Environment and Climate Change Canada
Environnement et Changement climatique Canada

Seasonal Summary

North American Arctic Waters

Spring 2022

By

Canadian Ice Service
Le service canadien des glaces

Canada

Foxe Basin, Hudson Bay, Davis Strait and Labrador Coast

End of Winter and Spring Ice Conditions

At the end of January, medium first-year ice covered most of Foxe Basin except for the northwestern section, which had mainly thin first-year ice and the southeastern section, which had a mix of thin and medium first-year ice (figure 6). Medium first-year ice covered northwestern Davis Strait except for mostly thin first-year ice in the southern and eastern sections. The ice pack along the coast in northwestern Davis Strait had a trace of embedded old ice. Mostly thin first-year ice was present in Cumberland Sound while thin first-year, grey-white and grey ice covered Frobisher Bay. Thin first-year ice covered most of Hudson Strait except for a mix of thin and medium first-year ice in the western section. A mix of thin first-year and grey-white ice covered southern Hudson Strait and Ungava Bay. Most of Hudson Bay had a mix of thin and medium first-year ice except for mostly thin first-year ice in the southeastern section and a mix of thin first-year and grey-white ice in the southwestern section and in western James Bay. Northwestern Hudson Bay had a mix of mostly thin first-year, grey-white and grey ice. The northern portion of the Labrador coast had a mix of thin first-year, grey-white and grey ice, while the rest of the Labrador coast had a mix of grey-white and grey ice (figure 1).

During the early winter months, freeze-up was significantly slower than normal for almost all areas. Additionally, from the end of January until the end of April, the ice concentration and extent in eastern Davis Strait and eastern Labrador Sea was above normal due to persistent westerly winds throughout the winter and colder than normal sea surface temperatures (figure 5).

Towards the end of February, the ice thickened to medium first-year over most of Foxe Basin, Hudson Strait, and western Davis Strait. Exceptions to this were in eastern and southern Davis Strait and eastern Ungava Bay where a mix of thin and medium first-year ice were present. Northwestern Hudson Bay and central Labrador Sea had thin first-year ice and along the coast of northwestern Hudson Bay and the Labrador coast there was a mix of grey-white and grey ice.

The ice became predominantly thick first-year over most of Foxe Basin and northwestern Davis Strait by the end of March. A trace of old ice was present in the central Labrador Sea. Thick first-year ice started to make its way into western Hudson Strait and western Hudson Bay by mid-April. However, over Hudson Bay, thick first-year ice became predominant over central sections only and it took until almost mid-May to do so due to a combination of later than normal freeze up and above normal temperatures during most of the winter (figures 2-4). The rest of Hudson Bay, most of Hudson Strait and eastern Davis Strait remained at mostly medium first-year ice except for a mix of thin first-year and grey-white ice over extreme northwestern Hudson Bay. In general, the ice was thinner than normal in most areas (figures 3 & 4).

In the northern Labrador Sea, predominantly thick first-year ice was present by the beginning of May with medium first-year ice along the coast and over southern sections. The leading edge of old ice reached the southern Labrador coast and eastern Hudson Strait by the end of April.

Some open areas began to emerge by early May, particularly along the eastern and extreme northwestern coasts of Hudson Bay and along the coast of Baffin Island in Hudson Strait. These areas persisted and expanded throughout the month of May and signaled the beginning of an early break-up for both regions. Early break-up and ice melt also occurred in Frobisher Bay and Cumberland Sound and over northwestern Foxe Basin. By the end of May, ice concentrations were also much less than normal over Labrador Sea but remained above normal over eastern Davis Strait. In general, ice break-up was 3-4 weeks earlier than normal over the entire area (figures 5 and 13).

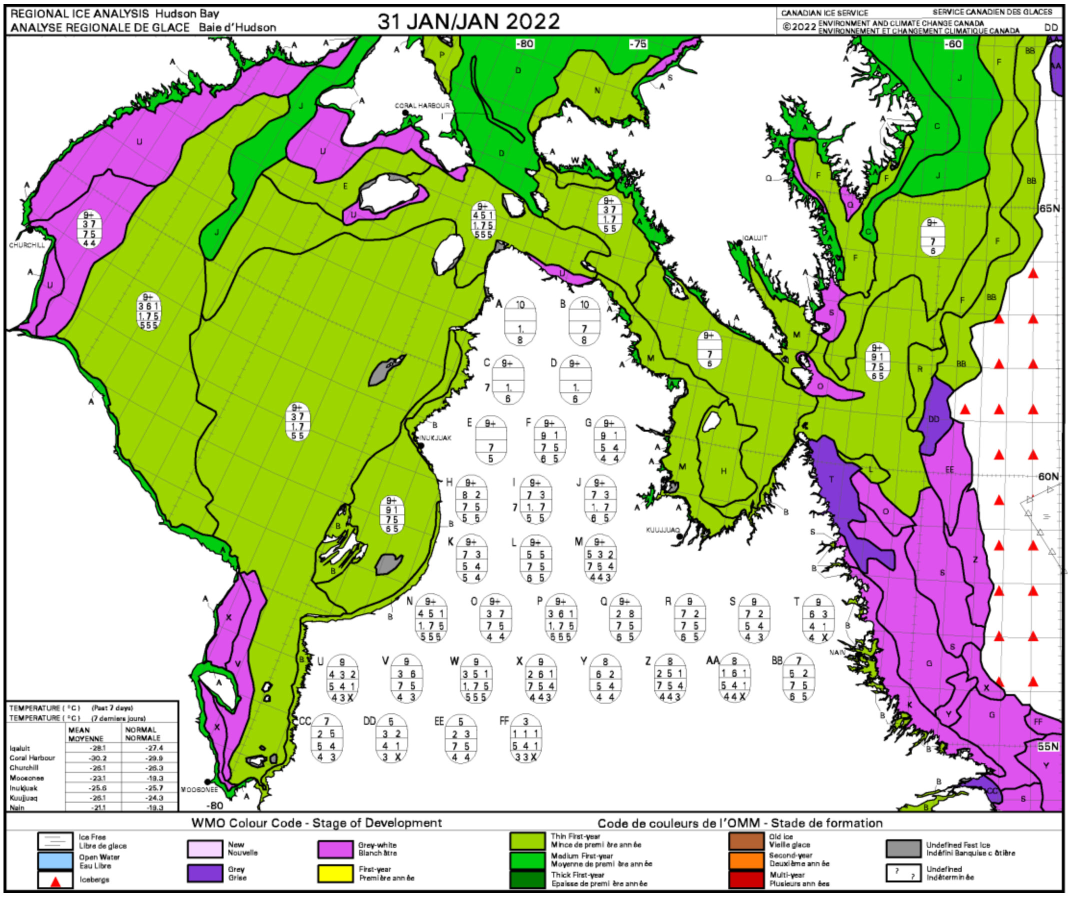


Figure 1 Ice stage of development analysis for the Hudson Bay, Hudson Strait, Davis Strait and Labrador Sea regions on January 31st, 2022

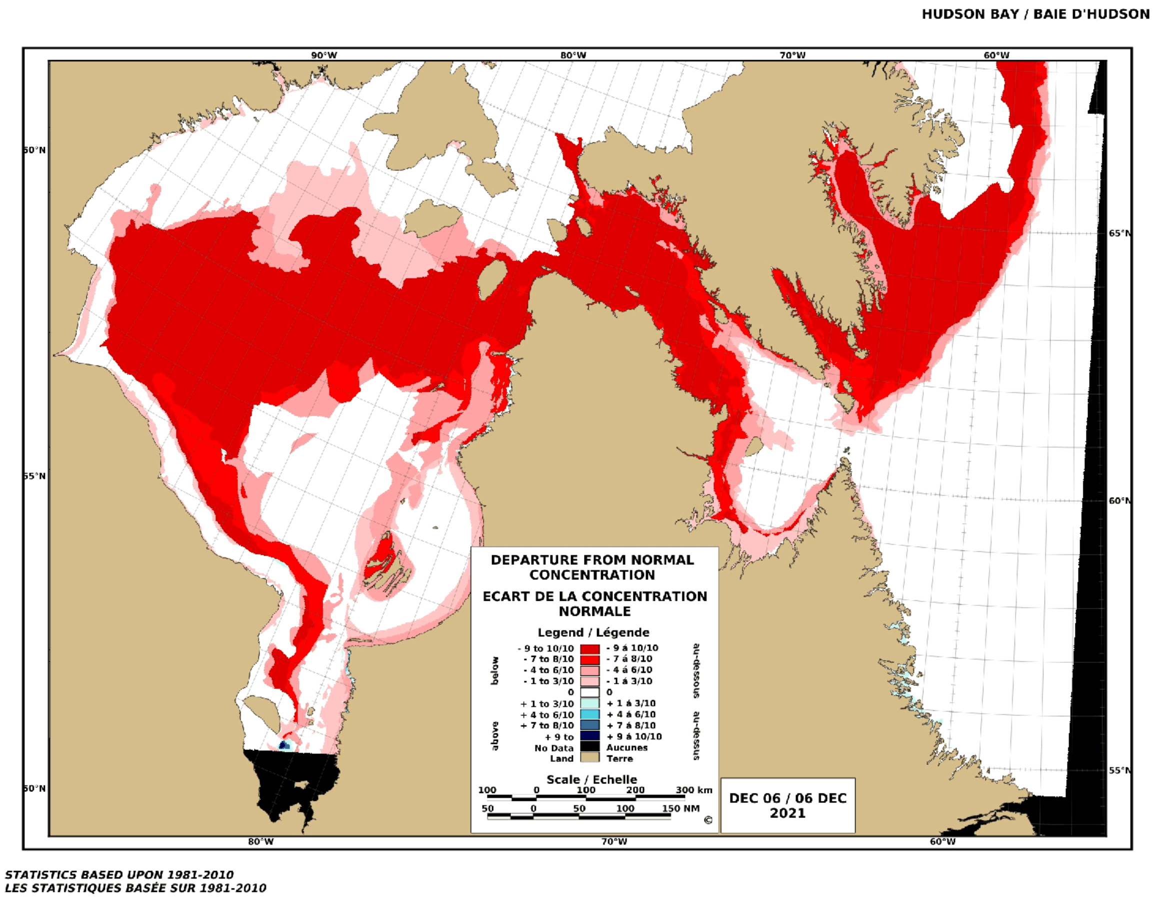


Figure 2 Departure from normal ice concentration for the Hudson Bay, Hudson Strait, Davis Strait and Labrador Sea regions on December 6th, 2021

