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Seasonal Summary

North American Arctic Waters Summer 2015

By



Canadian Ice Service
Le service canadien des glaces

Hudson Bay and the Labrador Coast

Summer Ice Conditions and Fall Freeze-up

Summer Temperatures: June to September

Surface air temperatures were near normal values over most locations except slightly below normal over southern Davis Strait and slightly above normal over James Bay (figure 1).

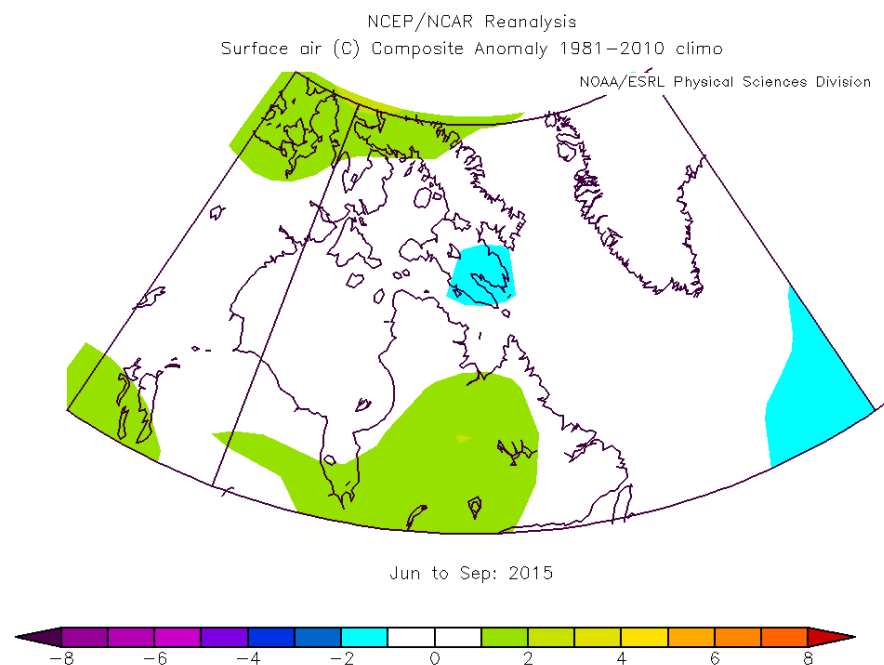


Figure 1: Air temperature anomaly for the Hudson Bay area from June to September

Summary of Ice Conditions:

In June, close to very close pack medium and thick first-year ice was present over the area. Multiple bands of up to 4 tenths of old ice were observed in Davis Strait and the Labrador coast.

Persistent westerly winds over Hudson Bay during the month of May caused a large area of open water to form in the northwestern section of the bay, 5 to 6 weeks earlier than normal. By early June the winds had weakened, but re-intensified during the second half of the month, compressing the ice pack along the eastern shore of Hudson Bay and delaying the melt along the coast by 5 to 6 weeks. Conditions started to

improve later in July, as easterly winds over the area moved the ice away from the shore.

During this time a persistent southeasterly wind circulation developed over Davis Strait, compressing the ice along Baffin Island and delaying ice melt by 4 to 5 weeks in Frobisher Bay and by 10 to 11 weeks in Cumberland Sound. The easterly winds also compressed the ice in southern Foxe Basin along Southampton Island, delaying the ice melt near Foxe Channel by 10 to 11 weeks.

First-year and old ice were still present in Cumberland Sound at the end of September, as new ice started to form in the vicinity. The last time ice survived the summer melt in Davis Strait was in 1983 (figure 4).

