Environment and Climate Change Canada
Environnement et Changement climatique Canada

Seasonal Summary

North American Arctic Waters

Spring 2021

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 Foxe Basin and northern Davis Strait (Figure 1). As for Hudson Bay, mostly thin and medium first-year ice covered a large portion of the bay except for mostly thin first-year and grey-white ice in the northwestern section. Mainly thin first-year ice covered a large part of Hudson Strait as well as Ungava Bay. Meanwhile, the northern portion of the Labrador coast area had a mix of thin first-year, grey-white and grey ice. At the same time, the central and southern part of the Labrador coast area had mostly grey-white ice except grey and grey-white ice with a trace of thin first-year ice within 10 to 40 nautical miles of the shore. Embedded in the pack ice in northern Davis Strait, just east of the Cumberland Peninsula, was a trace of old ice. Mostly thin first-year ice was present in Cumberland Sound while thin first-year, grey-white and grey ice covered Frobisher Bay.

By mid-February, the ice in most of Hudson Bay, western Hudson Strait and most of Davis Strait thickened to medium first-year ice. The exceptions were the coastal areas of Hudson Bay, the central and eastern parts of Hudson Strait, Ungava Bay as well as southern Davis Strait where a mix of thin and medium first-year ice with some patches of grey-white and grey ice were present. In southern Davis Strait along with most of the Labrador coast, mostly grey-white ice and thin first-year ice with some grey and new ice covered the area.

Ice became predominantly thick first-year ice in most of Foxe Basin during the first week of March and spread into most of the northern part of Hudson Bay and northern Davis Strait by the end of March. Meanwhile, the rest of Hudson Bay, Hudson Strait, southern Davis Strait, and the northern and central Labrador coast experienced a mix of medium and thin first-year ice with some grey-white and grey ice. Due to milder than normal temperatures over most regions, the thickening of the ice was slower than normal. By early May, only the central part of Hudson Bay reached the thick first-year ice stage while the coastal regions of the bay as well as James Bay had a mix of medium and thick first-year ice with some open water areas began to emerge, particularly the eastern coastal area of Hudson Bay. Moderate to strong persistent winds from the northeast caused a significant compression of the ice edge along the Labrador coast as well as the southern Davis Strait area during the last week of April into early May. Hence, the compression of the ice pack along Labrador coast was down to about 30 to 60 nautical miles east of the coast, significantly less than what would normally be observed for the first week of May. The leading edge of old ice reached the central Labrador Coast area by the beginning of May.

