



Environment and  
Climate Change Canada

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# Seasonal Summary

North American Arctic Waters

Summer 2022

By the Canadian Ice Service



Canada 

## Summary over North American Arctic Waters

A later than normal freeze up during the 2021-2022 winter led to thinner than normal sea ice in many areas of the North American Arctic. This thinner ice then contributed, in part, to an earlier than normal ice melt over the majority of Hudson Bay and Hudson Strait and portions of the Alaskan and Labrador coasts.

The absence of the formation of an ice bridge in Nares Strait this past winter resulted in more ice (including more old ice) than usual over northern Baffin Bay for the majority of the summer months.

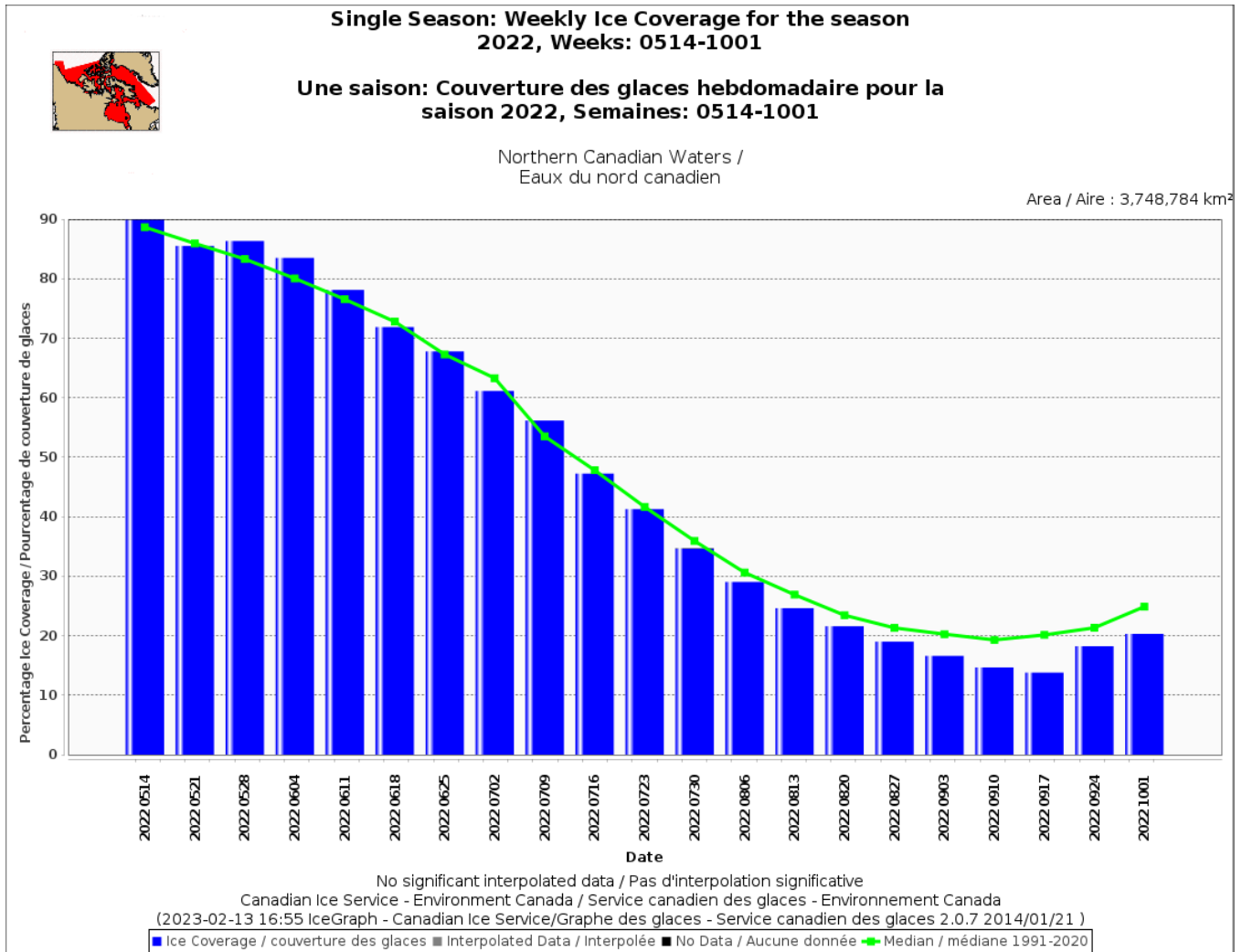
General ice melt along the central coast of Baffin Island and in extreme southern Baffin Bay and Davis Strait was around 2-3 weeks later than normal.

In the western Arctic, most notably the northern route of the Northwest Passage, the onset of ice melt was near normal but increased substantially in July and August. By mid-September, ice coverage in this area was the 4<sup>th</sup> lowest since 1968.

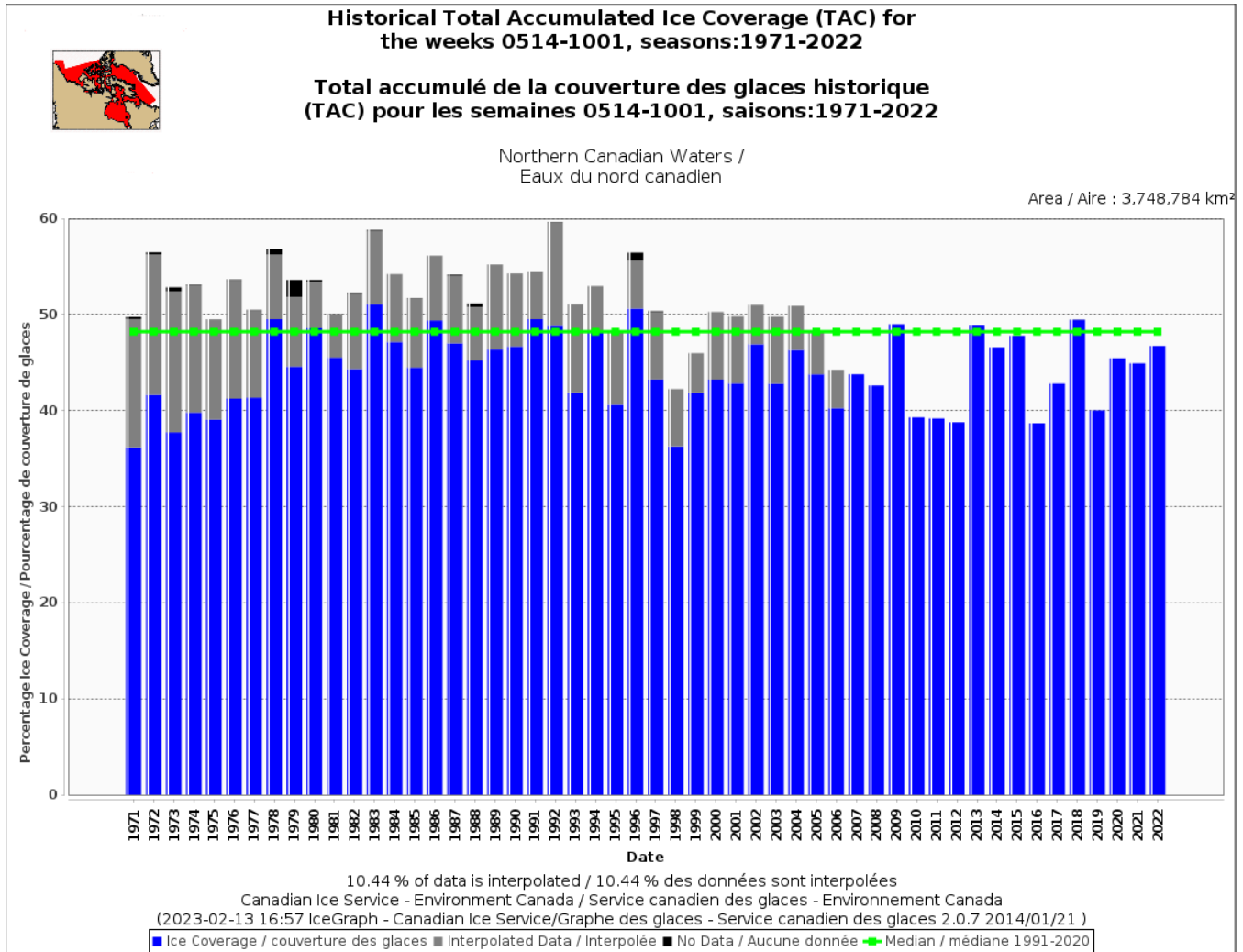
Sea ice in the southern Beaufort Sea, including old sea ice, was further south than normal for most of the summer. By summer's end, most eastern regions of the western Arctic had significantly less old ice than normal which contributed to the slower than normal freeze-up.

Freeze up was generally 2 weeks slower than normal over western portions of the eastern Arctic and around 1-2 weeks faster than normal over northern Baffin Bay including Pond and Navy Board Inlet. Freeze up was generally around 2 weeks slower than normal over eastern portions of the western Arctic.

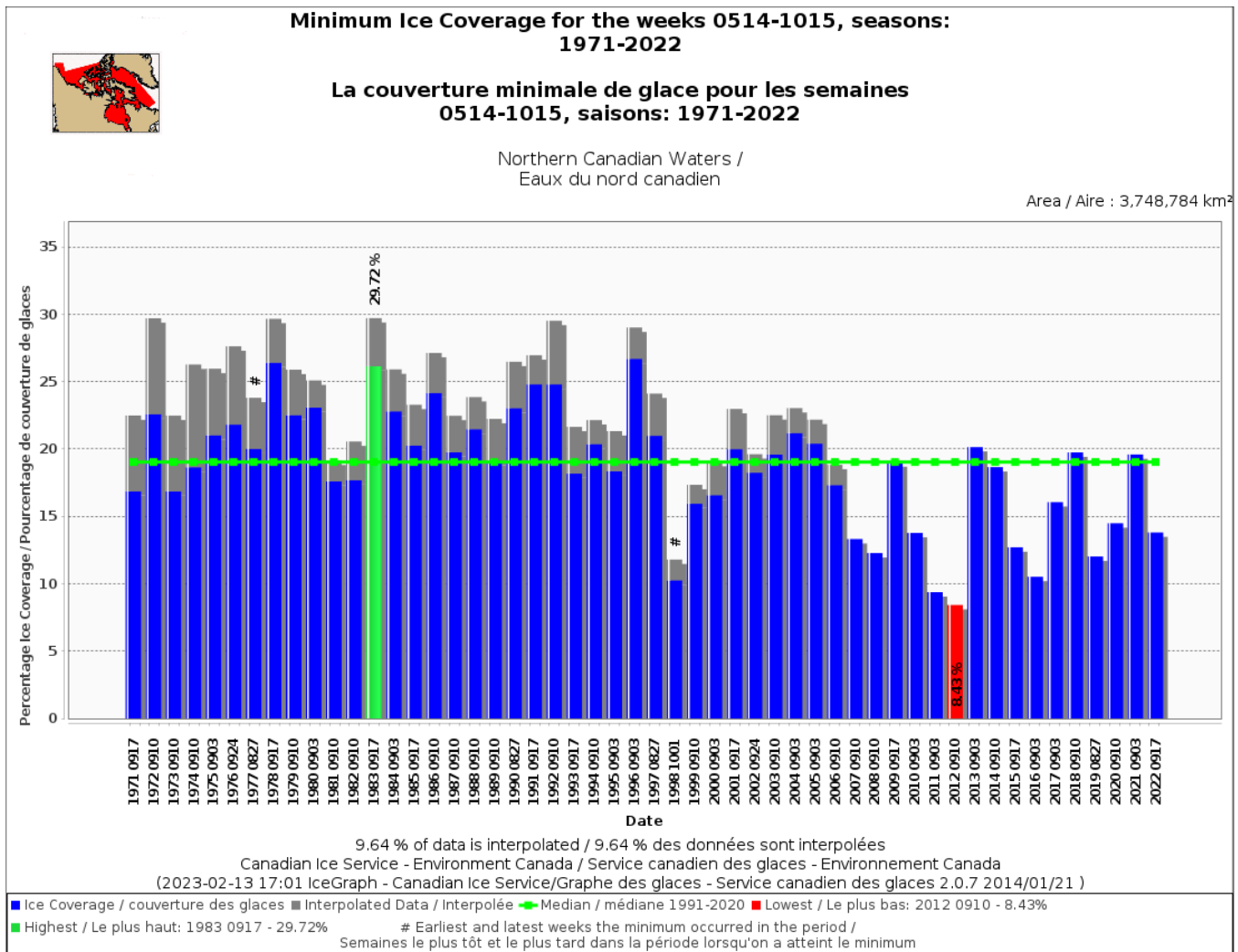
The transport of old ice from Nares Strait continued into the early fall resulting in more old ice than normal over northwestern Baffin Bay, Jones Sound, eastern Lancaster Sound and Pond and Navy Board Inlet.



**Figure 1 Weekly ice coverage for Northern Canadian waters – 2022 Season**



**Figure 2 Historical total accumulated ice coverage for Northern Canadian waters**



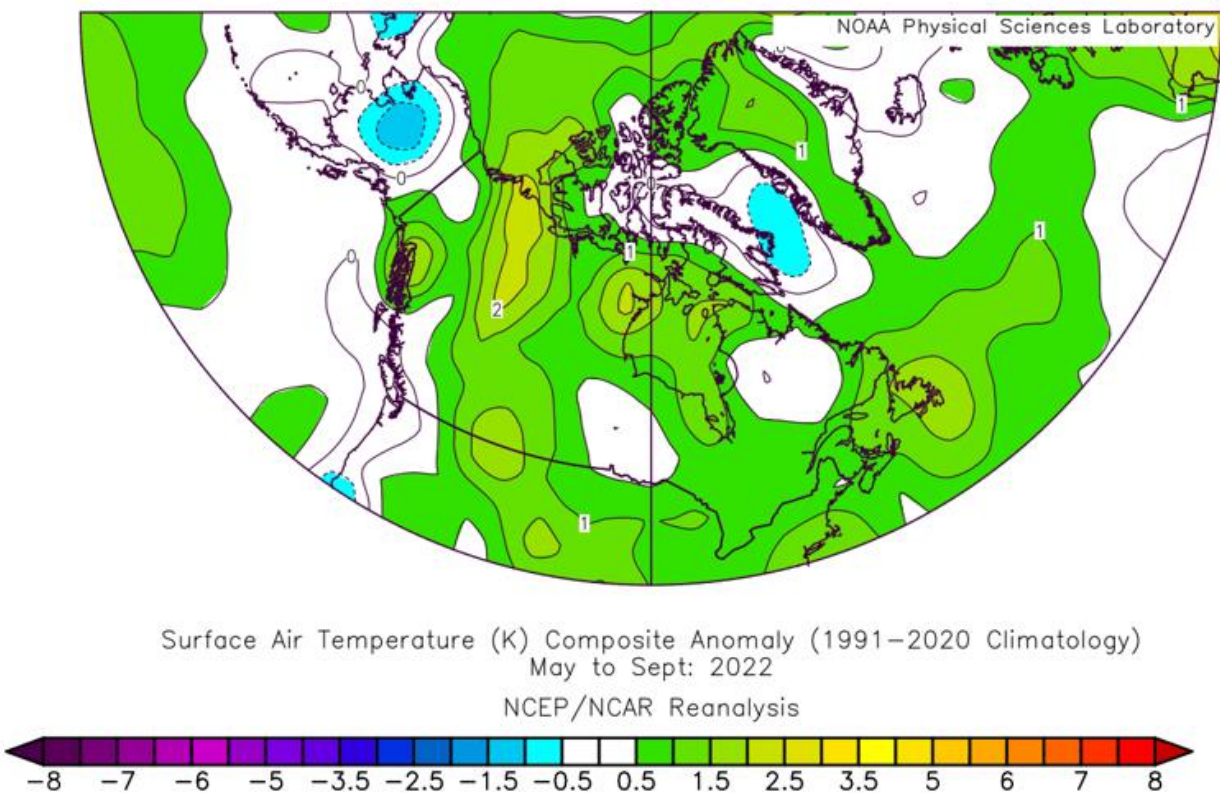
**Figure 3 Minimum ice coverage for Northern Canadian waters – 2022 Season**

The 2022 minimum ice coverage for northern Canadian waters was the 10<sup>th</sup> lowest since 1971 at 13.8%. The record lowest minimum ice coverage was in 2012 at 8.4%.

Since 2012, there has been only three years that the ice minimum has exceeded the median (19.0%).

- 2021 – 19.6%
- 2018 – 19.8%
- 2013 – 20.2%

From May 1<sup>st</sup> to September 30<sup>th</sup>, 2022, many areas in the North American Arctic saw a net weak positive temperature anomaly with a few notable exceptions, Baffin Bay and Davis Strait generally saw near to below normal temperatures throughout the summer months as well as several regions along the Alaskan coast and over the southern Chukchi Sea.



**Figure 4 Air temperature anomaly for the North American Arctic from May to September 2022**

# Hudson Bay and the Labrador Coast

## Summer Ice Conditions and Fall Freeze-up

### Summer Temperatures: June to September

Surface air temperatures were near to below normal over Davis Strait, eastern Hudson Strait, Ungava Bay and the northern Labrador Coast and above normal over Hudson Bay and most of Foxe Basin.