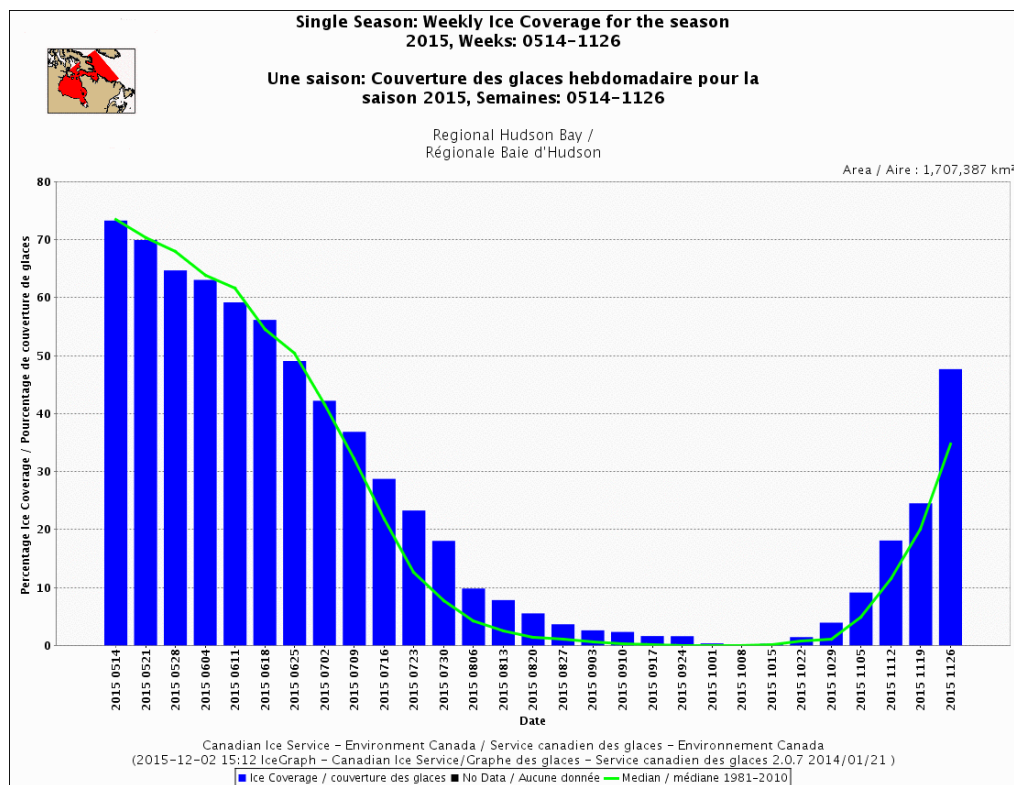


Figure 2: Weekly ice coverage for the Hudson Bay area for the 2015 season

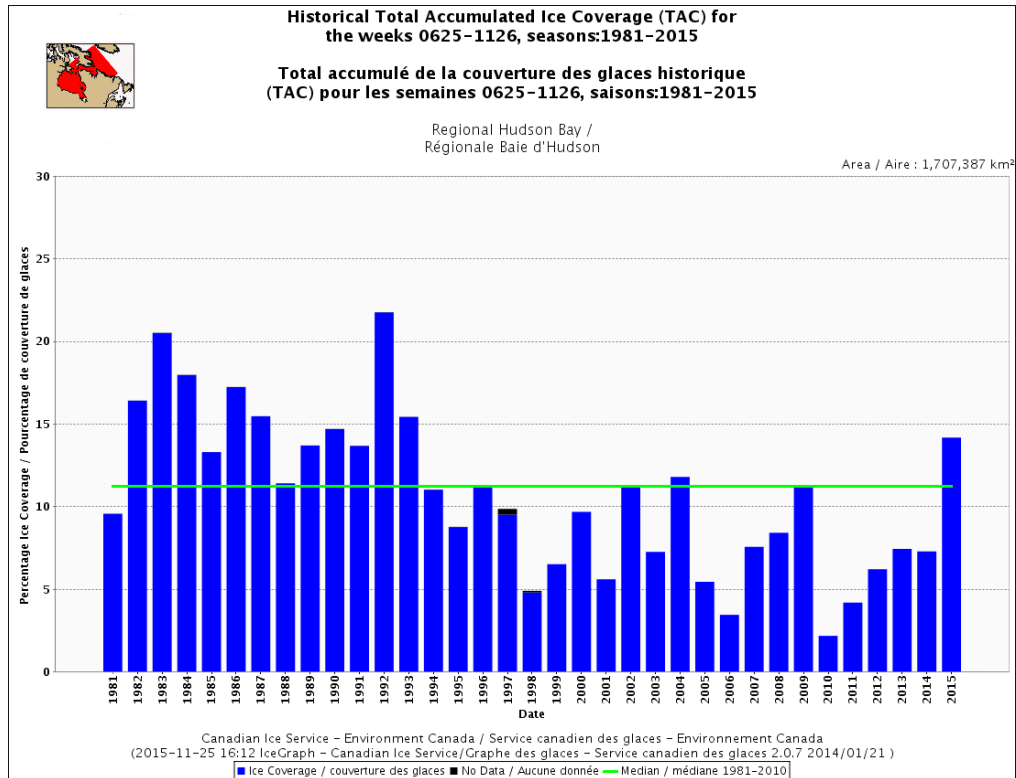


Figure 3: Historical Total Accumulated Ice Coverage for the Hudson Bay area

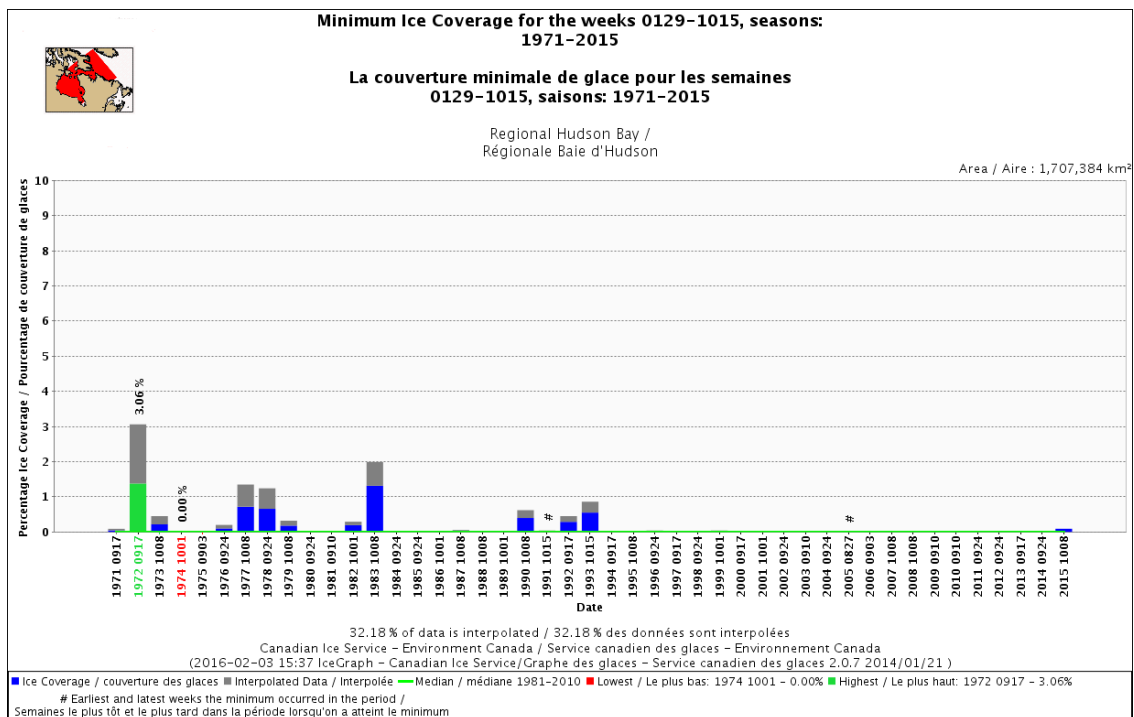


Figure 4: Minimum Ice Coverage for the Hudson Bay area, 1971-2015

June Ice Conditions:

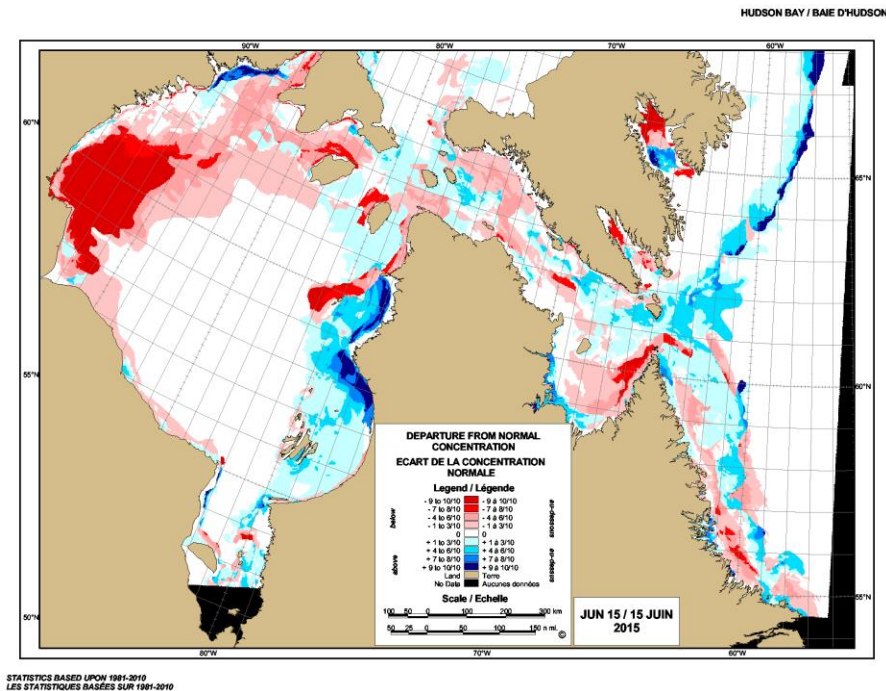


Figure 5: Departure from normal ice concentration for the Hudson Bay area near mid-June

At the beginning of June the ice along the Labrador coast had already receded to near 53N, just east of Cartwright. Open drift to close pack first-year ice was present south of Groswater Bay and in Lake Melville. Close to very close pack first-year ice was present north of Groswater Bay and within 120 nautical miles of the Labrador coast. A trace of old ice was embedded along the Labrador coast with a thin band of 2 tenths of old ice north of 57N.

The ice melted completely over Lake Melville during the first week of June. By the end of the third week, the ice edge had retreated north of Groswater Bay. Very open drift first-year ice including a trace of old ice was present along the mid-Labrador coast, while the larger concentrations remained to the north. Near the end of June, the ice had receded to the northern Labrador coast and consisted of very open drift first-year and old ice.

Over Davis Strait, close to very close pack first-year ice including a trace of old ice was present in Davis Strait within 180 nautical miles of Baffin Island at the beginning of the month. Multiple bands of up to 4 tenths of old ice were embedded in the pack ice. Areas of open water and very open drift first-year ice were observed in the northwestern sections of Frobisher Bay and Cumberland Sound.

During the second half of June, persistent southeasterly winds compressed the ice pack along the Baffin Island coast, reducing the ice extent by 60 to 120 nautical miles and closing the areas of bergy water in Frobisher Bay and Cumberland Sound.

Very close pack first-year ice was present over Hudson Strait, Foxe Basin, and Hudson Bay at the beginning of the month, with the exception of a large area of open water along the northwestern shore of Hudson Bay and the southern coast of Southampton Island. Open water leads were also present along the western shores of Foxe Basin and Ungava Bay, and the northern shore of Hudson Strait. A trace of old ice was present in the eastern section of Hudson Strait.

Ice concentrations gradually diminished through June over southern Hudson Strait, southern James Bay, and southeastern Foxe Basin to become open drift to close pack first-year ice by the end of the month. Periods of westerly winds during the second half of June kept the ice compressed along the eastern shore of Hudson Bay, preventing normal ice melt from occurring in that area.

July Ice Conditions:

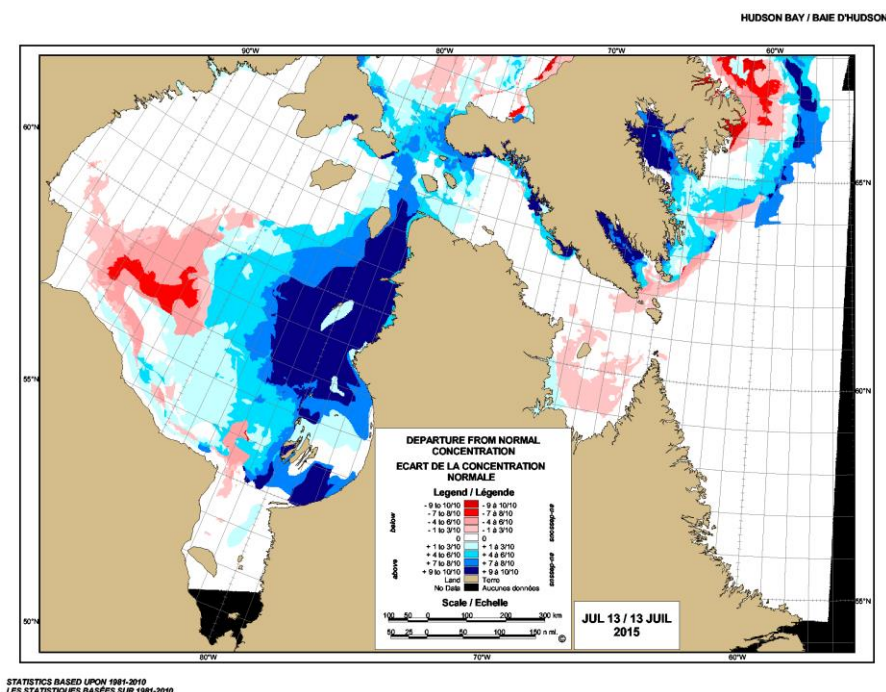


Figure 6: Departure from normal ice concentration for the Hudson Bay area near mid-July

During the first two weeks of July, the ice completely melted along the Labrador coast and most of Hudson Strait. By mid-month, ice conditions in Hudson Strait mostly consisted of bergy water except for very open to open drift first-year ice along the

western shore of Ungava Bay and the extreme western section of Hudson Strait. Close to very close pack first-year ice was still present along the northern shore. The ice melted completely in Hudson Strait near the end of July.

