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# Seasonal Summary

## North American Arctic Waters Summer 2012

By



**Canadian Ice Service**  
**Le service canadien des glaces**

## Summary over North American Arctic Waters

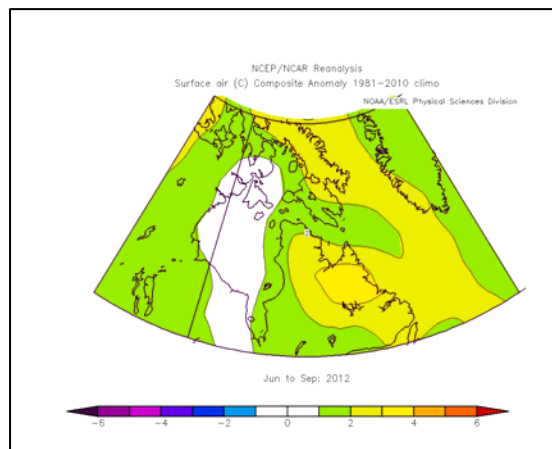
This year (2012) was characterized as the summer of 2 opposite extreme ice conditions. New records were set for the lowest sea ice minimum over Canadian Arctic Waters and for the latest ice melt in Frobisher Bay, Cumberland Sound and Foxe Basin. In general, the spring ice melt proceeded in a normal fashion for most areas of the Arctic and then was followed by an accelerated melt during the summer. Portions of the Northwest Passage and the Alaskan Coast saw normal ice conditions this summer.

## Hudson Bay and the Labrador Coast

### Summer Ice Conditions and fall freeze-up

#### *Summer temperatures: June to September*

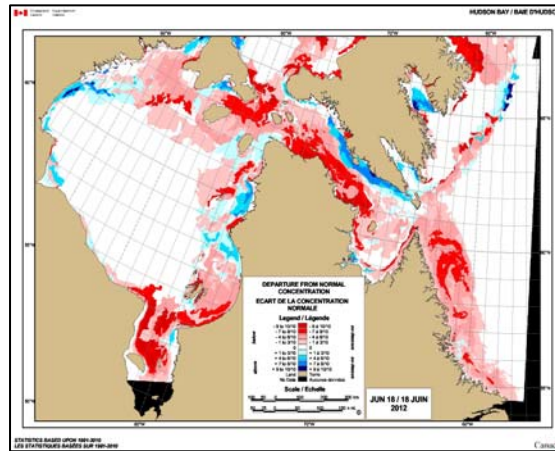
From June to September, surface air temperatures were generally near to slightly above normal over most locations. However temperatures were warmer along the Labrador Coast where average temperatures were 2 to 3°C above normal. The air temperature anomaly for Hudson Bay and the Labrador Coast is shown in Figure 1.



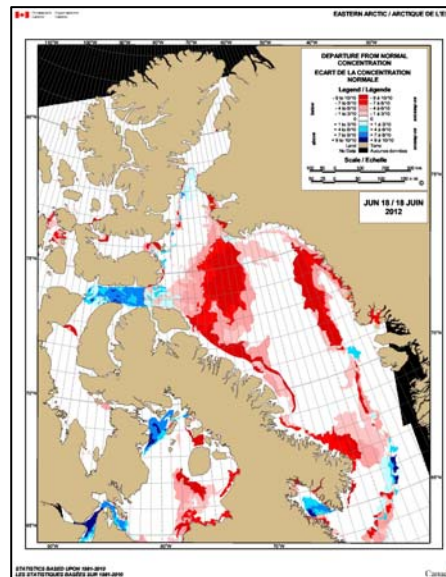
**Figure 1: Air temperature anomaly for Hudson Bay from June to September**

#### *June ice conditions:*

In early June, the ice melt was already underway along the Labrador Coast, in Hudson Strait, the northern and eastern sections of Hudson Bay and southeastern Foxe Basin. At mid-June, there was less ice than normal over these same areas; ice melt was 1 to 2 weeks earlier than normal as seen on Figure 2 and Figure 3.



**Figure 2: Departure from normal ice for Hudson Bay near mid-June**



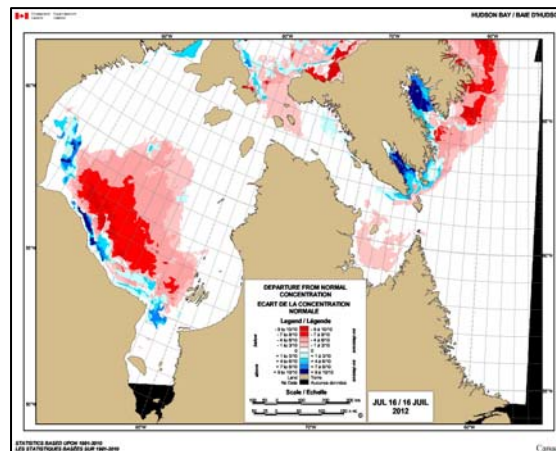
**Figure 3: Departure from normal ice for the Eastern Arctic near mid-June**