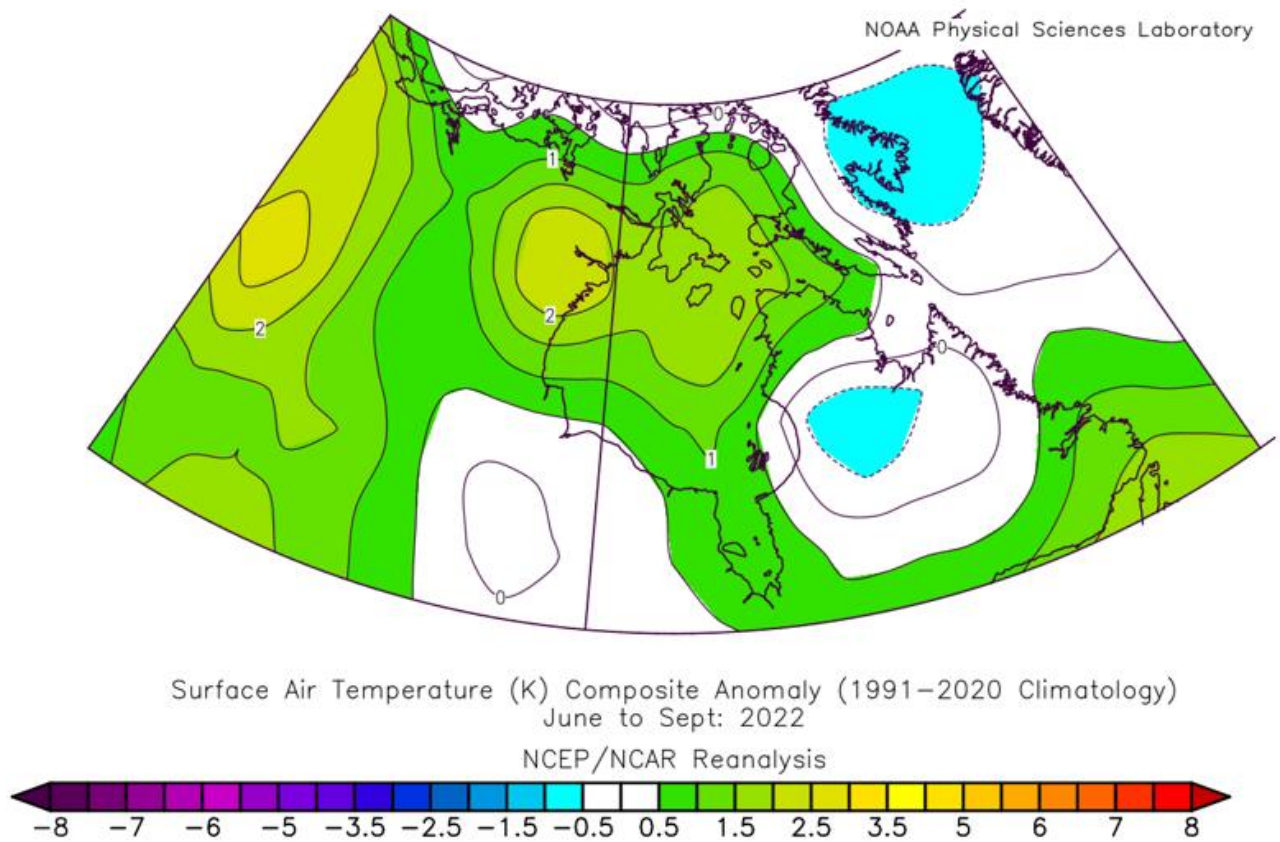


Figure 5 Air temperature anomaly from June to September 2022

## Summary of Ice Conditions

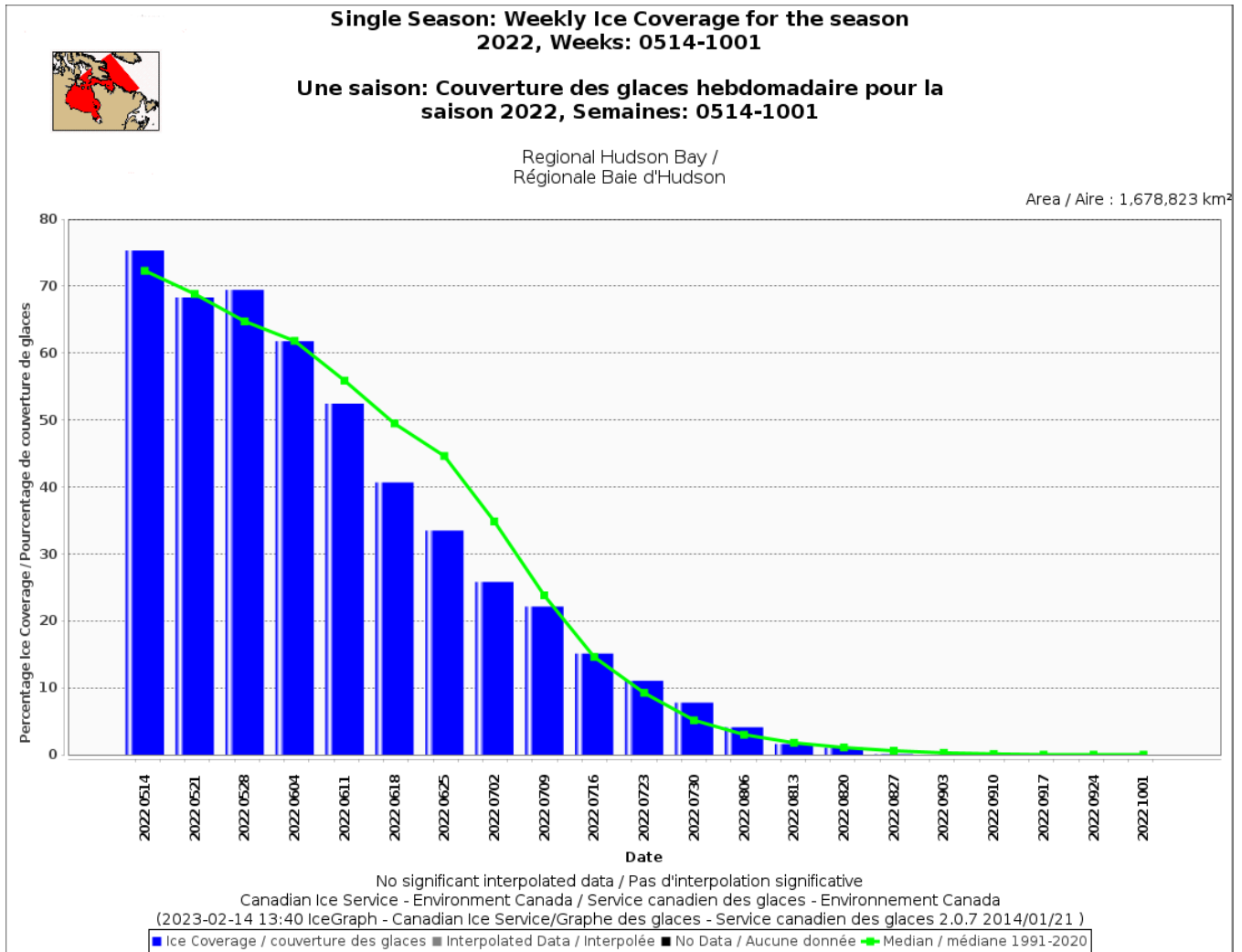
At the beginning of June, unusually low ice concentrations were present in northern Hudson Bay. Ice melt across most of Hudson Bay was around 2-3 weeks earlier than normal throughout the summer except for the southwestern coast, which had above normal ice concentrations for most of the summer. Ice melt in this area was around 2 weeks slower than normal. The rapid ice melt over most of Hudson Bay was due to a combination of thinner than normal ice, milder than normal temperatures and persistent offshore easterly winds. The lingering ice along the southwestern coast was due to persistent onshore northerly winds in combination with below normal temperatures in June, which acted to compact the ice along the coast. By mid-August, the ice in this area finally melted due to warmer temperatures and a shift in the wind pattern.

However, other than for the southwestern coast, most of Hudson Strait had unusually low ice concentrations and ice melt was generally 2 weeks earlier than normal. An exception to this was in the northeastern section, where ice melt was slower than normal by around 1-2 weeks. The early melt was attributed to thinner than normal ice as well as above normal temperatures over most of Hudson Strait. The northeastern section, however, had below normal temperatures encroaching from Davis Strait and later than normal ice melt.

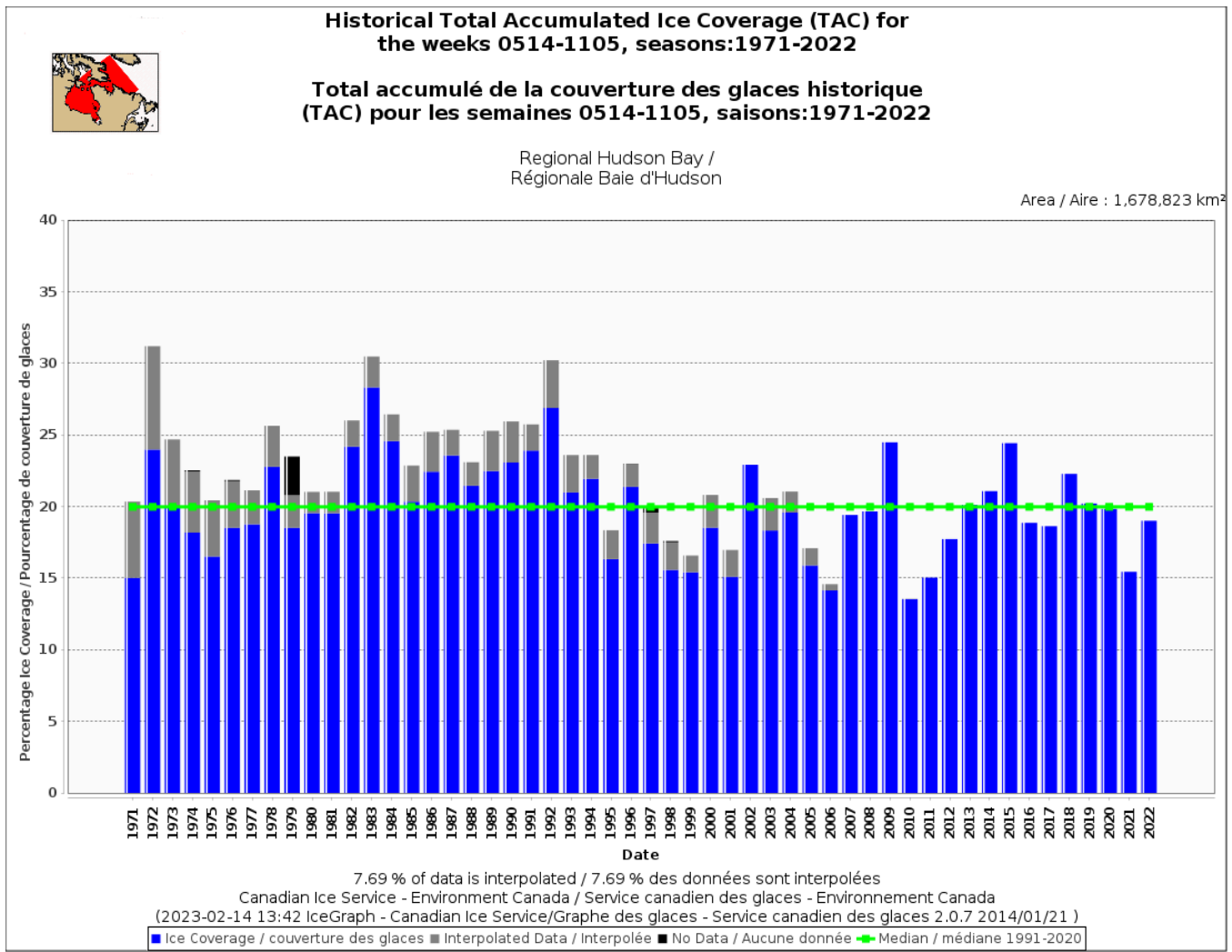
In the Labrador Sea, the ice edge was further east than normal in the southeastern section due to a combination of westerly winds pushing the ice eastwards and colder sea surface temperatures allowing for broader ice formation. Temperature anomalies varied throughout the summer in this region and general ice melt along the Labrador coast started around 1 week earlier than normal.

Davis Strait also had higher than normal ice concentrations in the southeastern section due to predominant northwesterly winds and below normal sea surface temperatures. Ice melt for the early part of the summer was close to normal but by mid-July, there was significantly more ice than normal in western Davis Strait and Cumberland Sound. This was mainly due to below normal temperatures and the continued transport of ice from Baffin Bay into Cumberland Sound. Complete ice melt did not occur until late August for both of these areas, about 2-3 weeks later than normal.





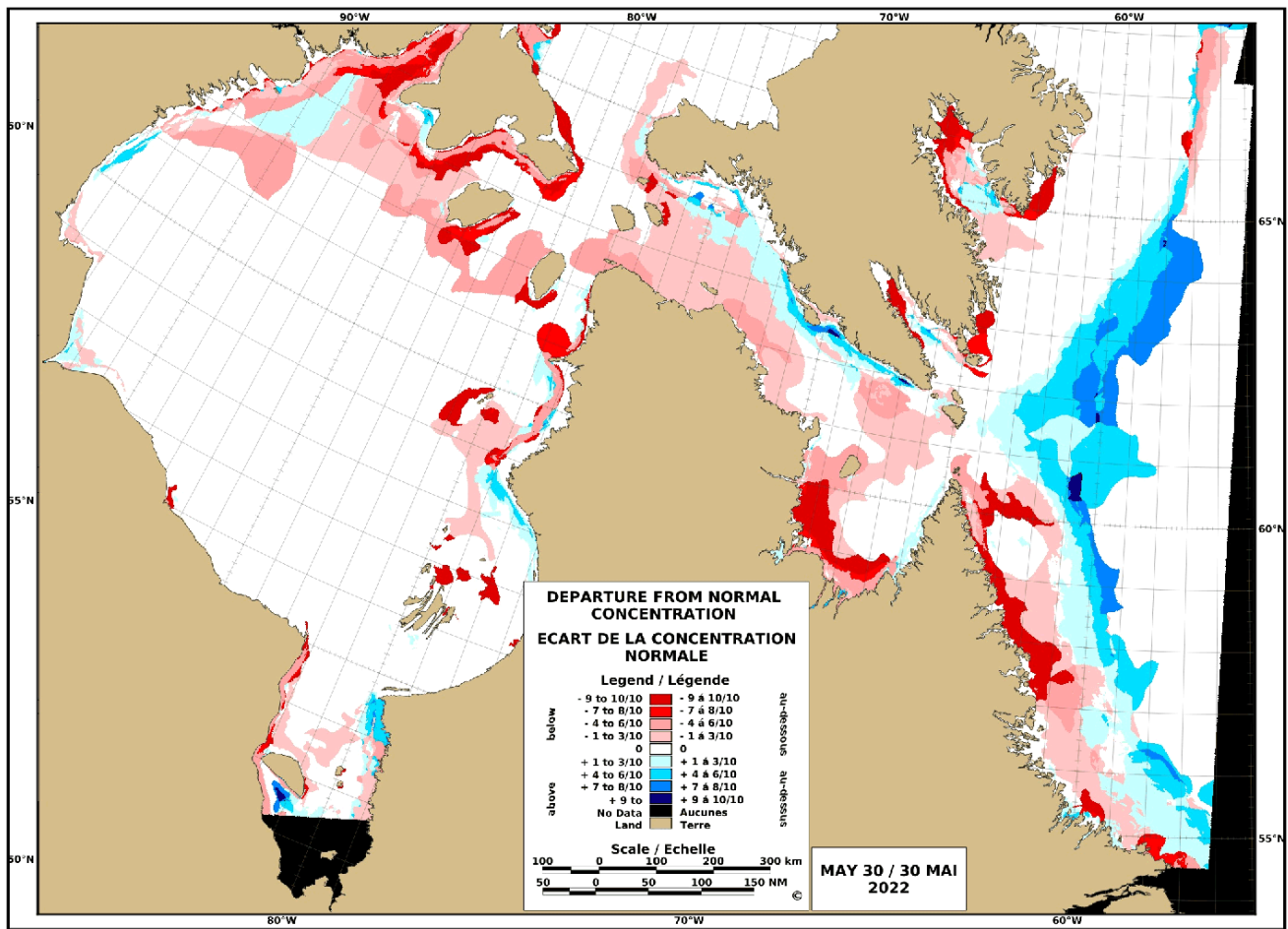
**Figure 6 Weekly ice coverage for the Hudson Bay area – 2022 Season**



**Figure 7 Historical total accumulated ice coverage for the Hudson Bay area**

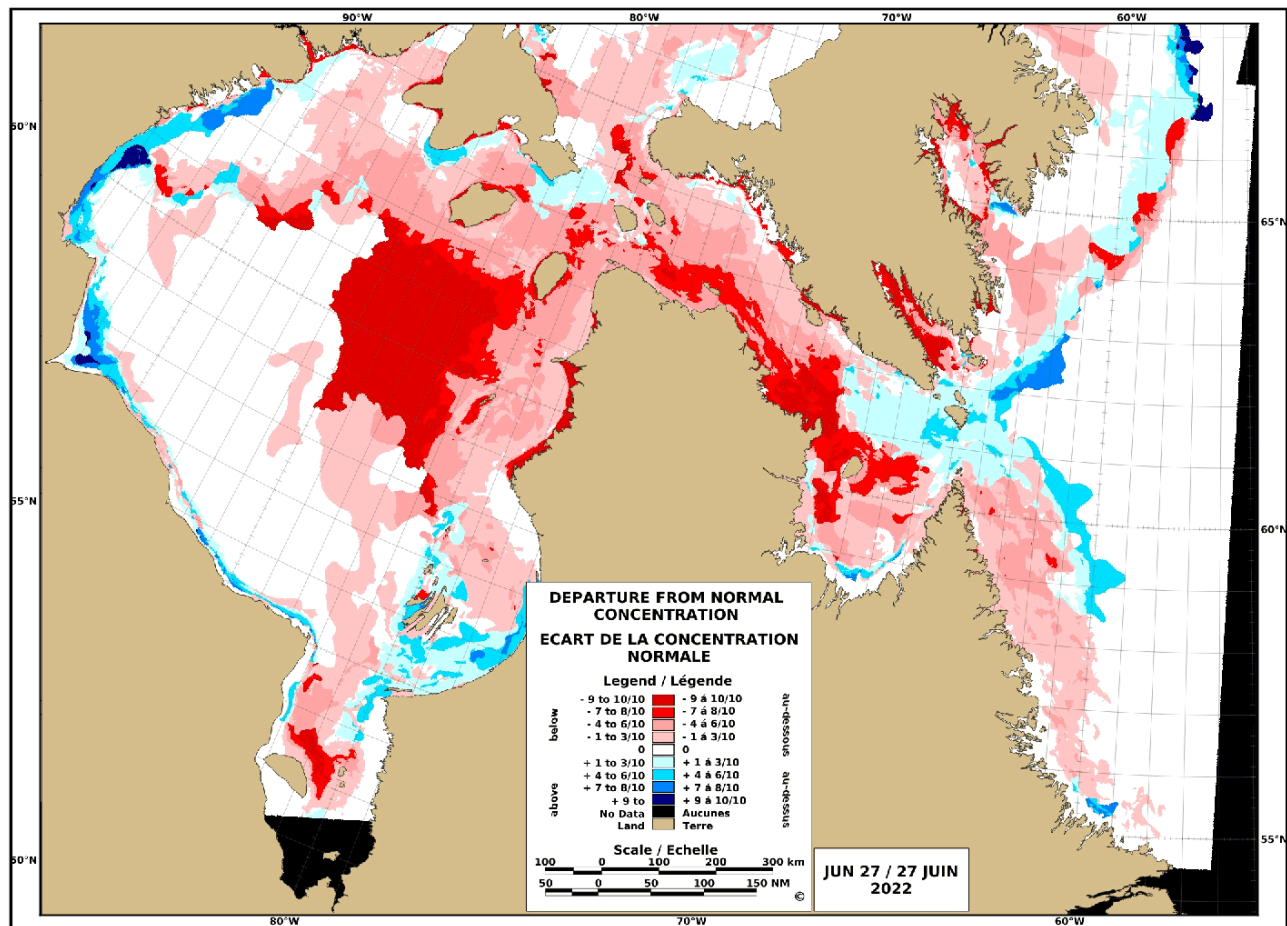
# June Ice Conditions

HUDSON BAY / BAIE D'HUDSON



STATISTICS BASED UPON 1981-2010 (INTERPOLATED BETWEEN 15-MAY AND 11-JUN)  
 LES STATISTIQUES BASÉES SUR 1981-2010 (INTERPOLÉES ENTRE LE 15-MAI ET LE 11-JUIN)

