

**Seasonal Summary  
for the Canadian Arctic  
Summer 2004**



**Produced by the Canadian Ice Service  
December 16, 2004**

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## **Hudson Bay and Approaches**

### **May 2004**

A prevailing moderate northwesterly flow over Hudson Bay in May resulted in near record cold temperatures especially over the northwestern section of the bay. As a result the onset of melting in Hudson Bay was delayed by about a month. Even if temperatures were much colder than normal the prevailing winds resulted in a wider than normal open water area over the northwestern section of Hudson Bay at the end of May.

### **June 2004**

During the month of June a moderate northwesterly flow continued to predominate (figure 31, page 24) over Hudson Bay and as a result below normal temperatures persisted. Over Hudson Strait temperatures averaged near to slightly below normal values (table 1, page 3).

Little change was noticed over the northwestern section of Hudson Bay. In James Bay open water areas started to develop early in June and expanded to cover much of the southern section of the bay at the end of the month. Significant ice melt occurred along the eastern shore of Hudson Bay and in Hudson Strait in June and open water areas have developed over those areas. Overall, at the end of the month, ice conditions in Hudson Strait and Ungava Bay were about a week ahead of normal but one week behind normal in Hudson Bay.

Along the Labrador coast June's temperature averaged near to slightly above normal. However predominant offshore winds helped in keeping the main ice pack dispersed and, as a result, the ice melted rapidly and the Labrador coast was mainly bergy water by the third week in June which is about three weeks earlier than normal. The last of the ice in Goose Bay melted during the first week in June.

Ice conditions and the departure from normal chart, at mid-June, can be seen on page 4, figure 3 and figure 4 respectively.

### **July 2004**

Temperatures have been generally slightly below normal in July except above normal over Hudson Strait and southern Davis Strait areas (Table 1, page 3). A generally light, occasionally moderate, northwesterly flow prevailed over the Hudson Bay and Hudson

Strait areas while a light and variable was reported over southern Davis Strait (figure 32, page 24).

The open water area in northwestern Hudson Bay expanded slowly southward during the first half of July but more rapidly during the second half as average temperatures increased. The ice south of Foxe Channel melted during the third week of July hence allowing for an open water route to Churchill to become established, however a few days later than normal. A coastal route along the eastern shore of Hudson Bay developed late in the third week of the month. Most of Hudson Strait and all of Ungava Bay were open water by the last week of July. The exception was loose ice lingering over the northeast end of Hudson strait. James Bay experienced a gradual decrease in ice concentration during July but a generally light and variable flow kept the ice compacted and a significant amount of ice was still present in the northern section at the end of the month. In fact significantly more ice than normal was found in southern Hudson Bay as well as in northern James Bay at the end of July. At that time the northern section of Hudson Bay was mainly open water.

A moderate to rapid ice melt occurred in southern Davis Strait area during the first three weeks in July due to higher than normal air temperatures. Open drift conditions in Frobisher Bay developed during the third week in July which is a near normal event. Frobisher Bay was mainly bergy water on the last day of the month which is 12 days earlier than normal. At the end of July the main ice edge was located near the entrance to Cumberland which is further north than normal.

Ice conditions as well as the departure from normal ice concentration chart for mid-July are shown on page 5, figure 5 and figure 6, respectively.

### **August 2004**

Colder than normal temperatures (Table 1, page 3) as well as, a cool northwesterly flow (Figure 31, page 25) continued to predominate during the month of August. The exception was over the southern Davis Strait area where slightly above normal temperatures predominated.

The southern ice edge continued its northward progression and moved just north of Cape Dyer during the third week in August which is about a week earlier than normal.

Hudson Strait became open water during the first days of the month. The ice along the southwest coast of Hudson Bay remained closely packed against the coast, hence melting as a very slow pace. As well the persistence of the northwesterly winds maintained the flow of ice into northern James Bay. As a result loose ice was still found, at the end of August, in the southern end of Hudson Bay as well as in the northern portion of James Bay which is not normally the case this late in the season.

Ice conditions as well as the departure from normal ice concentration chart for mid-August are shown on page 6, figure 7 and figure 8, respectively.

### **September 2004**

Slightly below to below normal temperatures prevailed during the first half of September (Table 1, page 3). The last of the ice in James Bay and Hudson Bay melted during the first and second week of September respectively (Figure 9 and Figure 10, page 7). In both instances new record were established for the late departure of the ice.