In June, the winter ice continued to melt at a moderate pace over the area. Open drift to close pack first-year ice persisted over eastern Hudson Strait, most of Hudson Bay and southeastern Foxe Basin except for large areas of very close pack ice over the southwestern section of Hudson Bay, along the southern shore of Baffin Island and over the rest of Foxe Basin. During June, a persistent southeasterly flow developing over Davis Strait pushed the pack ice into Frobisher Bay and Cumberland Sound. This was the start of the event which prevented the ice from melting quickly this summer. Up to 1 tenth of old ice was embedded in the pack ice over eastern Hudson Strait and Davis Strait. At the end of June, large areas of open water were already present over southern James Bay, east of Belcher Islands and south of Southampton Island.

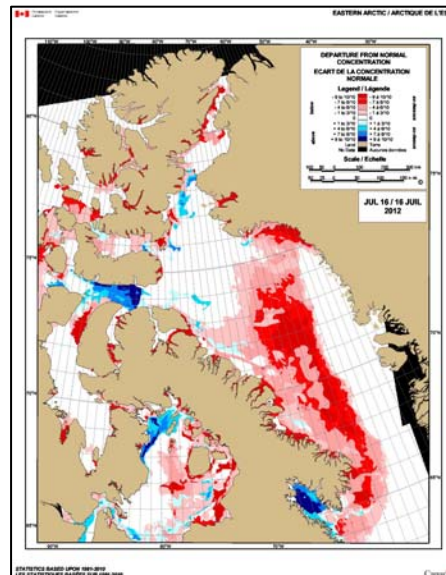
Meanwhile, bergy water dominated over western Hudson Strait and along the Labrador Coast except for an area of compacted ice along the northern shore of Hudson Strait.

### ***July ice conditions:***

In July, the ice melted at a moderate to rapid pace over most areas except for the compacted ice which lingered over Frobisher Bay and Cumberland Sound. At mid-July, the ice melt was 1 to 2 weeks earlier than normal but was 2 to 3 weeks later than normal in Frobisher Bay and Cumberland Sound as seen on Figure 4 and Figure 5.



**Figure 4: Departure from normal ice for Hudson Bay near mid-July**

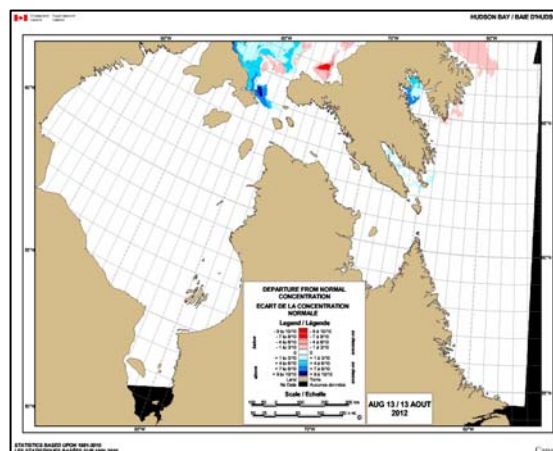


**Figure 5: Departure from normal ice for the Eastern Arctic near mid-July**

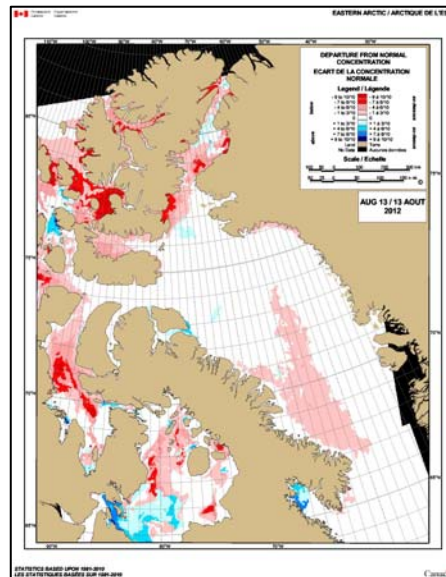
In July, bergy water prevailed along the Labrador Coast and in southern James Bay. First-year ice remained compacted in Frobisher Bay, Cumberland Sound, along the southeastern shore of Baffin Island and in western Foxe Basin due to persistent east to southeasterly winds. Ice concentrations of 1 to 3 tenths of old ice was observed in the pack ice over western Davis Strait. During the first half of July, very open to open drift first-year ice dominated over northern and eastern Hudson Bay. At mid-July, the ice melted completely over southern Hudson Strait, most of Hudson Bay and northern James Bay. The rest of Foxe Basin and the southwestern shore of Hudson Bay were covered with open drift to close pack first-year ice. With the continued ice melt, a few isolated patches of first-year ice persisted along the southwestern shore of Hudson Bay and in the extreme northern portion of James Bay at the end of the July. As well, bergy water dominated over most of Davis Strait, along the Labrador Coast and most of Hudson Strait, while open water was present over the rest of Hudson Bay. Close to very close pack first-year ice persisted over western Foxe Basin, while Cumberland Sound and Frobisher Bay were covered with open drift to close pack ice.