Figure 8 Departure from normal ice concentrations for the Hudson Bay area – end of May 2022



STATISTICS BASED UPON 1981-2010  
LES STATISTIQUES BASÉES SUR 1981-2010

**Figure 9 Departure from normal ice concentrations for the Hudson Bay area – end of June 2022**

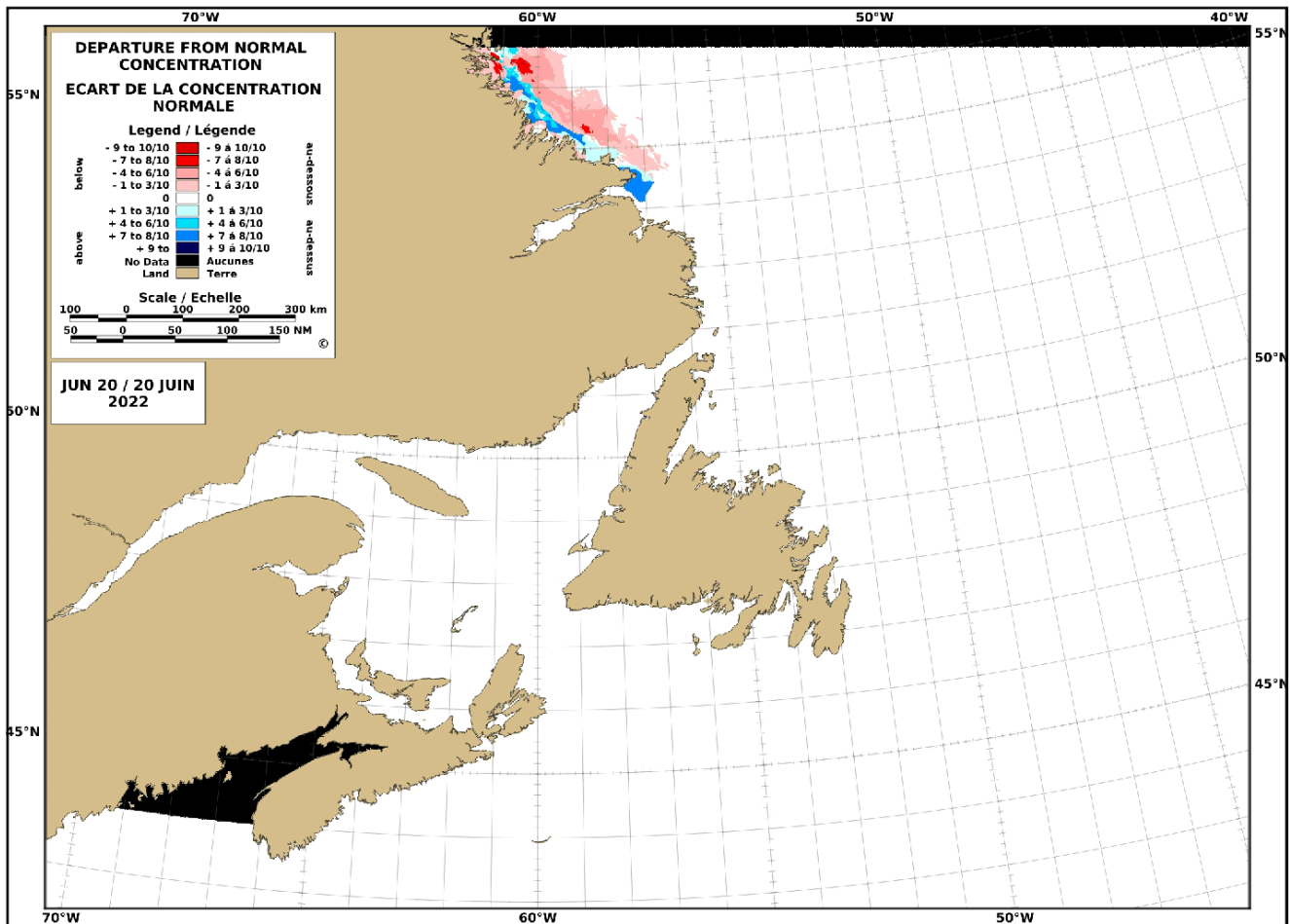
In early June, within 120 nautical miles (nm) of the Labrador coast, close pack medium and thick first-year ice (including a trace of old ice) was present as well as medium first-year fast ice along the coast. The pack ice was generally less extensive and about 30-60 nm further east than the climate normal. However, during the first week of June, the Labrador coast experienced prolonged onshore winds, which both eroded and compacted the ice along the coast. The fast ice began to fracture during the beginning of June and was completely broken and/or melted by the middle of the month. The ice in Lake Melville melted fully by the end of the first week of June.

Patches of close and very close pack medium and thick first-year ice (including a trace of old ice) remained along the coast until around the third week of June. Only bergy water was present further offshore. For the duration of the month, open to very open drift first-year ice conditions (including a trace of old ice) were present north of 57°N and within around 60 to 120 nm of the coast. Ice concentrations remained less than the climate normal throughout the month due to generally thinner than normal ice, strong winds and above normal temperatures.

The fast ice along the coasts of Frobisher Bay and Cumberland Sound continued to fracture in early June and completely melted by the very end of the month. Close to very close pack, medium and thick first-year ice was present in Frobisher Bay and Cumberland Sound at the beginning of June. By the middle of the month, the ice pack had melted leaving only bergy water and very open drift conditions, which remained for the duration of the month. The presence of bergy water and lower ice concentrations in both areas occurred 2-3 weeks earlier than the climate median. At the beginning of June, Davis Strait contained a mix of close to very close pack medium first-year ice (including a trace of old ice) in the central section, open to very open drift medium first-year ice in the eastern section and very close pack thick first-year ice (including a trace of old ice) in the western section. As mentioned previously, the ice pack was also further to the southeast than normal, where it remained until the middle of the month. The eastern section of the ice pack eroded throughout the month yielding bergy water by the end of the month. Close pack ice conditions remained in the western section. Ice melt for the month in this area was close to the climate median due to close to normal temperature and wind conditions.

Ice concentrations at the beginning of June over most of Hudson Strait were lower than the climate normal except along the coast of Baffin Island. Close pack medium first-year ice was present in the western section and a mix of very close pack medium and thick first-year ice (including a trace of old ice) was present in the eastern section. By mid-month, several areas of bergy water and open drift areas opened up in the western section. Close pack conditions were present in the eastern section. By the end of the month, most of the western section had bergy water to very open drift conditions. Ungava Bay had open drift conditions and the northeastern section had mostly close pack conditions. Most of Hudson Strait saw earlier than normal ice melt throughout the month of June due to thinner than normal ice and above normal temperatures. One notable exception to this was in the northeastern section where there was below normal temperatures and slower than normal ice melt by about 1-2 weeks (as noted previously).

The ice over most of Hudson Bay at the beginning of June consisted of a mix of very close pack medium and thick first-year ice with fast ice along most of the coasts. The ice in the northernmost section, around Southampton Island, started melting as early as the beginning of June. By mid-June, rapid ice melt continued for most of northern and eastern Hudson Bay as well as James Bay, yielding mainly open drift conditions in all three areas. Very close pack conditions remained in central and southwestern Hudson Bay. By the end of the month, open water to very open drift conditions were present over northwestern and northeastern Hudson Bay and very open drift conditions were present over James Bay, which was below the climate normal. Southwestern Hudson Bay had very close pack ice conditions except along the western, southern and southeastern coasts where there was above normal ice concentrations due to predominately northerly winds throughout the month.

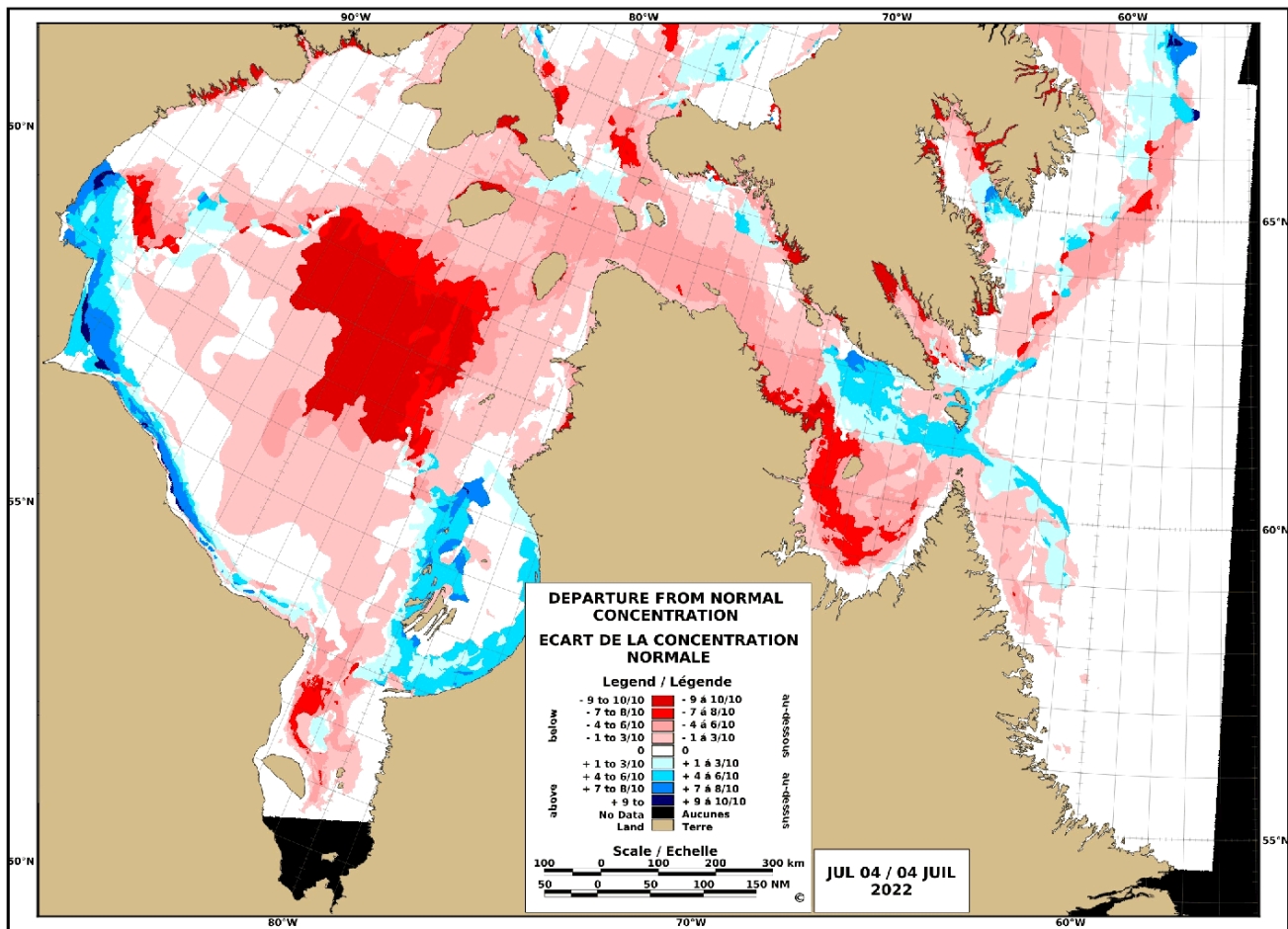


STATISTICS BASED UPON 1981-2010  
 LES STATISTIQUES BASÉES SUR 1981-2010

Figure 10 Departure from normal ice concentrations for the east coast – end of June 2022

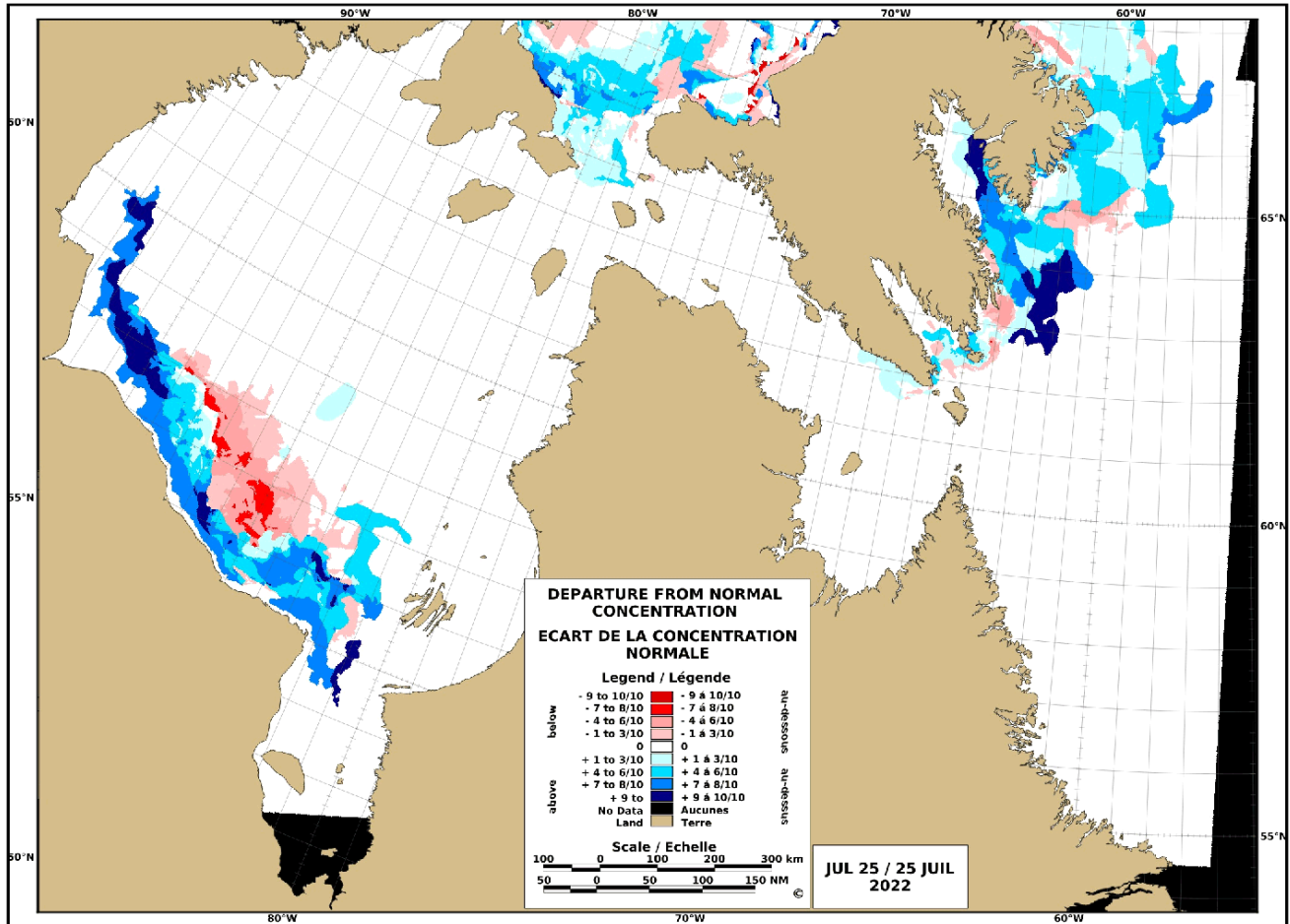
# July Ice Conditions

HUDSON BAY / BAIE D'HUDSON



STATISTICS BASED UPON 1981-2010  
 LES STATISTIQUES BASÉES SUR 1981-2010

Figure 11 Departure from normal ice concentrations for the Hudson Bay – beginning of July 2022



STATISTICS BASED UPON 1991-2020  
LES STATISTIQUES BASÉES SUR 1991-2020

**Figure 12 Departure from normal ice concentrations for the Hudson Bay area – end of July 2022**

For the early part of July, patches of very open drift thick first-year ice (including a trace of old ice) remained north of 58°N along the north Labrador coast. Complete sea ice melt along the entire Labrador coast occurred around July 11<sup>th</sup> 2022, which was near the climate normal.

Mostly bergy water was present in Frobisher Bay and Cumberland Sound except near the eastern entrances where there was close to very close pack thick first-year ice including up to 1 tenth old ice. Ice melt in both areas was faster than normal for the first half of July. However, for the second half of the month, open drift conditions remained near the entrance to Frobisher Bay and an increased transport very close pack ice conditions back into Cumberland Sound. Ice melt in both of these areas was slower than normal. Complete ice melt was achieved by the very end of the month for the entrance of Frobisher Bay but Cumberland Sound saw persistent areas of very close pack ice conditions until August.