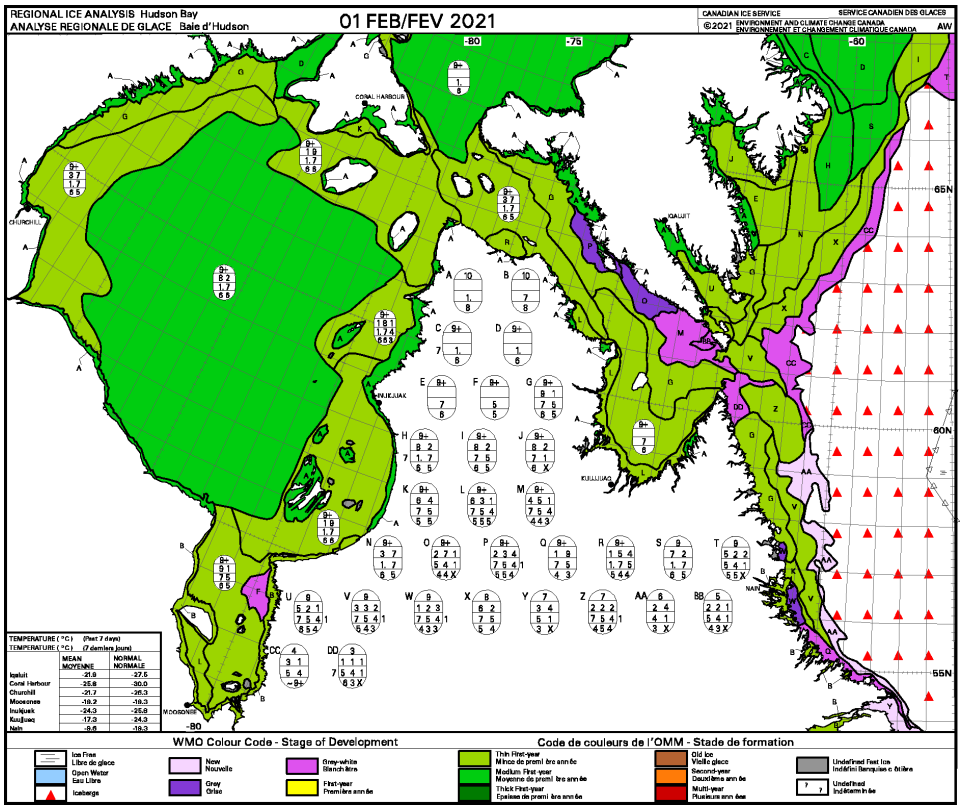

Figure 1: Ice stage of development analysis for the Hudson Bay area on February 1st, 2021.

For almost the entire winter, the ice concentration and extent along the ice edge from Davis Strait to Labrador Sea was less than normal.

Areas of bergy water began to emerge in eastern Hudson Strait and northwestern Ungava Bay during the first week of May and continued to expand during the month of May. Several coastal leads began to form in the Hudson Bay area. On June 1st, areas of open water were located over northwestern Hudson Bay, in parts of James Bay and the east coast of Hudson Bay. The ice concentration along the ice edge in southern Davis Strait and the Labrador Coast was much less than normal on June 1st.

Ice break-up was generally 3 weeks earlier than normal over the entire area (Figure 2).