### ***August ice conditions:***

In August, the remaining ice continued to melt over Foxe Basin and Hudson Bay but the ice melt was still delayed over Frobisher Bay and Cumberland Sound. At mid-August, the ice melt was 1 week earlier than normal over Hudson Bay and Foxe Basin but was 3 to 4 weeks later than normal over Frobisher Bay and Cumberland Sound as seen on Figure 6 and Figure 7.



**Figure 6: Departure from normal ice for Hudson Bay near mid-August**



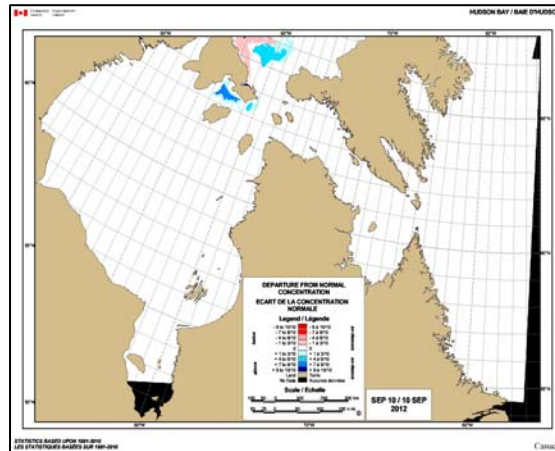
**Figure 7: Departure from normal ice for the Eastern Arctic near mid-August**

The remaining ice over the extreme southern section of Hudson Bay melted completely during the first week of August. During the month, the ice in Frobisher Bay and Cumberland Sound started to melt due to lighter winds and warmer temperatures. However the ice persisted over these areas until the last week of August which set a new record for the latest ice melt in Frobisher Bay. The ice continued to melt over the northern and eastern sections of Foxe Basin until it completely melted at the end of August. Meanwhile, areas of very open to open drift ice persisted in Fury and Hecla Strait. Close to very close pack first-year ice prevailed over the southwestern section of Foxe Basin and drifted eastward into the shipping channel during the first two weeks of August. A very narrow open water lead formed after mid-August along Foxe Peninsula, while ice concentrations decreased to open drift to close pack ice over southwestern Foxe Basin. During the last two weeks of August, a tongue of open drift to close pack ice originating from Foxe Basin wrapped around the southeastern shore of Southampton Island to drift towards Coral Harbour. Elsewhere, bergy water dominated along the Labrador Coast, Davis Strait and Hudson Strait, while ice free prevailed over the rest of Hudson Bay.

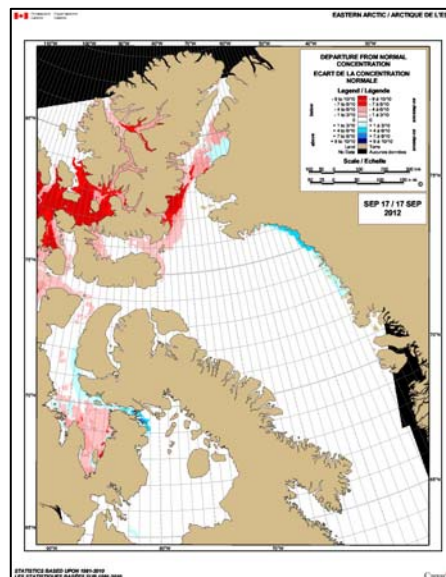
### ***September ice conditions:***

In September, the remaining ice continued to melt over Foxe Basin and south of Southampton Island. At mid-September, the ice melt was 1 week later than normal over these areas as seen on Figure 8 and Figure 9.