Ice concentrations decreased throughout the month in the central and southeastern parts of Foxe Basin, as well as along the northern and eastern shores. By the end of July, very close pack first-year ice was present in the southwestern portion of Foxe Basin, near Foxe Channel. Elsewhere, ice conditions consisted of areas of close to very close pack first-year ice interspaced with areas of open water near the shore and over the central section.

Ice melted completely in northwestern Hudson Bay and James Bay during the third week. The size of the ice pack in eastern Hudson Bay continued to decrease. During the second half of July, periods of easterly winds pushed the ice pack away from the eastern shore which allowed for more rapid melting. By the end of the month, concentrations within the ice pack in the southeastern part of Hudson Bay had diminished to mostly close pack first-year ice.

Strong and persistent southeasterly winds in Davis Strait compressed the ice along the Baffin Island coast and into Frobisher Bay and Cumberland Sound. By mid-month, very close pack first-year ice including up to 2 tenths of old ice prevailed in Frobisher Bay, Cumberland Sound, and in Davis Strait within 30 to 120 nautical miles of Baffin Island.

During the second half of July, ice concentrations began to diminish over southern Davis Strait and Frobisher Bay. By the end of the month, ice conditions in these areas consisted mostly of bergy water except for very close pack first-year and old ice along parts of the Baffin Island coast and in the northwestern section of Frobisher Bay. Very close pack first-year ice including up to 3 tenths of old ice remained in Cumberland Sound and in northern Davis Strait within 100 nautical miles of Baffin Island.

August Ice Conditions:

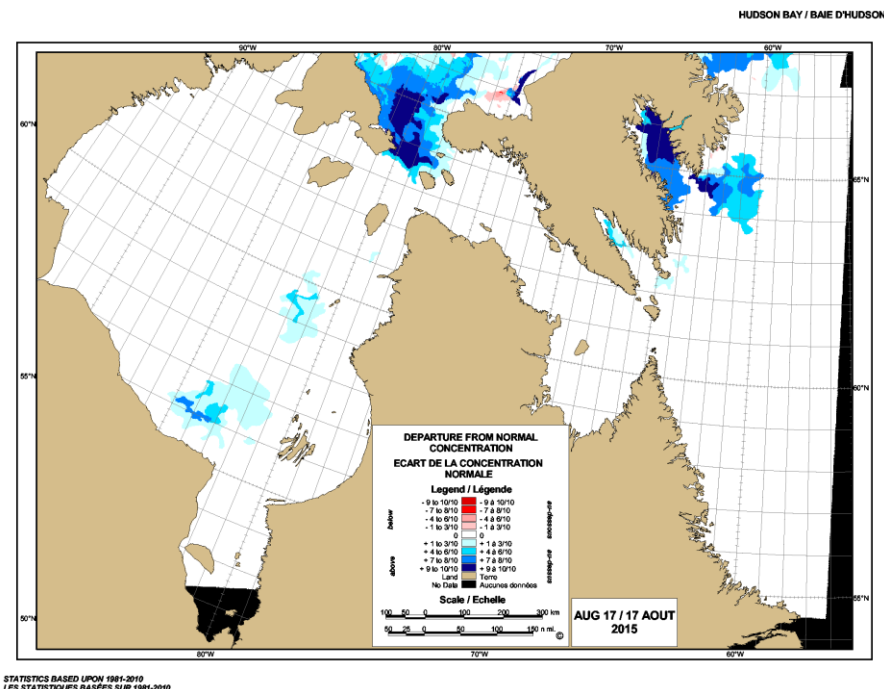


Figure 7: Departure from normal ice concentration for the Hudson Bay area near mid-August

The pattern of persistent winds seen in previous months mostly abated in August, and ice concentrations started declining more rapidly. The ice over the southern parts of Cumberland Sound finally started melting during the second week of August. By the middle of the month, ice free conditions largely dominated over Hudson Bay except for a few areas of very open drift first-year ice over the central and southeastern sections. In southern Davis Strait, the ice melted completely during the third week.

At the end of August, only a few isolated areas of very open drift first-year ice remained in southern Hudson Bay, northern Foxe Basin, northern Davis Strait and northwestern Frobisher Bay. Larger concentrations of first-year ice still remained near Foxe Channel. In Cumberland Sound, ice conditions were a mix of open drift first-year and old ice except for very close pack first-year including up to 3 tenths of old ice in the northern section.

September Ice Conditions:

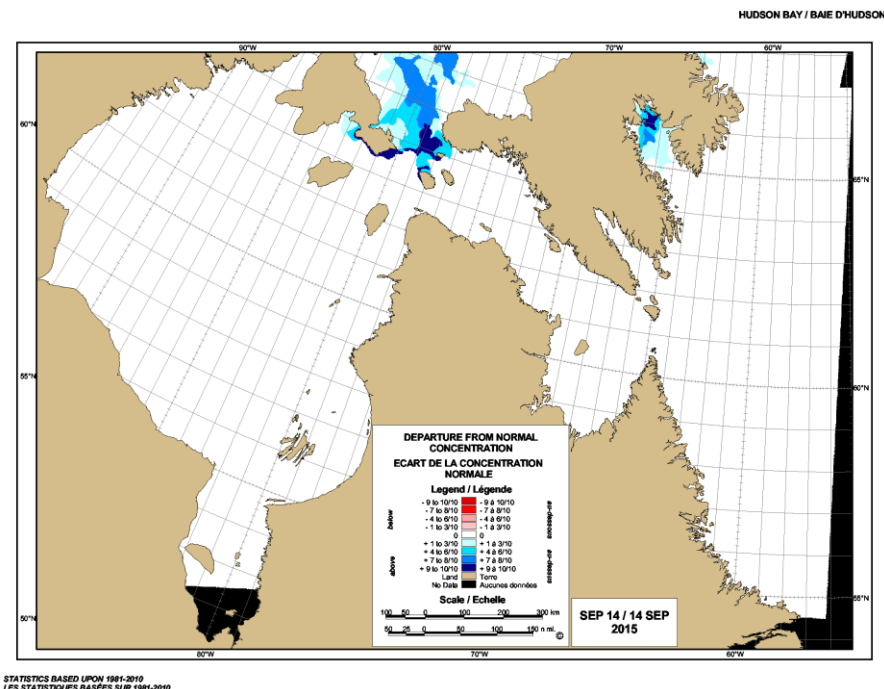


Figure 8: Departure from normal ice concentration for the Hudson Bay area near mid-September

During the first week of September, the last few remaining strips of first-year ice melted completely over the extreme southern section of Hudson Bay, northwestern Frobisher Bay and northern Davis Strait. The following week, the remaining ice melted over northern Foxe Basin. First-year ice continued to melt in Cumberland Sound, leaving behind predominantly old ice. Close to very close pack first-year ice remained in the southern section of Foxe Basin, near Southampton Island and Foxe Channel, but gradually decreased to open drift ice by the end of the month.

During the second half of the September, temperatures started to dip below freezing in the Davis Strait area, and patches of new ice started to form in the vicinity of the old ice in Cumberland Sound. By the end of September, a mix of open drift old and first-year ice was present in the extreme northern part of the sound.

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 most locations, except near normal over southern Baffin Bay.

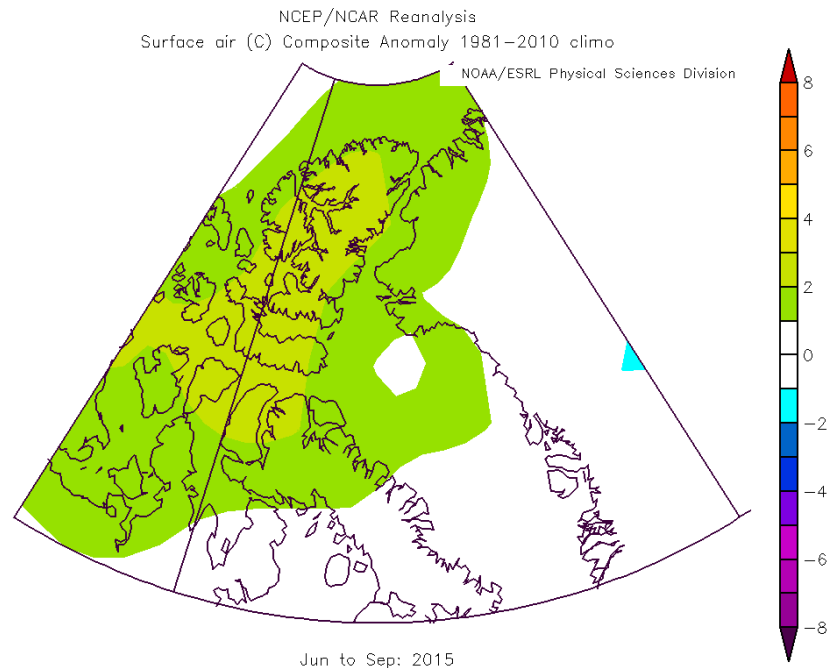


Figure 9: Air temperature anomaly for the Eastern Arctic area from June to September

Summary of Ice Conditions:

At the beginning of June, eastern Parry Channel and extreme northwestern Baffin Bay were mainly bergy water. Elsewhere in Baffin Bay, ice conditions consisted predominantly of very close pack first-year ice. In the archipelago, ice remained mostly consolidated. A trace of old ice was present over most locations in the Arctic, with higher concentrations of old ice observed in a few locations including: along the shore in Boothia Bay, in the form of elongated patches over central Baffin Bay, and in the Arctic Archipelago north of 75N.