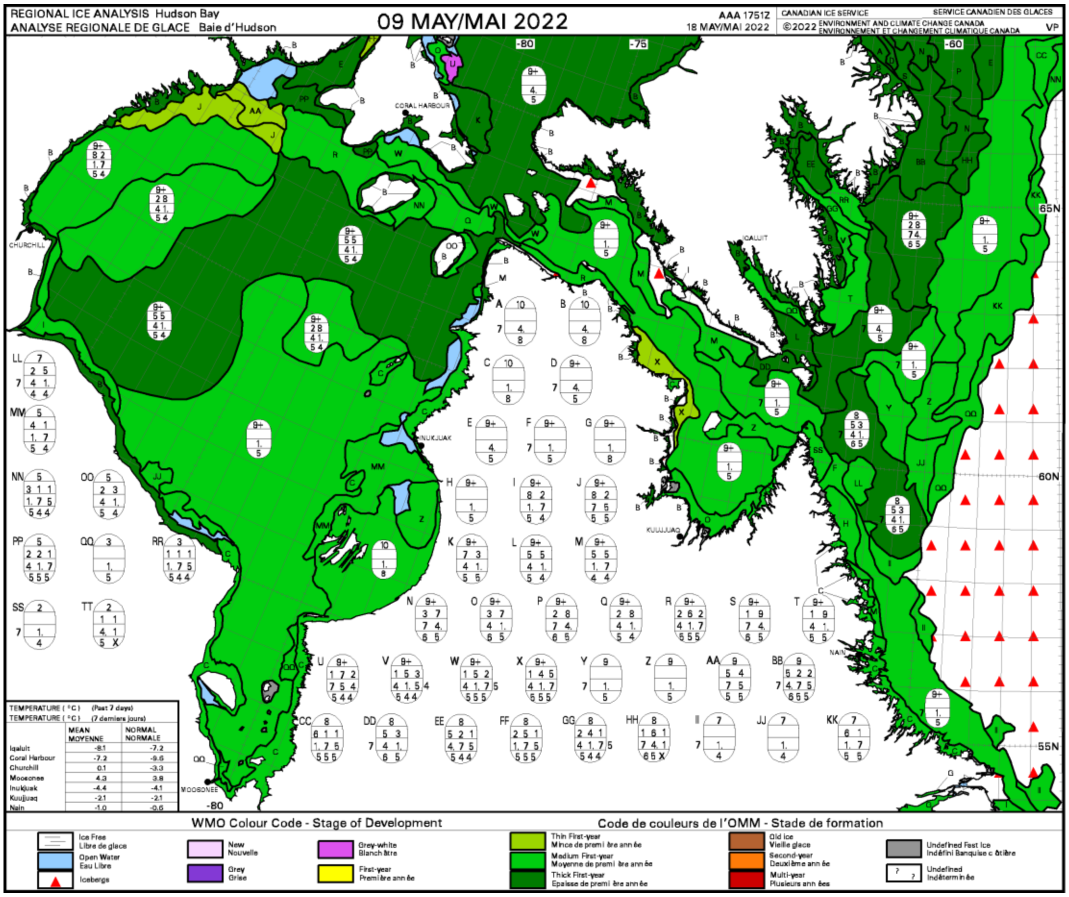


Figure 3 Ice stage of development analysis for the Hudson Bay, Hudson Strait, Davis Strait and Labrador Sea regions on May 9th, 2022

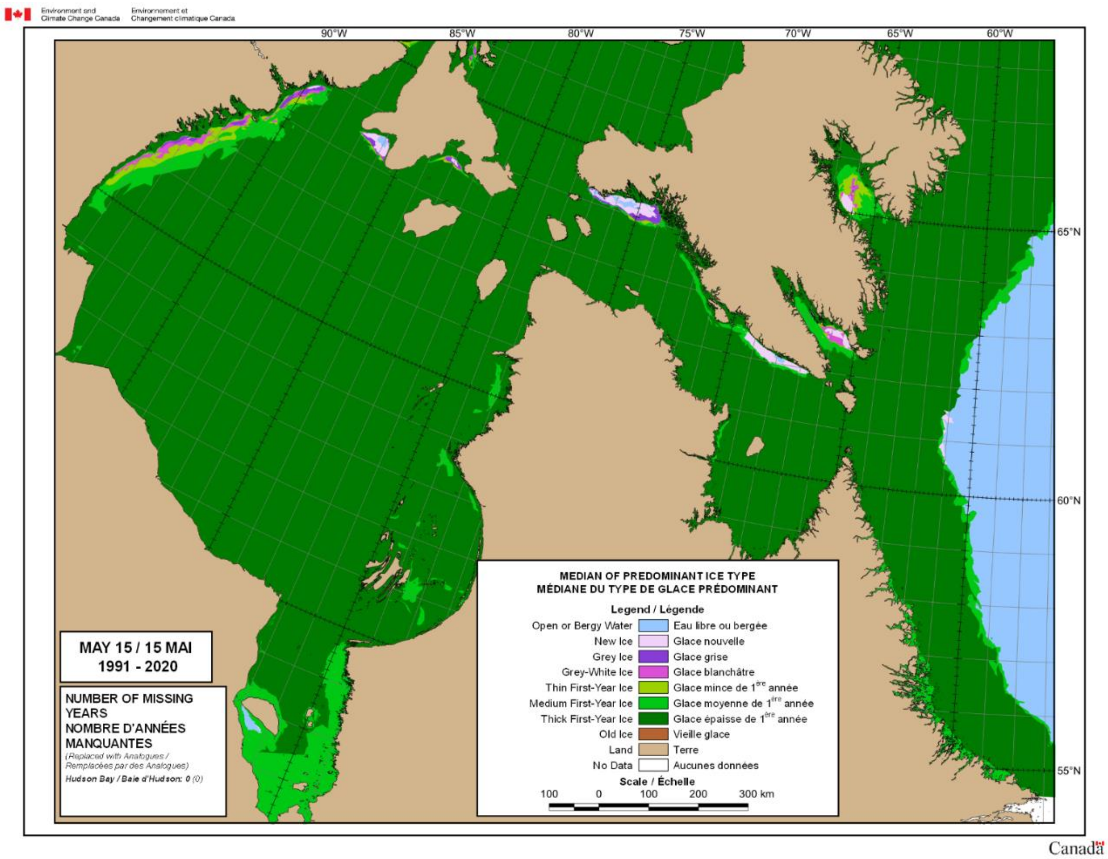


Figure 4 30-year climate median (1991-2020) of predominant ice type for the Hudson Bay, Hudson Strait, Davis Strait and Labrador Sea regions on May 15th, 2022

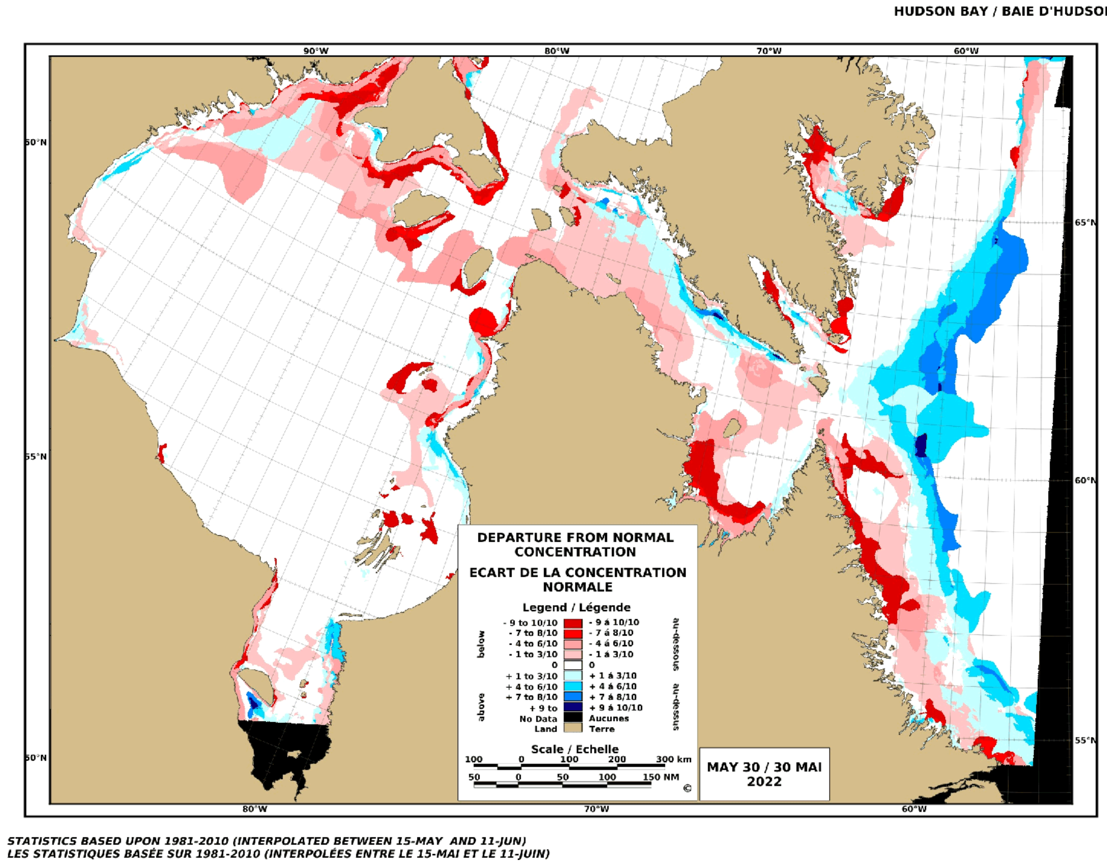


Figure 5 Departure from normal ice concentration for the Hudson Bay area on May 30th, 2022