**Figure 8: Departure from normal ice for Hudson Bay near mid-September**



**Figure 9: Departure from normal ice for the Eastern Arctic near mid-September**

In September, an area of very open to open drift first-year ice prevailed over the southwestern section of Foxe Basin and north of Foxe Channel until the third week of the month. More ice was drifting out of Foxe Basin during the first half of the month maintaining areas of very open to open drift ice along the southeastern shore of Southampton Island east of Coral Harbour. Afterwards the ice melted completely near mid-month. In September, areas of open drift to close pack first-year ice were present over Fury and Hecla Strait. Some of this ice drifted as far south as Hall Beach before retreating northward at the end of the month. Elsewhere, bergy water dominated along the Labrador Coast, Davis Strait

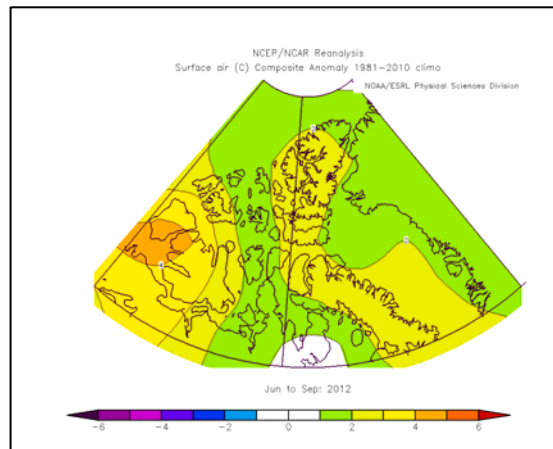
and Hudson Strait during the month, while ice free prevailed over the rest of Hudson Bay.

## 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 generally above normal values over the whole area. Average temperature ranged from 1 to 3°C above normal. The air temperature anomaly for the Eastern Arctic is shown in Figure 10.

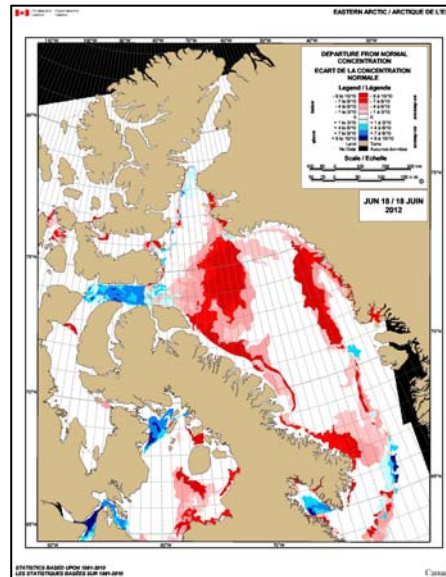


**Figure 10: Air temperature anomaly for the Eastern Arctic from June to September**

#### *June ice conditions:*

In early June, the ice melt was already underway especially along the western shore of Greenland and in northwestern Baffin Bay. However, the ice remained consolidated over Lancaster Sound which delayed the breakup later in the season. At mid-June, there was less ice than normal over most of Baffin Bay, while near normal ice conditions were present over the rest of the Eastern Arctic. In general, the ice melt was 1 to 2 weeks earlier than normal, but was 1 week later than normal over Lancaster Sound as seen on Figure 11.



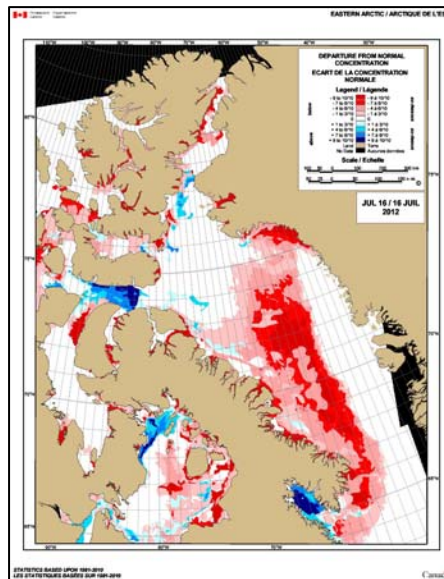


**Figure 11: Departure from normal ice for the Eastern Arctic near mid-June**

At the start of the season, consolidated first-year ice was present over Lancaster Sound which hasn't been observed since 2002. This did have an impact on the breakup in Parry Channel later in the season due to the presence of this consolidated ice. Ice concentrations of 3 tenths of old ice was observed in the pack ice over eastern Lancaster Sound. The bergy water lead which formed along the Greenland Coast south of 73°N slowly progressed northward to reach 75°30'N by the end of June. Meanwhile, a large area of bergy water which extended from Smith Sound to east of Devon Island expanded during the month to cover northwestern Baffin Bay. As well, very close pack first-year ice with ice concentrations of 1 tenth of old ice prevailed over central Baffin Bay from Cape Dyer to Melville Bay. The rest of the Arctic was covered with consolidated first-year ice with very low concentrations of old ice along the main shipping routes. However, the ice from southern Prince Regent Inlet to northern Committee Bay remained mobile during June.

### ***July ice conditions:***

In July, the ice melted at a moderate to rapid pace over most areas. However, the presence of ice in Lancaster Sound delayed the breakup over the area. At mid-July, there was much less ice than normal especially over Baffin Bay. The ice melt was 1 to 2 weeks earlier than normal over most areas, but was 1 week later than normal over Lancaster Sound as seen on Figure 12.