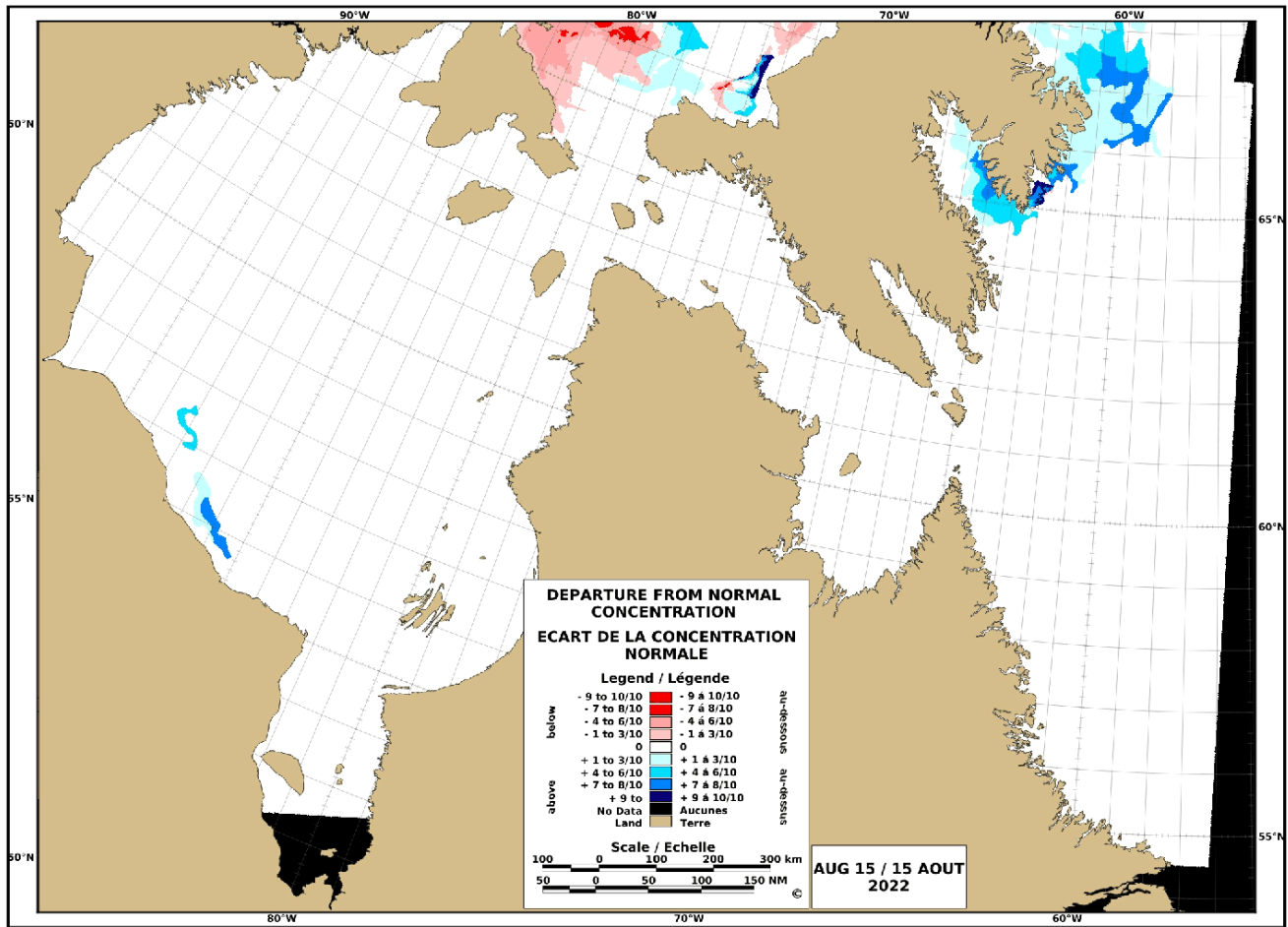
Ice melt in Davis Strait started to slow down throughout the month of July and was 4-5 weeks slower than normal. Close to very close pack ice conditions remained over western sections for most of the month. For both Davis Strait and Cumberland Sound, the ice persisted well later than normal due to below normal temperatures over the region.

In July, the same trend continued in Hudson Strait. Faster than normal ice melt continued over most areas except for the northeastern section which was under the influence of below normal temperatures which were occurring in the Davis Strait region. For the early part of July, most of Hudson Strait and Ungava Bay saw bergy water to very open drift ice conditions and open drift conditions in the northeastern section. By the end of the month, most of the region saw near normal bergy water ice conditions except for the remaining very open drift ice conditions over the extreme northeastern section.

For the first half of July, most of northern Hudson Bay continued to see faster than normal ice melt and predominately open water conditions. The ice conditions over southern Hudson Bay were a mix of close pack over the central section (less than normal) and very close pack ice conditions along the southern coasts (greater than normal). The areas of very close pack ice persisted throughout the second half of the month due to lower than normal temperatures over southern Hudson Bay and a shift in the wind regime.

# August Ice Conditions

HUDSON BAY / BAIE D'HUDSON



STATISTICS BASED UPON 1991-2020  
 LES STATISTIQUES BASÉES SUR 1991-2020

**Figure 13 Departure from normal ice concentrations for the Hudson Bay area – mid-August 2022**

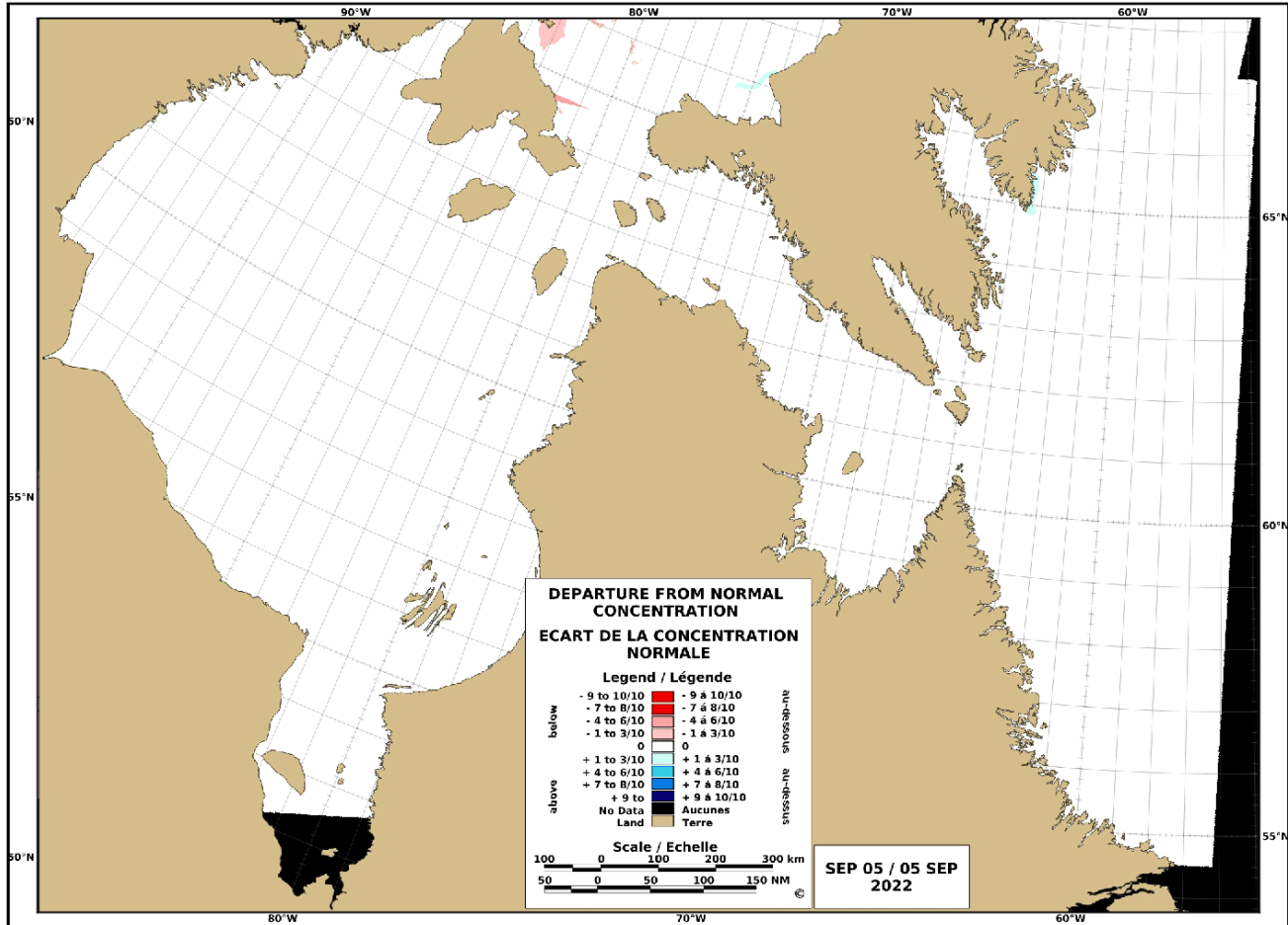
The Labrador coast, eastern Davis Strait, Frobisher Bay, Ungava Bay and Hudson Strait remained bergy water for the entire month of August.

Cumberland Sound continued to have more ice than normal. Close pack to open drift conditions were present for the first half of the month and very open drift to bergy water was present by the end of the month. Ice melt in this area was significantly later than normal by about 3-4 weeks. Close pack to open drift conditions remained in western Davis Strait for the early part of the month. For the second half of the month, southwestern Davis Strait finally transitioned to bergy water but a few patches of very open drift ice conditions remained along the coasts in the northwestern section at the end of the month.

Open drift to very open drift conditions also remained over southwestern Hudson Bay for the early part of the month and complete sea ice melt occurred near the third week of August, around 2-3 weeks later than normal. The rest of Hudson Bay and James Bay remained ice-free for the duration of the month of August.

### September Ice Conditions

HUDSON BAY / BAIE D'HUDSON



STATISTICS BASED UPON 1991-2020  
LES STATISTIQUES BASÉES SUR 1991-2020

**Figure 14 Departure from normal ice concentrations for the Hudson Bay area – early September 2022**

Bergy water to ice-free conditions prevailed for the month of September over Hudson Bay, Davis Strait and the Labrador coast. Exceptionally, a few patches of very open drift conditions were present along the Baffin Island coast, southwest of Cape Dyer during the first week of September.

# Eastern Arctic and Canadian Archipelago

## Summer Ice Conditions and Fall Freeze-up

### *Summer Temperatures: June to September*

From June to September, surface air temperatures were above normal over Kane Basin and Foxe Basin and generally near normal elsewhere.

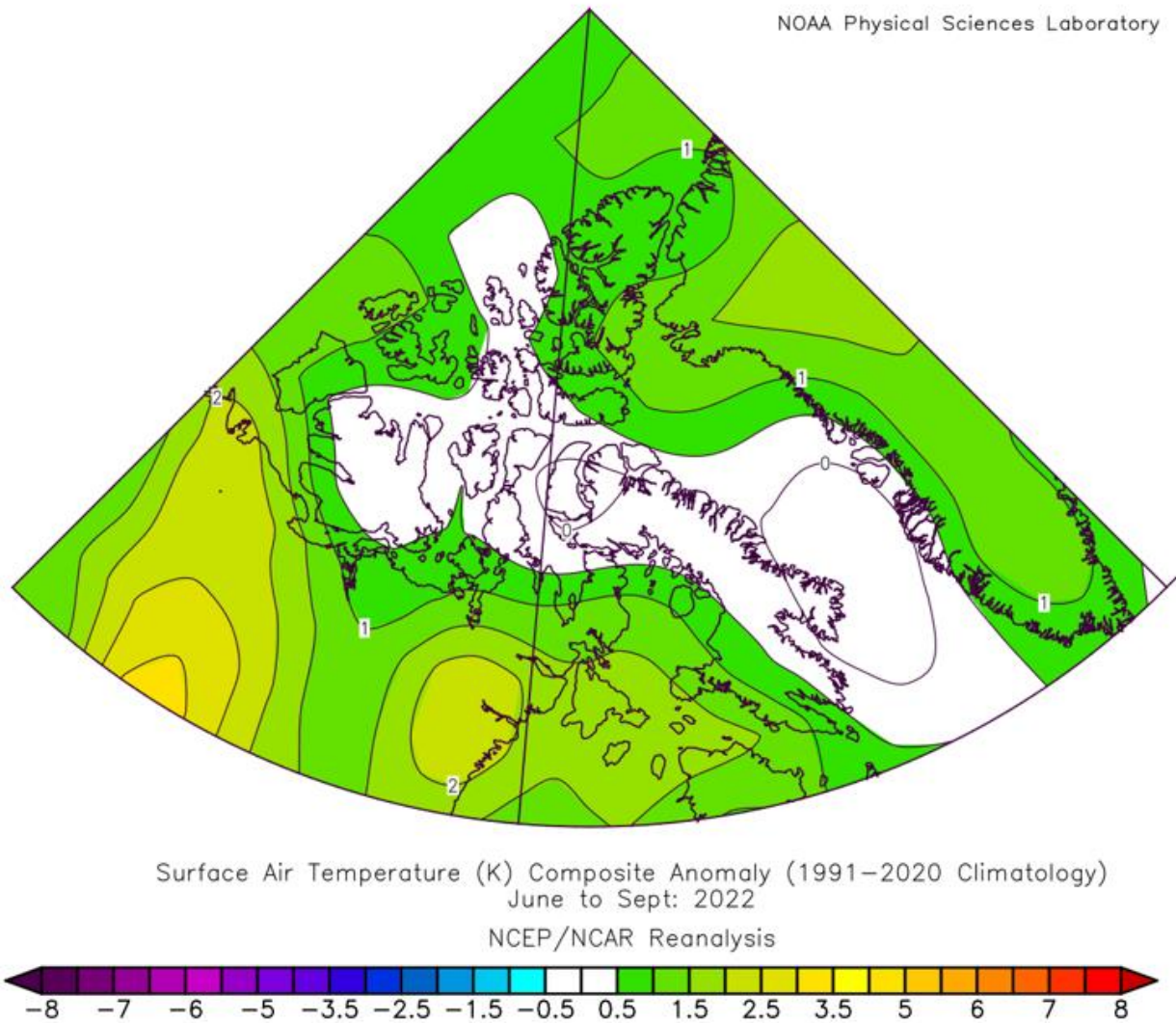
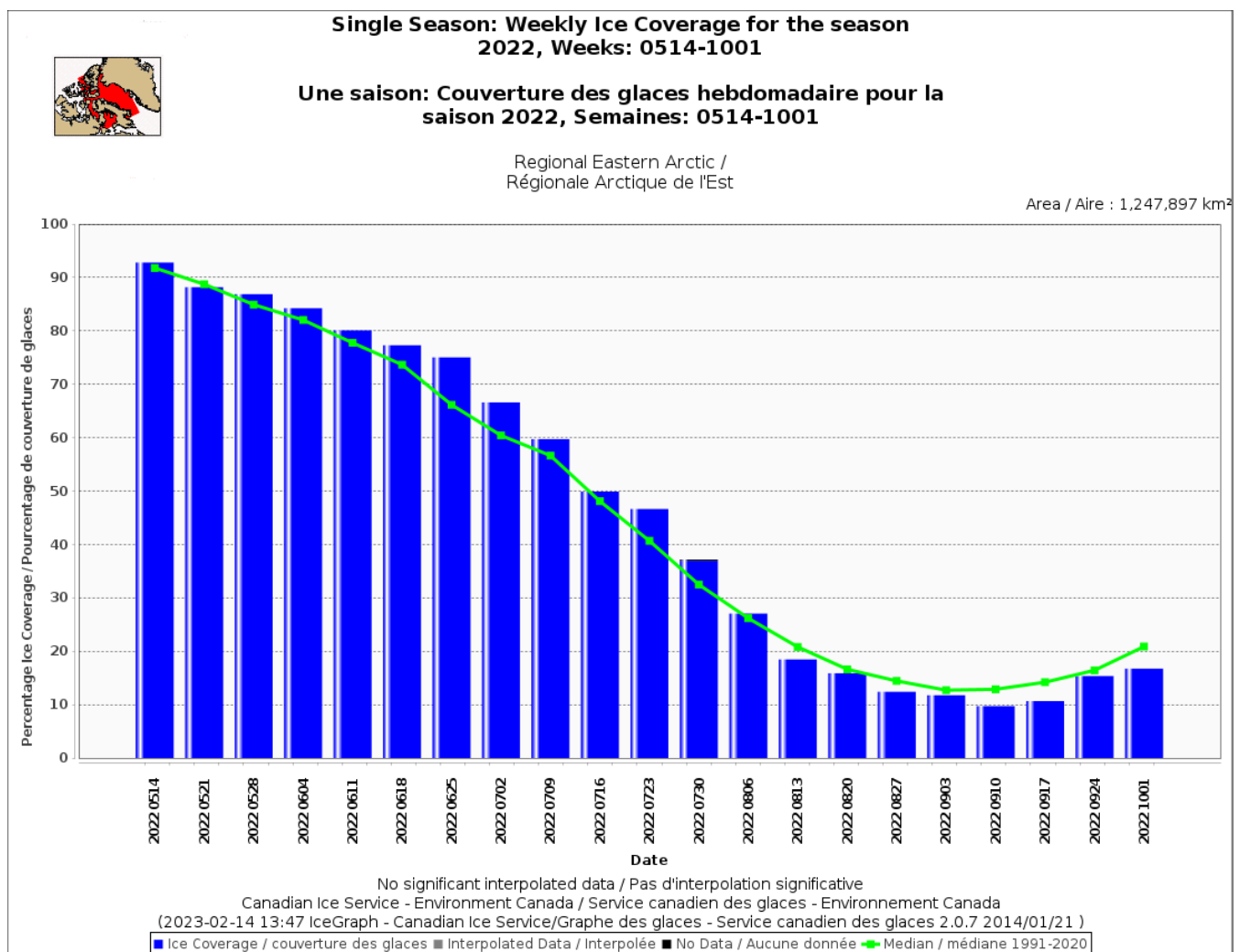


