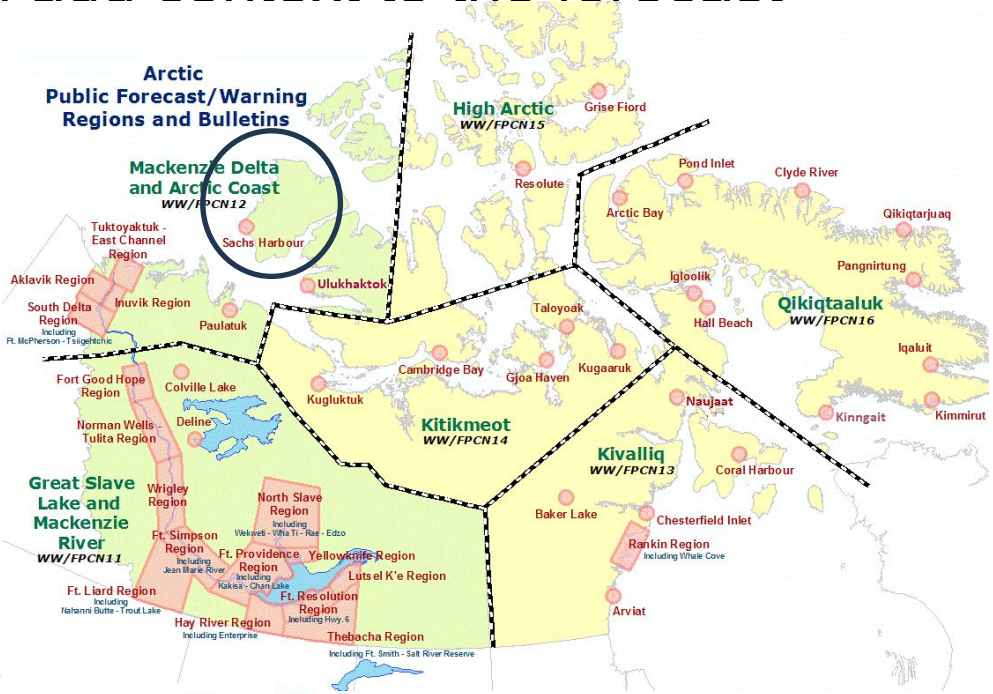
WHAT WE DO NOW – PUBLIC – METNOTES

- Metnotes are text products available on our app and website written by forecasters which add context to the forecast

MetNotes (1)

Valid: Now - Thu, 27 Jul 6:00 pm

Thunderstorms will continue over Banks Island. Be prepared to encounter lightning, heavy rain and gusty winds if heading out.



WeatherCAN
Environment and Climate Change Canada

WHAT WE DO NOW – PUBLIC – USING EXISTING PRODUCTS MORE EFFECTIVELY

- Effective warning text – using free format text to simplify and effectively communicate hazards and potential impacts both in the communities and nearby areas

- Media interviews – answering media calls in a way that understands that our users are traveling between communities and adding context to the forecast

WHAT WE DO NOW – GOVERNMENT – SUPPORT

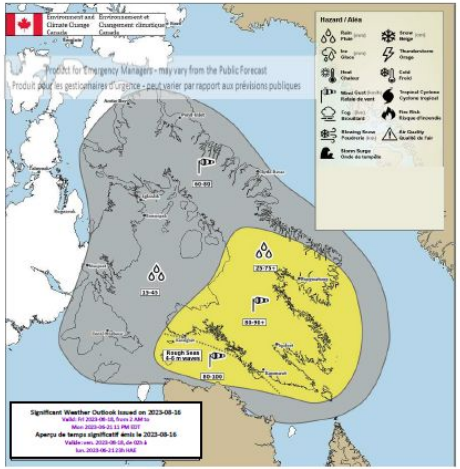
- Regular check ins
- Climate summaries and outlooks
- Relationship building

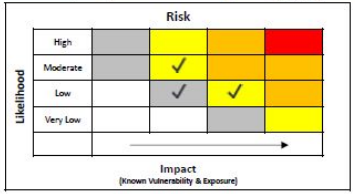
WHAT WE DO NOW – GOVERNMENT – SUPPORT

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Heavy Rainfall, Strong Winds and High Seas for Baffin Island

Event Duration: Fri August 18 to Monday August 21, 2023





Impacts

- On-water activities are not recommended due to extremely dangerous sea conditions, particularly over Hudson Strait.
- Over-land travel, including ATV, will be difficult due to heavy rain.
- Utility outages are possible due to strong winds.

ECCC Weather Summary – August 24, 2023

Thursday (Aug 24): *Warm and windy*

- Temperatures: 22-26°C
- Winds:
  - **Yellowknife:** SW 15-20 km/h, continues through the night
  - **Fort Smith:** Light northeasterly, becoming southerly late this afternoon
  - **Hay River:** Light winds increasing to S 15-20 km/h in the afternoon
- Rain showers over the northern NWT (2-5 mm); none in the south
- Smoke and poor visibility over South Slave – may move into Yellowknife

Friday (Aug 25): *Warm and windy*

- Temperatures near 30°C for South Slave, mid 20s for Yellowknife
- Winds from the SW up to 20-30 km/h
  - **Yellowknife:** SW 15-20 km/h increasing to S 30 km/h afternoon and evening
  - **Fort Smith:** SW 20 km/h afternoon and evening
  - **Hay River:** SW 25 km/h afternoon and night
- Rain showers over the northern NWT (5-10 mm); none in the south

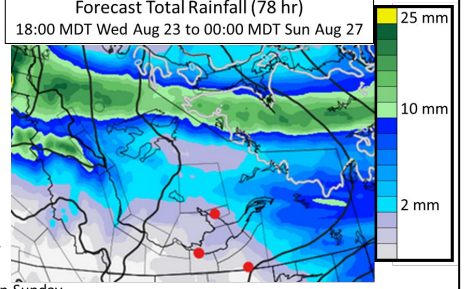
Saturday & Sunday (Aug 26-27): *Strong, gusty winds through the weekend*

- Temperatures: 20-25°C for Yellowknife and Fort Smith, near 30°C for Hay River
- Chance of light showers near GSL
- Winds: Gusty northwest winds on Saturday. Strong south or southwesterlies on Sunday.