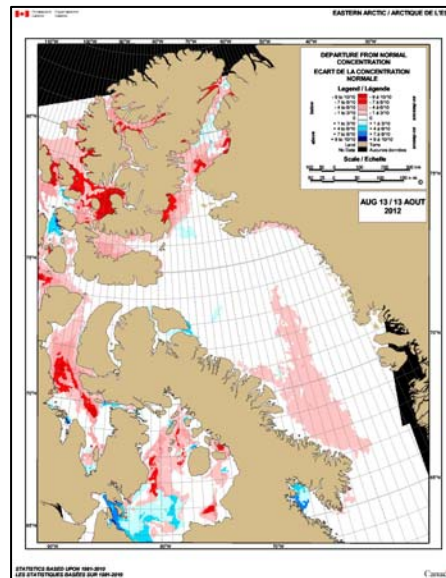


**Figure 12: Departure from normal ice for the Eastern Arctic near mid-July**

The consolidated ice over Kane Basin fractured earlier than expected at the beginning of July. During that time, a bergy water route already developed along the Greenland Coast into northern Baffin Bay and to Thule, while a large area of bergy water was present over northwestern Baffin Bay. The presence of the consolidated ice in Lancaster Sound delayed the breakup over Parry Channel with the ice fracturing early in the second week of July. This had an impact on the breakup for the rest of month where close to very close pack first-year ice remained over the area until the last week of the month. Ice concentrations of 3 tenths of old ice was embedded in the pack ice in eastern Lancaster Sound. Fracture events continued over Eureka Sound during the second week of July and the rest of the High Arctic during the following week. As well, close to very close pack first-year ice with ice concentrations of 1 tenth of old ice was present over central Baffin Bay from Cape Dyer to south of 74N. However ice concentrations decreased rapidly over Baffin Bay with only a few patches of ice remaining along the coast from Cape Dyer to south of Pond Inlet at the end of July. Also, very open to open drift first-year ice with a trace of old ice was present along the shipping route to Eureka with higher concentrations of ice in eastern Norwegian Bay during the second half of the month. At the end of July, the ice melted rapidly over the Eastern Arctic with large areas of bergy water developing over southern Admiralty Inlet, in McDougall Sound, Pelly Bay and northern Barrow Strait.

### ***August ice conditions:***

In August, the ice melted at a moderate to rapid pace over most areas. At mid-month, there was much less ice than normal across the Eastern Arctic, while the ice melt was 2 weeks earlier than normal as seen on Figure 13.

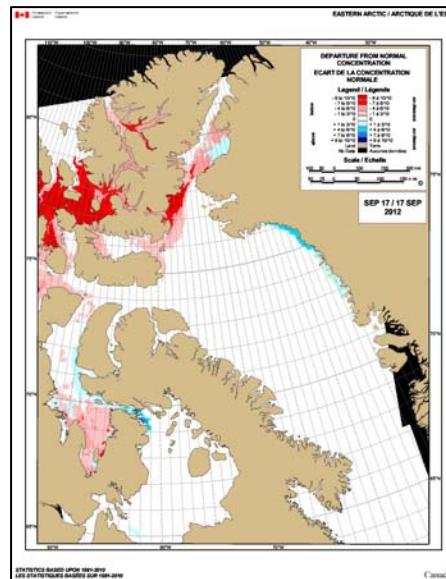


**Figure 13: Departure from normal ice for the Eastern Arctic near mid-August**

The ice cover which delayed the breakup in Parry Channel drifted eastward into northwestern Baffin Bay and melted rapidly during the first two weeks of August. Then the ice melted completely near mid-month. Meanwhile, ice concentrations decreased rapidly over the rest of the Eastern Arctic especially along the main shipping routes to Resolute and Eureka, where bergy water was present over these areas near mid-August. During that time, the remaining ice along eastern Baffin Island and in northern Admiralty Inlet melted completely. Very low ice concentrations of old ice drifted out of Kane Basin and melted out as it drifted towards Jones Sound. However, an extensive amount of first-year ice with a trace of old ice remained from southern Prince Regent to Committee Bay during the first half of August. During the last two week of the month, bergy water prevailed along the main shipping routes, while ice concentrations slowly decreased from Gulf of Boothia to Committee Bay. Some of the ice from Committee Bay drifted into Fury and Hecla Strait during the second half of August. The rapid ice melt observed over the High Arctic resulted in significant loss of old ice over Nansen Sound, Norwegian Bay, Massey Sound and Nares Strait.