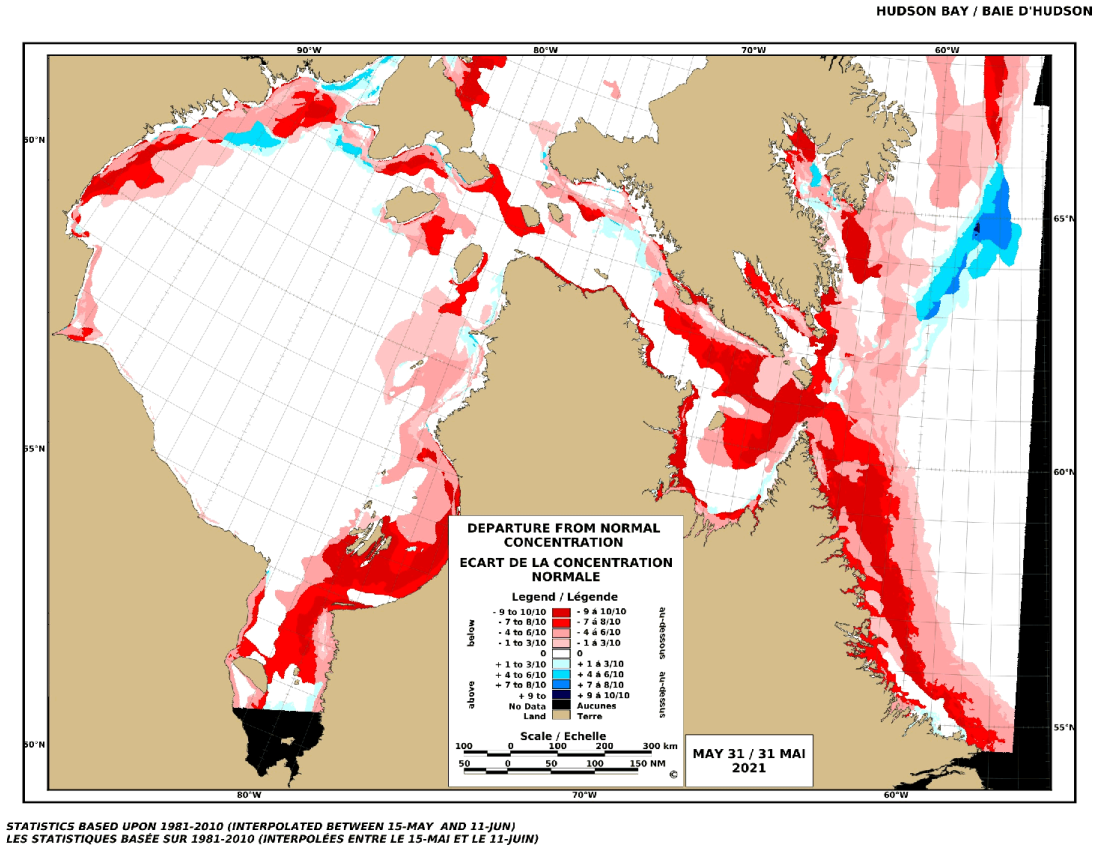

Figure 2: Departure from normal ice concentration for the Hudson Bay area on May 31st, 2021.

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	1410	2254	63	*2.2*	*1.2*
Iqaluit	2943	4019	73	*-2.3*	*2.1*
Kuujjuaq	2269	3188	71	*3.4*	*3.2*
Inukjuak	2670	3316	81	*-1.3*	*0.5*
Cape Dorset	2688	3424	79	*-3.8*	*1.2*
Churchill	3117	3638	86	*-1.8*	*-1.1*
Hall Beach	4275	5229	82	*-8.2*	*0.9*

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, ice was predominantly medium first-year in Baffin Bay with up to 2 tenths old ice in the western section. Prince Regent Inlet as well as the Gulf of Boothia contained mostly medium first-year ice except in the southwestern section of the gulf where medium and thin first-year ice with some grey-white ice was present (Figure 3). Most of Lancaster Sound and eastern Barrow Strait had medium first-year ice including a trace of old ice. Areas of 2 tenths old ice were present in western Lancaster Sound as well as the extreme eastern section of the sound. The western part of Barrow Strait had consolidated medium first-year ice with up to 7 tenths old ice in some areas. The ice bridge of mostly consolidated old ice in southern Kane Basin kept the old ice in the Lincoln Sea from drifting into the Baffin Bay area while also creating an area of mostly grey-white to thin first-year ice in the extreme northwestern part of Baffin Bay. Consolidated thick first-year and old ice was present in the High Arctic while consolidated medium first-year ice with a trace of old ice prevailed in Jones Sound. Consolidated medium first-year ice covered Admiralty Inlet as well as Pond and Navy Board Inlets areas.

By mid-February, the ice in the western part of Lancaster Sound and eastern Barrow Strait thickened to thick first-year ice with up to 2 tenths old ice. By the end of February, Prince of Wales Strait and the Gulf of Boothia area thickened to mostly thick first-year ice. After mid-March, the ice in northwestern Baffin Bay section reached thick first-year ice with areas of up to 2 tenths old ice mostly near the eastern Baffin Island coast. Extreme northwestern Baffin Bay, south of Smith Sound, contained a mix of medium first-year, grey-white, grey and new ice.

At mid-March, concentrations of old ice were above normal north of Cornwallis Island, Kennedy Channel, southern Norwegian Bay and most of Kane Basin into Kennedy Channel. At the same time, the northwestern part of the Queen Elizabeth Islands into northern Norwegian Bay, as well as Committee Bay, had less than normal old ice concentration. Generally near normal old ice was present in the western part of Baffin Bay into northwestern Davis Strait.