Canadian Ice Service

Table 1: Temperatures and departures from normal (°C)

Stations	June		July		August		September	
	Temp.	Depart.	Temp.	Depart.	Temp.	Depart.	Temp.	Depart.
Nain	7.1	1.0	12.5	2.4	11.3	0.7	7.1	0.4
Iqaluit	3.8	0.3	8.4	0.9	6.4	-0.4	2.6	0.4
Kuujuaq	6.4	-0.6	12.0	0.7	11.4	0.9	6.0	0.4
Cape Dorset	2.0	-0.3	7.1	0.0	6.5	0.7	2.1	0.7
Churchill	3.9	-2.7	12.3	0.5	10.7	-0.8	7.0	1.3
Moosonee	11.0	-1.4	15.1	-0.6	12.4	-2.5	12.2	1.7
Kuujuarapik	4.9	-2.0	10.5	-0.1	9.0	-2.3	8.0	0.7

Figure 1: Temperature trend at Churchill, June – September 2004

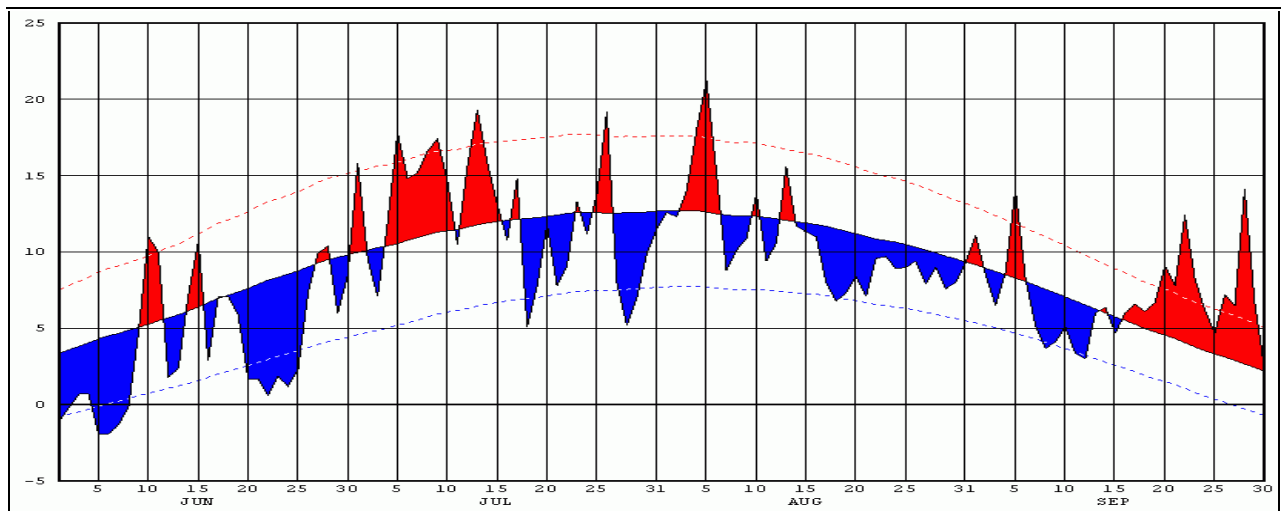


Figure 2: Temperature trend at Iqaluit, June – September 2004

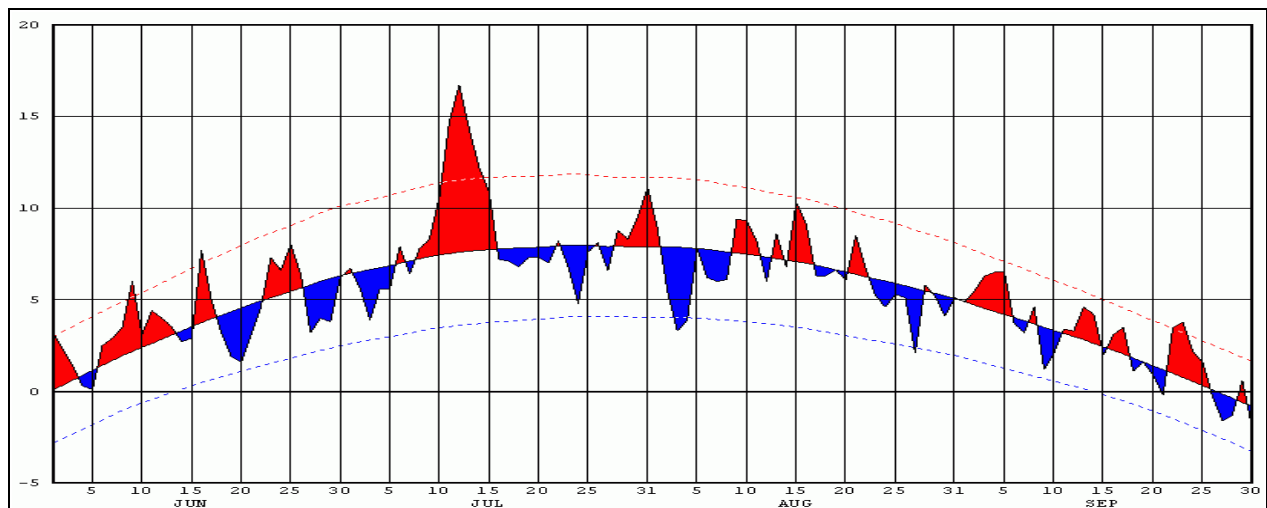


Figure 3: Hudson Bay regional chart - 14 June, 2004

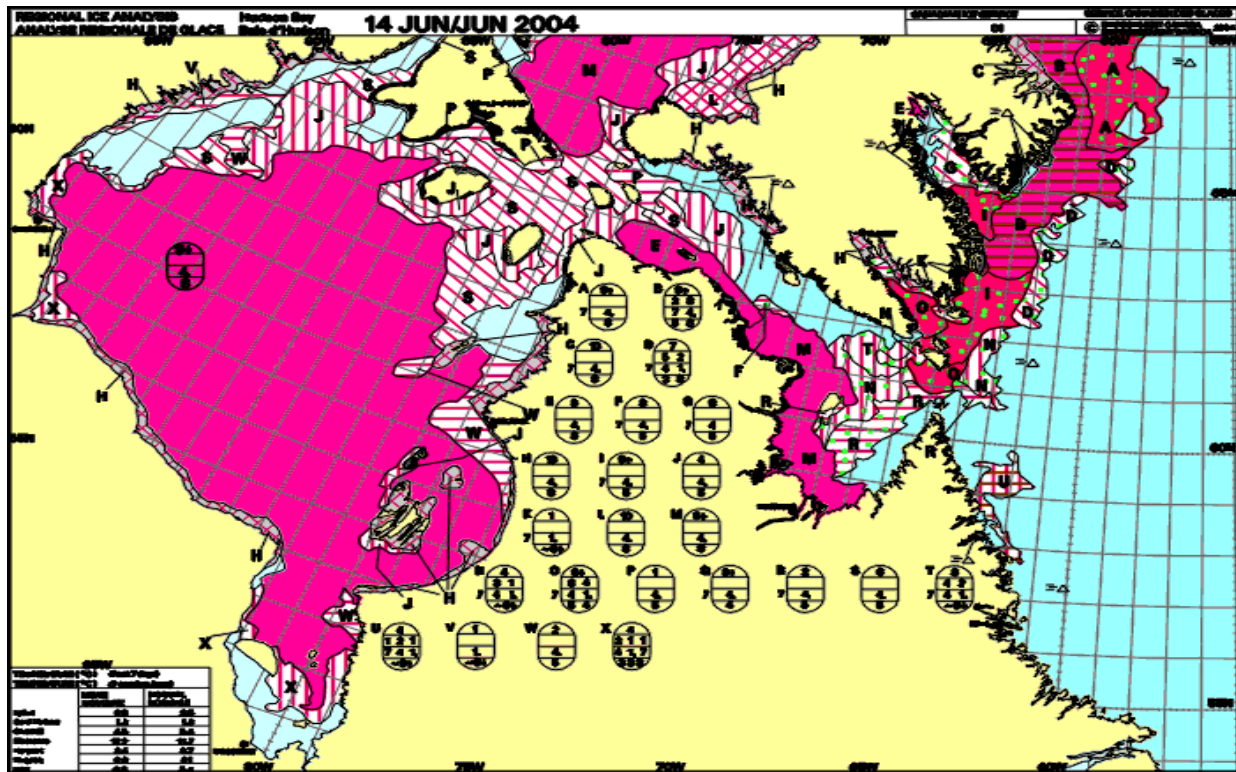
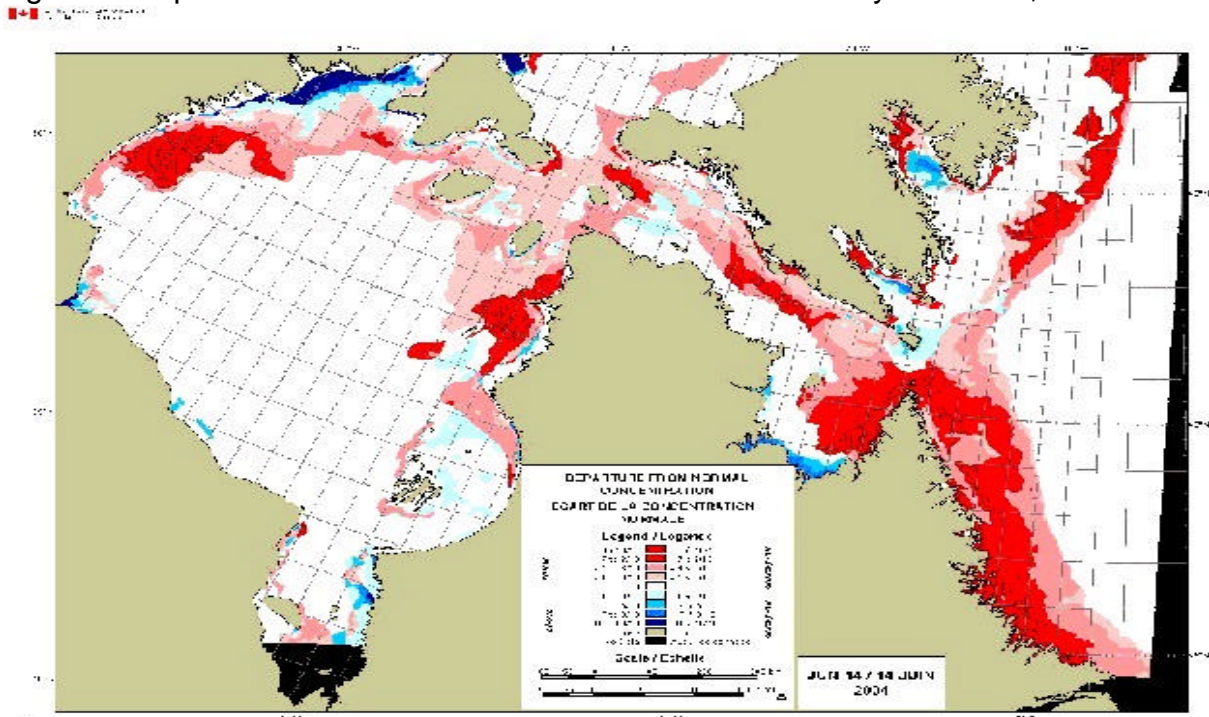