Throughout the summer months, ice melted roughly 1 to 3 weeks earlier than climatology (1981-2010). Notable exceptions were near Barrow Strait, where ice melt

occurred 7 to 8 weeks early; and southern Baffin Bay where ice melt occurred 5 to 6 weeks late.

The overall minimum ice extent for the region occurred in early September and was slightly less than normal. First-year ice surviving the summer melt was observed in Gulf of Boothia, Nares Strait, Norwegian Bay, and elsewhere over the Queen Elizabeth Islands.

New ice began to form in the High Arctic during the second half of September and spread southward over the following weeks, 1 to 2 weeks later than normal.

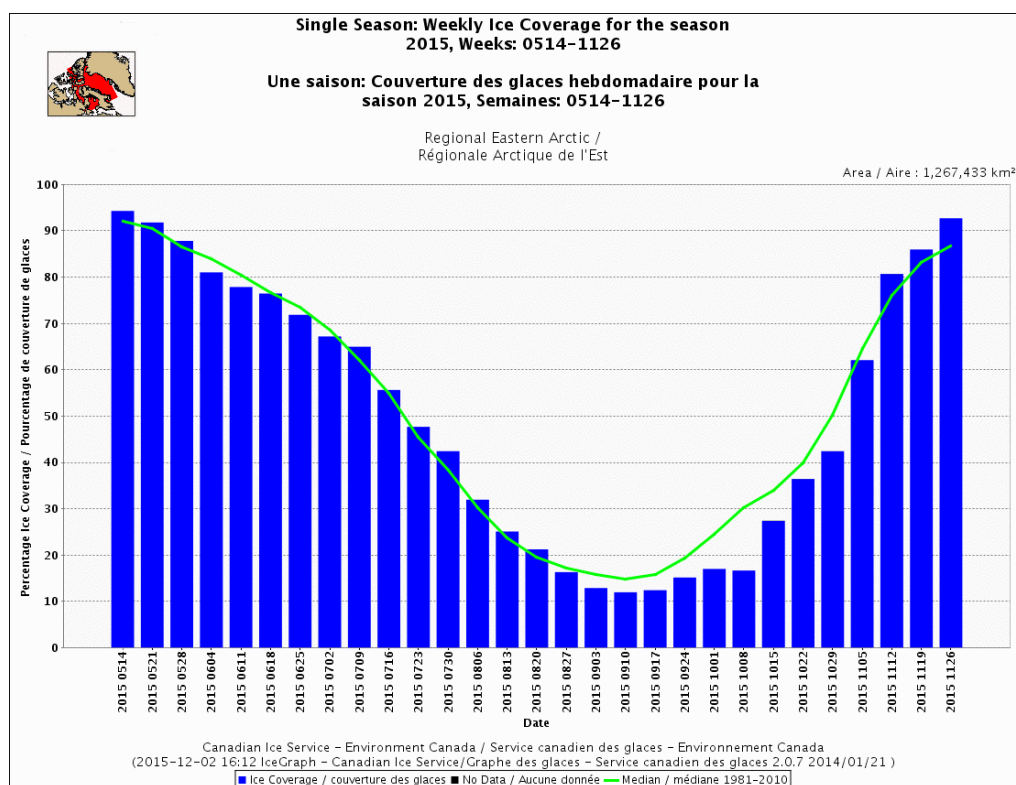


Figure 10: Weekly ice coverage for the Eastern Arctic area for the 2015 season

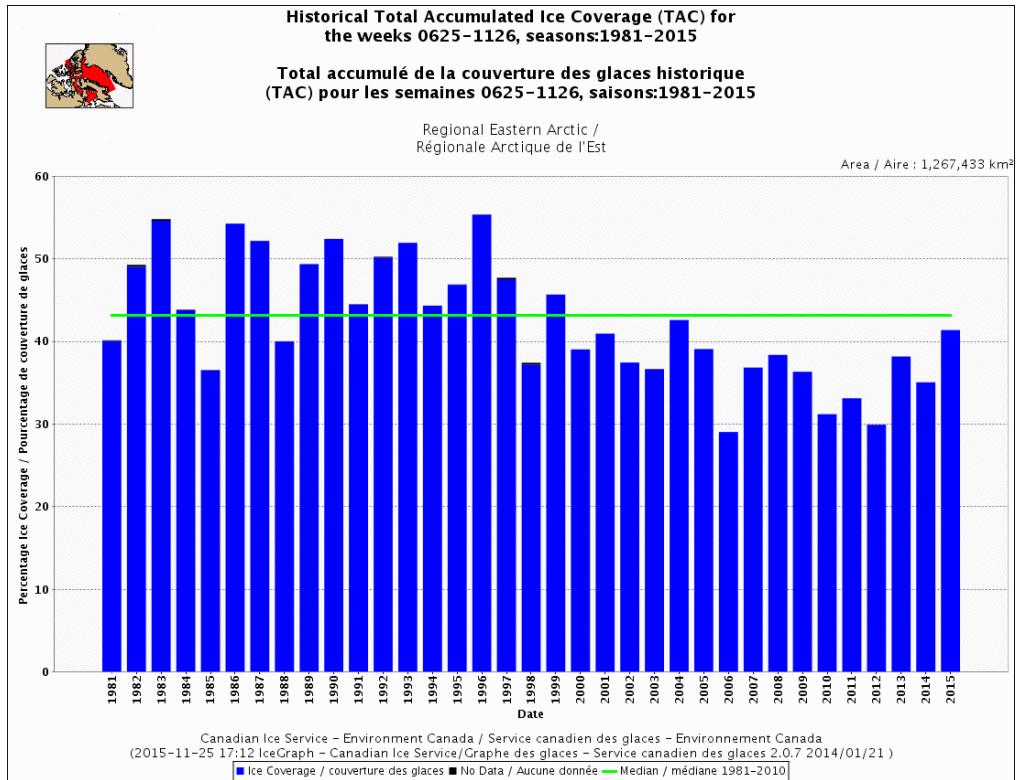


Figure 11: Historical Total Accumulated Ice Coverage for Eastern Arctic area

June Ice Conditions:

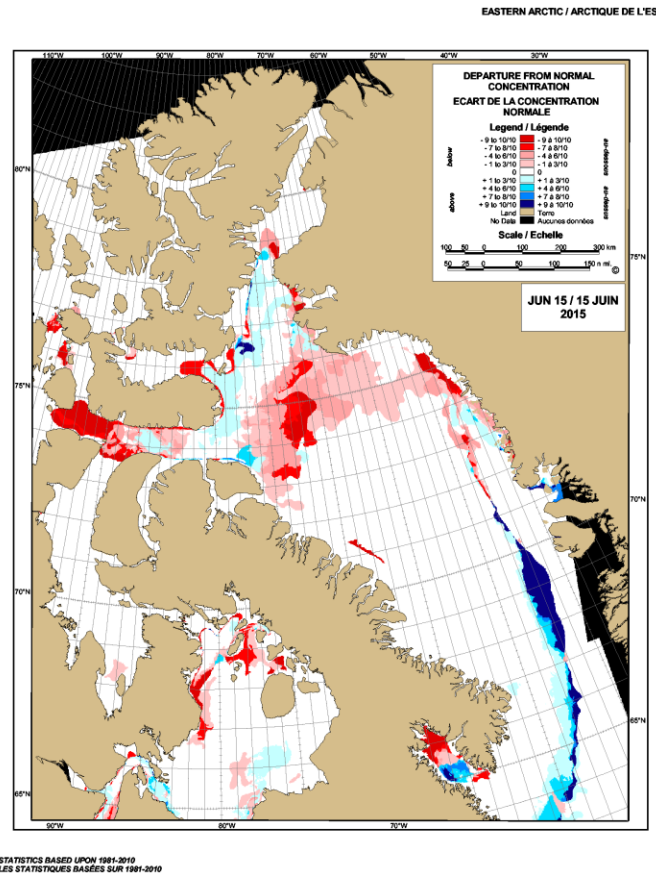


Figure 12: Departure from normal ice concentration for the Eastern Arctic area near mid-June

At the beginning of June, large areas of bergy water and very open drift first-year ice were present in eastern Barrow Strait, western Lancaster Sound and the extreme northwestern section of Baffin Bay.