Station	Actual end of April FDD	Median end of April FDD (1981-2010)	Percent of normal FDD	May average temperatures (°C)	May departure from normal (°C)
Nain	2001	2254	89	*1.7*	*0.7*
Iqaluit	3327	4019	83	*-5.0*	*-0.6*
Kuujjuaq	2756	3188	86	*1.5*	*1.3*
Inukjuak	2972	3316	90	*-0.7*	*1.1*
Cape Dorset	2880	3424	84	*-4.5*	*0.5*
Churchill	3351	3638	92	*0.5*	*1.2*
Hall Beach	4313	5229	82	*-9.5*	*-0.4*

Table 1 End of April freezing degree-days (FDD) and May temperatures for the Hudson Bay area

Eastern and Northern Arctic

End of Winter and Spring Ice Conditions

At the end of January, there was predominantly medium first-year ice in Baffin Bay with up to 5 tenths old ice in the western section. In the eastern and northwestern sections, there remained mostly thin first-year ice or a combination of thin and medium first-year ice. The Gulf of Boothia and Prince Regent Inlet contained mostly medium first-year ice except over the northwestern section of Prince Regent Inlet where there was mostly thin first-year ice. Most of Lancaster Sound and eastern Barrow Strait had medium first-year ice including a trace of old ice with some areas of higher old ice concentrations over the southern sections. Western Barrow Strait had consolidated medium first-year ice with up to 6 tenths old ice. Most of Jones Sound had consolidated medium first-year ice with a trace of old ice. Consolidated medium first-year ice covered most of Admiralty Inlet including a trace of old ice over the northern section. Pond and Navy Board Inlets contained mostly consolidated medium first-year ice with a trace of old ice except for Eclipse Sound, which had no trace of old ice. In the Arctic Archipelago, consolidated thick first-year and old ice was present while mobile old ice was present over the high Arctic Basin (figure 6). There was also more old ice than normal in southeastern Gulf of Boothia and in southern Fury and Hecla Strait as well as in Barrow Strait and northwestern Baffin Bay (figure 11).

By the end of February, the ice thickness over much of the eastern Arctic was thinner than normal due to a slower than normal freeze up and above normal temperatures, which occurred over the winter months (figure 12). Cumberland Sound also had thinner ice than normal with a mix of thin first-year, grey-white and grey ice and areas of up to 5 tenths old ice remained in western Baffin Bay. The ice over most of Baffin Bay, Prince Regent Inlet and eastern Lancaster Sound remained as medium first-year ice when normally these areas have thick first-year ice by this time of year (figures 7 & 8). However, in western Lancaster Sound, consolidated thick first-year ice with a trace of old ice formed much further to the east than normal. Western Gulf of Boothia contained consolidated thick first-year ice and Jones Sound contained mostly consolidated thick first-year ice with a trace of old ice.

The ice bridge in northern Kane Basin did not form this winter, which allowed for more old ice than normal to flow southward into Nares Strait and into northwestern and western Baffin Bay from the Lincoln Sea. This also caused the ice to be more mobile in general over extreme northern Baffin Bay and southern Kane Basin resulting in areas with lower than normal ice concentrations and a mix of thinner ice types with old ice in the area (figure 7).

By the end of March, the ice in northern and western Baffin Bay and Prince Regent Inlet finally thickened to thick first-year ice but the ice in eastern Baffin Bay remained predominately medium first-year. Cumberland Sound had thinner ice than normal with consolidated medium first-year ice in the western section and a mix of medium first-year, thin first-year, grey-white and grey ice in the eastern half.

By the beginning of May, some of the ice in eastern Baffin Bay thickened to thick first-year ice; however, a 60-90 nautical mile wide area of ice remained thinner than normal at medium first-year. The ice in Cumberland Sound reached normal thickness compared to climatology. The Nares Strait ice bridge remained unformed (figures 9 & 10). From mid-May until the end of May, bergy water areas started to form due to localized wind regimes. Initially in eastern Lancaster Sound and subsequently along the consolidated ice edge in the central coast of Baffin Island. These areas of lesser ice concentrations persisted into June.

In general, ice melt over the eastern Arctic was near climatology (1991-2020) over most areas. Exceptions were in extreme northern Baffin Bay, southern Kane Basin and most of Lancaster Sound where melt was slower than normal, due to lower than normal temperatures and the continued transport of ice from Kane Basin as well as due to the eastward presence of consolidated ice in western Lancaster Sound. Additionally, due to strong offshore winds at the end of May, bergy water areas formed along the southwestern Baffin Bay coast, leading to a faster than normal ice melt in this area by about 4-6 weeks (figure 13).

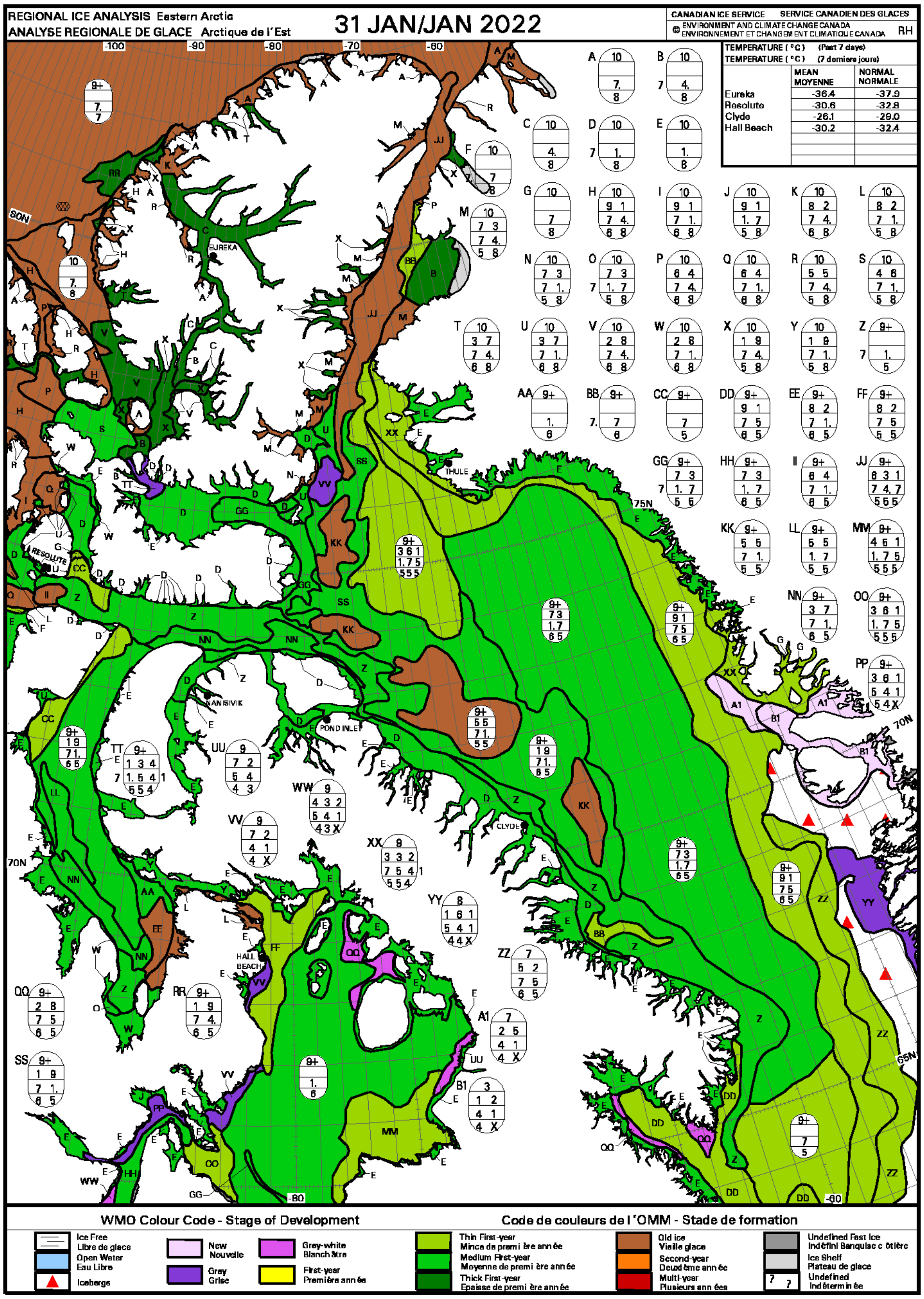


Figure 6 Ice stage of development analysis for the Eastern Arctic area on January 31st, 2022