Monday (Aug 28): *High temperatures*

- Temperatures near 30 for South Slave, mid 20s near Yellowknife
- Light, variable winds

Forecast Total Rainfall (78 hr)
18:00 MDT Wed Aug 23 to 00:00 MDT Sun Aug 27



Date	August 21						August 22		
	6 am	9am	12pm	3pm	6pm	9pm	12am	3am	6am
Wind Direction	VRB	VRB	NE	E	SE	SE	SE	SE	SE
Wind Speed (km/h)	5-10	5-10	15	10	10	10	10	10	10
Probability of precipitation	0	0	0	0	0	0	30	30	0
Precipitation amount (mm)	0	0	0	0	0	0	0-1	0-1	0

* VRB = variable

FUTURE PLANS

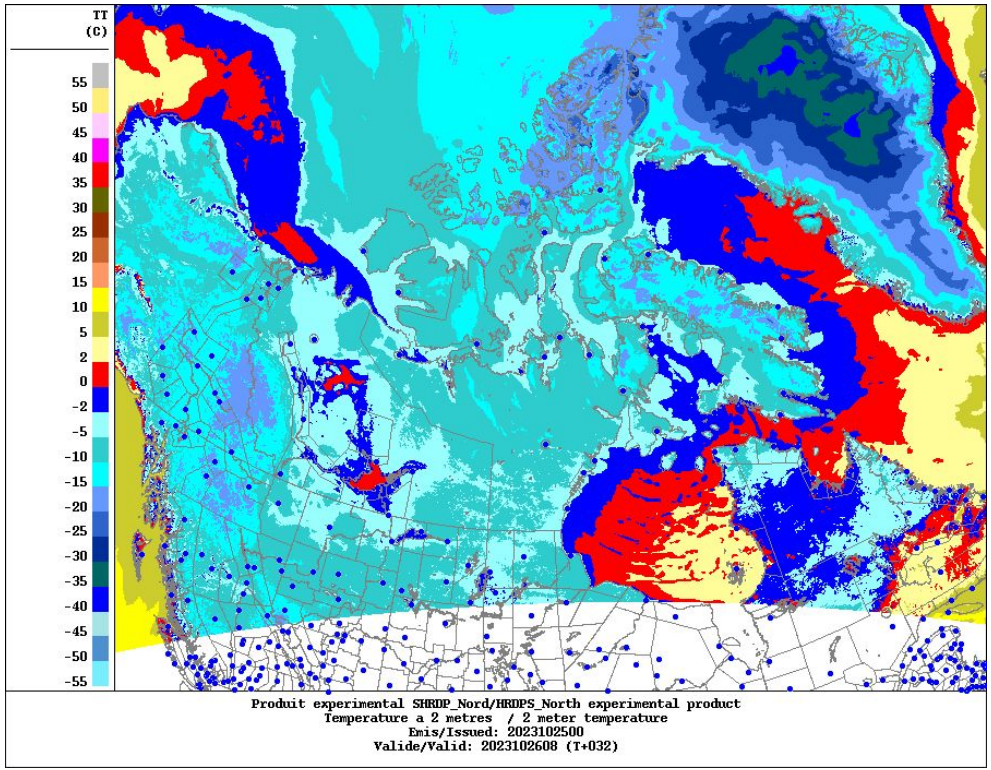
FUTURE PLANS – SHORT TERM

- **Arctic Ambassador** – An inuk to inform future changes to our forecasting program
- **Academia**

FUTURE PLANS – SHORT TERM

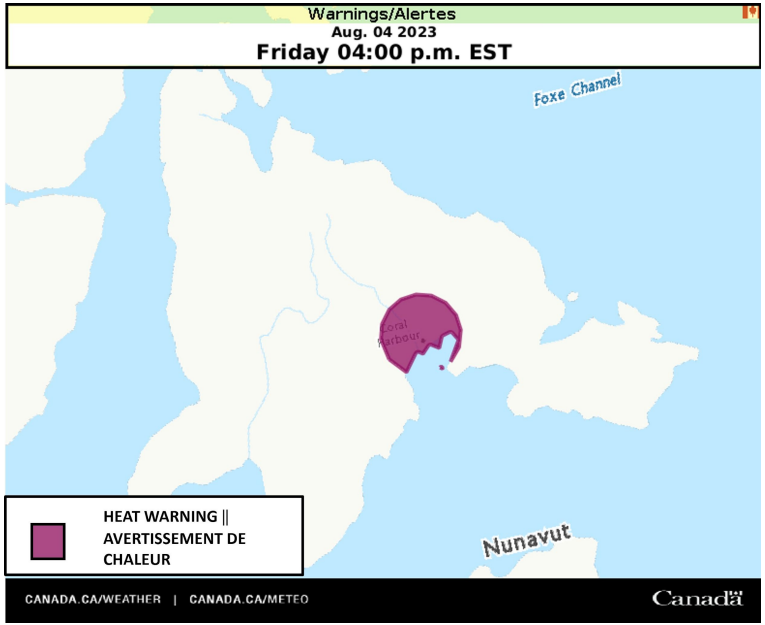
FUTURE PLANS – LONG TERM

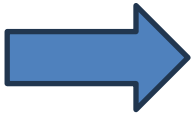
- **Weather Elements on the Grid** – will create high resolution pure model forecasts for all of Canada

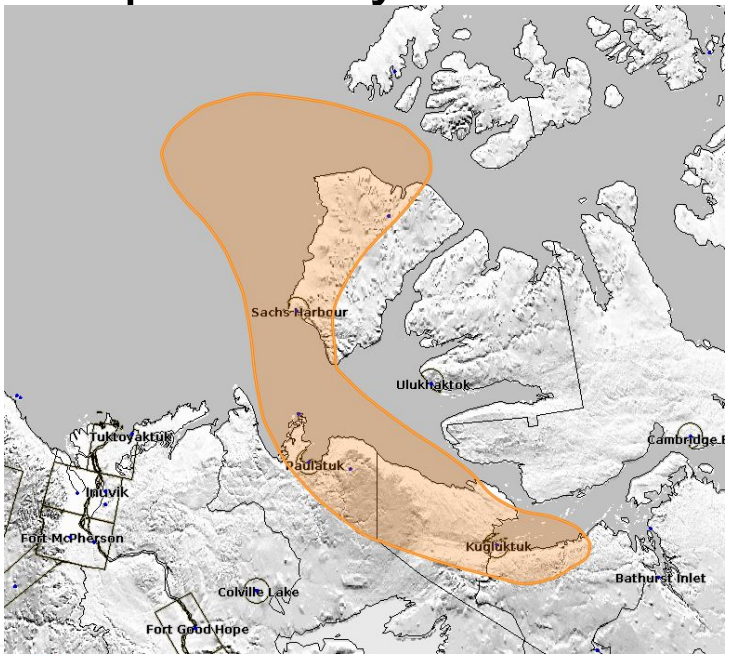


FUTURE PLANS – LONG TERM

- **Warning renewal** – Meteorologists will be able to draw a polygon that encompasses the area impacted by an alert