During the month, the ice in Baffin Bay slowly receded from the north. Open drift first-year ice including a trace of old ice observed in eastern Lancaster Sound at the beginning of June became very open drift ice near the middle of the month. A bergy water lead started developing along the Greenland coast early in June and spread northward to 75°N by the end of the month. As the ice pack retreated southward, bergy water mostly dominated in northwestern Baffin Bay north of 74°N.

During the fourth week, the consolidated ice in Prince Regent Inlet fractured, becoming very close pack first-year ice including a trace of old ice. Elsewhere in the Arctic, consolidated first-year ice remained. A trace of old ice was present in Eureka Sound, eastern Norwegian Bay, western Barrow Strait, Prince Regent Inlet, Pond Inlet, and along the Baffin Island coast. Consolidated old ice was present in larger concentrations

over southern Gulf of Boothia, Navy Board Inlet, Kane Basin, western Norwegian Bay, and elsewhere over the Queen Elizabeth Islands.

July Ice Conditions:

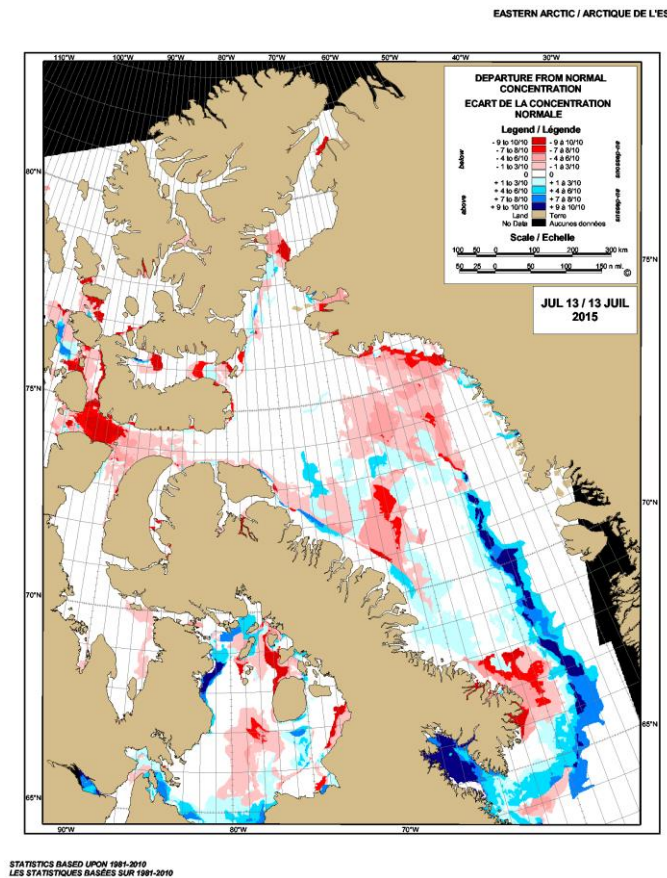


Figure 13: Departure from normal ice concentration for the Eastern Arctic area near mid-July

During the first two weeks of July, consolidated old ice over western Kane Basin fractured and started to drift southward. Consolidated ice fractured over Eureka Sound and Jones Sound during the third week and over Norwegian Bay near the end of the month. By then, Jones Sound, southern Norwegian Bay, and Eureka Sound were mainly bergy water.

To the south, consolidated ice fractured completely over western Barrow Strait and Wellington Channel during the second week of July, over Pond Inlet during the third week, and over Admiralty Inlet and Navy Board Inlet during the fourth week. At the end of July, the ice had completely melted over these areas except for very close pack first-

year ice including a trace of old ice over western Barrow Strait and southern Admiralty Inlet.

Over Baffin Bay, the pack ice continued to recede rapidly from the north and the west. Near the end of the month, consolidated ice along the Baffin Island coast started to fracture. Baffin Bay was mainly bergy water except for close to very close pack first-year ice including a trace of old ice in the southwestern section of the bay and along the Baffin Island Coast. Up to 2 tenths of old ice was present in the main pack ice.

August Ice Conditions:

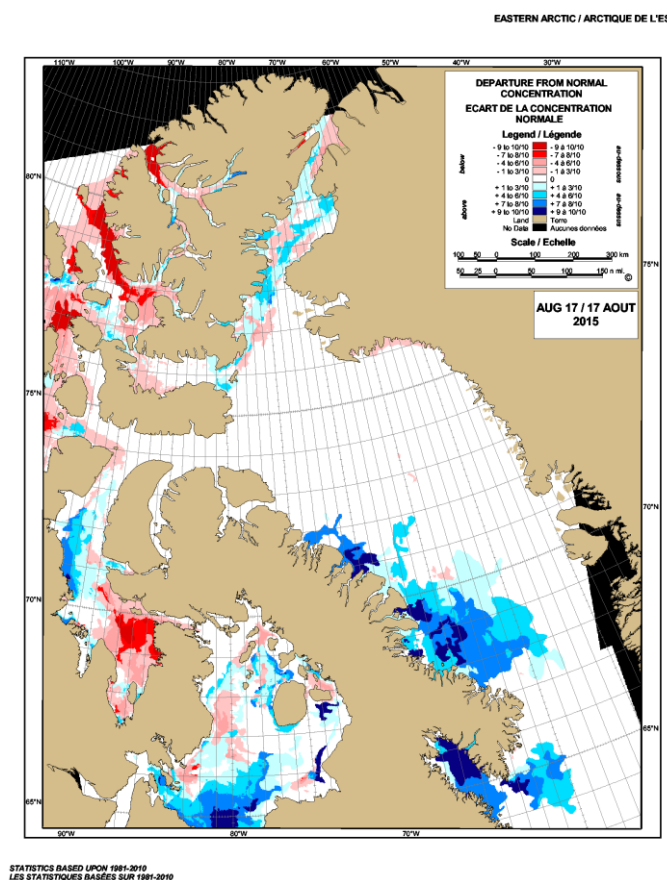


Figure 14: Departure from normal ice concentration for the Eastern Arctic area near mid-August

During the first week of August, the last remaining ice in Jones Sound melted completely. Close pack old and first-year ice present in Kane Basin at the beginning of the month continued drifting southward along Ellesmere Island over the following weeks. In Norwegian Bay, very close pack old and first-year ice became very open to open drift ice. Throughout the month, small amounts of old ice drifted into the extreme

western and eastern sections of Jones Sound from Norwegian Bay and Nares Strait. During this time, close pack old and first-year ice also drifted into Eureka Sound from Nansen Sound. However, by the end of the month only a few large floes of old ice remained over the extreme northern section of Eureka Sound.

To the south, very open drift old ice in Navy Board Inlet melted completely during the first week of August. Very close pack first-year ice in southern Admiralty Inlet melted the following week. By the end of the third week, ice concentrations over southern Prince Regent and the northern and eastern sections of Gulf of Boothia Inlet had declined to very open drift first-year ice including a trace of old ice. However, very close pack ice remained along the southwestern shore at the end of August. Over western Barrow Strait, ice melt progressed more rapidly during the second half of August as ice concentrations diminished to open drift ice by the end of the month.

Most of the remaining consolidated ice along the Baffin Island coast fractured during the first week of August. Afterwards, ice slowly melted in southwestern Baffin Bay, becoming close pack ice near the middle of the month. By the end of August, very open drift ice remained in the extreme southwestern portion of Baffin Bay and along parts of Baffin Island coast.

September Ice Conditions:

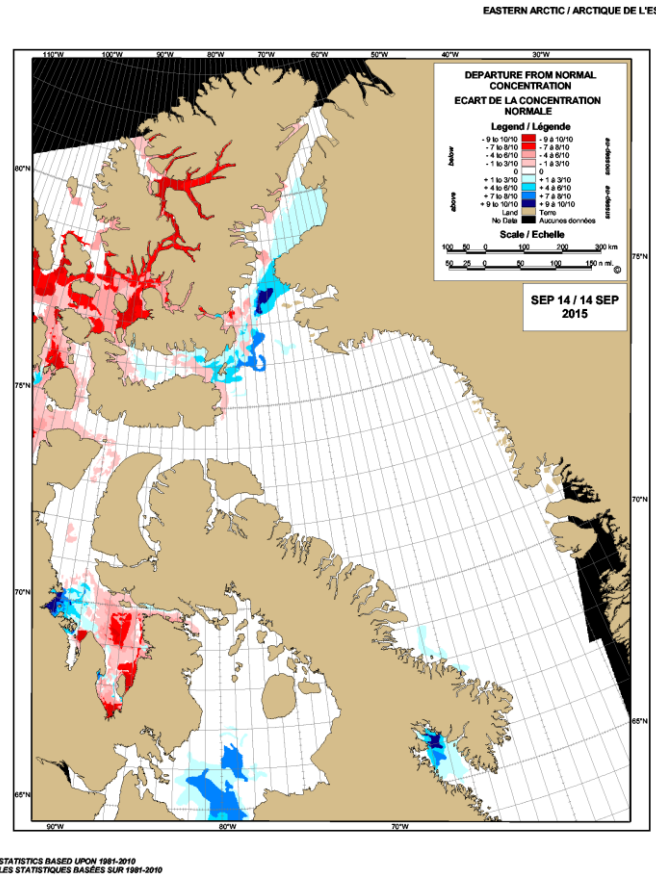


Figure 15: Departure from normal ice concentration for the Eastern Arctic area near mid-September

Throughout September, old and first-year ice continued to drift from Nares Strait along Ellesmere Island and into Jones Sound and Lancaster Sound.