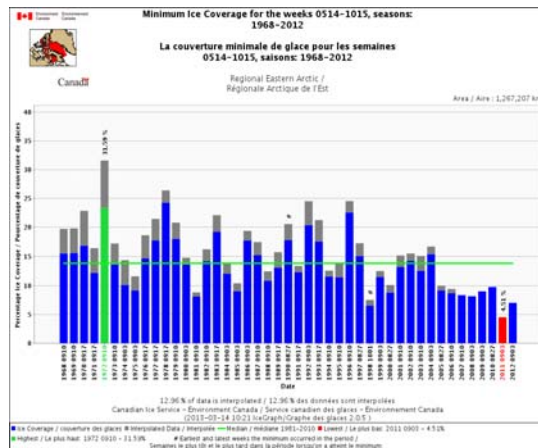
### ***September ice conditions:***

In September, the ice continued to melt at a moderate to rapid pace over the High Arctic until mid-September and the rest of the region near the end of September. At mid-month, there was much less ice than normal across the Eastern Arctic as seen on Figure 14.



**Figure 14: Departure from normal ice for the Eastern Arctic near mid-September**

The rapid ice melt which persisted during the first two weeks of the month contributed in a significant loss of old ice in Massey Sound, Norwegian Bay and Nansen Sound. Rarely seen in the past, bergy water was observed across a major portion of the Eastern Arctic and in major shipping ports. The only exception would be the area of open drift to close pack first-year ice with a trace of old ice which was persisting in Gulf of Boothia and Committee Bay. A significant amount of this ice drifted into Fury and Hecla Strait during the first half of September. Isolated patches of old ice still drifted along the western shore of Queens Channel. The minimum sea ice cover during the month was the second lowest observed in comparison to the record minimum ice cover set in 2011. It reached the minimum ice cover on September 3, 2012 as shown in Figure 15. The ice melt came to an end when the sea ice started to form over Melville Bay and the High Arctic near mid-September; however the ice continued to melt over the southern regions especially the Gulf of Boothia and Committee Bay during the second half of September. During that time, the ice extent and concentrations decreased rapidly to become very open to open drift ice over the eastern section of Committee Bay and in Fury and Hecla Strait. The freeze-up was restricted to Melville Bay, Eureka Sound and Nares Strait where new and grey ice developed over these areas during the last two weeks of the month.



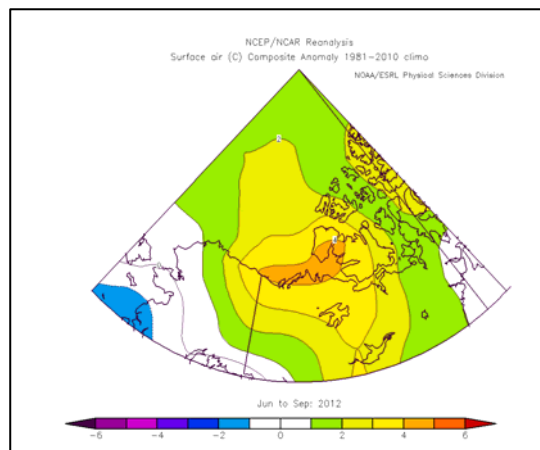
**Figure 15: Minimum sea ice coverage for the Eastern Arctic in September 2012**

## Western Arctic

### Summer Ice Conditions and fall freeze-up

#### *Summer temperatures: June to September*

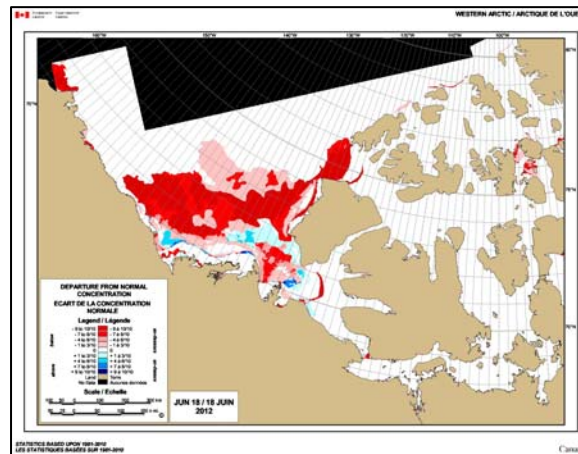
From June to September, surface air temperatures were generally much above normal values over most locations. Average temperature ranged from 2 to 5°C above normal. Temperatures were closer to normal values west of Point Barrow and over the Central Arctic. This temperature trend would impact the ice melt over the Western Arctic during the latter half of the summer. Air temperature anomalies for the Western Arctic are shown in Figure 16.



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

### ***June ice conditions:***

In early June, the ice melt already started over the southeastern Beaufort Sea, as large leads of open water developed over the area. At mid-month, there was much less ice than normal over the southeastern Beaufort Sea, while the ice melt was 2 to 3 weeks earlier than normal as seen on Figure 17.