THANK YOU

Nakurmiik

Tak

Kiitos

Tusen takk

Merci

NATIONAL WEATHER SERVICE

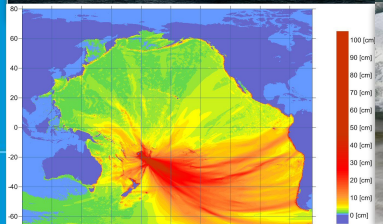
NWS Supporting Regional Subsistence Users ACF-12

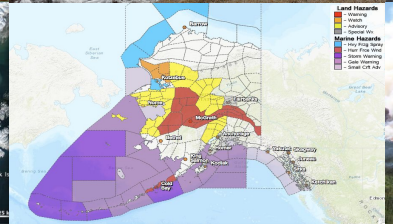
November 12, 2023

Presenter: Brian Brettschneider, NWS Alaska Region





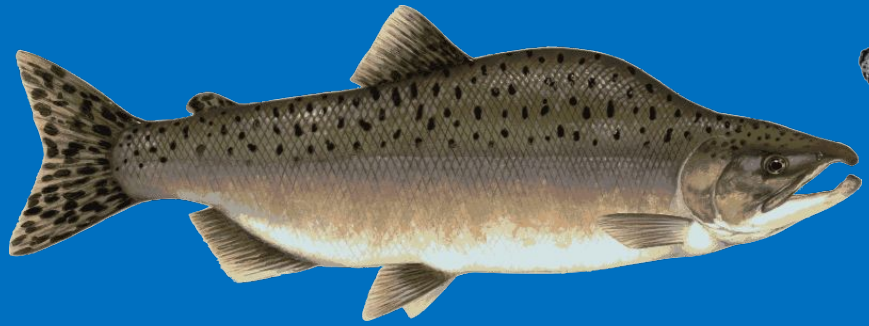



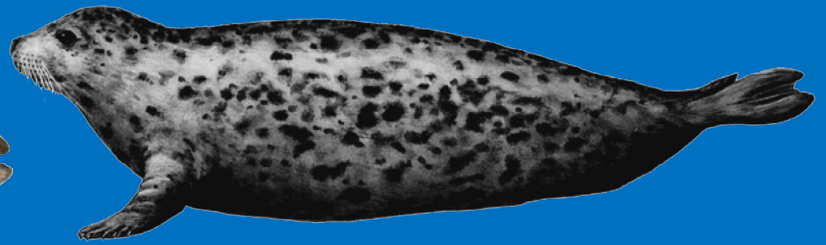



Outline

- What is Subsistence
- Legal Framework
- Regional Advisory Council Support from NWS

Alaska Subsistence





Subsistence is a Big Deal

Alaska Public Media News @AKpublicnews ·

Climate change and subsistence concerns were a major topic of discussion at the Alaska Federation of Natives convention on Friday.

ANICLA Law (1980)

LOCAL AND REGIONAL PARTICIPATION

16 USC 3115.

SEC. 805. (a) Except as otherwise provided in subsection (d) of this section, one year after the date of enactment of this Act, the Secretary in consultation with the State shall establish—

(1) at least six Alaska subsistence resource regions which, taken together, include all public lands. The number and boundaries of the regions shall be sufficient to assure that regional differences in subsistence uses are adequately accommodated;

(2) such local advisory committees within each region as he finds necessary at such time as he may determine, after notice and hearing, that the existing State fish and game advisory committees do not adequately perform the functions of the local committee system set forth in paragraph (3)(D)(iv) of this subsection; and

(3) a regional advisory council in each subsistence resource region.

Regional advisory council, authority.

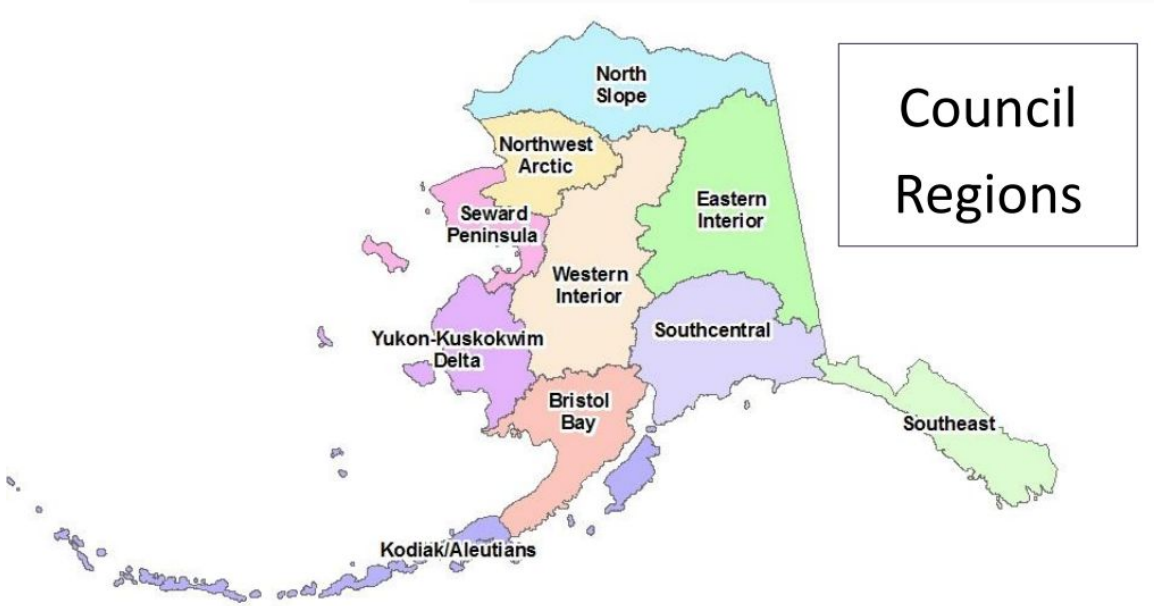
Each regional advisory council shall be composed of residents of the region and shall have the following authority:

(A) the review and evaluation of proposals for regulations, policies, management plans, and other matters relating to subsistence uses of fish and wildlife within the region;

(B) the provision of a forum for the expression of opinions and recommendations by persons interested in any matter related to the subsistence uses of fish and wildlife within the region;

(C) the encouragement of local and regional participation pursuant to the provisions of this title in the decision-making process affecting the taking of fish and wildlife on the public lands within the region for subsistence uses;

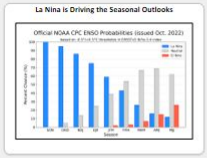
Regional Advisory Councils (RACs)



Federal Agency Support of RACs

NWS Support of RAC Mission

1



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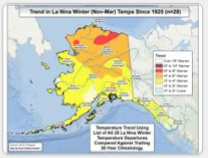
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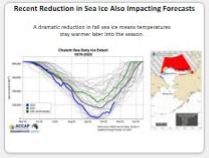

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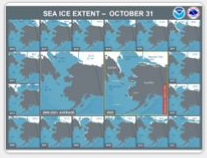

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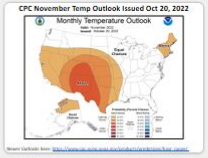

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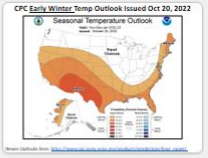

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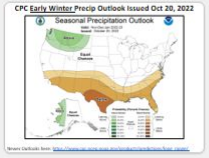

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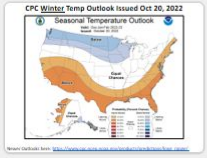

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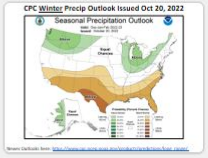

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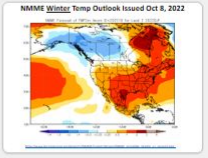

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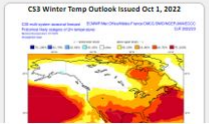
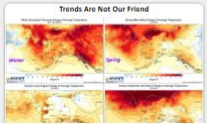
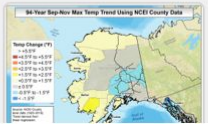


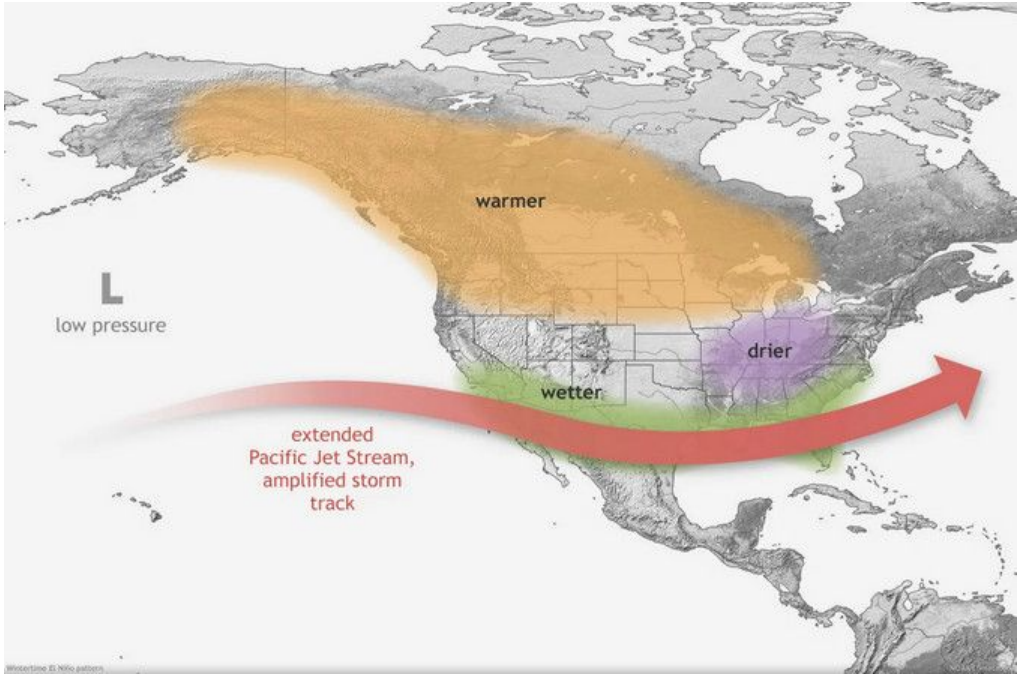




NWS Support of RAC Mission

NWS Support of RAC Mission

NWS Support of RAC Mission



Thank You!

NATIONAL WEATHER SERVICE

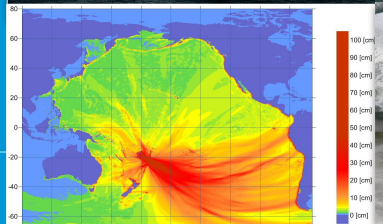
Sea Ice for Walrus Outlook (SIWO) & Seasonal to Subseasonal Outreach Work in Alaska

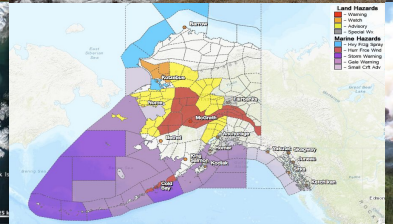
NOVEMBER 6, 2023

Presenter: Mary-Beth Schreck, NOAA NWS
Alaska Sea Ice Program (ASIP) Leader








Alaska Sea Ice Program (ASIP)

The ASIP has undergone significant advancement since its modest beginning in 1984 when a weather forecaster identified a need for ice charts in Alaska waters. As the climate continues to change, sea ice has become an even bigger focus for many people as they adapt.