Figure 4: Departure from normal ice concentration Hudson Bay –14 June, 2004.



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Figure 5: Hudson Bay regional chart – 12 July 2004

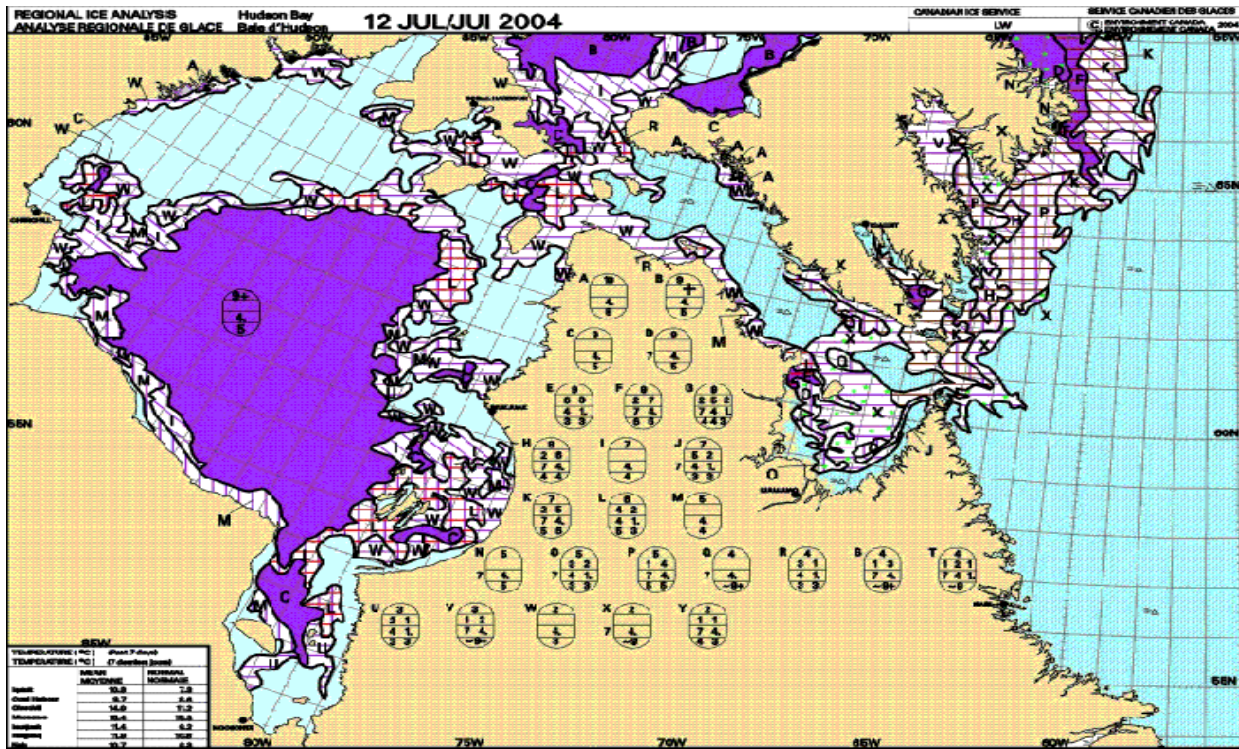


Figure 6: Departure from normal ice concentration Hudson Bay – 12 July 2004

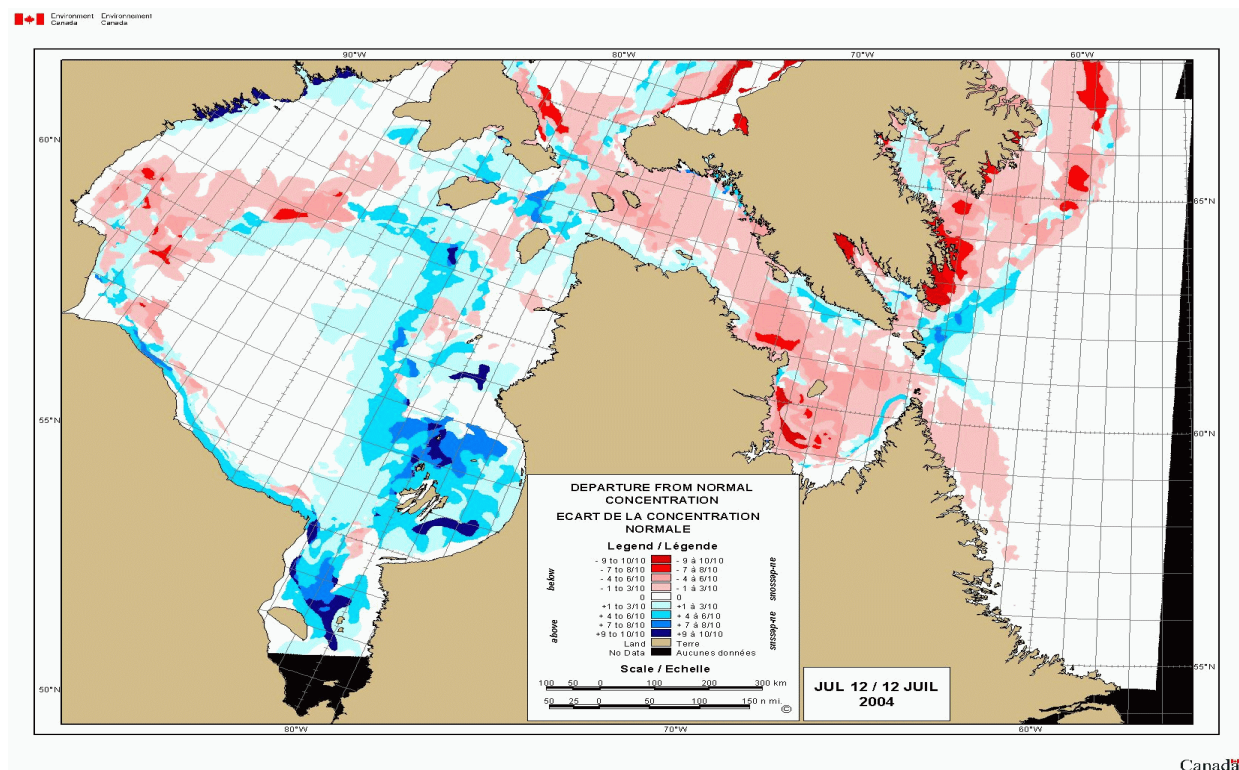