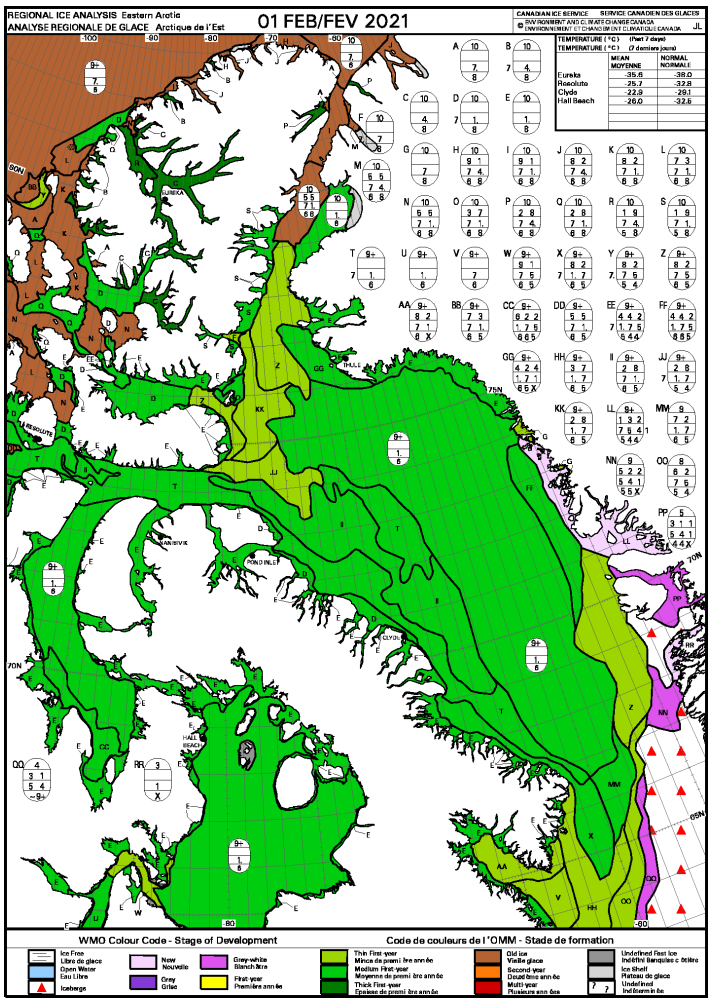

Figure 3: Ice stage of development analysis for the Eastern Arctic area on February 1st, 2021.

By the end of March, most of the drifting ice had thickened to thick first-year ice. The exceptions were in the extreme northwestern part of Baffin Bay as well as near the ice edge in the eastern part of Baffin Bay, where mostly thin and medium first-year ice with some grey-white and grey ice prevailed. Cumberland Sound had grey-white and grey ice with some thin first-year ice due to export of ice into Davis Strait. Note the lack of consolidated ice in most of Prince Regent Inlet as well as the eastern and central part of Barrow Strait. These areas normally become consolidated during the winter period however, they did not occur this season.

By mid-April, thin first-year ice with some grey-white and grey ice was still present over northwestern Baffin Bay. Elsewhere in Baffin Bay and most of northern Davis Strait, ice thickened to thick first-year ice. Up to 2 tenths old ice was observed over the western sections. Lancaster Sound and most of Barrow Strait had mainly thick first-year ice with patches of up to 2 tenths old ice. Prince of Wales Strait was covered with thick first-year ice with the northern reaches had a trace of old ice. The Gulf of Boothia area was mostly thick first-year except in southern Committee Bay where mostly medium first-year ice with some thick first year ice prevailed.

Once again, mild temperatures were observed over most of the region in May. This triggered an earlier than normal onset of ice melt in northwestern Baffin Bay as well as along the ice edge in most of eastern

Baffin Bay. Lancaster Sound and Barrow Strait were also impacted as the ice pack in these areas was exported eastwards during the month. The bergy water lead over the southeastern part of Baffin Bay propagated northwards along the Greenland coast to reach northwest of Disko Island by the end of the month. In the meantime, concentrations of ice in the northwestern Baffin Bay area began to decrease after mid-May. The bergy water area was beginning to emerge during the latter part of the month from south of Smith Sound into extreme northwestern Baffin Bay however the area just south observed weak easterly winds which slowed down the progress of the bergy water further south.

Ice melt was slightly earlier than climatology (1981-2010) over most the northwestern part of Baffin Bay (Figure 4) by the end of the month. Meanwhile, the eastern parts of Baffin Bay and northern Davis Strait saw ice melt that was 2-3 weeks earlier than normal. Northern Lancaster Sound and Barrow Strait also experienced lighter than normal ice concentration due to persistent northerly circulation over the area during the last two weeks of May.