SHORT HISTORY

Aug 1984
Earliest ASIP Ice Chart Archived. Charts created M, W, F

Apr 2007
First GIS Shapefile Available

Nov 2010
Full Color Ice Charts Begin

Jun 30, 2014
Daily Ice Charts Begin

Oct 1, 2015
SIPAS and WMO-Standard Ice Charts Begin

SEASONAL FISHING BOAT CALLS

*Generally late December through April

2019-2020	138	
2020-2021	206	
2021-2022	178	*Opilio Crab Quota Cut 88%
2022-2023	7	*Opilio Crab Season Cancelled

NUMBER OF ANALYSTS

YEAR: 1984	YEAR: 2011	YEAR: 2022
1	2	3

CONTACT

weather.gov/afc/ice
nws.ar.ice@noaa.gov
1-907-266-5138
@NWSAlaskaSealce

Routine Sea Ice Products

- NWS Alaska Sea Ice Program website
- Daily Static ASIP Sea Ice Charts
  - Sea Ice Concentration
  - Sea Ice Thickness
  - Sea Ice Forecast
  - Sea Surface Temperatures
- Text 5-day Forecast
  - Posted each Monday, Wednesday, and Friday
- Text 3-month Outlook
  - Posted on the 4th Thursday of each month

Sea Ice Outlook for Western and Arctic Alaskan Coastal Waters
National Weather Service Anchorage Alaska
139 PM AKDT Friday 13 October 2023

Updated for faster freeze-up along the Alaska coastline north of Unalakleet.

...SEPTEMBER 2023 MONTHLY SEA ICE OUTLOOK…

Sea ice has continued to melt significantly especially across the Chukchi Sea through September. While a couple isolated areas of sea ice remain farther south, the main ice pack has melted back to 74N and even as far north as 77N across part of the area. New sea ice growth has been observed within eastern portions of the remaining ice pack, though other areas are still melting. We've also noted that while the sea surface temperatures near and west of the Mackenzie River Delta in Canada were quite warm earlier in the summer, they have cooled quite a bit to be more in line with the surrounding Beaufort Sea waters.

Looking into freeze-up, El Nino conditions look to strengthen and persist through the end of the year. Overall freeze-up looks like it will be slower than average across Alaska waters. Storm tracks during El Nino tend to bring storms north into and through the Bering Sea, so it will likely be a season of variable sea ice conditions.

Detailed information can be found in each pertinent section below.

…FREEZE-UP OUTLOOK FOR THE BEAUFORT SEA…

Sea ice growth beyond barrier islands is expected by the third week of October.

Sea ice concentration within 20 nm of the north coast of Alaska is expected to reach seven tenths during the third or fourth week of October.

Sea ice is expected to begin expanding south of the ice pack during the second week of October. The main ice pack will likely merge with the new ice along the Alaska coast by the end of October.

…FREEZE-UP OUTLOOK FOR THE CHUKCHI SEA…

Along the coast from Icy Cape to Utqiagvik, new sea ice is expected to begin forming beyond protected bays during the third week of October.

Sea Ice-Related Decision Support Activities

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Cook Inlet		◆	◆	◆	◆	◆	◆					
Bering Sea		◆	◆	◆	◆	◆	◆	◆	◆			
Crab Fishery		◆	◆	◆	◆	◆	◆	◆				
Cod Fishery		◆	◆									
Herring Fishery							◆	◆				
Subsistence Hunting					◆	◆	◆	◆	◆	◆	◆	
Kuskokwim Bay	◆	◆					◆	◆				
West Coast Re-supply	◆							◆	◆	◆	◆	◆
Yukon River	◆							◆	◆			
Norton Sound Fish/Supply								◆	◆			
St. Lawrence Subsistence						◆	◆	◆	◆			
Kivalina – Red Dog Mine	◆	◆							◆	◆		
Chukchi Sea – Subsistence							◆	◆	◆	◆	◆	
Chukchi Sea – Commercial	◆	◆								◆	◆	◆
North Coast Supply/Crossing	◆	◆							◆	◆	◆	◆
Tourism & Recreation	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

Sea Ice for Walrus Outlook (SIWO)

- Mid-March to mid-June
- Fairbanks Weather Forecast Office provides weather
- ASIP provides sea ice info

Spring 2010:

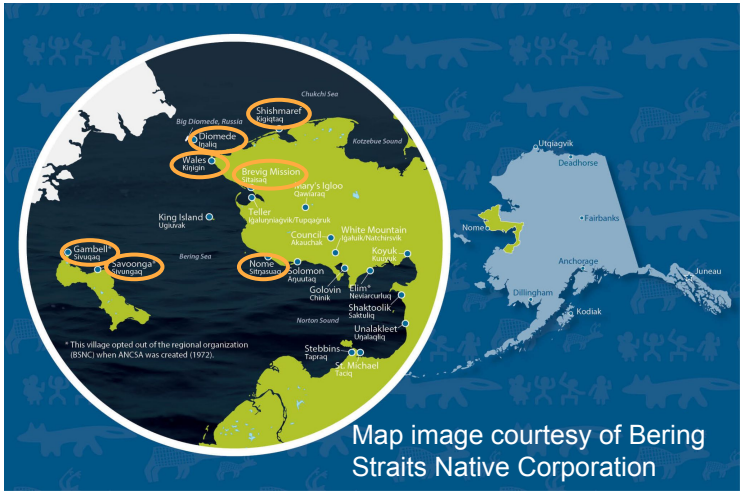
- Began with Gambell, Wales and Shishmaref

Spring 2017:

- Added Nome, Little Diomede, and Savoonga/rest of St. Lawrence Island

Spring 2019:

- Added Brevig Mission/Port Clarence



Map image courtesy of Bering Straits Native Corporation

ARCUS

Sea Ice for Walrus Outlook

International Arctic Research Center

Sea Ice for Walrus Outlook (SIWO)

Date: 12 May 2023

Assessment of Current Ice Conditions Relevant to Distribution and Access of Walrus

Click the name of each community below to view more frequently updated and detailed information from the National Weather Service.

Synopsis High pressure over the Bering Strait persists through Friday night before a low from the southwest approaches the west coast. It will bring increased southwest-south winds and primarily rain through the weekend and possibly another round of rain through early next week.