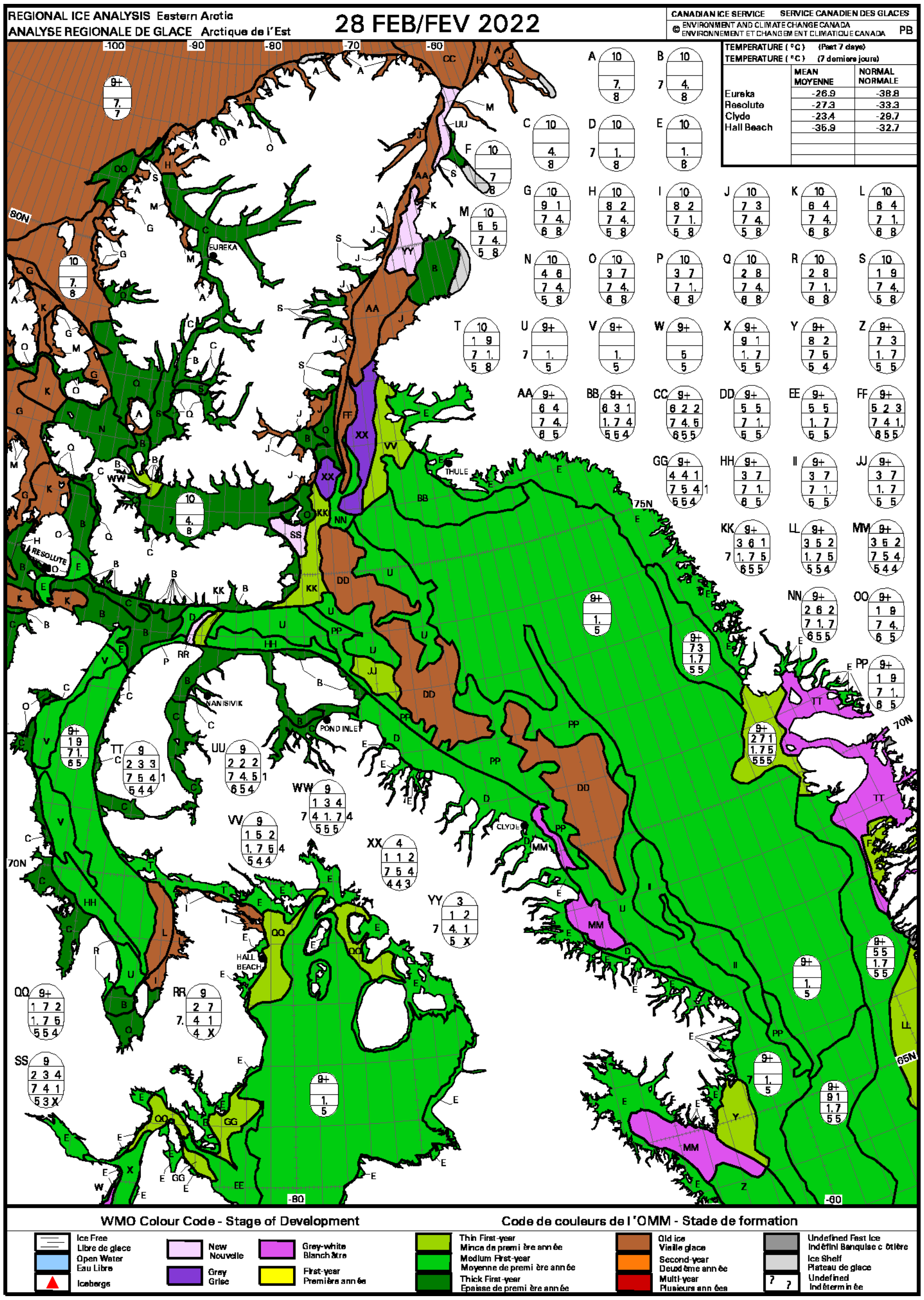


Figure 7 Ice stage of development analysis for the Eastern Arctic area on February 28th, 2022

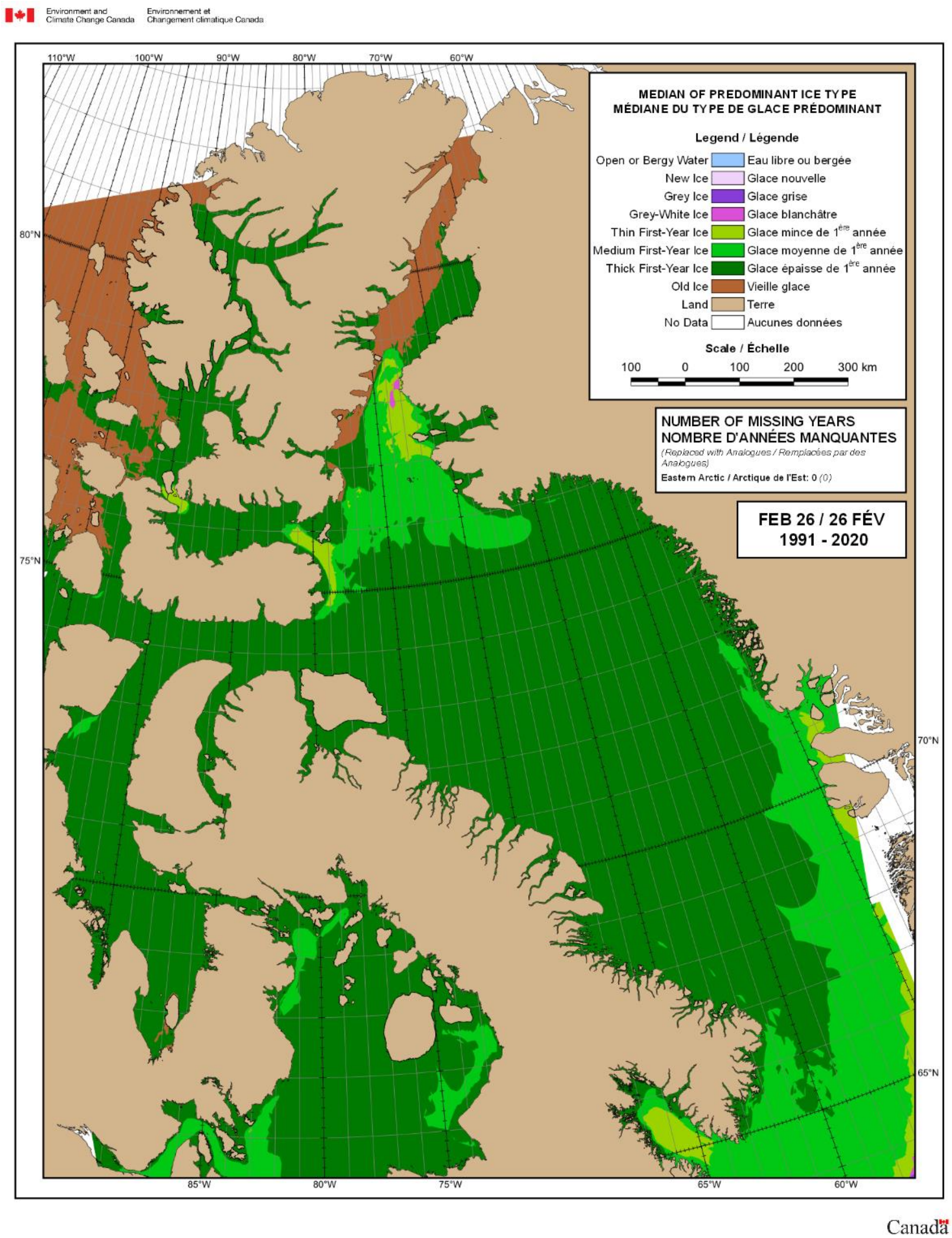


Figure 8 Climatological median (1991-2020) of predominant ice type for the Eastern Arctic area on February 26