Figure 7: Hudson Bay regional – 16 August 2004

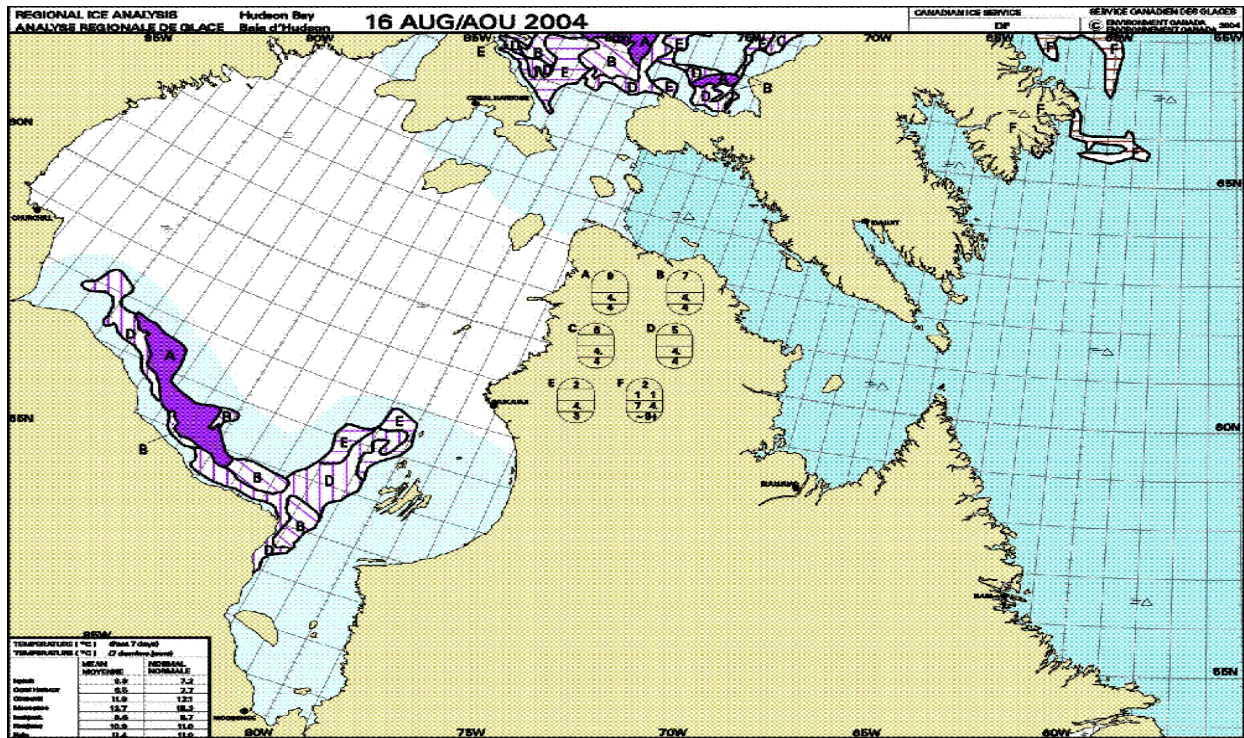


Figure 8: Departure from normal ice concentration Hudson Bay – 16 August