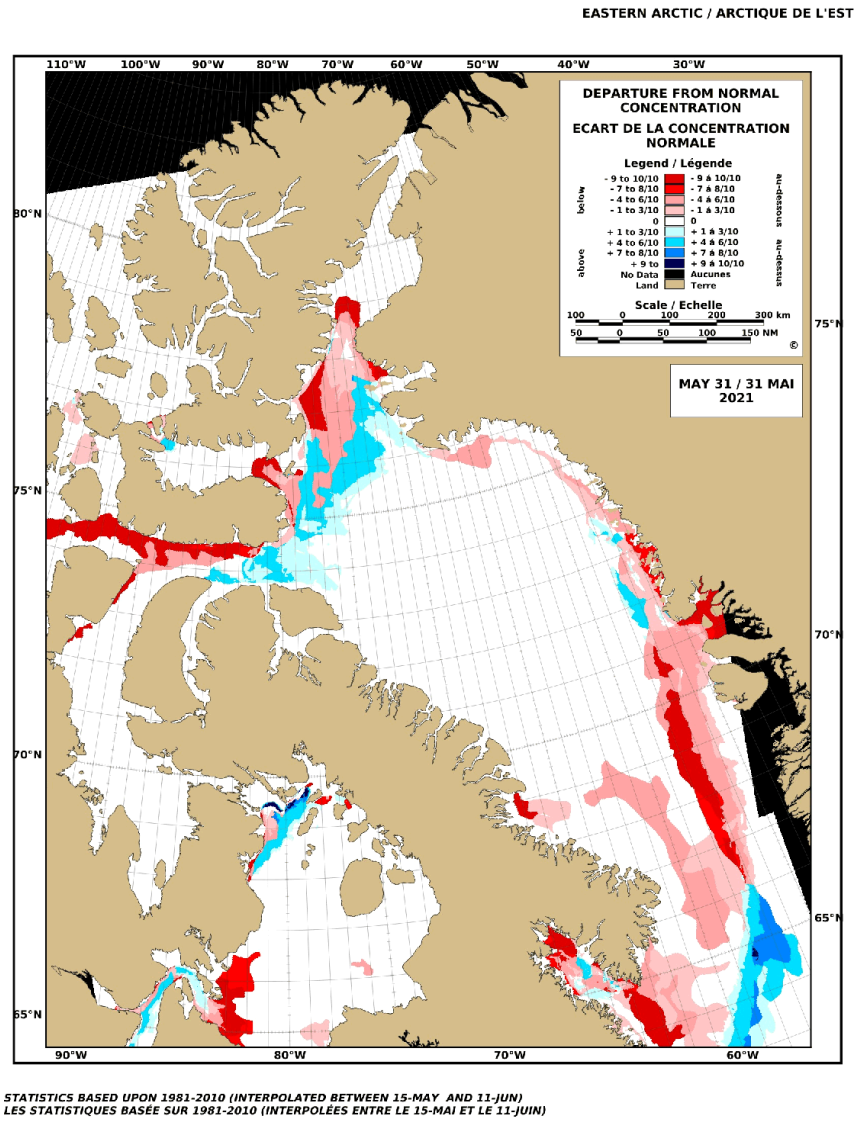

Figure 4: Departure from normal ice concentration for the Eastern Arctic area on May 31st, 2021**.**

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	3742	4678	80	*-6.5*	*1.7*
Pond Inlet	4343	5433	91	*-6.0*	*3.2*
Resolute	4715	5797	80	*-10.6*	*0.2*
Eureka	5788	7131	81	*-7.5*	*3.5*