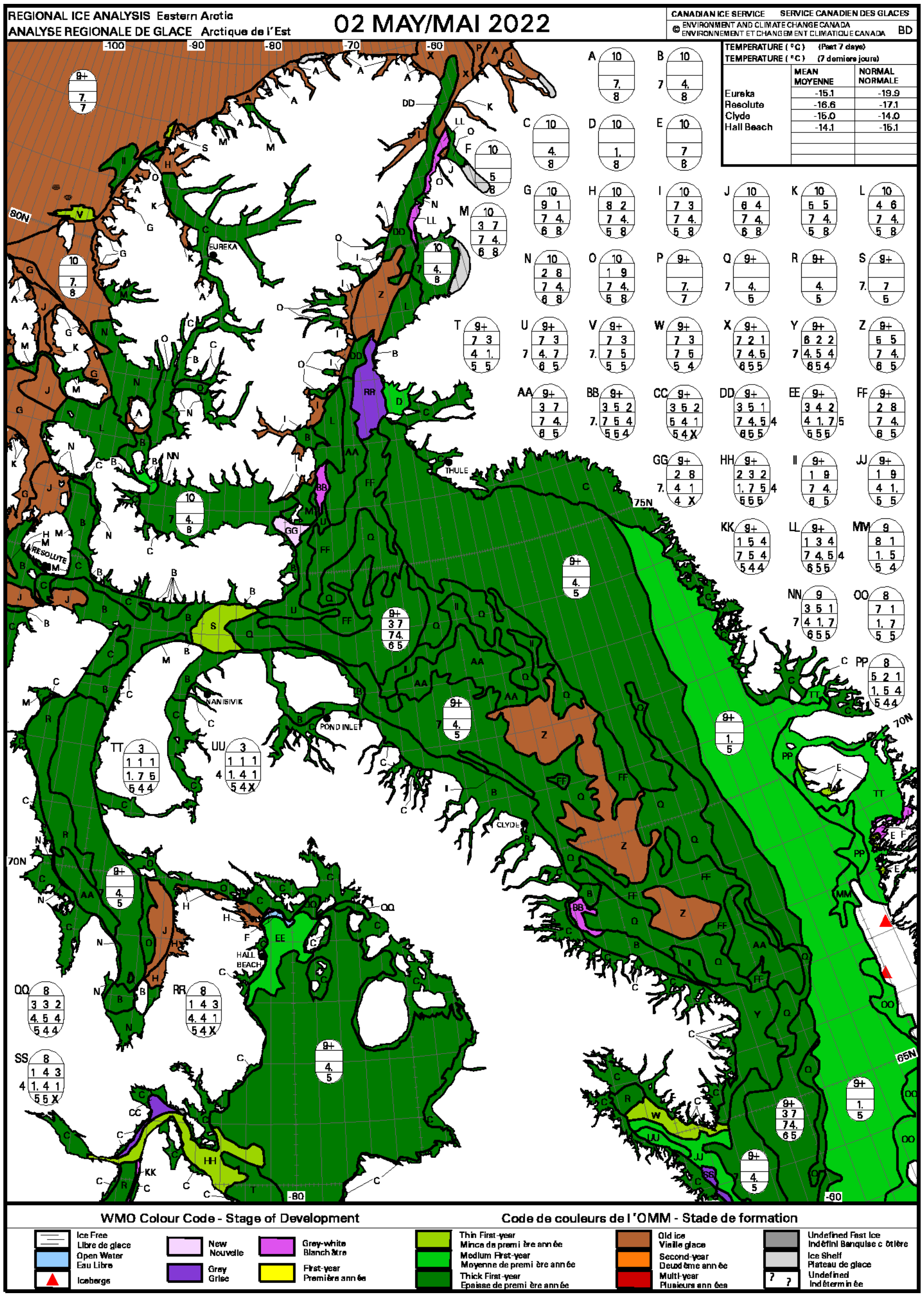


Figure 9 Ice stage of development analysis for the Eastern Arctic area on May 2nd, 2022

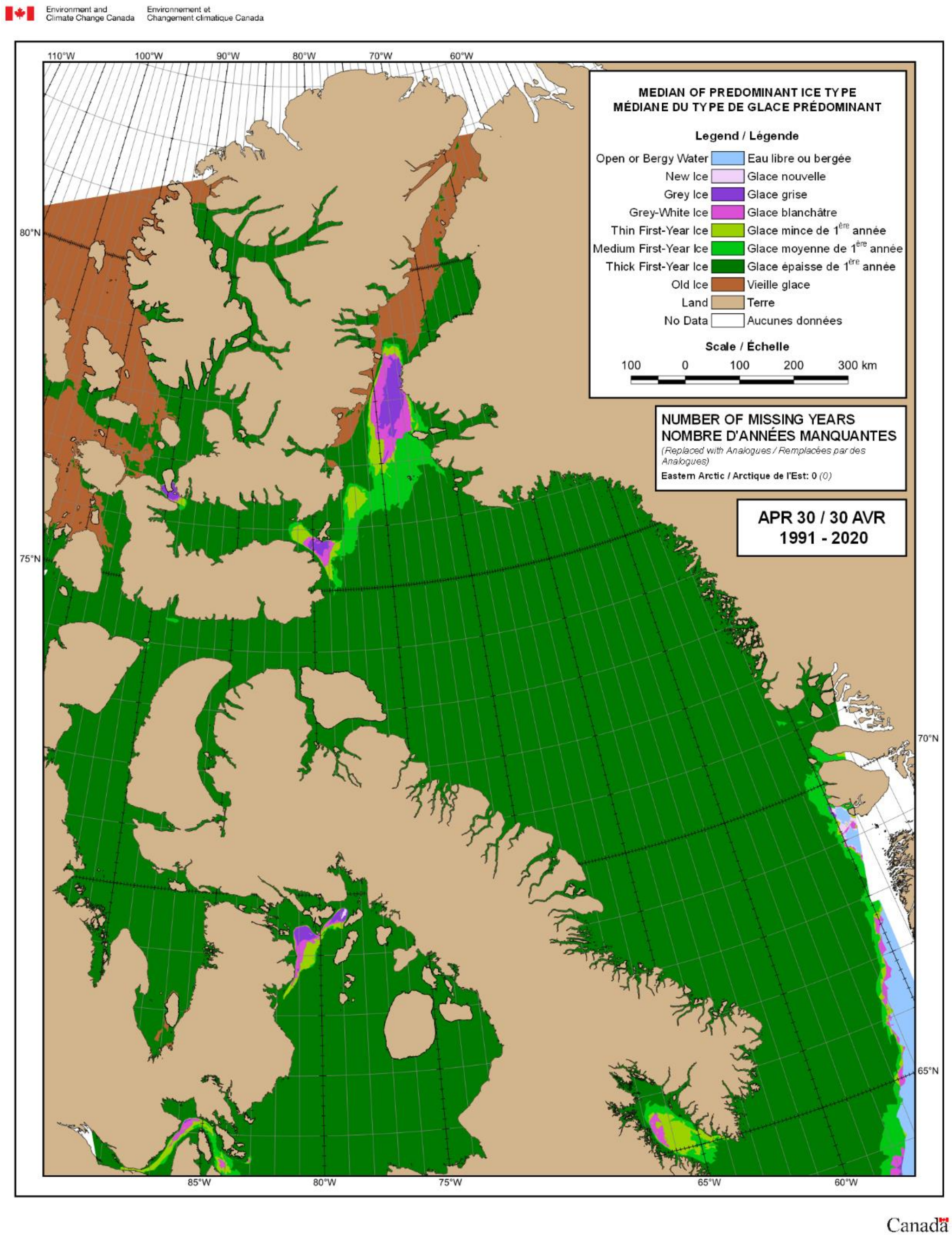
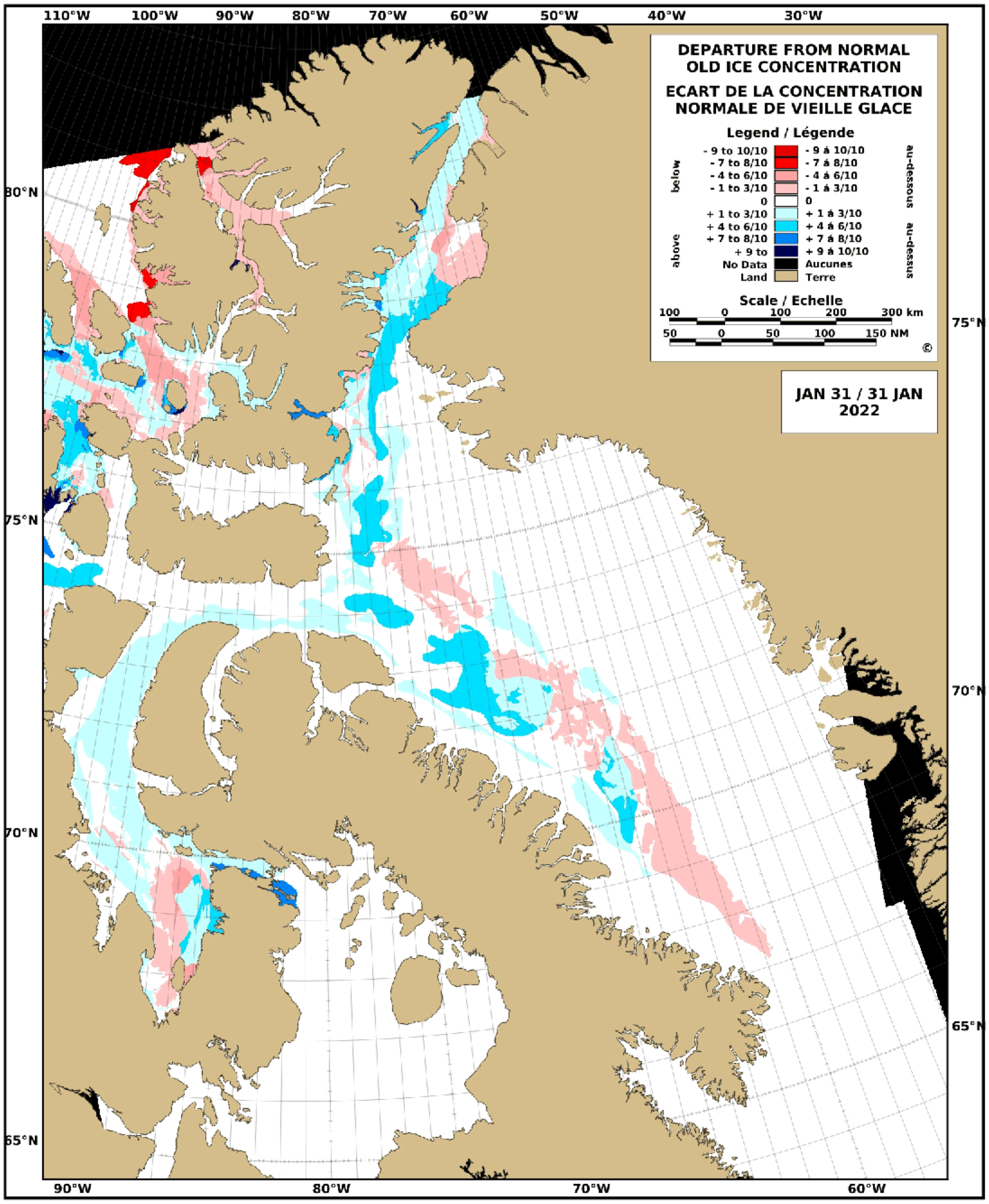