Near St. Lawrence Island

Open water has greatly expanded since last week, stretching from 40 miles (64 km) northeast of Gambell to up to 130 miles (210 km) from the south coast of the island. There are several areas of open pack ice 40 to 70 miles (64 to 113 km) southwest to southeast of Gambell. The last round of southerly winds broke shorefast away along the northern coast, but some areas still remain. Between Gambell and Niyakpak Lagoon, shorefast ice extends up to 4 miles (6.5 km) away from the coast. Another area between Taphook Point and Kangee Camp extends up to 2.5 miles (4 km) away from the coast. East of Savoonga, a large portion of shorefast broke away, but shorefast remains from roughly Cape Kitnik through Camp Kulowiye up to 2 miles (3.2 km) from the coast. Shorefast from the east side through the south side of the island remains unchanged. The largest shorefast extent is in Oomeyaluk Bay, out up to 7 miles (11 km) from the coast. Very close pack of first year medium ice with small to vast floes exists from north of Savoonga through the east side of the island.

Nome

Shorefast ice remains unchanged from the previous week and extends up to 2 miles (3 km) offshore along the Nome coast, with the exception of up to 7 miles (11 km) offshore near Sledge Island. Beyond the shorefast ice is an area of open water that extends up to 13 mi (21 km) from the shorefast ice. Beyond the open water is open pack ice southwest of Nome to close pack ice southeast of Nome.

Nome port entra
e362-65cb-914e

Sea Ice for Walrus Outlook

- Overview
- 2023 SIWO Partners Workshop
- SIWO Archive
- Resources
- Observers
- Contact

Observations from Shishmaref

Thursday, 11 May 2023 - Curtis Nayokpuk

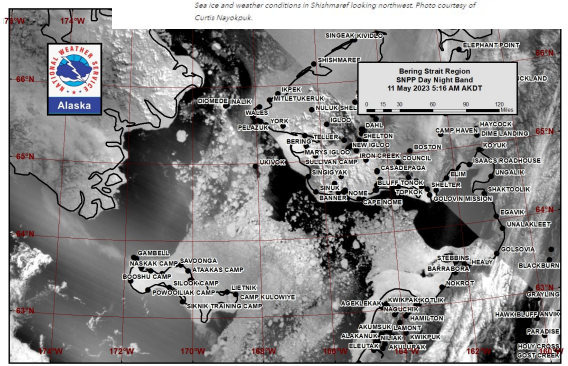
Fog again this a.m. No chance to go out on ice to take a look at location of lead north. Better post latest pictures (solid ice 2) for next Friday? Will be a week or two to go out as my snowmobile needs new rear shocks and planned multi public meetings next week (WX...permitting).

Friday, 12 May 2023 - Curtis Nayokpuk

Third heavy fog morning. Couple hunters went out late last night (almost 24 hr. light) when visibility improved to 3-5 mile viz. and white out overcast condition but returned due to rough ice. Forecast high southerly winds (gust to 40?) for weekend so new leads will open up close to shore. Hope ALL the ice don't take off to the North, some boats still frozen to the ground with cold freezing nights.

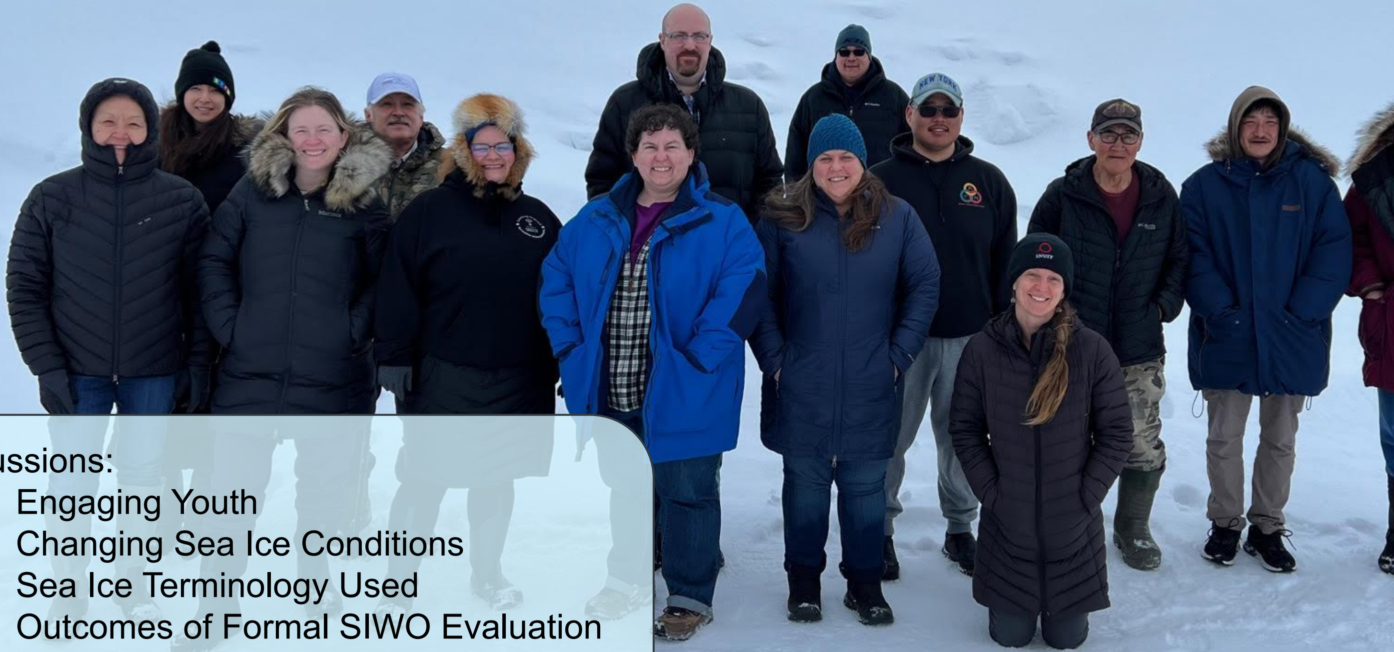
Sea ice and weather conditions in Shishmaref looking west. Photo courtesy of Curtis Nayokpuk.

Sea ice and weather conditions in Shishmaref looking northwest. Photo courtesy of Curtis Nayokpuk.