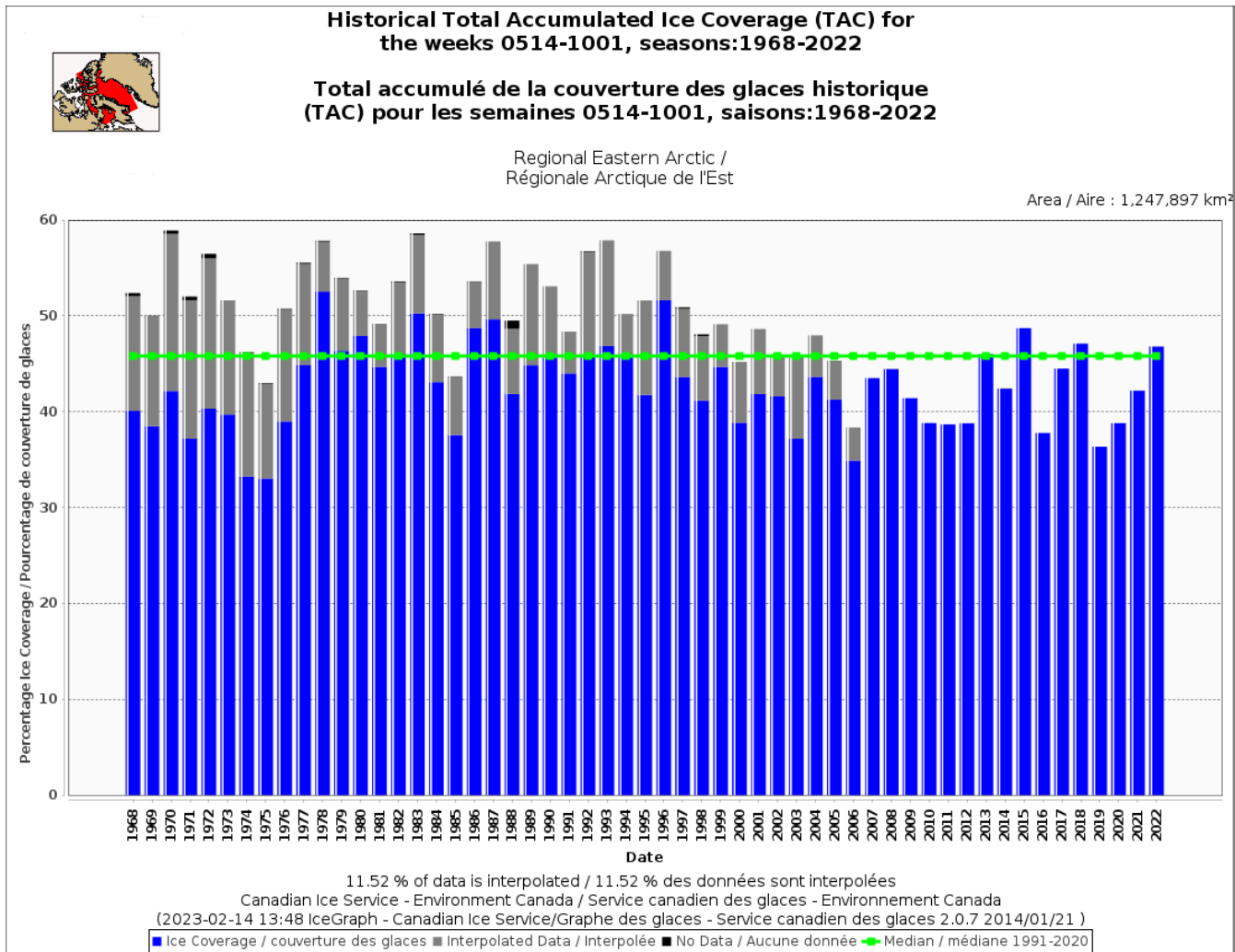
Figure 15 Air temperature anomaly for the Eastern Arctic area from June to September 2022

## Summary of Ice Conditions

Ice melt was slower than normal over many areas of the eastern Arctic. Greater than normal ice concentrations (including greater than normal old ice concentrations) were present in northern and western Baffin Bay and Lancaster Sound. Ice persisted longer than usual in these areas by about 2 weeks, due to the lack of an ice bridge in Nares Strait and because the fast ice in Lancaster Sound developed further east than normal. Ice melt was closer to normal over eastern Baffin Bay and earlier than normal over portions of Foxe Basin, Gulf of Boothia and Prince Regent Inlet. Overall, ice coverage was above the historical median until around mid-August and slightly below in September.



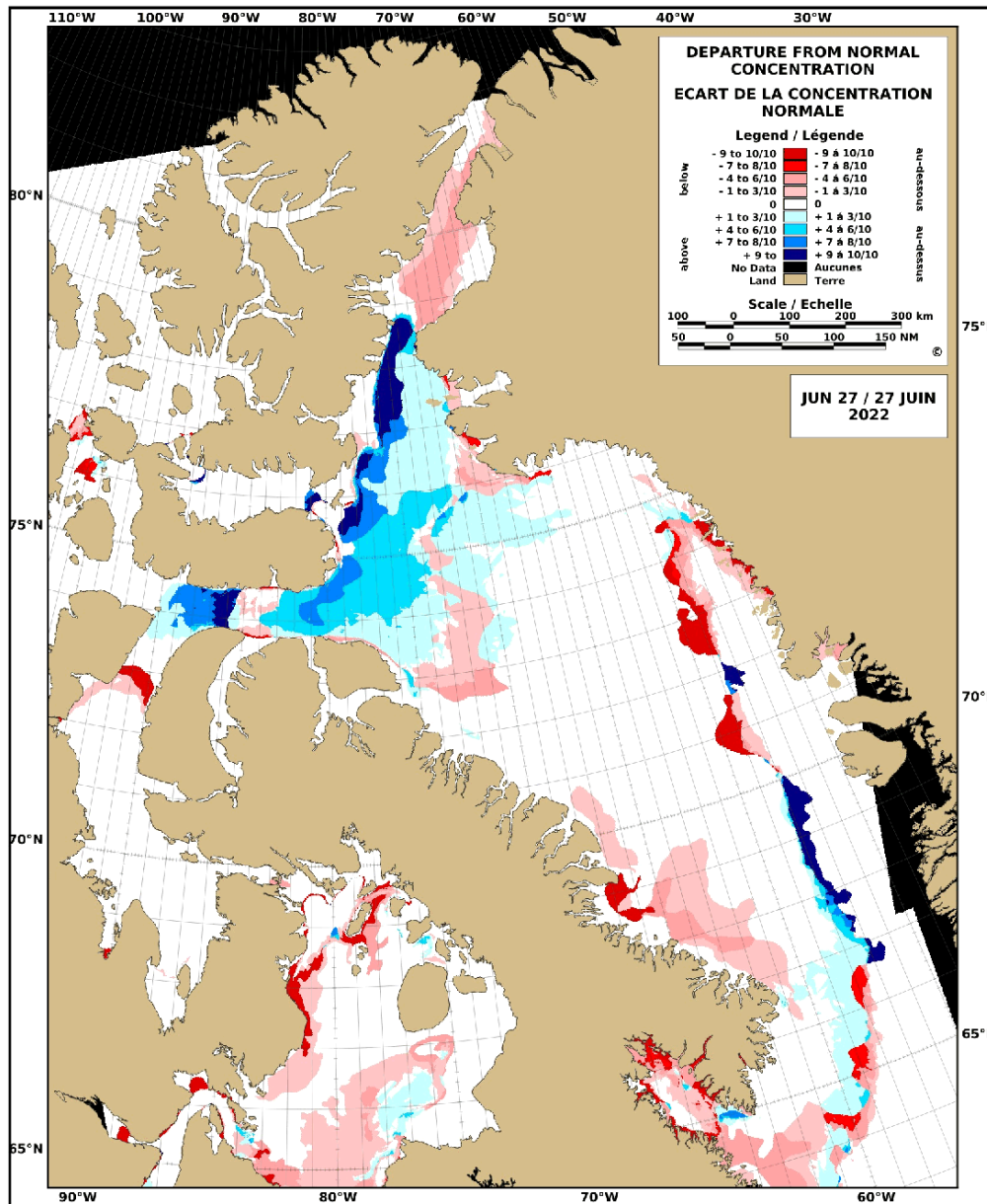
**Figure 16 Weekly ice coverage for the Eastern Arctic area – 2022 Season**



**Figure 17 Historical total accumulated ice coverage for the Eastern Arctic area**

# June Ice Conditions

EASTERN ARCTIC / ARCTIQUE DE L'EST



STATISTICS BASED UPON 1981-2010  
LES STATISTIQUES BASEES SUR 1981-2010

Figure 18 Departure from normal ice concentrations for the Eastern Arctic area – end of June 2022

At the beginning of June, close to very close pack thick first-year and old ice were present in northwestern Baffin Bay and fast first-year ice including a trace of old ice was present along the coast of Baffin Island. The lack of an ice bridge in Nares Strait led to a continuous transport of ice (including old ice) into the region and significantly greater than normal ice concentrations.

Some areas of Kane Basin had less ice than normal (including less old ice) because of this ice transport and displacement southwards into Baffin Bay. The rest of Baffin Bay had very close pack thick first-year ice including up to 5 tenths old ice. Overall, the area contained near normal ice concentrations and greater than normal old ice concentrations because of the input of old ice from Kane Basin throughout the past winter. Slower than normal ice melt continued throughout the month in northwestern Baffin Bay and Lancaster Sound (2-3 weeks slower than normal).

The leading edge of fast ice was further east than normal at the end of February 2022 in Lancaster Sound. This, along with lower than normal temperatures, caused a slower than normal fast ice break up and general ice melt. The ice conditions in western Lancaster Sound remained fast throughout the month with bergy water to open drift thick first-year and old ice in the eastern section.

Foxe Basin had open water to very open drift thick first-year ice in the northern section. Very close pack thick first-year ice conditions were present throughout the rest of the basin for the first half of the month, which was close to the climate normal. Towards the end of the month, Foxe Basin saw early ice melt in the southeastern section of the basin. By mid-month, close ice pack conditions were present in several areas in the northwestern and southeastern sections as the ice began to melt. Greater than normal old ice was present in eastern Committee Bay and Fury and Hecla Strait, which was left over from the previous summer and fall.

Fast ice remained in place throughout the month along the Baffin Island, Ellesmere Island and Greenland coasts.



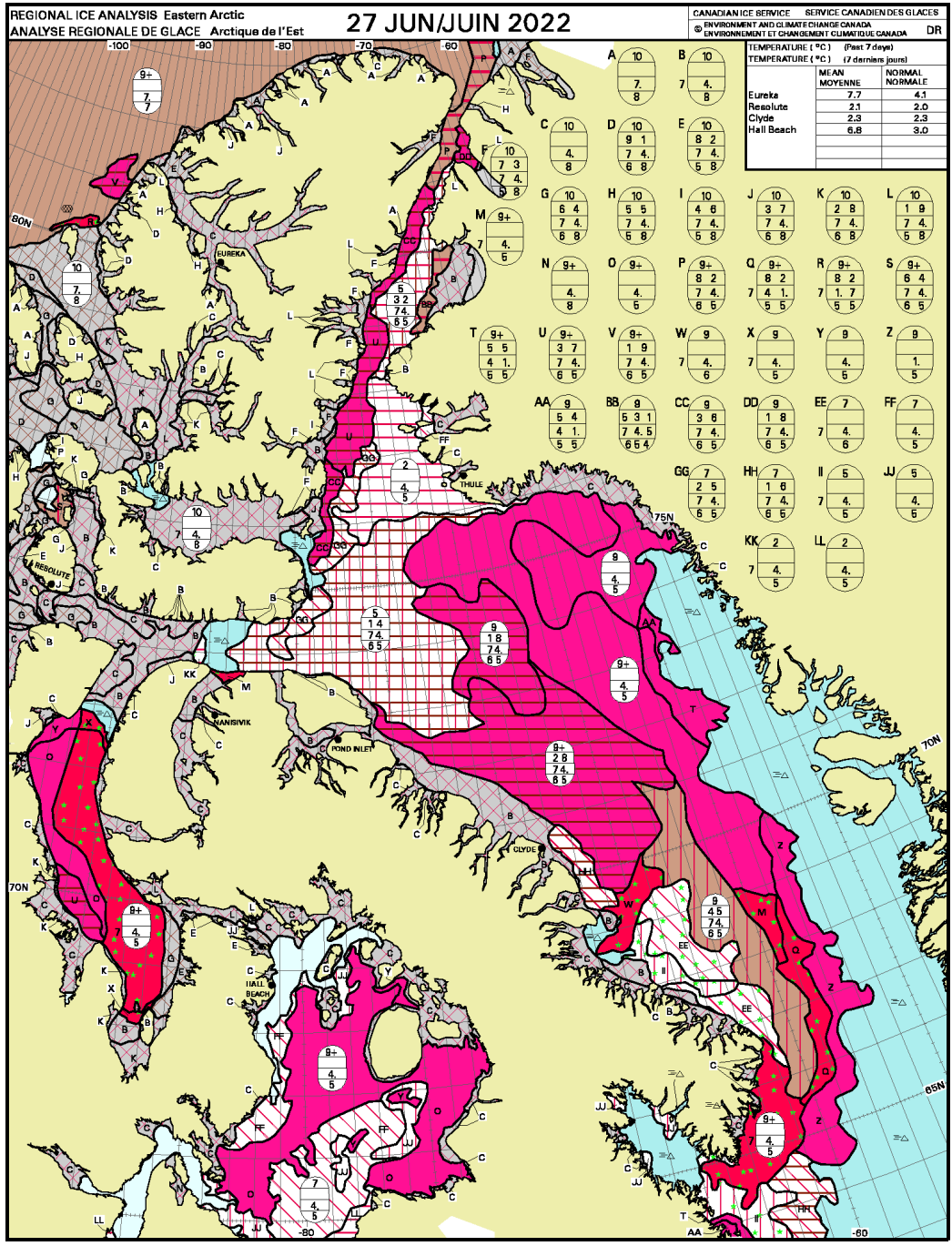
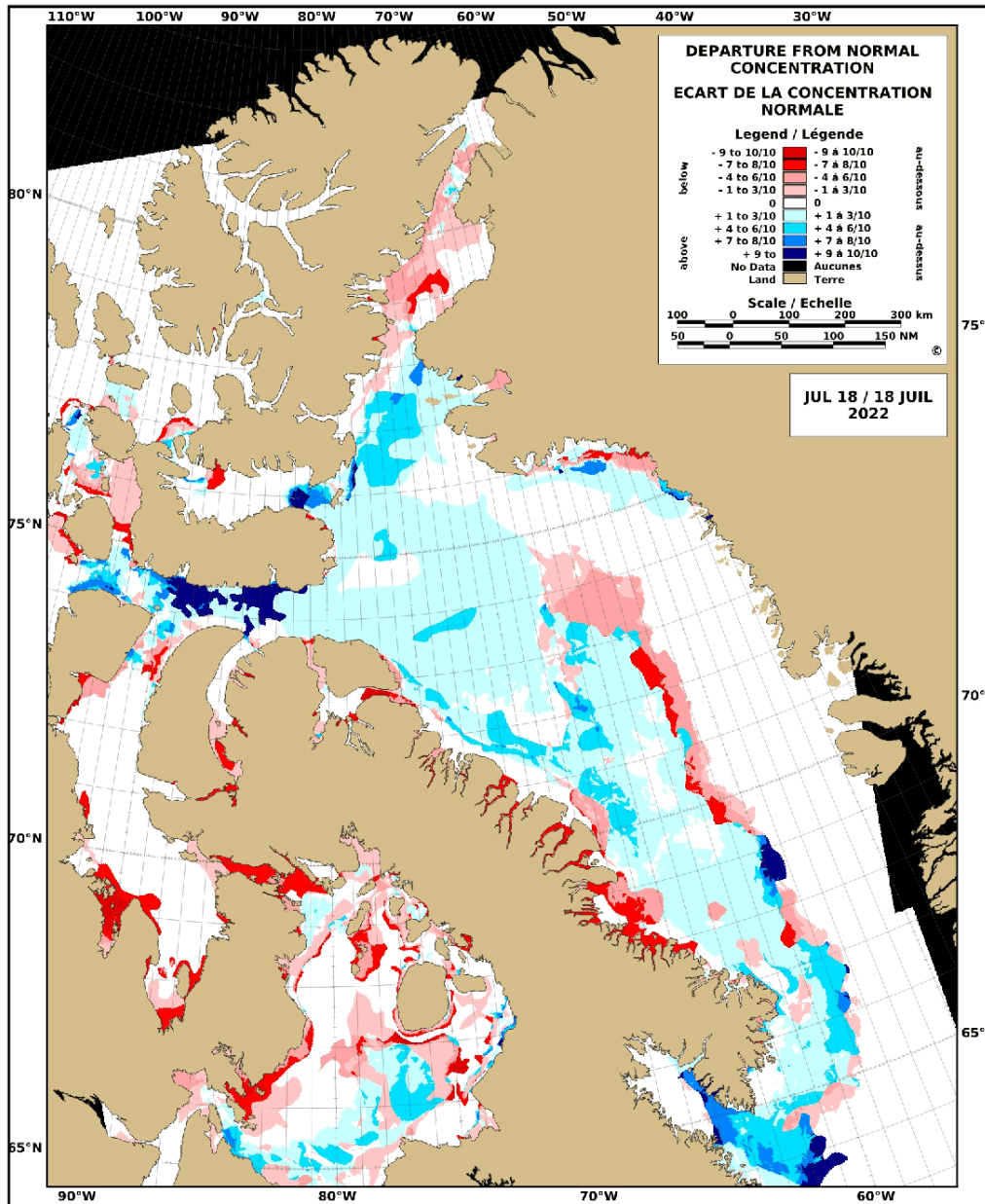


Figure 19 Eastern Regional ice chart for June 27<sup>th</sup>, 2022

# July Ice Conditions

EASTERN ARCTIC / ARCTIQUE DE L'EST



STATISTICS BASED UPON 1991-2020  
 LES STATISTIQUES BASÉES SUR 1991-2020

Figure 20 Departure from normal ice concentration for the Eastern Arctic area – end of July 2022

Later than normal ice melt continued in early July and was about 2-3 weeks later than normal over Lancaster Sound and northwestern Baffin Bay. Southern and eastern Baffin Bay saw a mixture of ice melt progression for the early part of July. Ice thicknesses over eastern Baffin Bay

were thinner than normal at the end of this past winter and as a result, ice melt in this area progressed faster than normal. By mid-month northern Baffin Bay continued to have more ice than normal with open drift to very open drift conditions. The fast ice had also fractured along most of the Baffin Island coasts and inlets. By the end of the month, northern and eastern Baffin Bay saw near normal ice melt as the ice diminished to bergy water and very open drift in northern and eastern Baffin Bay. Open drift conditions remained over extreme northwestern Baffin Bay as ice transport continued from Nares Strait. Southern Baffin Bay also saw persistent above normal open drift ice conditions due to below normal temperature anomalies in this area. All of the fast ice south of 76°N had fractured or melted out completely by month's end.