Ice completely melted from northern Gulf of Boothia early in the month. Very open drift first-year ice including a trace of old ice was present in the southeastern section, while very close pack ice remained along the southwestern shore. By the end of September very open to open drift ice remained over southern Gulf of Boothia except for very close pack ice along parts of the southwestern shore.

Most of the remaining first-year ice in western Barrow Strait melted during the second week of September; however small amounts of old ice continued to drift in from areas to the north.

Ice completely melted in southwestern Baffin Bay during the third week.

New ice started appearing in small quantities over Kane Basin during the first week of September and over Eureka Sound during the second week. New ice formed more

rapidly during the fourth week. By the end of the month, close to very close pack new ice was present over Kane Basin, Eureka Sound, Norwegian Bay, northeastern Viscount Melville Sound, and Barrow Strait.

Western Arctic

Summer Ice Conditions and Fall Freeze-up

Summer Temperatures: June to September

From June to September, surface air temperatures were above normal over most locations except near normal over the Beaufort Sea.

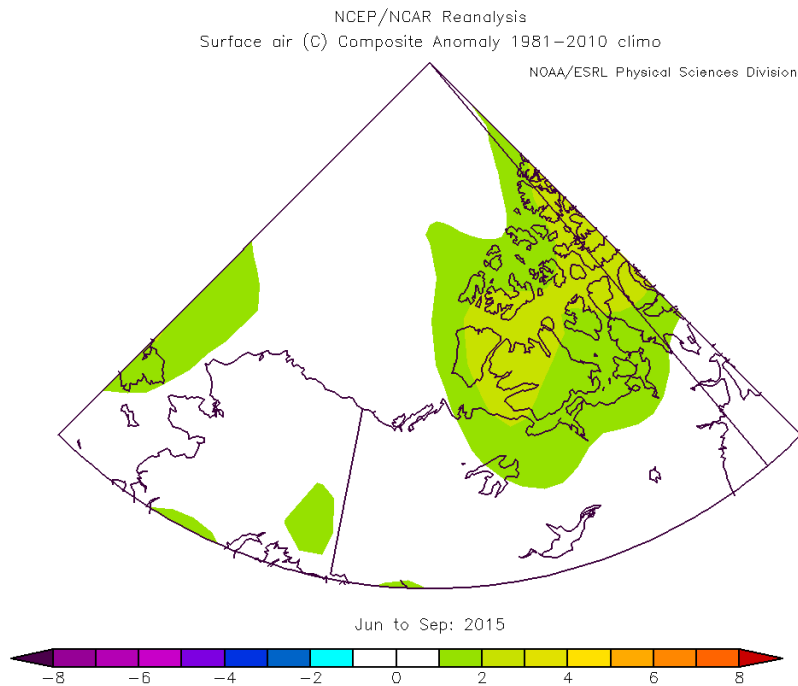


Figure 16: Air temperature anomaly for the Western Arctic area from June to September

Summary of Ice Conditions:

In early June, the western and central Arctic were mostly ice covered. However, areas of open water had developed earlier in May over southeastern Beaufort Sea and Amundsen Gulf, approximately 4 to 5 weeks earlier than climatology (1981-2010). In the Beaufort Sea, the pack of old ice was located approximately 120 nautical miles from the shore with thick first-year ice to the south. Consolidated first-year ice was dominant along the coast and within the archipelago south of Queen Elizabeth Islands, while consolidated old ice dominated to the north. Above normal concentrations of old ice were present along the southern waterways, most notably in western Queen Maude Gulf.

Ice melt was relatively minimal until mid-July. Afterwards, ice breakup occurred at rate of 1 to 2 weeks earlier than normal values for the remainder of summer.

Near record low amounts of sea ice were observed over the Beaufort Sea and Parry Channel during August and September. The ice minimum occurred over the region near mid-September and was the 3rd lowest on record after 2012 and 2011 (figure 15). New ice spread southward to cover Parry Channel by the end of September. Freeze-up occurred 2 to 3 weeks later than normal.