Figure 10 Climatological median (1991-2020) of predominant ice type for the Eastern Arctic area on April 30



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

Figure 11 Departure from normal old ice concentration for the Eastern Arctic area on January 31st, 2021

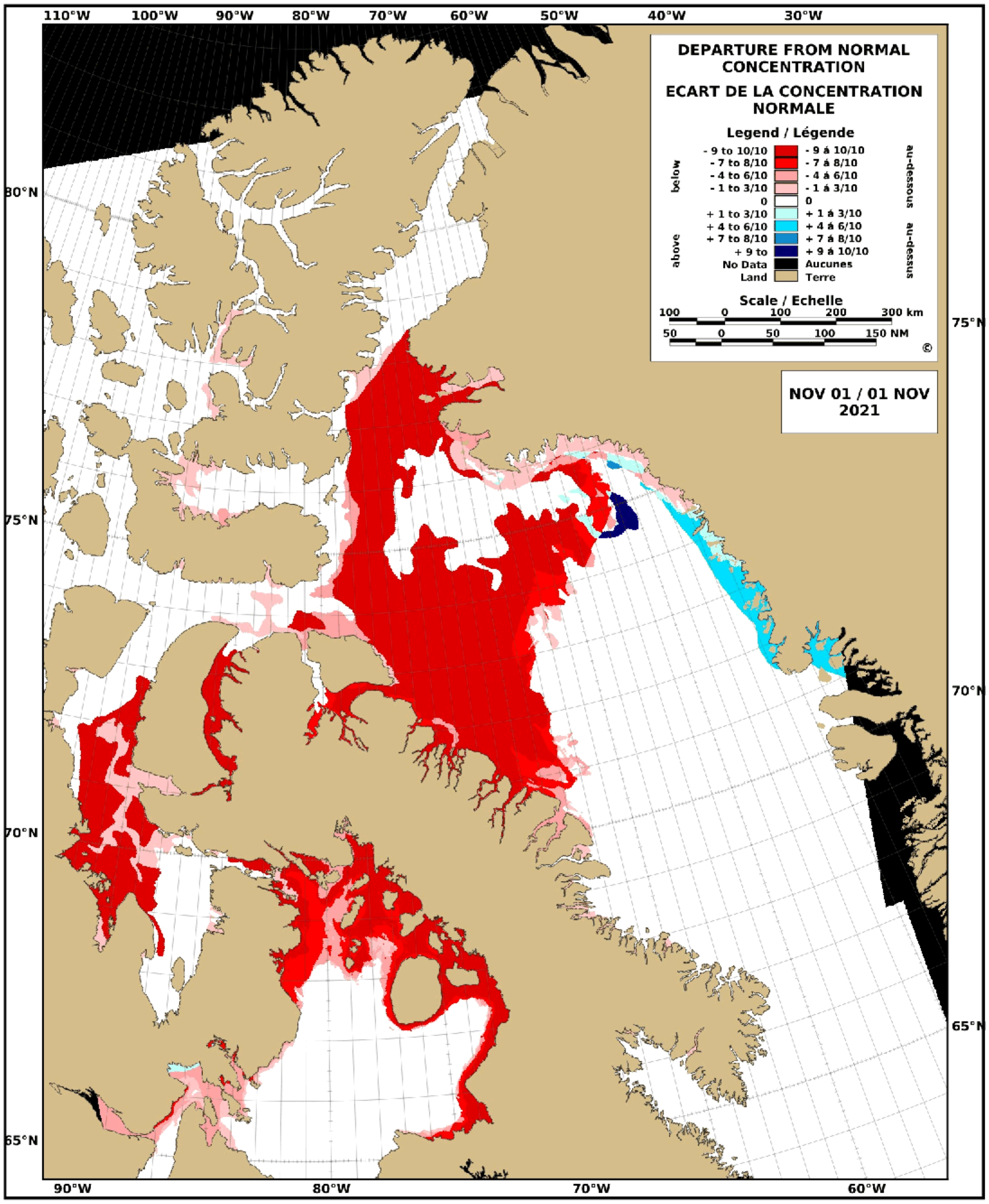


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Figure 12 Departure from normal ice concentration for the Eastern Arctic area on November 1st, 2021

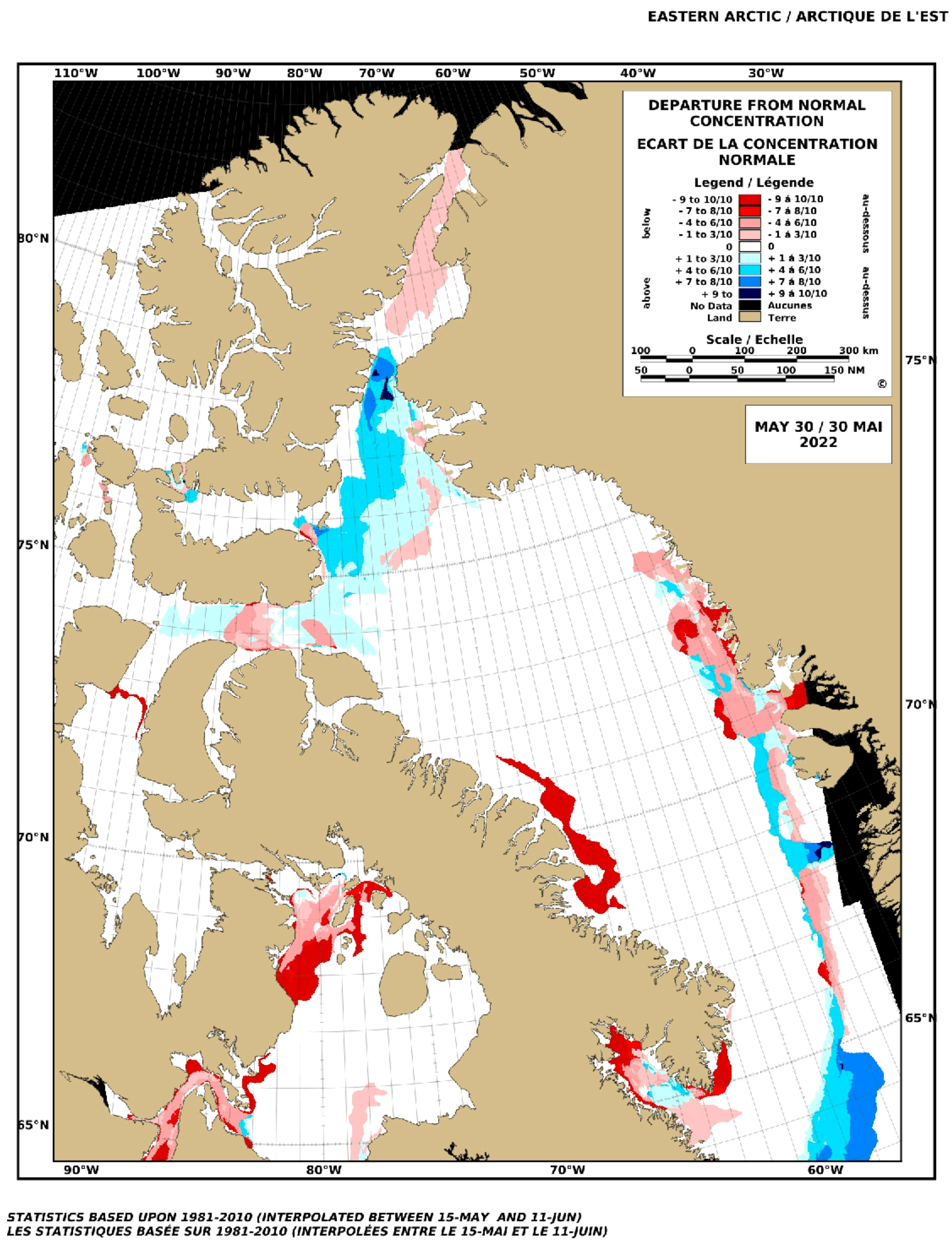


Figure 13 Departure from normal ice concentration for the Eastern Arctic area on May 30th, 2022

Station	Actual end of April FDD	Median end of April FDD (1981-2010)	Percent of normal FDD	May average temperatures (°C)	May departure from normal (°C)
Clyde	3838	4678	82	*-7.9*	*0.3*
Pond Inlet	4549	5433	84	*-9.3*	*-0.1*
Resolute	4949	5797	85	*-10.3*	*0.5*
Eureka	6030	7131	85	*-8.1*	*2.9*

Table 2 End of April freezing degree-days (FDD) and May temperatures for the Eastern Arctic area

Western and Central Arctic

End of Winter and Spring Ice Conditions

At the end of January, mainly medium and thin first-year ice with a trace of old ice covered the extreme southern Beaufort Sea. The rest of the Beaufort Sea, the Arctic Ocean and M'Clure Strait were covered with predominantly old ice with some medium first-year ice present. The leading edge of old ice was located within 10-50 nautical miles of the coast from Point Barrow to Kaktovik, which was much further south than normal in the southern Beaufort Sea. The central part of Parry Channel saw higher than normal old ice concentrations due to persistent southerly winds in the fall before the onset of the ice becoming fast and lower than normal old ice concentrations over southern McClintock and Viscount Melville Sounds.