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, medium first-year ice with some old ice was present over the southwestern part of the Beaufort Sea. Over the eastern Beaufort Sea, the Arctic Ocean, as well as M'Clure Strait, mostly old ice with some medium first-year ice was present. The leading edge of the old ice was located within 20-60 nautical miles of the coast from Prudhoe Bay to Baillie Island. Consolidated medium first-year ice with a trace of old ice was present in the shallow waters along most of the coast of the Alaska and NWT coasts as well as the southern part of Amundsen Gulf and Prince of Wales Strait. The shipping route from Dolphin and Union Strait to western Queen Maud Gulf had medium first-year ice however, the rest of Queen Maud had consolidated old and medium first-year ice. A significant portion of Victoria Strait and Larsen Sound had mobile medium first-year ice including a trace of old ice with the exception of the eastern side of Victoria Strait where old and medium first-year ice was present. Consolidated medium first-year ice including a trace of old ice covered Peel Sound. Consolidated old and thick first-year ice prevailed in eastern M'Clure Strait and western Viscount Melville Sound, as well as around the Queen Elizabeth Islands. Most of M'Clintock Channel and western M'Clure Strait was still mobile with old and medium first-year ice

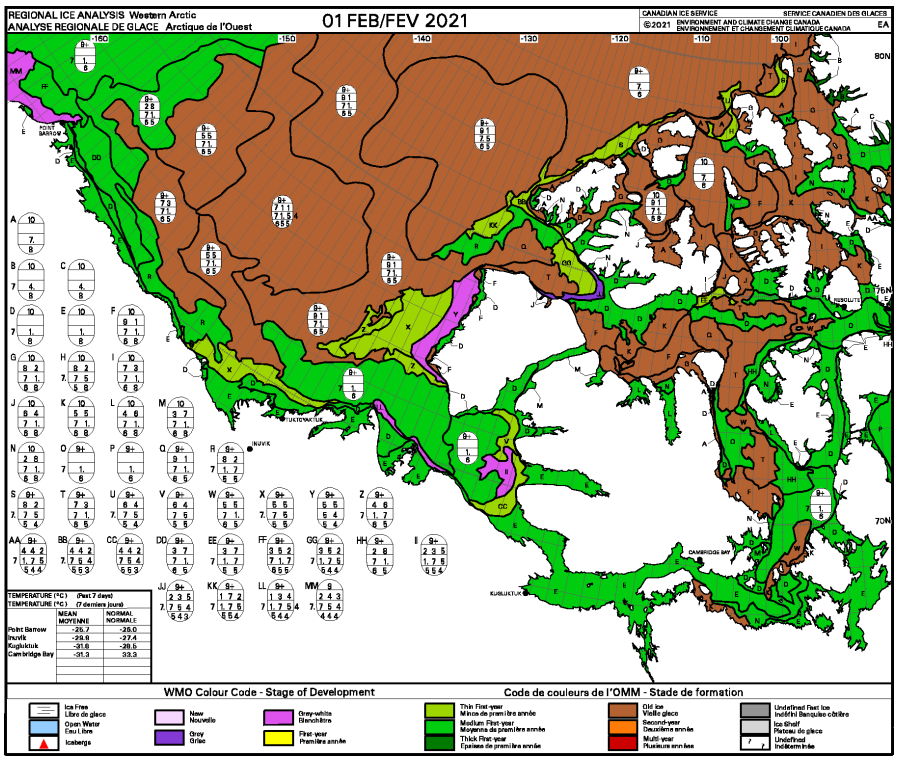

Figure 5: Ice stage of development analysis for the Western Arctic area on February 1st, 2021.

At mid-February, most of the ice thickened to thick first-year ice except over the southern Beaufort Sea as well as Amundsen Gulf were a mix of medium and thick first-year ice prevailed. Meanwhile, most of Victoria Strait, M'Clintock Channel became consolidated while the eastern Viscount Melville Sound

achieved that state by the end of February. Over the southern Beaufort Sea, the leading edge of old ice remained mostly unchanged at about 20 to 60 nautical miles north of the Alaska and NWT coasts. The old ice edge was further south than normal for that time of year. Ice thickened to thick first-year ice near mid-February in eastern Coronation Gulf and Queen Maud Gulf. Amundsen Gulf and western Coronation Gulf reached thick first-year ice at the beginning of March.