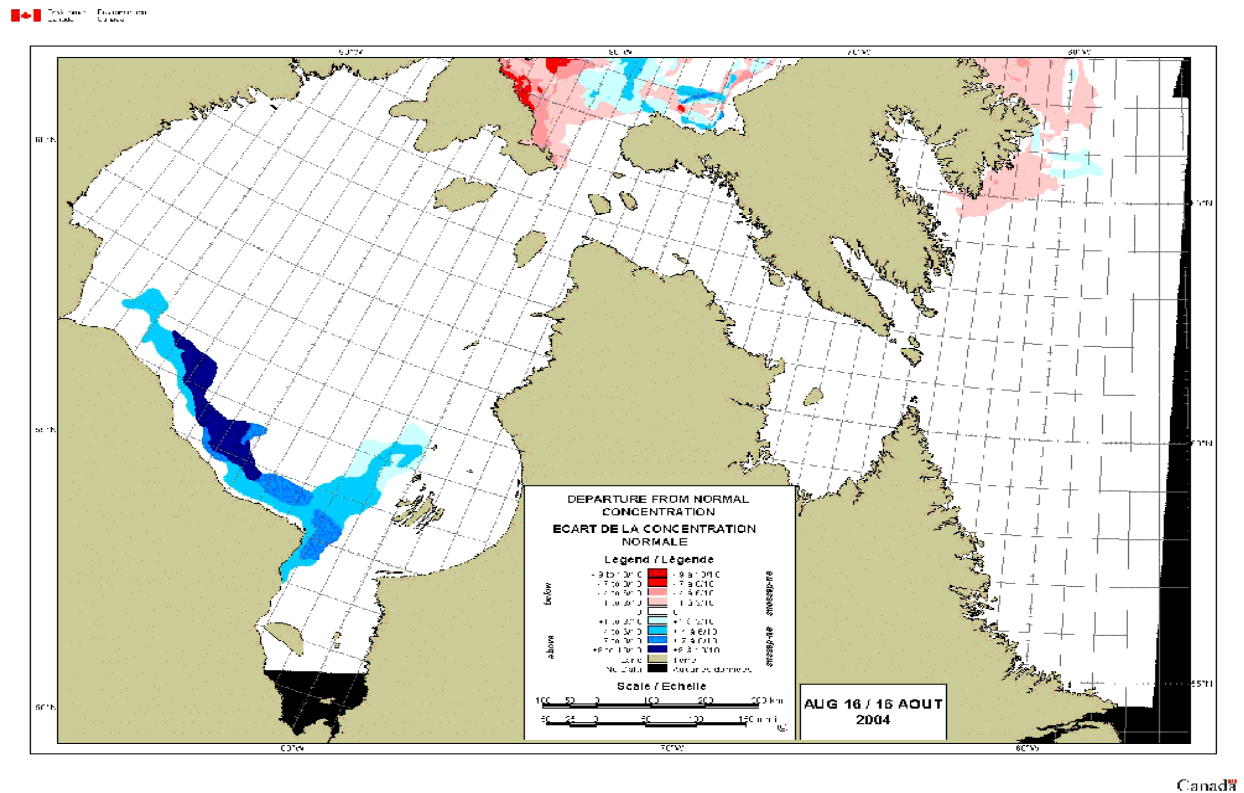


Figure 9: Hudson Bay regional – 13 September 2004

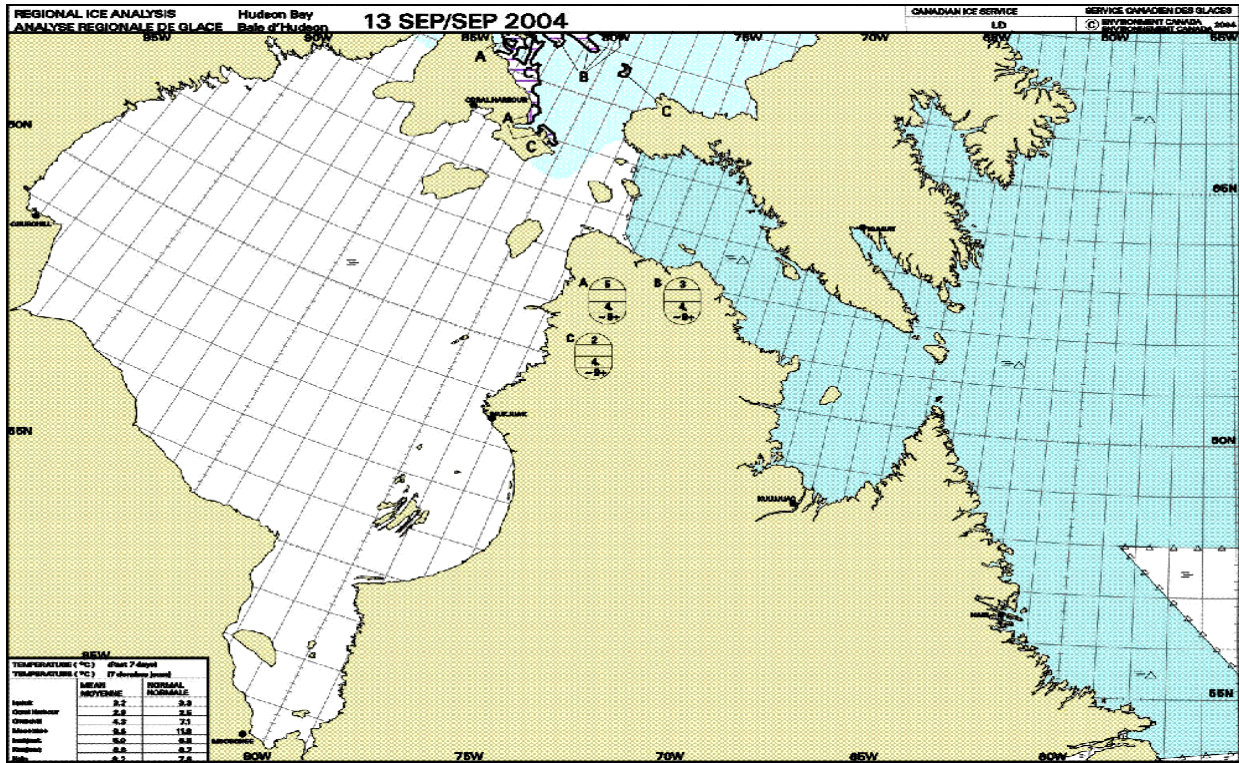
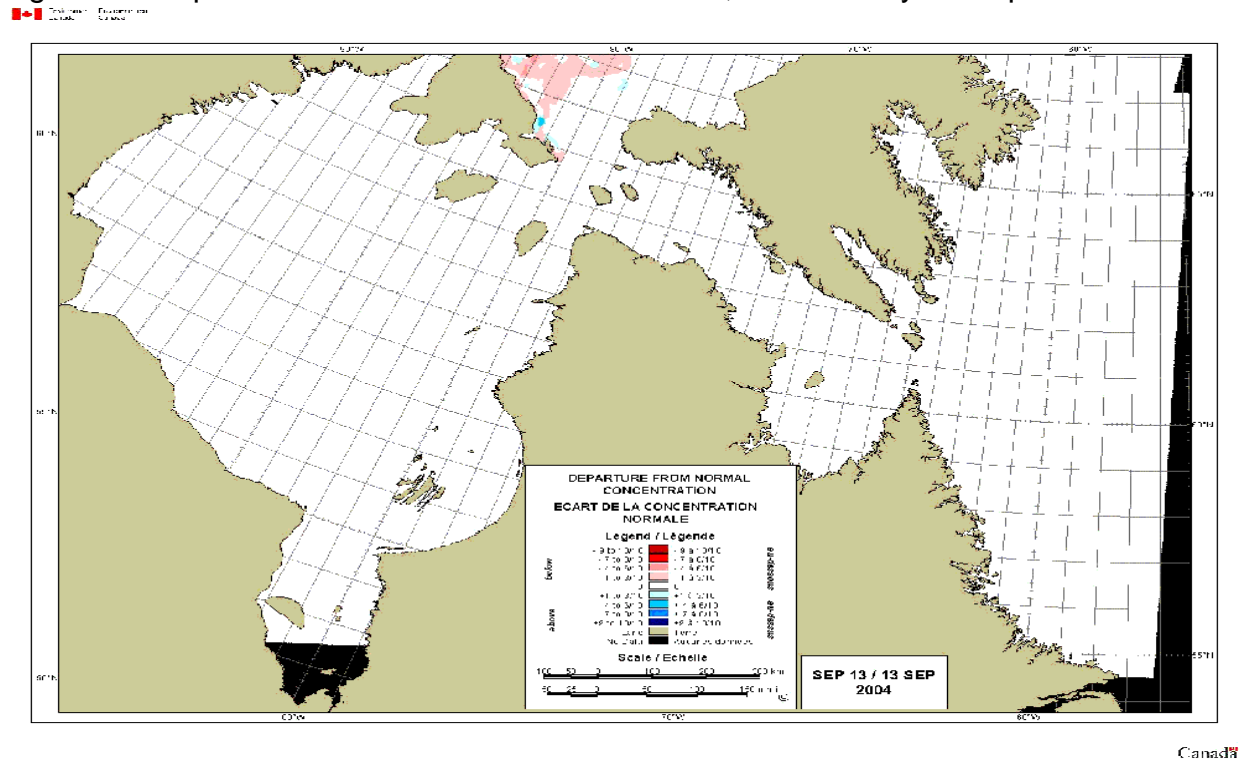