- Partnership among Arctic Research Consortium of the US (ARCUS), Eskimo Walrus Commission, National Weather Service (NWS), the University of Alaska Fairbanks (UAF), and local observers.
- NWS forecast office in Fairbanks, AK provides wind and temperature forecasts
- ASIP provides description of current sea ice conditions, sea ice forecast, and satellite graphics
- Observers provide weekly sea ice observations via text and photos
- UAF provides a “State of the Ice” report before the start of the season.

SIWO Meeting in Nome, Alaska



Discussions:

- Engaging Youth
- Changing Sea Ice Conditions
- Sea Ice Terminology Used
- Outcomes of Formal SIWO Evaluation
- SIKU App Demonstration
- Ideas/Recommendations for Future
- Interpreting Satellite Imagery

SEA ICE FOR WALRUS OUTLOOK

ARCUS

Eskimo Walrus Commission

PARTNERS WORKSHOP REPORT
25–26 MARCH 2023
NOME, ALASKA

INTRODUCTION

The Sea Ice for Walrus Outlook (SIWO; https://www.arcus.org/siwo) is a resource for Alaska Native subsistence hunters, coastal communities, and others interested in sea ice and walruses. The SIWO provides weekly reports during the spring sea-ice season with information on weather and sea-ice conditions relevant to walruses in the northern Bering Sea and southern Chukchi Sea regions of Alaska. Partners of the Sea Ice for Walrus Outlook program met for a two-day workshop hosted by the Arctic Research Consortium of the US (ARCUS; https://www.arcus.org) and the Eskimo Walrus Commission (https://www.eskimowalruscommission.org), 25–26 March 2023 in Nome, Alaska to focus on relationship building, steering the future of the SIWO following an evaluation completed in early 2023, and capacity building for SIWO observers. The workshop was supported by the National Science Foundation's Arctic Sciences Section (Award #1928794).

Figure 1. Sea Ice for Walrus Outlook meeting participants. Left to right: Vera Metcalf, Sarah Rosengard, Kitty Sopow, Curtis Nayokpuk, Amy Hendricks, Mary-Beth Schreck, Ryan Metzger, Jill Prewitt, Robert Tokeinna, Jr., Marcus Barr, Lisa Sheffield Guy, Clarence Irrigoo, Jr., Marty Eeleengayouq Ozenna, and Rick Thoman. Not pictured: Gay Sheffield.

As the first in-person opportunity for SIWO partners and local observers to collectively meet and work toward building a stronger network, the goals of the meeting were to:

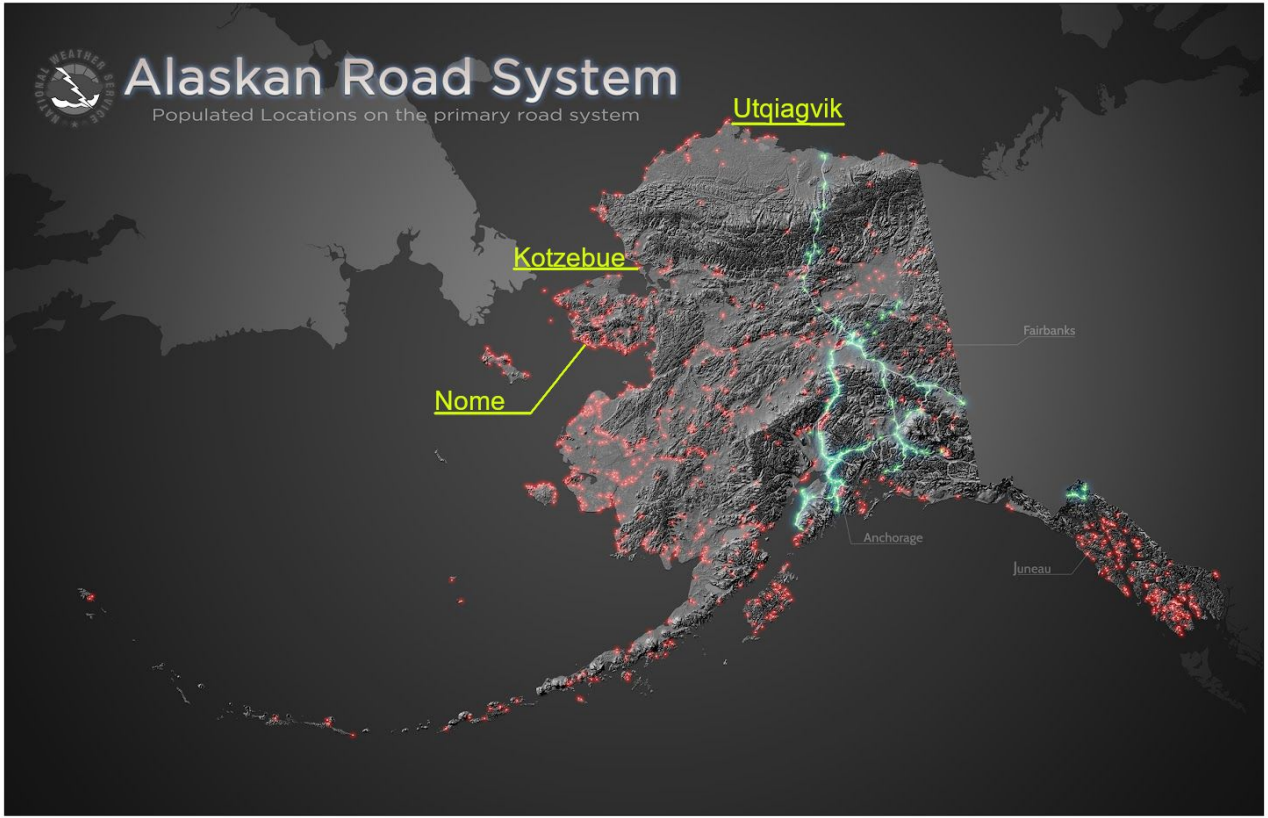
1. Create an opportunity for SIWO partners to meet and discuss the future of the program and give local observers from nearby communities a chance to meet one another and learn about new opportunities;
2. Co-develop ways to improve the program and prioritize recommendations from the SIWO evaluation; and
3. Discuss and identify teams to work on SIWO collaborations (presentations, papers, and other products).