By the last week of April, open water leads or areas of lower ice concentration emerged along the consolidated ice edge from Point Barrow to Amundsen Gulf as well as west of Banks Island. These areas of open water continued to expand during most of the month of May. Patches of consolidated ice along the Tuktoyaktuk Peninsula fractured and were carried away westwards with predominantly southeasterly winds. By the end of the month, winds had shifted and caused the looser area of ice with open water to decrease. Despite that, the breakup was still ahead of the median ice conditions, in particular the Amundsen Gulf and west of Banks Island (See Figure 6).

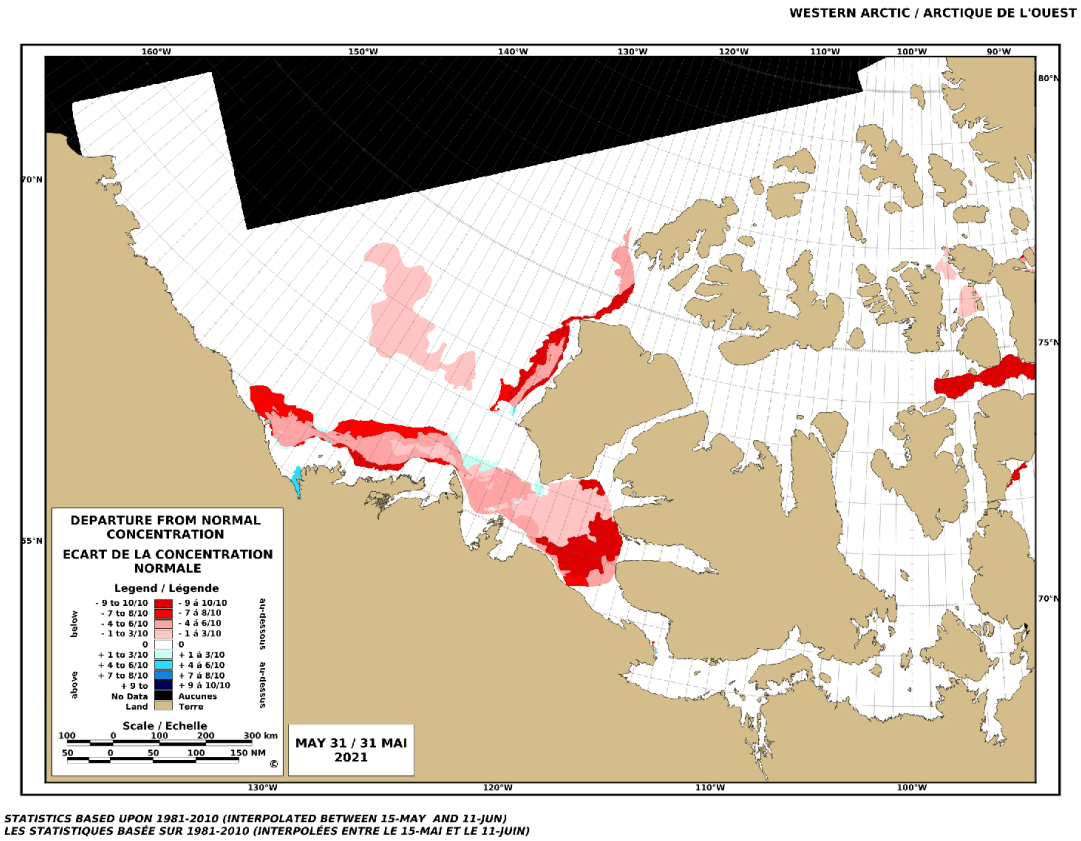

Figure 6: Departure from normal ice concentration for the Western Arctic area on May 31st, 2021.

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	5342	6148	87	-10.8	0.1
Cambridge Bay	4986	5513	90	-9.3	-0.2
Kugluktuk	4472	4598	97	-4.1	-0.9
Tuktoyaktuk	4254	4271	100	-3.2	1.0

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