Consolidated medium first-year ice was present along most of the Alaska, Yukon and NWT coasts as well as throughout the shipping route from Dolphin and Union Strait to the Queen Maud Gulf. A trace of old ice was also present in the consolidated ice west of Point Barrow. The consolidated medium first-year ice with a trace of old ice was much further west than normal in the western Amundsen Gulf. There was predominantly consolidated old ice with some medium first-year ice along the west coast of Banks Island, Prince of Wales Strait and throughout the rest of the western Arctic Archipelago. Exceptions were over western Barrow Strait, which had mobile medium first-year ice with a trace of old ice and east of Bellot Strait, where there was a mix of thin and medium first-year ice (figure 14).

By the end of February, most of the mobile and consolidated medium first-year ice thickened to thick first-year ice except in the Amundsen Gulf, in the mobile ice in the southern Beaufort Sea and west of Point Barrow where medium first-year ice remained which was thinner than normal for this time of year (figures 15 & 16). The trace of old ice remained 10-50 nautical miles offshore of the Alaska and Yukon coast and in the western Amundsen Gulf. The remaining medium first-year ice in the southern Beaufort Sea thickened to predominantly thick first-year ice by the end of March.

Toward the end of April, open water leads and areas of lower ice concentration began to emerge along the consolidated ice edge from Hershel Island to southwestern Banks Island. Throughout the beginning of May, these areas expanded and propagated northward along the consolidated ice edge west of Banks Island to western M'Clure Strait (figure 17). By the end of May, chunks of the consolidated ice in the western Amundsen Gulf began to break away due to the prevalent southeasterly winds and above normal temperatures during the first half of May. The second half of May saw calmer winds and a closer to normal temperature regime. The first half of June saw a below normal temperature regime and lighter winds for the southern Beaufort Sea, which slowed down the ice breakup process.

Overall, the western Arctic experienced near normal ice melt except slightly slower than normal over the southeastern Beaufort Sea and western Amundsen Gulf and earlier than normal along the western coast of Alaska (figure 18).

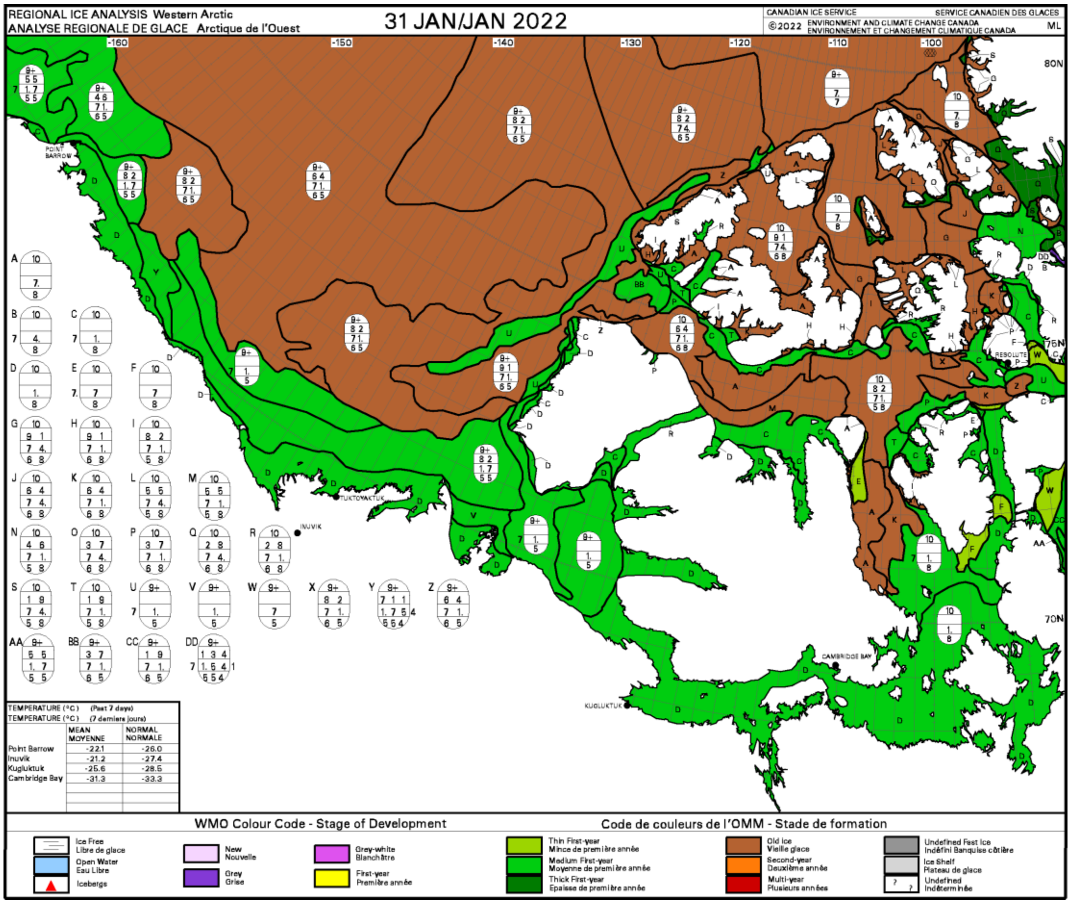


Figure 14 Ice stage of development analysis for the Western Arctic area on January 31st 2022

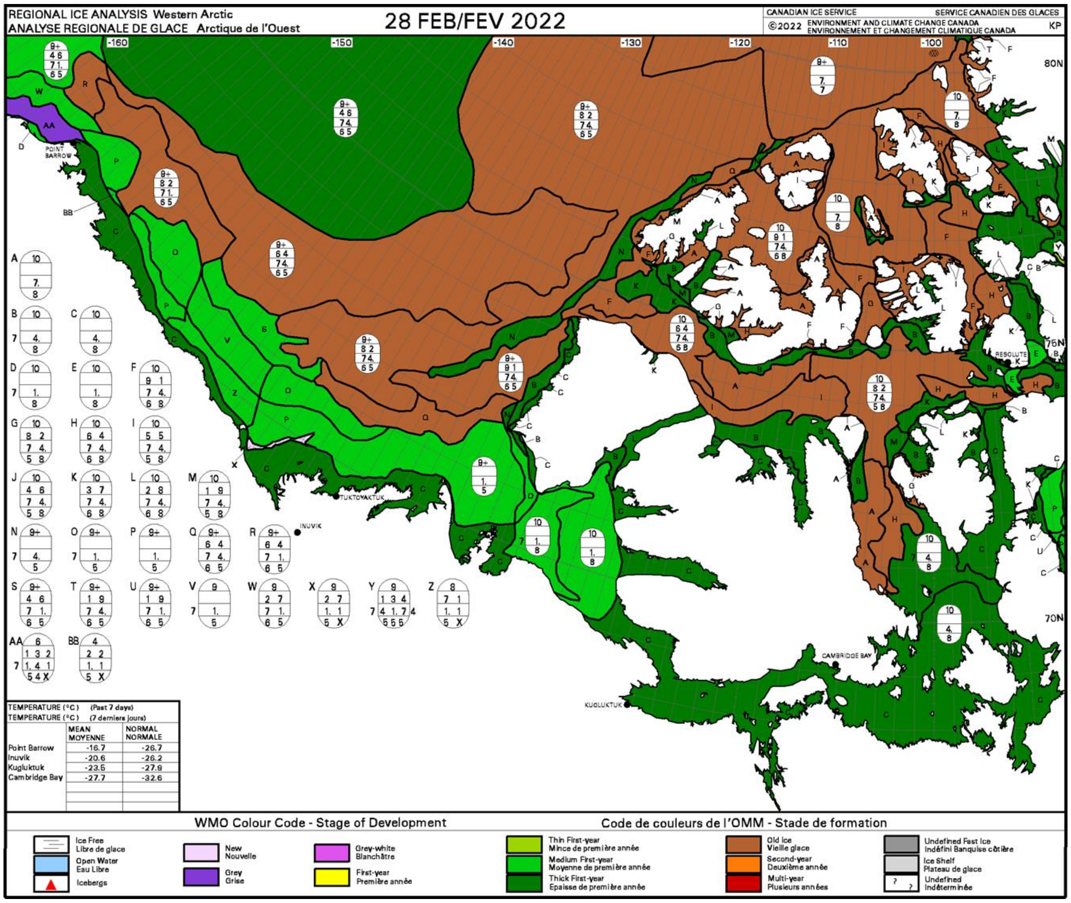


Figure 15 Ice stage of development analysis for the Western Arctic area on February 28th 2022