The format was a two-day, round-table meeting focused on engaged conversations (as opposed to presentations) among fifteen participants (Fig. 1; participant list available in the online report appendix; https://www.arcus.org/siwo/2023-partner-workshop). This report captures the main discussion themes and meeting outcomes, organized by day, with additional appendix materials available online.

https://www.arcus.org/files/publication/34310/siwo2023report.pdf

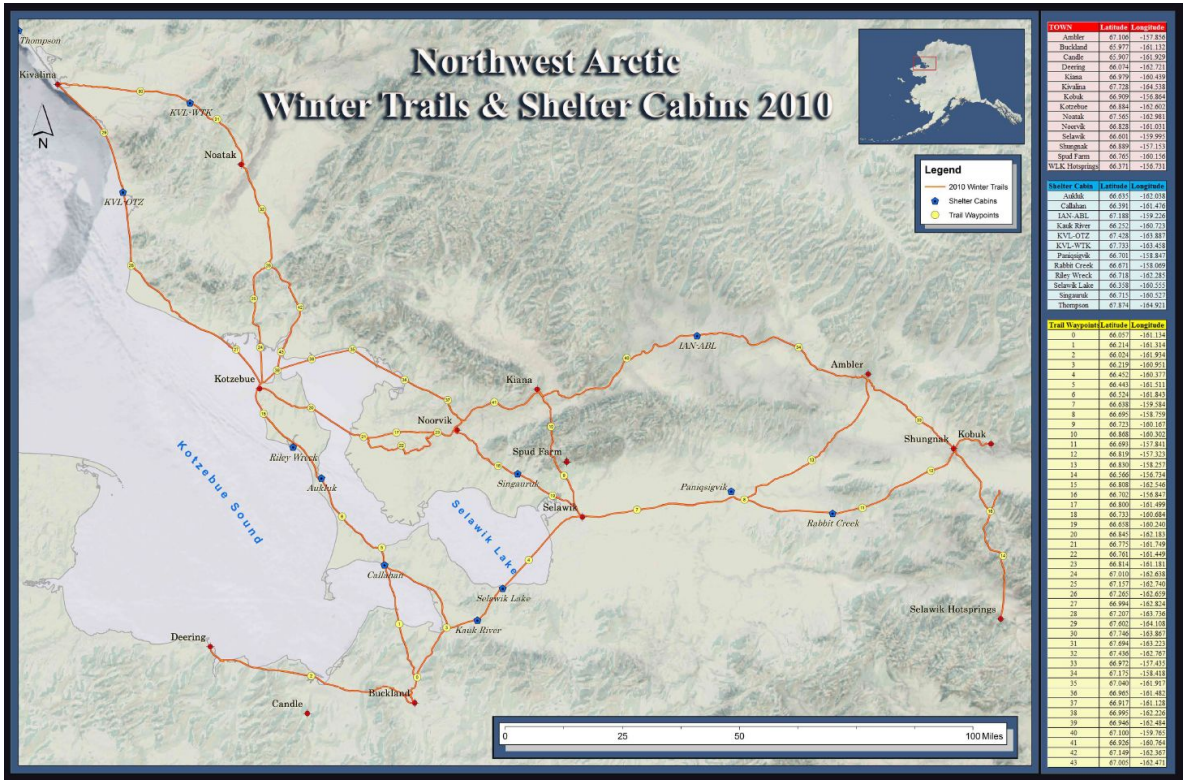
Community Needs - Sea Ice Information

- 1 year (hopefully 2 year) project looking at sea ice information needs in 3 communities, focused on longer lead prediction
- In collaboration with University of Alaska Fairbanks



Community Needs - Sea Ice Information

- Initial findings reveal specific sea ice hazards to each community, generally driven by wind and currents.
- Use of local place names is lowest hanging fruit for improved services.



Thank You!

ACF
Arctic Climate Forum

17:50 (45')	**Seasonal to Subseasonal Climate Support Presentation Session** 1. Meeting Forecast Service Needs in the Canadian North (15') 2. NWS Alaska Supporting Regional Subsistence Users (15') 3. Sea Ice for Walrus Outlook (SIWO) & Seasonal to Subseasonal Outreach Work in Alaska (15')	Session Chair: Stephen Baxter - NOAA 1. Jesse Wagar - ECCC 2. Brian Brettschneider - NOAA 3. Mary-Beth Schreck - NOAA - Alaska Sea Ice Program

Preview of Day 2 Agenda

TIME (UTC)	ITEM	DETAILS
16:00 (10')	**Day 1 Sum Up and Day 2 Intro**	Becki Heim - NOAA
16:10 (30')	**Arctic Summer 2023 Seasonal Summary:** • Atmospheric patterns • Temperature, precipitation, sea-ice, polar ocean and land hydrology based on observations and reanalysis data • Briefs for winter 2023-2024	Session Chair: Jelmer Jeuring - MET Norway Vasily Smolyanitsky - AARI
16:40 (15')	**Climate Conditions and Socio-Ecological Impacts at the (Sub)Seasonal Timescale:** • Summary of bioclimatic indexes in the Arctic for the past season • Forecast for the next season	Anastasiia Revina - AARI, Svetlana Emelina, Maria Tarasevich, Vasilisa Vorobyeva - Hydromet Centre
16:55 (15')	**Q&As on Seasonal Summary of Observations**	Moderator: Jelmer Jeuring - MET Norway

Preview of Day 2 Agenda

17:25 (25')	**Temperature, Precipitation, Sea Surface Temperature and Snow/Water Equivalent** • Validation of the outlook for summer 2023 • Outlook for winter 2023-2024 and model confidence	Session Chair: Andrew Palmer - ECCC Marko Markovic - ECCC
17:50 (25')	**Sea Ice Outlook for Winter 2023-2024** • Validation of the summer 2023 outlook • Outlook for winter 2023-2024 and model confidence	Adrienne Tivy - ECCC
18:15 (15')	**Q&As on Validation and Confidence and Sea-Ice Outlooks**	Moderator: Andrew Palmer - ECCC
18:30 (20')	**ACF-12 User & Participant Discussion**	John Nangle & Stephen Baxter - NOAA
18:50 (5')	**Final Thoughts and Wrap-Up**	Becki Heim - NOAA