Slower than normal ice melt continued in Lancaster Sound for most of the month. The first half of the month saw close pack to very close pack ice conditions. It took until the very end of the month for the ice to diminish to bergy water and very open drift conditions, which was about 2 weeks later than normal.

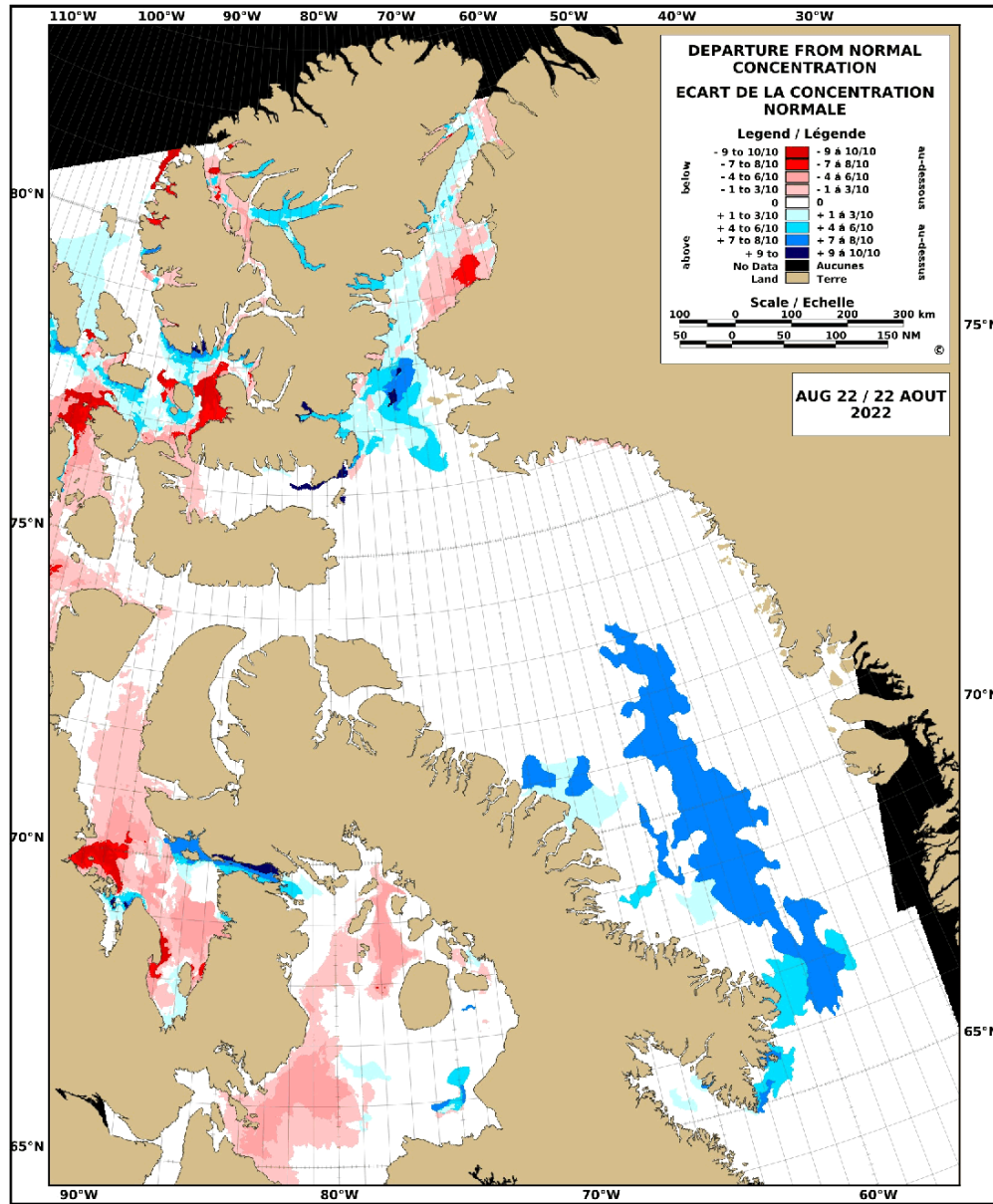
Close to very close pack ice conditions were present in Prince Regent Inlet and the Gulf of Boothia for the first half of the month, which was near the climate normal. For the second half of the month, ice melt progression increased due to above normal temperatures and a series of strong wind events. Open drift to close pack ice conditions were present over most of the area, which was about 1-2 weeks faster than normal.

Ice melt over Foxe Basin was generally faster than normal by about a week or so. Close pack to very close pack ice conditions were present over most of the basin for the first half of the month and open water to very open drift over the northwestern section. Fast ice remained along the coasts in the northern section. By month's end, all of the fast ice had fractured or melted and ice cover in the basin varied from open water to close pack ice conditions.

Ice conditions in the northern regions of the archipelago, in and around Ellesmere Island and Devon Island, were near normal with a mixture of fast and very close pack ice. One exception was in the eastern section of Jones Sound, which had open drift to close pack conditions, which was a higher than normal ice coverage.

# August Ice Conditions

EASTERN ARCTIC / ARCTIQUE DE L'EST



STATISTICS BASED UPON 1991-2020  
 LES STATISTIQUES BASÉES SUR 1991-2020

Figure 21 Departure from normal ice concentrations for the Eastern Arctic area – end of August 2022

Later than normal ice melt continued for southern Baffin Bay for most of August. Ice conditions diminished from close pack to open drift and bergy water by mid-month, about 3-4 weeks later than normal. Over extreme northwestern Baffin Bay, generally greater than normal ice coverage remained for the duration of the month. Even as the ice eroded as warmer temperatures moved over the region, there was a continuous southward transport of ice from Nares Strait. Ice conditions in the area alternated between open drift and bergy water conditions throughout the month. By the end of the month, the rest of Baffin Bay saw near normal bergy water conditions with a few patches of very open drift in the extreme south. The Kane Basin/Nares Strait area continued to have generally more ice than normal with very close pack conditions along the western coasts and very open drift to close pack conditions in the eastern section.

For the first half of August, Lancaster Sound had generally more ice than normal, mainly in the extreme western section. Ice conditions in the western section diminished from close pack to very open drift by the middle of the month and to bergy water by the third week of August, about 2 weeks later than normal.

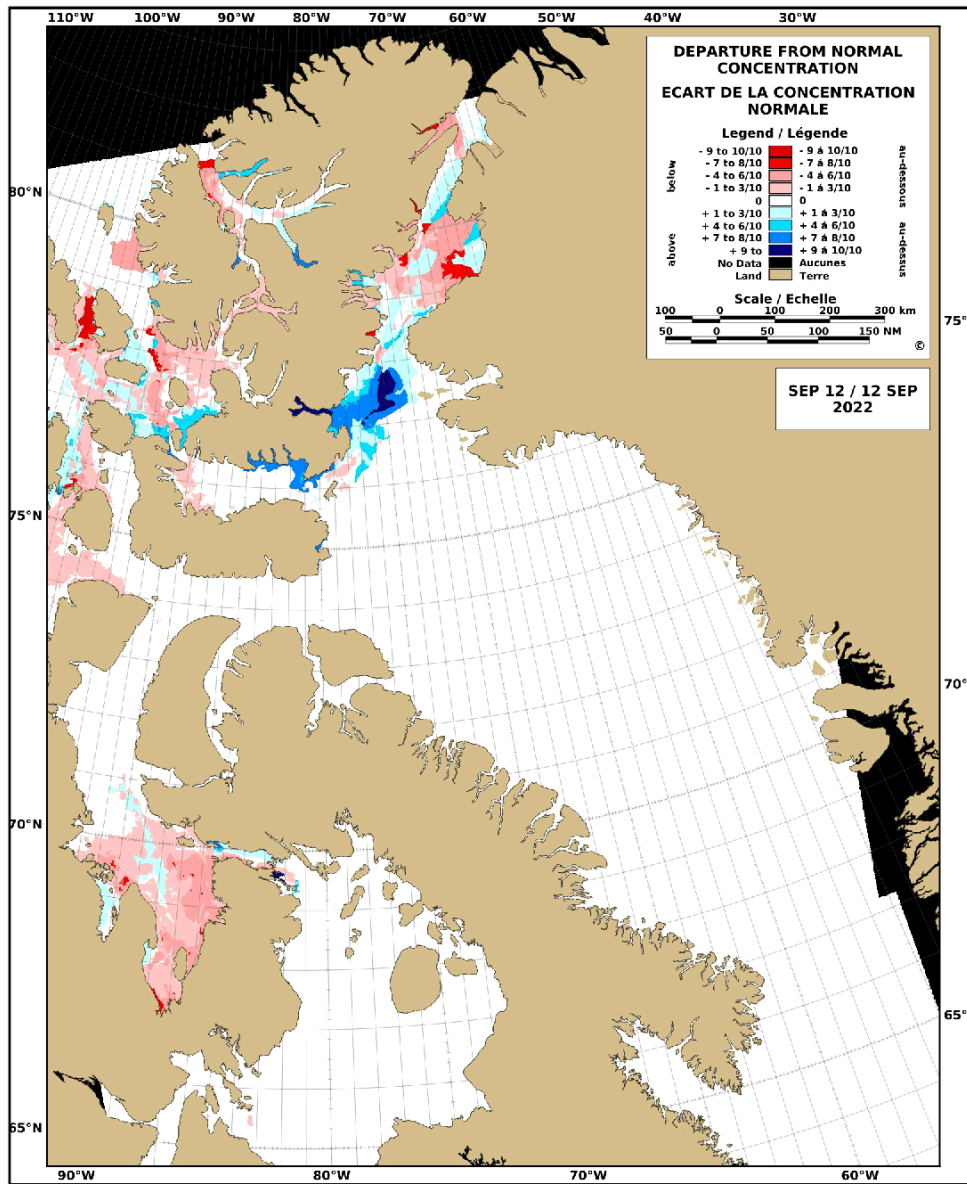
In Prince Regent Inlet and the Gulf of Boothia, earlier than normal ice melt continued throughout the month of August. In Prince Regent Inlet, ice conditions diminished to very open drift thick first-year ice (including a trace of old ice) by mid-month. The ice continued to diminish to bergy water by the third week of August, about 1 week faster than normal. In the Gulf of Boothia, the ice diminished to very close pack thick first-year and old ice at the beginning of the month. The northern section saw bergy water with close pack to open drift conditions present in eastern Committee Bay and Pelly Bay by month's end, which was about 1 week faster than normal.

In Foxe Basin, the first half of the month saw generally faster than normal ice melt. In particular, the central section of the basin saw conditions diminish from close pack thick first-year ice to very open drift, about 1 week faster than normal. For the rest of the basin, ice melt was near normal for the month. Ice free or open water conditions were present by month's end over the entire basin. Exceptionally, there was greater than normal ice (including greater than normal old ice) in Fury and Hecla Strait for the second half of the month due to the pre-existing presence of greater than normal old ice from the previous winter

Ice conditions in the northern sections of the archipelago varied throughout the month of August. Fast ice fracture was complete by mid-month. Ice melt was delayed by about a week in Jones Sound and southern Wellington Channel but was earlier than normal in McDougall Sound and parts of Norwegian Bay by about a week.

# September Ice Conditions

EASTERN ARCTIC / ARCTIQUE DE L'EST



STATISTICS BASED UPON 1991-2020  
 LES STATISTIQUES BASÉES SUR 1991-2020

**Figure 22 Departure from normal ice concentrations for the Eastern Arctic area – mid-September 2022**

Baffin Bay saw mostly bergy water conditions for the month of September except for a couple of small patches of thick first-year ice (including a trace of old ice) along the central coast near Clyde River, which melted out by the end of the first week of September. In the extreme northwestern section, along the coast of Ellesmere Island, there remained greater than normal ice concentrations. Ice conditions in this area varied throughout the month. At the beginning

of the month, very close pack thick first-year and old ice conditions were present along the coast with very open drift conditions further offshore. Very close pack and close pack ice conditions were present along the coast of Ellesmere Island, Jones Sound and as far south as the eastern entrance of Lancaster Sound. By month's end, open drift first-year and old ice conditions were present along the north coast of Bylot Island, which was much further south than normal. First-year and old ice began to fast along parts of the Ellesmere Island coast by the end of the month.

Lancaster Sound saw mostly bergy water conditions for the month of September except along the eastern entrance. During the first week of September, a tongue of open drift old and thick first-year ice drifted southward along the coast of Devon Island into the eastern entrance of the Sound before being destroyed by strong north-easterly winds. Bergy water prevailed for the rest of the month until the last week of September when additional ice was transported southward into the eastern entrance from northwestern Baffin Bay. The extreme eastern section saw open drift to very close pack thick first-year and old ice by the end of the month.

Prince Regent Inlet and the northern inlets of Baffin Island remained bergy water for the month of September. Open drift to very open drift thick first-year and old ice remained in the Gulf of Boothia, including Pelly Bay, for the first three weeks of September. In general, less ice than normal was present in eastern Committee Bay due to above normal temperatures as well as erosion of the ice due to a series of strong wind events. The month ended with bergy water throughout the Gulf of Boothia and open water in Pelly Bay.

Most of Foxe Basin remained open water to ice free for the duration of September. For the early part of the month, there was more ice than usual along the coast in the extreme northwestern section and in Fury and Hecla Strait. Open drift to close pack thick first-year and old ice remained for the first few weeks of September in these areas and deteriorated to very open drift old ice patches during the latter half of the month. Bergy and open water conditions were present by the very end of the month.

Ice conditions varied in the northern archipelago throughout the month of September. Jones Sound saw generally more ice than normal with very open drift to open drift thick first-year and old ice conditions present for the first half of the month. The ice then progressed to close pack to very close pack conditions by the end of the month. Wellington Channel, McDougall Channel and northern Norwegian Bay had generally less ice than normal in September due to above normal temperatures, which delayed the onset of ice formation.

# Western Arctic

## Summer Ice Conditions and Fall Freeze-up

### Summer Temperatures: June to September

From June to September, the western Arctic saw generally above normal temperatures except near to below normal temperatures along the coast of Alaska and the Chukchi Sea as well as near normal temperatures over Parry Channel, M'Clintock Channel and Peel Sound.

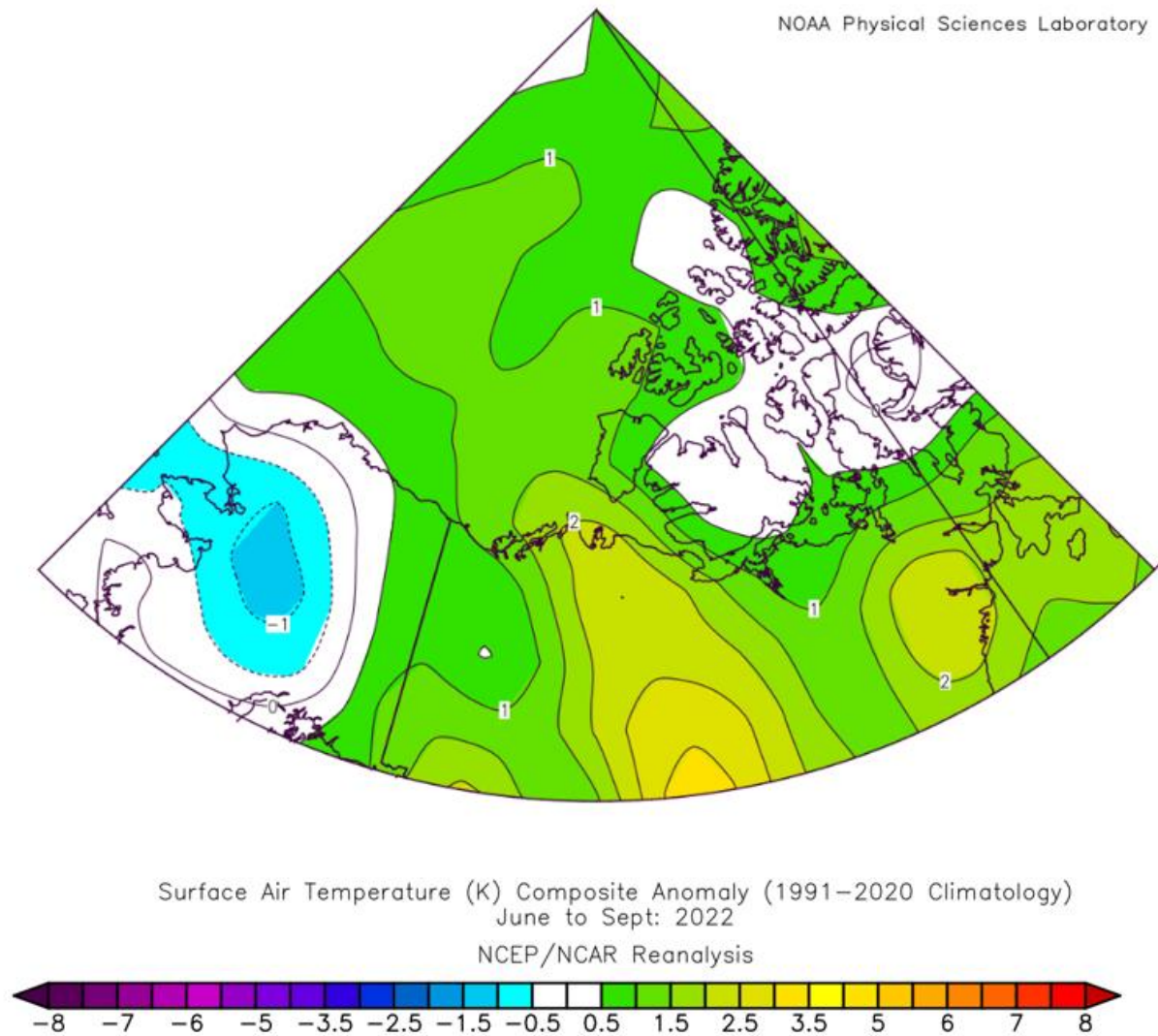


Figure 23 Air temperature anomaly for the Western Arctic area from June to September 2022



## Summary of Ice Conditions

The southeastern Beaufort Sea experienced a later than normal ice breakup this summer due to several factors. At the end of the winter, the fast ice in the Amundsen Gulf was much further west than normal. Additionally, throughout the month of June, persistent northerly winds and colder than normal temperatures contributed to the delay in ice break up and melt (by about 3 weeks). The combination of the above factors led to more ice than normal (including more old ice than normal) over the southern Beaufort Sea at the start of the melt season.