**Figure 17: Departure from normal ice for the Western Arctic near mid-June**

In early June, large areas of open water were already present within 80 miles west of Banks Island and within 120 miles north of Tuktoyaktuk Peninsula. Meanwhile, a major portion of the consolidated ice over western Amundsen Gulf fractured and started drifting into the Beaufort Sea. A narrow lead of open water developed in the Arctic Ocean west of Queen Elizabeth Islands but only persisted during the first week of June. An area of very close pack first-year ice with a trace of old ice was present off the Alaskan Coast, while the main area of predominantly old ice was located north of 72°30'N. The rest of the Western Arctic and the shores of the mainland coast were covered with consolidated ice. Only a trace of old ice was observed in Victoria Strait, while areas of 6 tenths of old ice were embedded in the pack ice along the central sections of Viscount Melville Sound and M'Clure Strait.

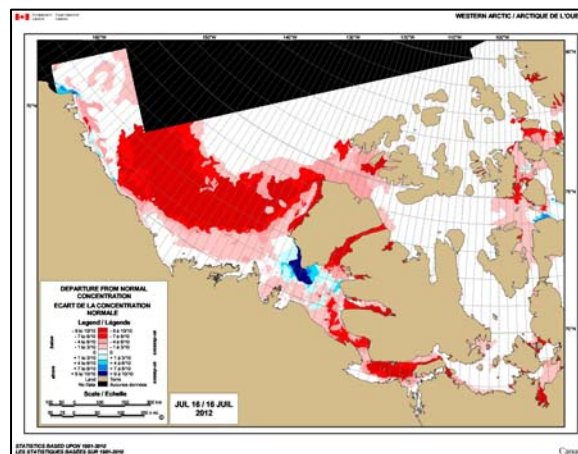
During the first half of June, the ice drifted northwestward pushing the main pack of old ice to about 73°N. Areas of open water continued to expand slowly northward over the Beaufort Sea and westward to Barter Island. Meanwhile, bands of close to very close pack first-year ice with a trace of old ice was observed near Herschel Island and between 71°N and 72°N due to ice fracturing in Mackenzie Bay and western Amundsen Gulf respectively. After mid-June, the ice fractured over the rest of Amundsen Gulf and western M'Clure Strait with close to very close pack ice persisting over these areas. Over the southeastern Beaufort Sea, ice concentrations decreased rapidly to become very open to open drift first-year ice at the end of June. At that time, the ice fractured



along Tuktoyaktuk Peninsula. Little change was observed in the ice conditions over the rest of the Western Arctic during the month.

### ***July ice conditions:***

In July, the ice melted at a moderate to rapid pace over the Western Arctic. At mid-month, there was much less ice than normal especially over the southeastern Beaufort Sea and along the southern route of the Northwest Passage. The ice melt was 1 to 2 weeks earlier than normal as seen on Figure 18.



**Figure 18: Departure from normal ice for the Western Arctic near mid-July**

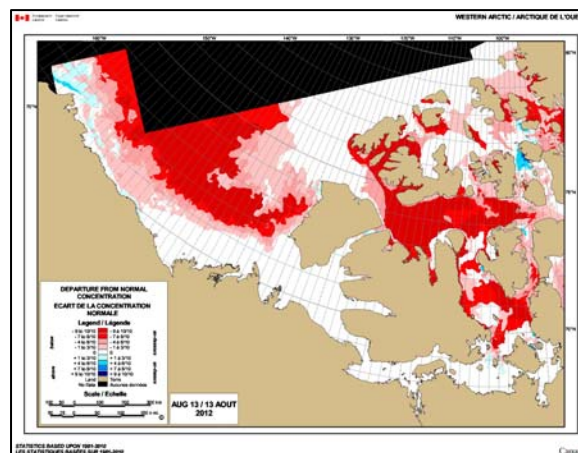
Ice concentrations decreased rapidly along the Tuktoyaktuk Peninsula and in the southeastern Beaufort Sea during the first half of July. During that time, it decreased at a slower pace over Amundsen Gulf to become open drift to close pack first-year ice. The ice fractured over Coronation Gulf during the second week of July. Near mid-July, a very large area of open water was present over the southeastern Beaufort Sea which extended as far north as 72°30'N and as far west as 146°W. However, very open drift first-year ice persisted along the Alaskan Coast from Herschel Island to east of Prudhoe Bay. During the second half of July, the ice melt accelerated over the Central Arctic and the Beaufort Sea west of 146°W. During the third week of the month, additional fracture events were observed over the rest of the southern and northern routes of the Northwest Passage, while the ice melted completely over Coronation Gulf.