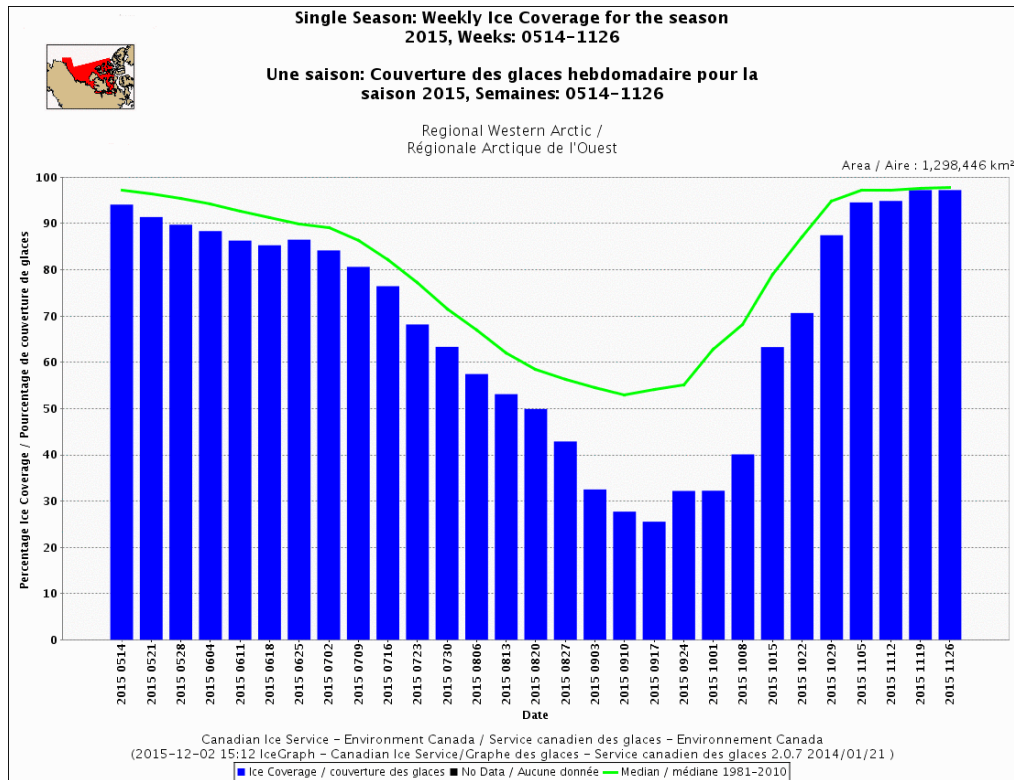


Figure 17: Weekly ice coverage for Western Arctic area for the 2015 season

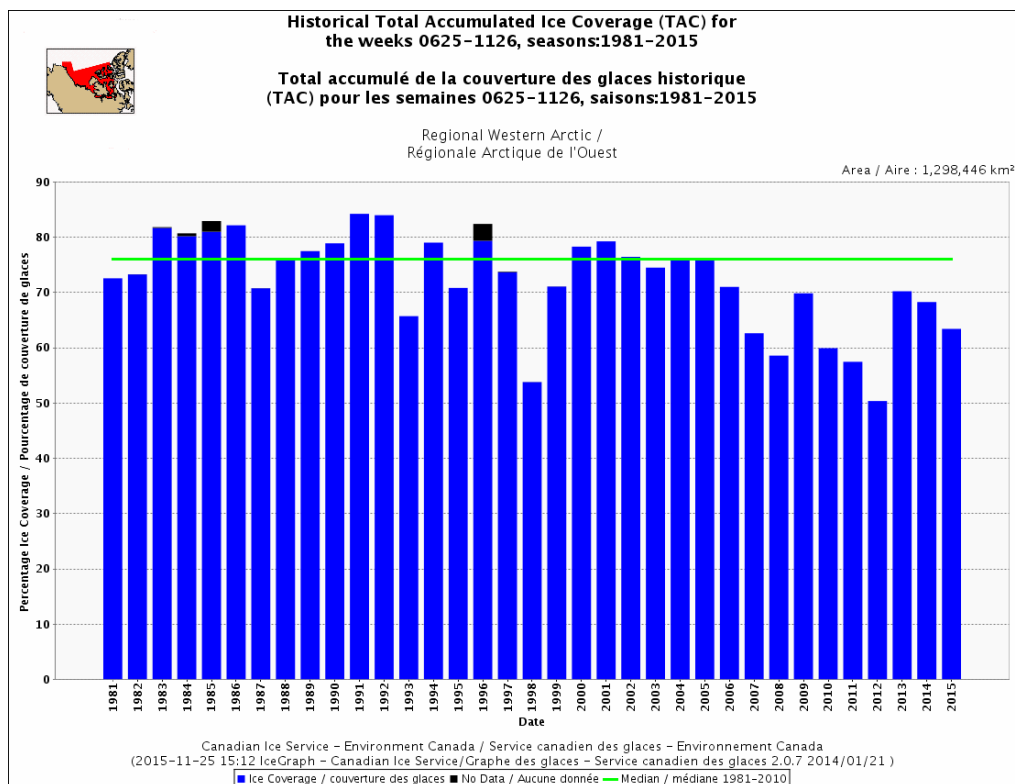


Figure 18: Historical Total Accumulated Ice Coverage for Western Arctic area

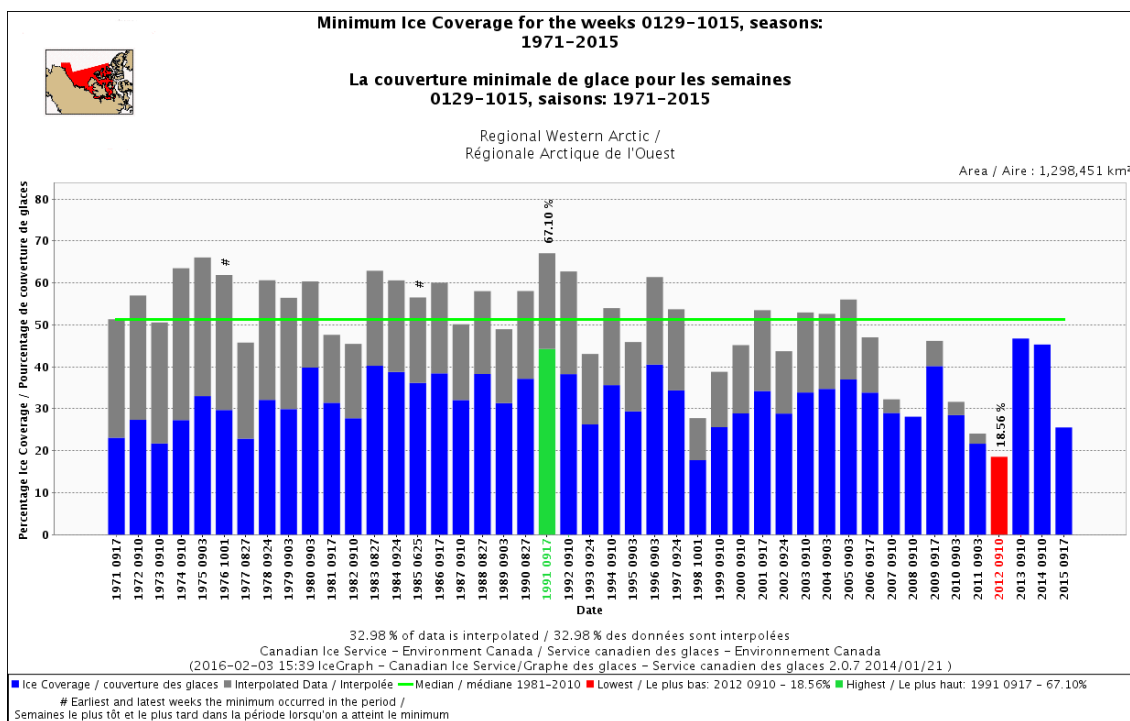


Figure 19: Minimum Ice Coverage for the Western Arctic area, 1971-2015

June Ice Conditions:

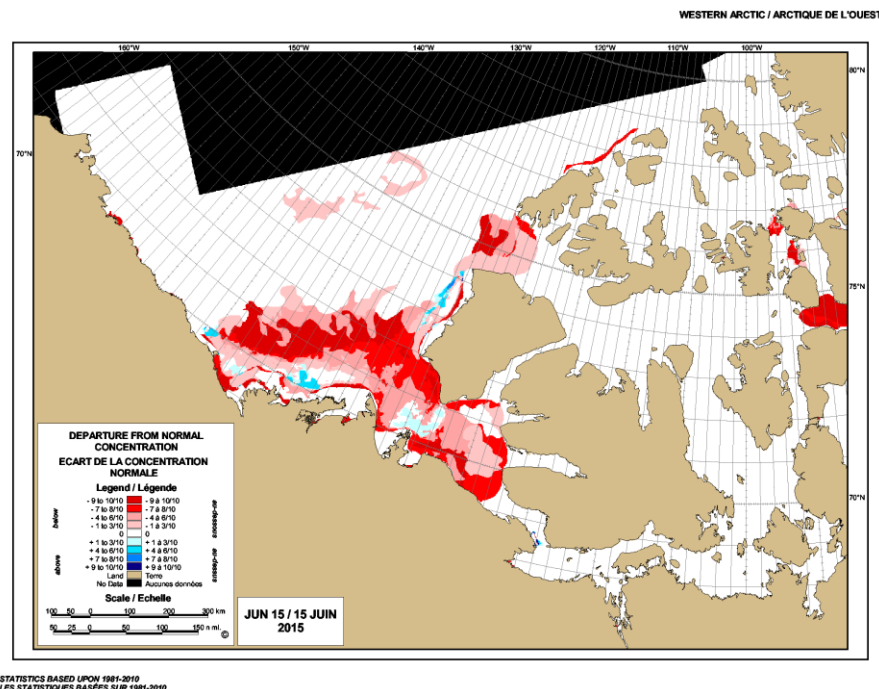


Figure 20: Departure from normal ice concentration for the Western Arctic area near mid-June

Areas of open water were already present over the southeastern Beaufort Sea at the beginning of June. Very open drift first-year ice including a trace of old ice was present over western Amundsen Gulf with larger concentrations to the east.

Consolidated ice was present over the archipelago, with predominantly first-year ice over areas to the south of Queen Elizabeth Islands and old ice in areas to the north. Large areas of old ice were also present over western Queen Maud Gulf and the southern sections of M'Clure Strait, Viscount Melville Sound, M'Clintock Channel, and Peel Sound. Elsewhere, bands of old ice were present in eastern Coronation Gulf, Victoria Strait, and Larsen Sound. A trace of old ice was present in Prince of Wales Strait, and Parry Channel.

Consolidated first-year ice near Mackenzie Bay, which had started to erode at the beginning of the month, fractured during the second week. By the end of June, the consolidated ice had completely fractured from the Alaskan coast to western Dolphin and Union Strait.

Open water was mainly dominant within 70 nautical miles of the coast from Mackenzie Bay to western Amundsen Gulf except for open drift to close pack first-year ice from Tuktoyaktuk Peninsula to Darnley Bay. The pack of old ice was located approximately beyond 100 nautical miles from the coast.

July Ice Conditions:

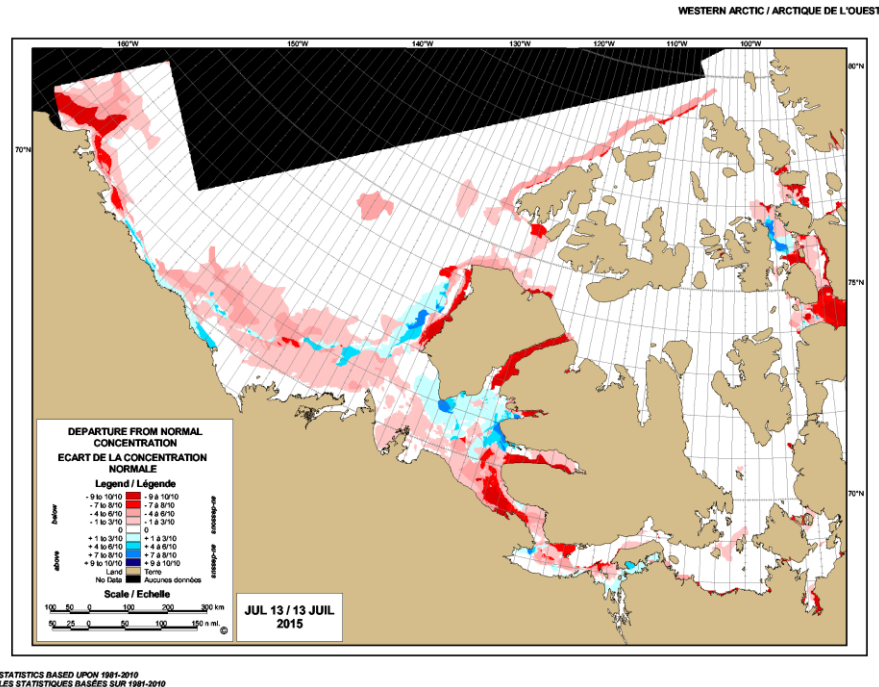


Figure 21: Departure from normal ice concentration for the Western Arctic area near mid-July

During the first half of July, the remaining coastal ice east of Tuktoyaktuk Peninsula to Darnley Bay melted completely. During this time, consolidated ice fractured over western M'Clure, Prince of Wales Strait, Amundsen Gulf, and Coronation Gulf.