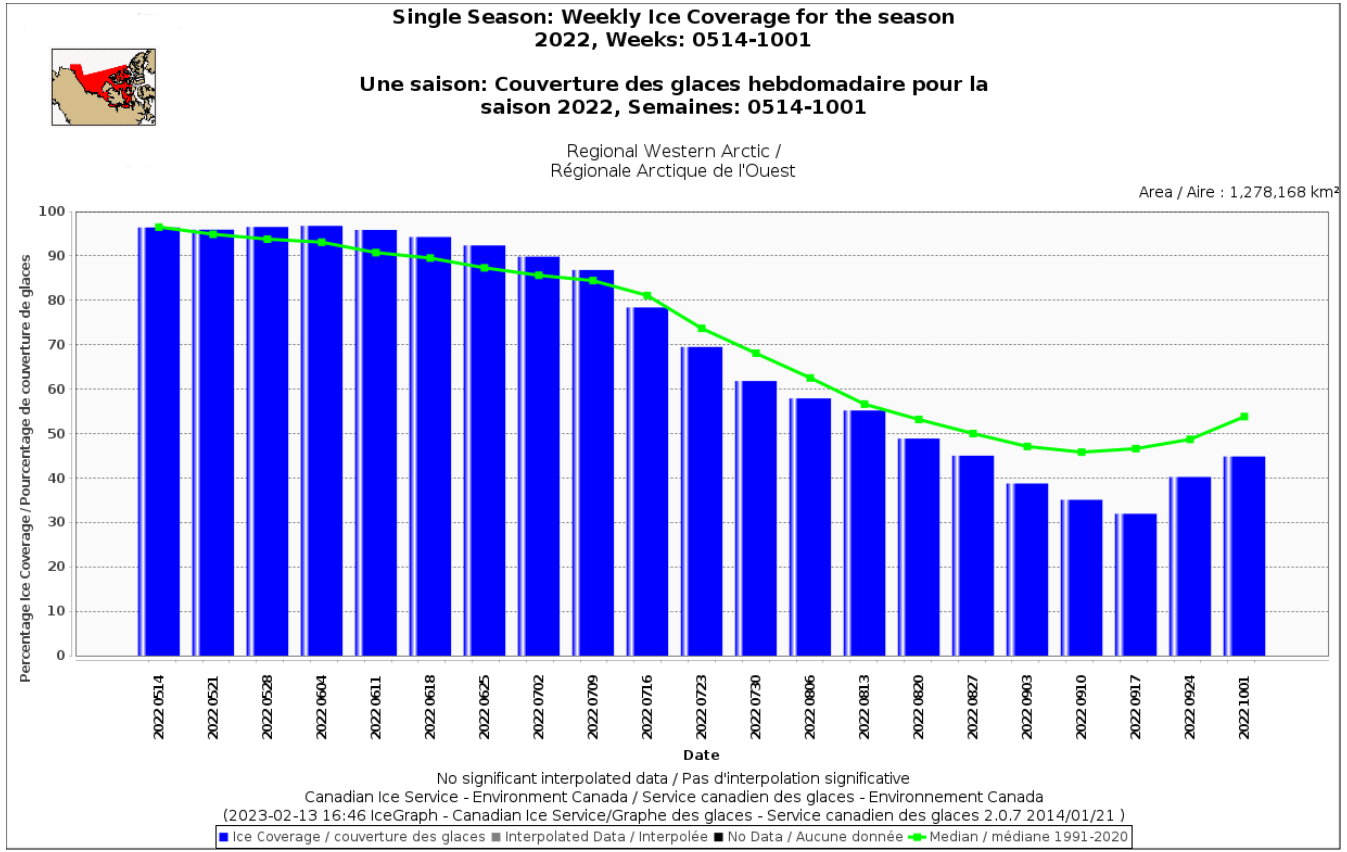
The northern and western Alaskan coasts saw a faster than normal break up and melt (by about 1-2 weeks) and generally less ice than normal for most of the summer months. This was mainly a result of thinner than normal ice and strong southerly offshore winds during the latter half of June.

There was generally less old ice than normal over the Arctic Ocean throughout the melt season. Normally there is predominately old ice over the entire Arctic Ocean however at the end of this past winter and throughout the summer months there was a mixture of old and thick first-year ice.

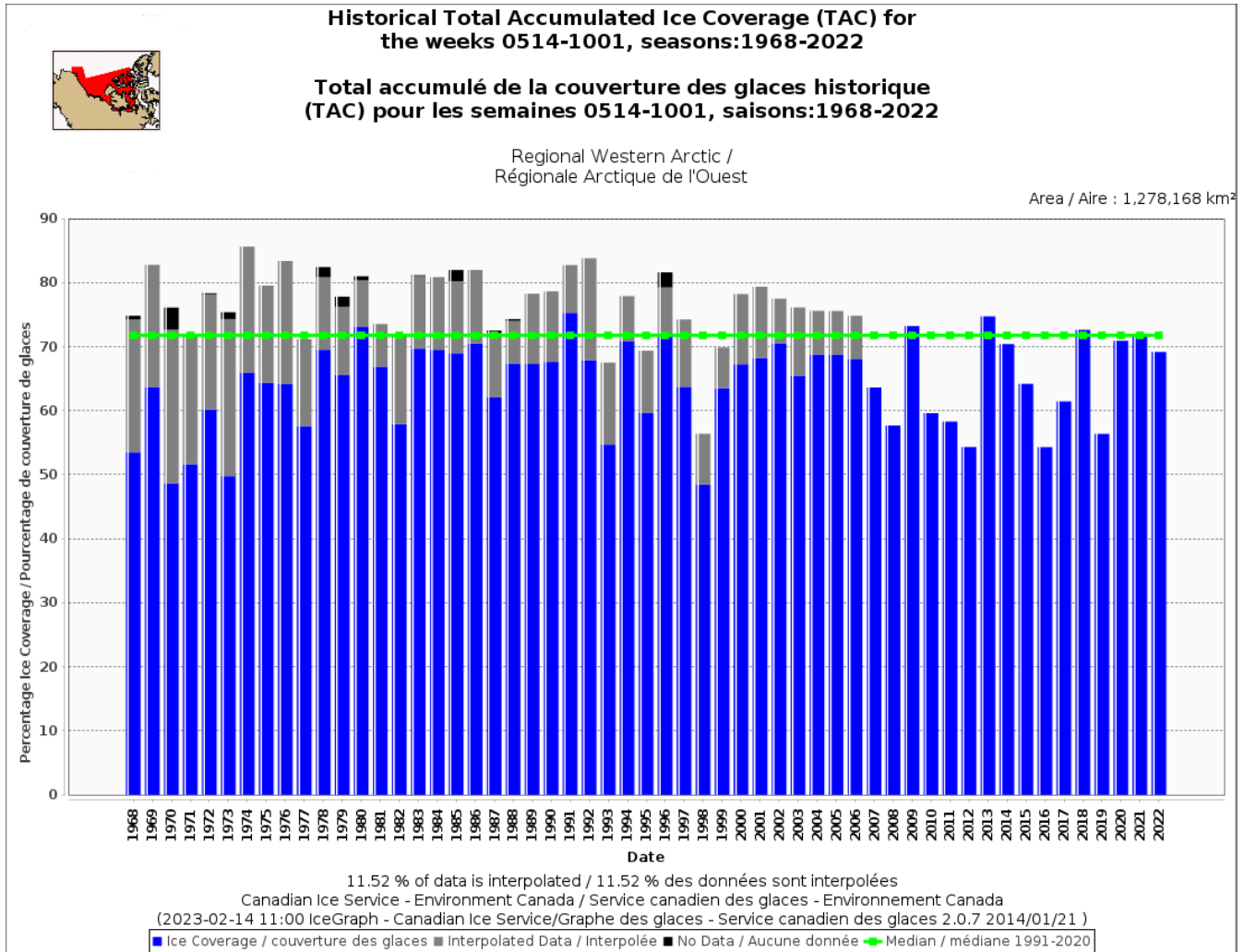
The northern half of Parry Channel saw more old ice than normal at the beginning of the melt season and less old ice over the southern half. This was primarily due to the occurrence of strong southerly winds during the previous fall freeze-up period. These old ice conditions generally persisted until late August.

In July, August and September, many of the eastern regions of the western Arctic saw above normal ice melt, including the erosion of old ice. This was mainly a result of a series of multi-day strong wind events, which began in mid-July and continued into September. Ice coverage along the northern route of the Northwest Passage was the 4<sup>th</sup> lowest on record since 1968 during the week of September 10<sup>th</sup>.

The lower than normal ice concentrations in the eastern regions and above normal temperature anomalies over the entire western Arctic in September led to a slower than normal freeze-up. Freeze-up was delayed by about 1-2 weeks in the eastern regions and in the southern Beaufort Sea.



**Figure 24 Weekly ice coverage for the Western Arctic area – 2022 Season**



**Figure 25 Historical total accumulated ice coverage for the Western Arctic area**

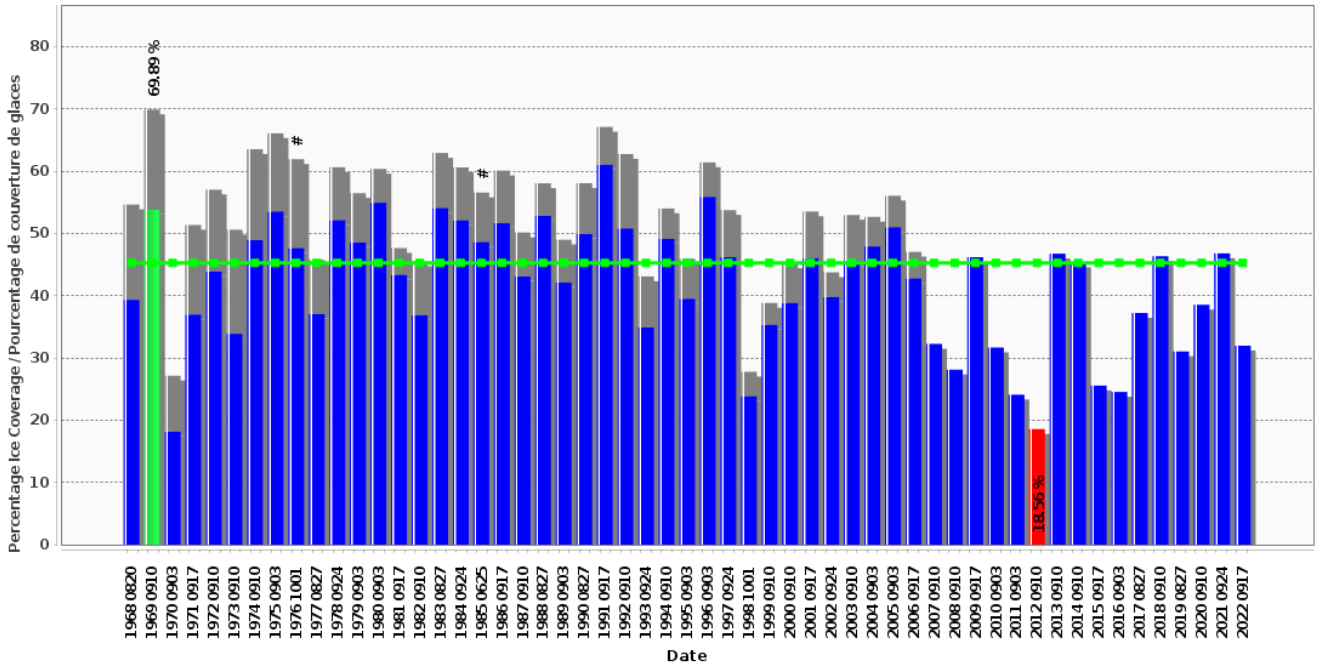
Minimum Ice Coverage for the weeks 0514-1001, seasons:  
1968-2022



La couverture minimale de glace pour les semaines  
0514-1001, saisons: 1968-2022

Regional Western Arctic /  
Régionale Arctique de l'Ouest

Area / Aire : 1,278,168 km<sup>2</sup>



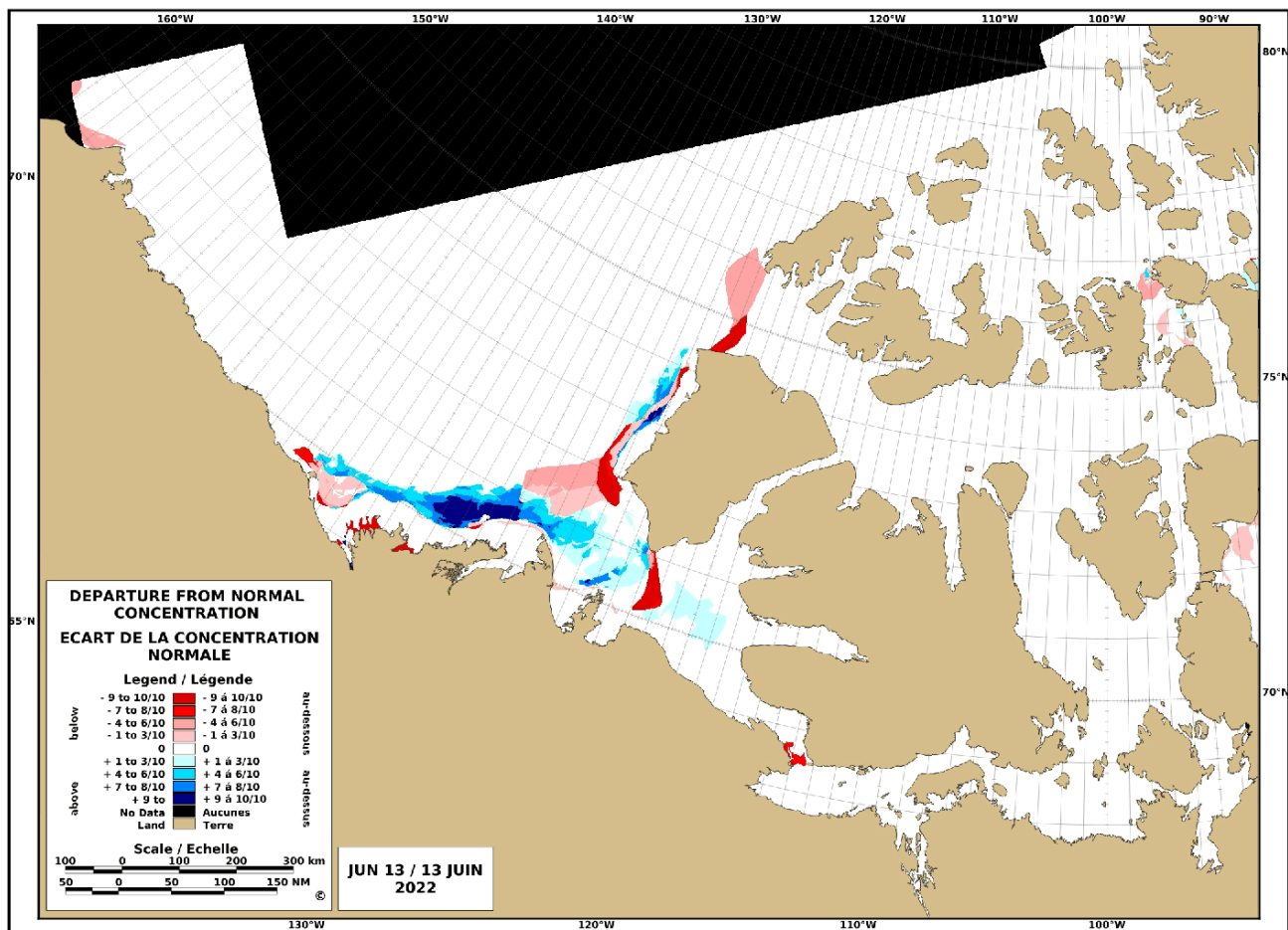
11.52 % of data is interpolated / 11.52 % des données sont interpolées  
 Canadian Ice Service - Environment Canada / Service canadien des glaces - Environnement Canada  
 (2023-02-14 11:08 IceGraph - Canadian Ice Service/Grphe des glaces - Service canadien des glaces 2.0.7 2014/01/21 )

■ Ice Coverage / couverture des glaces ■ Interpolated Data / Interpolée — Median / médiane 1991-2020 ■ Lowest / Le plus bas: 2012 0910 - 18.56%  
 ■ Highest / Le plus haut: 1969 0910 - 69.89% # Earliest and latest weeks the minimum occurred in the period /  
 Semaines le plus tôt et le plus tard dans la période lorsqu'on a atteint le minimum

Figure 26 Historical minimum ice coverage for the Western Arctic area – 2022 Season

## June Ice Conditions

WESTERN ARCTIC / ARCTIQUE DE L'OUEST



STATISTICS BASED UPON 1981-2010  
LES STATISTIQUES BASÉES SUR 1981-2010

**Figure 27 Departure from normal ice concentrations for the Western Arctic area – mid-June 2022**

Ice break up and melt was delayed over the southeastern Beaufort Sea/western Amundsen Gulf by about 3-4 weeks. The fast ice south of Banks Island formed further to the west this past winter. This, in addition to colder than normal temperatures and persistent northerly winds, meant that the ice melt in this area was delayed for the duration of the month. Fast ice breakup was delayed by several weeks and close to very close pack thick and medium first-year ice and old ice was present for the entire month of June. The predominately old ice pack in the southern Beaufort Sea was much further south than normal for the month.