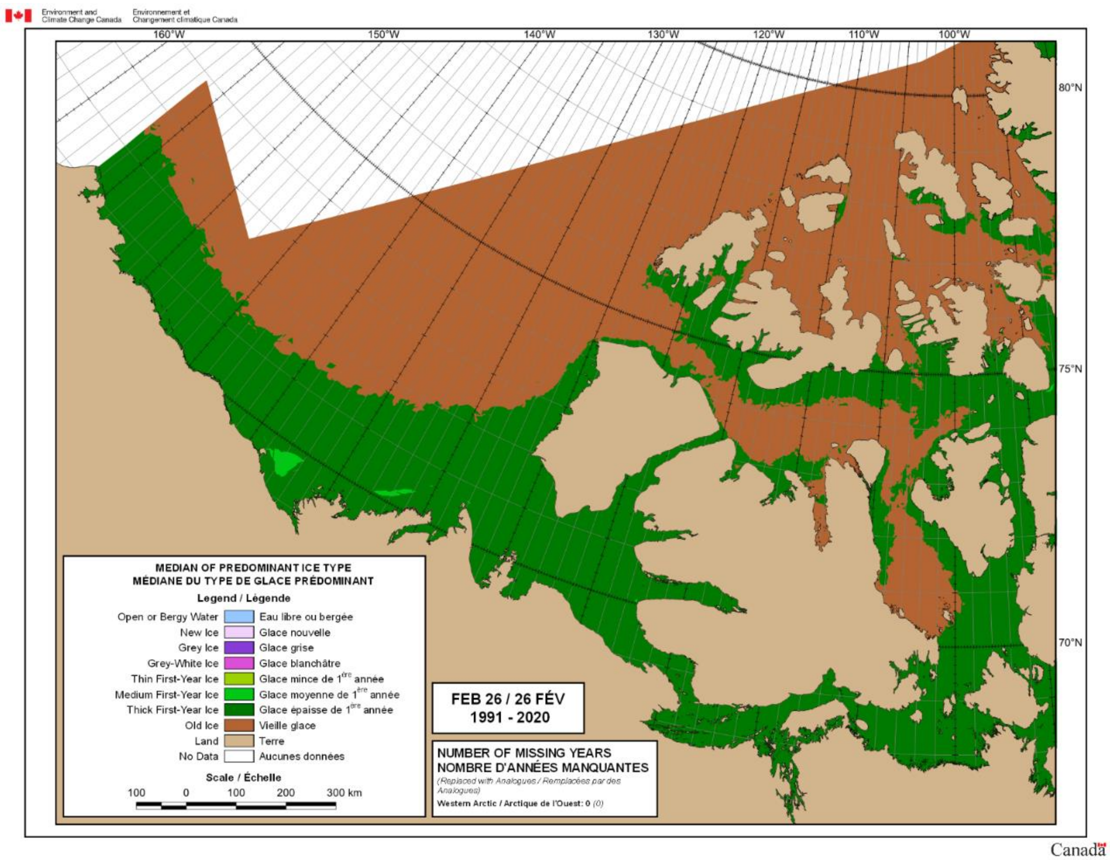
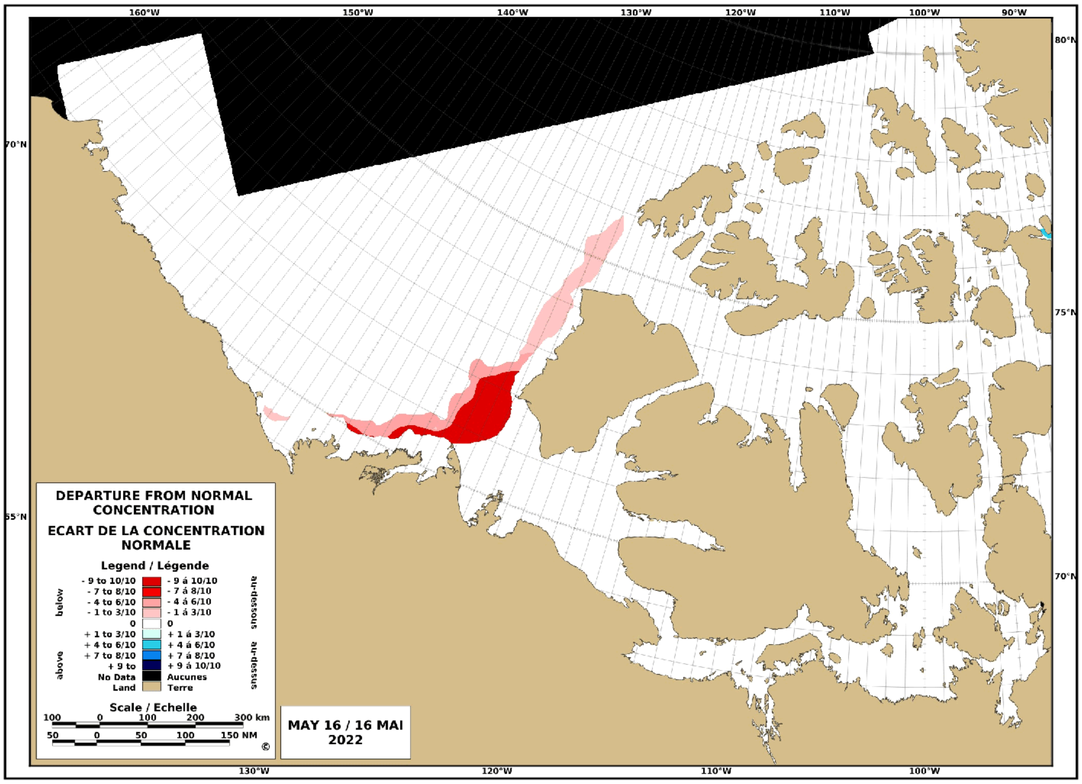


Figure 16 Climatological median (1991-2020) of predominant ice type for the Western Arctic area on February 26th

WESTERN ARCTIC / ARCTIQUE DE L'OUEST



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LES STATISTIQUES BASÉE SUR 1981-2010

Figure 17 Departure from normal ice concentration for the Western Arctic area on May 16th, 2022

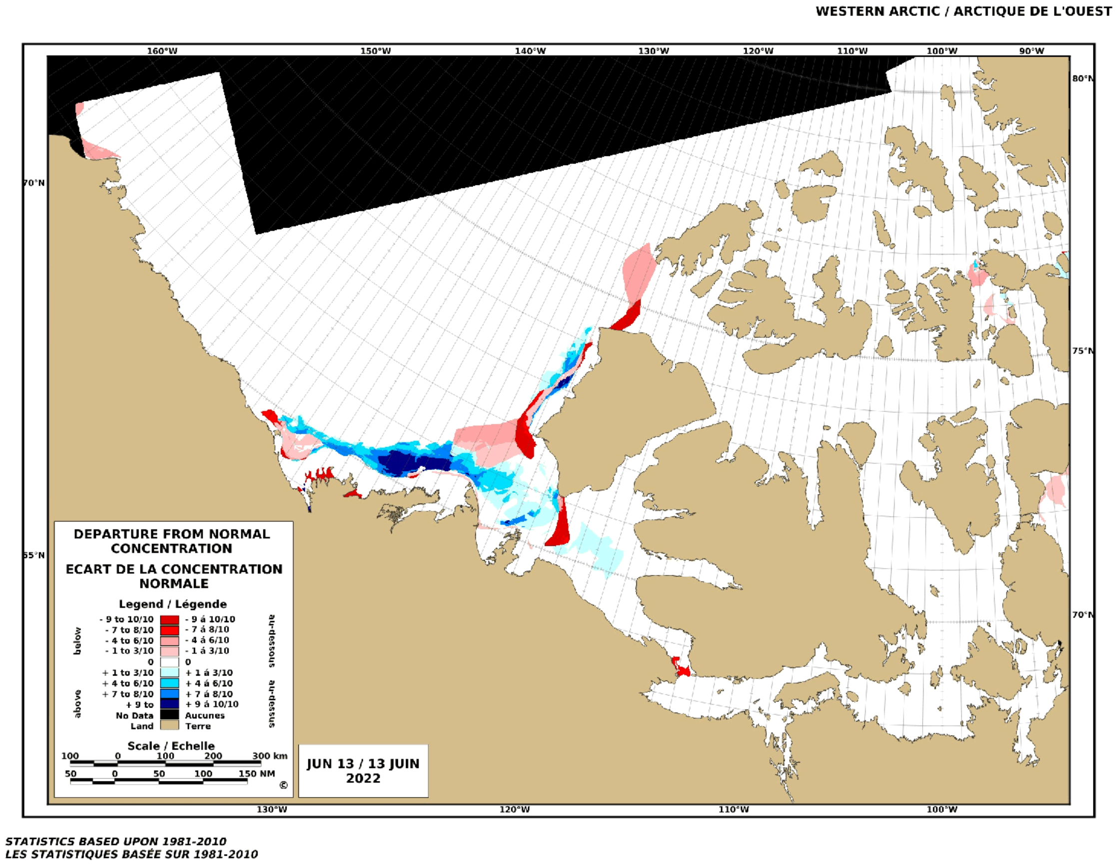

Figure 18: Departure from normal ice concentration for the Western Arctic area on June 13th, 2022.

Station	Actual end of April FDD	Median end of April FDD (1981-2010)	Percent of normal FDD	May average temperatures (°C)	May departure from normal (°C)
Mould Bay	5478	6148	89	-7.5	3.4
Cambridge Bay	4776	5513	87	-7.9	1.2
Kugluktuk	4304	4598	94	-0.8	4.2
Tuktoyaktuk	4176	4271	98	-0.4	3.8

Table 3 End of April freezing degree-days and May temperatures (FDD= Freezing Degree Days)