At the end of July, open water was present over most of M'Clure Strait and from the southeastern Beaufort Sea to western Queen Maud Gulf except for isolated strips of first-year ice over southeastern Amundsen Gulf. At that time, the ice over Viscount Melville Sound drifted over the southern section, while very open to open drift first-year ice with ice concentrations of 2 tenths of old ice prevailed over the northern section. The ice in M'Clintock Channel drifted into

Larsen Sound and southern Peel Sound maintaining an area of close to very close pack first-year ice with a trace of old ice. Most of the ice melted out in northern Peel Sound except for bands of very close pack first-year ice drifting into the northern entrance. Close to very close pack first-year ice with a trace of old ice persisted along the Alaskan Coast west of 146°W until the last week of July when ice concentrations decreased to open drift ice. North of 73°N, very close pack old ice dominated over the area but ice concentrations decreased to open drift to close pack ice west of 143°W.

### ***August ice conditions:***

In August, the ice melted at a moderate to rapid pace over the Western Arctic. At mid-month, there was much less ice than normal over most of the Western Arctic except along the Alaskan Coast where the pack ice lingered over the area throughout the month. The ice melt was 2 to 3 weeks earlier than normal but was near normal along the Alaskan Coast as seen on Figure 19.



**Figure 19: Departure from normal ice for the Western Arctic near mid-August**

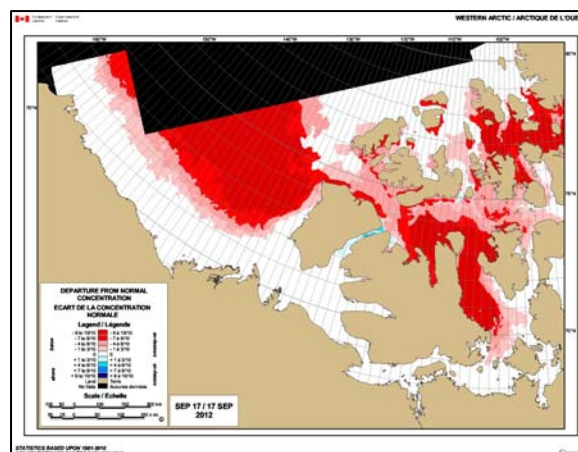
Ice free or open water conditions were present along the shipping route from the southern Beaufort Sea to southern Queen Maud Gulf and in Rasmussen Basin during the first half of August. During that time, a significant amount of old ice from the Beaufort Sea drifted over the western section of M'Clure Strait. The presence of very open to open drift first-year ice with a trace of old ice over the northern section of Queen Maud Gulf prevented the open water route to Taloyoak to develop until a few days before mid-August. At that time, the ice melted completely over Peel Sound and northeastern Larsen Sound except for narrow areas of very close pack ice in the northern entrance to Peel Sound. The ice from M'Clintock Channel continued to drift into southwestern Larsen Sound with close to very close pack first-year ice with a trace of old ice. In the Beaufort Sea, the area of open water continued to expand northward to 75°N and westward to 148°W. However, a large area of open drift to close pack old ice

persisted within 180 miles west of Banks Island. West of 148°W and near Barter Island, very open to open drift first-year ice with a trace of old ice was present over the area. The main pack of old ice was located north of 75°N with very close pack ice but ice concentrations decreased to open drift to close pack ice west of 140°W.

Near mid-August, the ice concentrations of old ice started to decrease rapidly over the western section of the Arctic Ocean as the ice melt accelerated over the area. The rapid ice melt which was observed during the second half of August would decay the ice even in areas where the ice would not melt usually. This would continue to affect the ice cover over the Western Arctic until the rest of the summer season. During the last two weeks of the month, ice concentrations decreased rapidly over Larsen Sound to become very open drift first-year ice with a trace of old ice at the end of August. The rest of the southern route of the Northwest Passage became ice free, while the northern route was covered with open drift to close pack old ice. During the last week of the month, ice free or open water conditions dominated over the Beaufort Sea and along the Alaskan Coast. A section of the southern limit of the old ice over the western portion of the Arctic Ocean retreated as far north as 78°N which was quite unusual for that time of year.

### ***September ice conditions:***

The rapid ice melt which was observed in the previous month continued over the Arctic Ocean and Queen Elizabeth Islands until mid-September and the rest of the region near the end of September. At mid-September, there was much less ice than normal over most of the Western Arctic as seen on Figure 20.



**Figure 20: Departure from normal ice for the Western Arctic near mid-September**

In early September, ice free conditions prevailed along the shipping routes over the Beaufort Sea and along the southern route of the Northwest Passage

except for isolated areas of first-year ice with a trace of old ice in Larsen Sound which lasted until the second week of the month. During the first two weeks of September, ice drifting out of Byam Martin Channel and the Arctic Ocean maintained open drift old ice conditions over Viscount Melville Sound and M'Clure Strait. Over the eastern section of the Beaufort Sea, the southern limit of the pack ice retreated northward to 74°N near mid-September. In the Arctic Ocean, a section of the southern limit of the old ice was observed as far north as 80°N which was the first time ever it was recorded at that location.