Ice break-up along the western and northern Alaska coast was a few weeks earlier than normal. During the first half of the month, the ice concentrations along the western Alaskan coast decreased from very close pack thick and medium first-year ice (including a trace of old ice) to open drift and very open drift by mid-month. The earlier than normal melt was a result of thinner

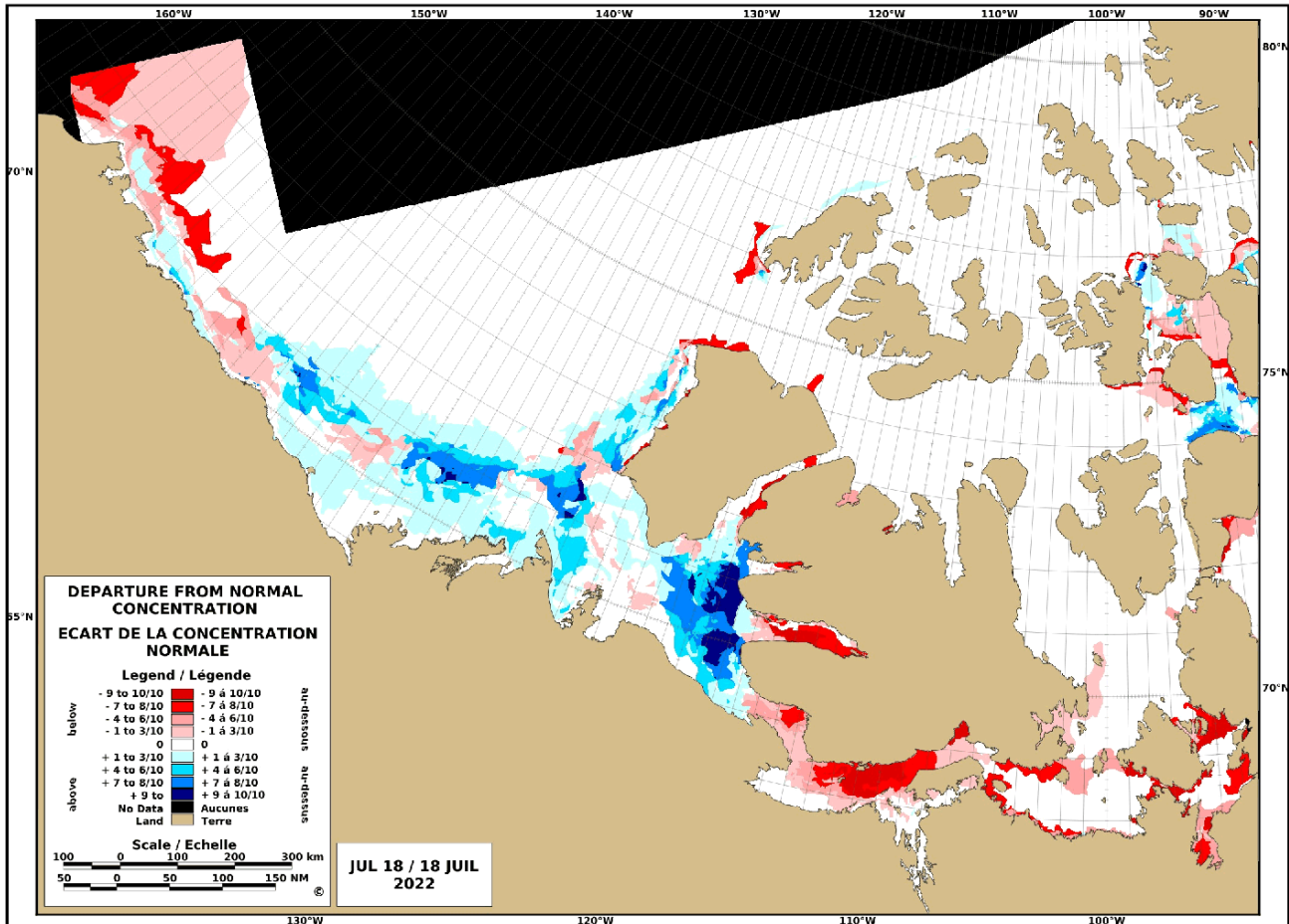
than normal ice as well as a change in wind regime to a southerly offshore flow as well as warmer temperatures than over the rest of the western Arctic coasts. By month's end, the southerly winds opened up areas of open water and very open drift along the western and northern Alaskan coasts, just off shore of the fast ice edge.

A mixture of very close pack thick first-year and old ice was present over the Arctic Ocean for the entire month when normally the ice is predominately old in this area.

Fast ice was present over the archipelago with a mixture of thick first-year and old ice south of 76°N and predominately old ice north of 76°N. The old ice embedded within the fast ice was displaced when compared to normal. The fast old ice along the northern section of Parry Channel was further north than normal with much less old ice in the southern half. This was due to strong southerly winds during ice formation the previous fall/winter. Near normal fast thick first-year ice was present south of 71°N.

## July Ice Conditions

WESTERN ARCTIC / ARCTIQUE DE L'OUEST



STATISTICS BASED UPON 1991-2020  
 LES STATISTIQUES BASÉES SUR 1991-2020

**Figure 28 Departure from normal ice concentrations for the Western Arctic area – end of July 2022**

Ice melt continued to be slower than normal in the southeastern Beaufort Sea and in the Amundsen Gulf for most of the month of July. Open drift to close pack ice conditions remained in the extreme southern Beaufort Sea until mid-month. By the end of the month, closer to normal ice conditions were present in the southern Beaufort Sea with open water to very open drift conditions present, however the southern extent of the ice pack and old ice extent remained further south than normal. The fast ice along the coast had completely broken up and melted out by mid month.

In the Amundsen Gulf, very close pack thick first-year ice (including a trace of old ice) remained until mid-month. By the end of the month, open water to very open drift conditions were present which was a slower than normal ice deterioration by about 2 weeks.

There was less ice than normal along the northern and western coasts of Alaska throughout the month. Ice conditions varied from open water to very open drift thick first-year ice (including a trace of old ice) for western Alaska. Along the northern coast, ice conditions diminished from fast and very close pack thick first-year ice (including a trace of old ice) at the beginning of the month to very close pack thick first-year ice (including a trace of old ice) towards the end of the month.

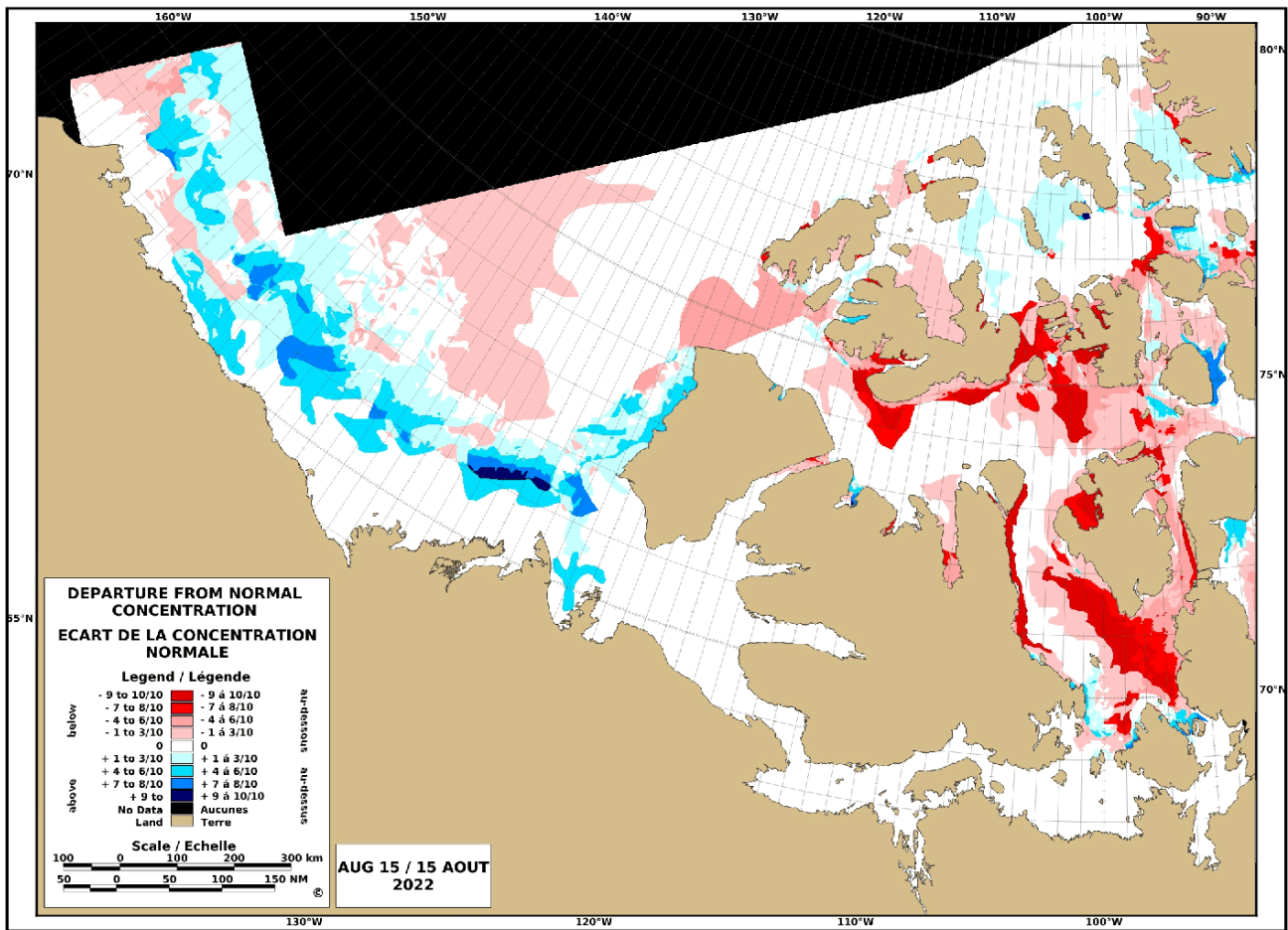
The ice conditions in the Arctic Ocean remained at very close pack thick first-year and old ice for the duration of July.

In the southern regions of the Kitikmeot region, ice melt was generally faster than normal by about 1 week. In Coronation Gulf, ice conditions diminished from mostly fast thick first-year ice to ice free by the third week of July. In Queen Maud Gulf, ice conditions diminished from fast thick first-year ice to open drift by the end of the month. M'Clintock channel, Victoria Strait and Peel Sound contained fast thick first-year and old ice at the beginning of the month with some open water areas starting to form by the end of the month. The ice remained mostly fast in the Queen Elizabeth Islands throughout the month of July with only some areas north of Resolute beginning to break up at the very end of the month.



## August Ice Conditions

WESTERN ARCTIC / ARCTIQUE DE L'OUEST



STATISTICS BASED UPON 1991-2020  
 LES STATISTIQUES BASÉES SUR 1991-2020

**Figure 29 Departure from normal ice concentrations for the Western Arctic area – mid-August 2022**

In general, ice concentrations remained greater than normal over extreme southern Beaufort Sea in August. For the first half of the month, close pack and very close pack ice conditions diminished to open water and very open drift in the extreme south and close pack over the northern Beaufort Sea. Ice conditions remained generally greater than normal over the northern Amundsen Gulf. Open drift thick first-year ice (including a trace of old ice) conditions were present at the beginning of the month and diminished to open water and ice free conditions by mid-month, which was about 3-4 weeks slower than normal.

Ice concentrations remained lower than normal along the western coast of Alaska throughout the month of August with open water to ice free conditions prevailing. Along the northern coast of Alaska, ice melt progression varied. Open drift conditions were present all along the coast at the beginning of the month. By month's end, very open drift and open water conditions were

present. There was generally more ice than normal along the northern Alaskan coast. Remnant patches of very open drift ice concentrations took about an extra 1-2 weeks to melt.

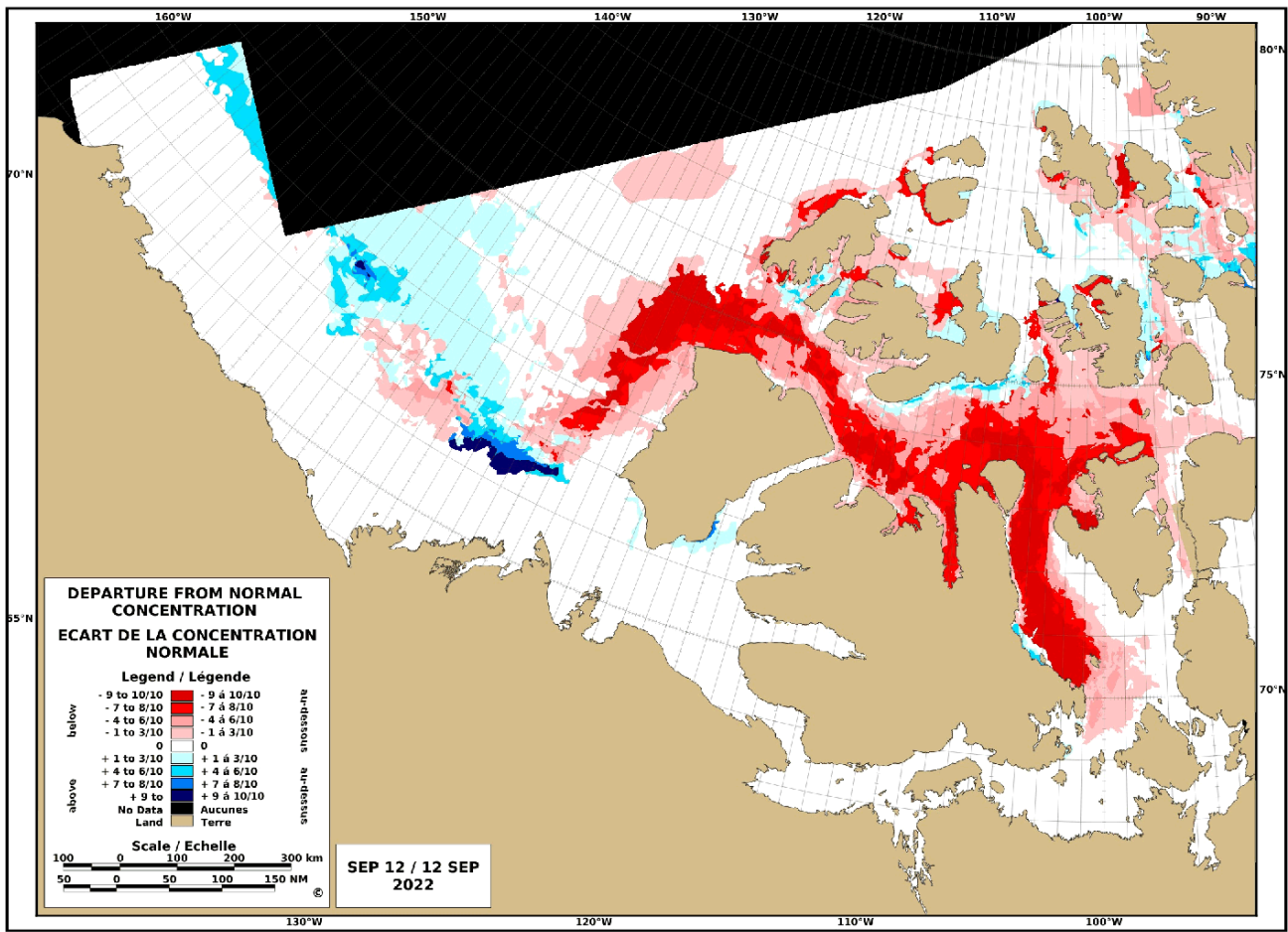
Portions of the western Arctic Ocean saw less ice (including less old ice) than normal throughout the month of August due to several factors. Thick first-year ice has replaced a portion of the old ice pack. Additionally, the occurrence of warmer than normal temperatures led to greater than normal ice melt in some areas by mid-month. Very close pack ice conditions were present in the Arctic Ocean at the beginning of the month. In the western section, conditions deteriorated to close pack by mid-month and a combination of open drift and close pack by month's end.

Many of the eastern regions of the western Arctic saw earlier than normal ice melt and significant ice loss in August. The ice conditions in Victoria Strait went from very close pack to open water and open drift conditions. Peel Sound went from open drift to open water by mid-month. M'Clintock channel went from very close pack to close pack by mid-month and open drift by the end of the month. Many areas of Parry Channel went from very close pack to a combination of open drift and very close pack conditions by mid-month and open water to close pack by month's end. Ice melt was generally about 3-4 weeks earlier than normal.

Fast ice in and around Queen Elizabeth Island was fully broken up by the end of the month.

# September Ice Conditions

WESTERN ARCTIC / ARCTIQUE DE L'OUEST



STATISTICS BASED UPON 1991-2020  
LES STATISTIQUES BASÉES SUR 1991-2020

**Figure 30 Departure from normal ice concentrations for the Western Arctic area – mid-September 2022**

Ice concentrations varied throughout the Beaufort Sea during the month of September. For the first half of the month, there continued to be more ice than normal over most of the Beaufort Sea. Exceptionally, in the eastern section along the coast of Banks Island saw much less ice than normal. Open drift to close pack conditions prevailed over the central section and open water to ice free conditions remained in the southern section. Within 60 to 120 nm of Banks Island, conditions went from very open drift to open water by mid-month which was a significant erosion of ice (including of old ice) when compared to normal. By the last week of September, new and grey ice began to form in the easternmost ice pack along the coast of Banks Island, where historically old ice was located. Open water to ice free conditions prevailed in the Amundsen Gulf for the duration of the month with the exception of areas of very open drift conditions, which drifted southward from the Prince of Wales Strait during the first half of the month.

Open water to ice free conditions prevailed along the western and northern Alaskan coasts throughout the month.

Ice conditions over the Arctic Ocean varied throughout the month. There was more ice than normal over the southwestern section and areas of less ice than normal in the southeastern section. Areas of open water and close pack conditions were present in the western section and very close pack and close pack conditions in the eastern section. Freeze-up began towards the end of the month as areas of new and grey ice began to form in between the floes, which increased ice conditions to very close pack once again over most of the Arctic Ocean.

At the beginning of September, a series of strong wind events and above normal temperatures continued to erode the ice (including old ice) in many of the eastern regions of the western Arctic. The northern route of the Northwest Passage saw the 4<sup>th</sup> lowest sea ice coverage on record (since 1968) during the week of September 10<sup>th</sup>. At 10% coverage, this was dramatically below the historical median of 43%. Coronation Gulf, Queen Maud Gulf and Peel Sound had open water to ice free conditions throughout the month. M'Clintock channel went from open drift to nearly open water by mid-month except for compacted very close pack ice along the northeastern coast of Victoria Island. The ice conditions in Barrow Strait varied between very open drift to open water throughout the month. In Viscount Melville Sound, ice conditions deteriorated from open drift to very open drift by mid-month and in McClure Strait very open drift ice conditions remained for most of the month. By the end of the month, freeze up had begun in these two regions. New and grey ice formation increased the ice concentrations to close to very close pack by month's end bringing ice concentrations closer to normal. However, old ice concentrations remained well below normal over many areas of the western Arctic, including over many regions in the eastern section and over the eastern Beaufort Sea.