Over the following weeks, ice melted completely from Amundsen Gulf to Coronation Gulf and open water was present along the southern shore of Queen Maude Gulf.

Most of the remaining consolidated ice south of Queen Elizabeth Islands fractured during the second half of July, however close to very close pack first-year and old ice remained over these regions.

Near the end of July, ice concentrations in the Beaufort ice pack started to diminish rapidly as large areas of open drift to close pack ice started to form.

August Ice Conditions:

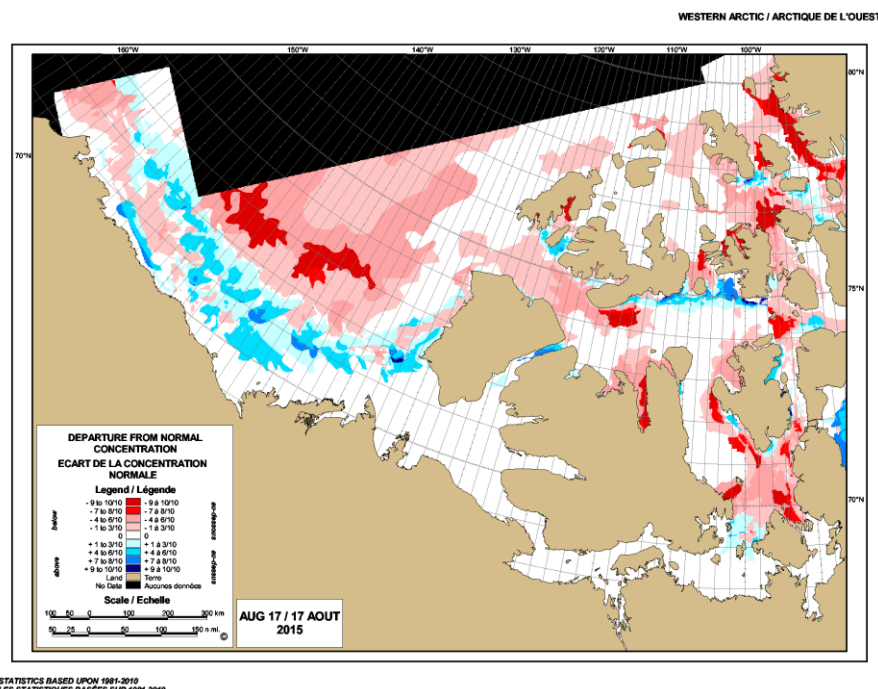


Figure 22: Departure from normal ice concentration for the Western Arctic area near mid-August

Ice concentrations continued to diminish during August. Consolidated ice by Queen Elizabeth Islands fractured during the first week and open water developed along the northern shore of Viscount Melville Sound.

By the middle of the month, the ice had completely melted in Queen Maude Gulf. Large areas of open water were present in Peel Sound, which then expanded to Larsen Sound during the third week.

During the second half of August, the ice completely melted in Peel Sound and Larsen Sound, while few strips and patches of old ice remained in Victoria Strait. Ice concentrations diminished rapidly to very open drift old ice over M'Clure Strait, Prince of Wales Strait, and western Viscount Melville Sound.

Close to very close pack first-year ice including a trace of old ice remained in eastern Viscount Melville Sound and northern M'Clintock Channel while close to very close pack old ice persisted in southern M'Clintock Channel.

Over the Beaufort Sea, large areas of open water developed west of 135W while open drift to close pack old ice remained to the east.

September Ice Conditions:

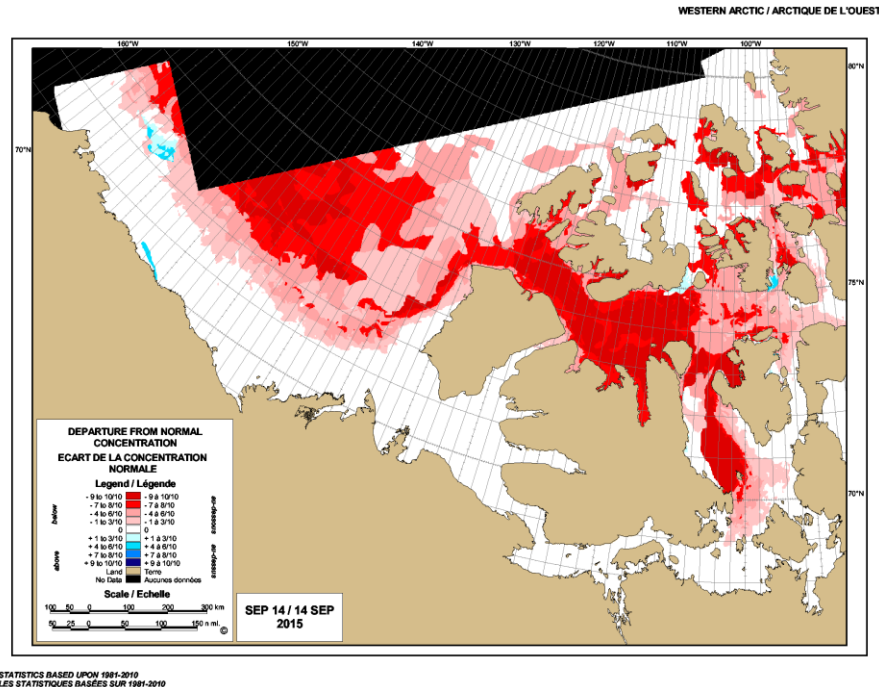


Figure 23: Departure from normal ice concentration for the Western Arctic area near mid-September

During the first two weeks of September, ice concentrations in eastern Viscount Melville Sound and northern M'Clintock Channel declined rapidly to very open to open drift first-year ice including a trace of old ice. The ice melted completely in Prince of Wales Strait.

In the second half of September, the remaining in M'Clure Strait and western Viscount Melville Sound melted completely. Very open drift old ice remained over eastern Viscount Melville Sound and northern M'Clintock Channel. Open water was dominant in southern M'Clintock Channel except for very close pack old ice along the western shore.

Over the eastern Beaufort Sea, ice concentrations diminished to very open drift old ice, while the western portions were mainly open water.

New ice started to appear over northern Beaufort Sea and Queen Elizabeth Islands during the second and third weeks of September and spread southward to Parry Channel by the end of the month.

Western Beaufort Sea

The following summary was prepared by the National Weather Service, Alaska Region

June

May was exceptionally warm across northern Alaska, resulting in an early start to near shore ice break-up. At the start of June areas of 1 to 3 tenths ice concentrations were found with a few nautical miles of the coast. During June there was only a slow decrease in ice concentrations, with 8 to 10 tenths cover present within ten nautical miles of the shore at the end of the month. Near surface easterly winds were much weaker than normal, and as a result open water was slow to work westward from the Mackenzie River Delta, with generally one to three tenths concentrations only in a narrow strip between Prudhoe and Herschel Island at the end of the month.

July

Ice loss accelerated during July, as easterly winds offshore were much closer to normal values than in June. Open water spread from the Mackenzie River Delta westward to Flaxman Island, where open or low concentration coverage extended 60 nautical miles offshore at month's end. Ice concentrations from Flaxman Island to Point Barrow were slower to decrease, mostly notably a remnant band of multi-year ice 50 to 75 nautical miles offshore.

August

Ice loss continued apace in August with open water appearing from Point Barrow to Drew Point by mid-month, which spread rapidly eastward during the last week of the month. However, the remnant band of multi-year ice persisted offshore, and nearshore from Cape Halkett to Camden Bay, there were generally 3 to 5 tenths concentrations but small areas saw more ice, and eastward bound barge traffic was delayed for a time at Barrow. By the end of August the Beaufort Sea was largely ice free south of 72N and generally 2 to 4 tenths or less concentration south of 73N, though a small area of ice persisted within the barrier Islands near Prudhoe Bay and east toward Camden Bay.

September

Sea ice coverage in the Beaufort Sea reached the seasonal minimum during the second week of the month, with only a few areas persisting south of 74N. The ice within in the barrier islands near Prudhoe Bay did not completely melt out, the first time in some years that any nearshore ice has survived the summer. New ice began to form in protected bays after the 20th as the thaw season came to an end.