Figure 10: Departure from normal ice concentration, Hudson Bay 13 September



## **Eastern Arctic**

### **June 2004**

At the beginning of June, the lead along the west coast of Greenland was wider and extended further north than normal. At that time bergy water was reported south of Kane Basin stretching southward to the northeast entrance to Lancaster Sound. Normally this ice condition is seen only during the third week in June. The ice in Eastern Barrow Strait and Lancaster Sound remained mobile all winter. Otherwise conditions were near normal.

June temperatures have been generally just above normal except below normal over the Central Arctic down to Foxe Basin (Table 2, page 11). All the ice in Eastern Barrow Strait and in Lancaster Sound gradually flushed out into Baffin Bay. Since the western portion of Barrow Strait remained consolidated, very little ice was found in eastern Barrow Strait Lancaster Sound at the end of June. The lead along western Greenland expanded both seaward and northward and conditions in Baffin Bay were 10 days to two weeks ahead of Normal at the end of the month.

The consolidated ice in Prince Regent Inlet did not fracture as per normal due to colder than normal temperatures reported in June. Hence, at the end of June, a significantly larger than normal portion of the Inlet was still consolidated. Little change was noticed in Foxe Basin during June except for normal ice melt over the southeast portion of the Basin. Otherwise ice conditions, at the end of June, were near normal in Foxe Basin and elsewhere in the eastern Arctic.

The departure from normal ice concentration chart for June 14 (Figure 14, page 12) indicates that there is a lot less ice than normal in Eastern Baffin Bay, eastern Barrow Strait as well as in Western Lancaster Sound.

Overall ice conditions over the eastern Arctic area, at mid-June, are shown on Figure 13, page 12.

### **July 2004**

Winds were for the most part light and variable over most of the eastern Arctic area during the month of July except for a generally moderate northwesterly flow over the central Arctic stretching down into Foxe Basin during the second half of the month (Figure 32, page 24). Reported temperatures have been generally near normal except colder than normal over the Central and the High Arctic (Table 2, page 11).

Lancaster Sound and eastern Barrow Strait remained generally bergy water during most of July. However the fracture of the consolidated ice over Western Barrow Strait brought significant amounts of first year and old ice into Eastern Barrow Strait as well as into western Lancaster Sound late in the month. Pond Inlet fractured during the third week of July which is a near normal ice event. The rest of the consolidated ice in Prince Regent and Admiralty Inlets fractured during the first half and the last week of the month respectively. Ice continued to melt in Baffin Bay and an open water route across the northern section of the bay developed late in the month which is near normal. The ice bridge in Nares Strait started to break in early July but was completely broken by mid-month which is about 10 days earlier than normal. Small open water areas developed early in the period in some sections of Foxe Basin and expanded gradually during the course of the month. Jones sound and Pelly Bay fractured just before the end of the month. Ice conditions at the end of July were a few days ahead of normal in Foxe Basin and in Baffin Bay.

Ice conditions and the departure from normal ice concentration chart can be seen on page 13, figure 15 and 16 respectively.

### **August 2004**

Temperatures were generally near to slightly below normal except above normal over the High Arctic and Baffin Bay areas (Table 2, page 11). Light to moderate southerly flow predominated in August over Baffin Bay area while light to moderate northwesterly flow generally prevailed over the rest of the area (Figure 33, page 25).

The ice in the central portion of Baffin Bay gradually decreased in size but there was still a patch left near the center of the bay at the end of August. Southern Norwegian Bay fractured early in August while the northern section completely fractured during the third week. Northern Eureka sound was fractured at the beginning of August but the southern section fractured late in the third week of the month. Eureka Sound was mainly bergy water at the end of August except for loose ice persisting over the northern section. Wellington Channel and McDougall Sound fractured about a week into the month but the area between LCI and Cornwallis Island remained consolidated throughout the summer season. Pelly Bay was mainly open water by mid-month but close to very close pack thick first year and old ice persisted in southern Prince Regent Inlet throughout the rest of the month. Bergy water developed in northern Admiralty Inlet within a week into August. The fracture of Viscount Melville Sound allow for a continuous flow of mainly old ice into Barrow Strait and western Lancaster Sound specially during the second half of August so at the end of the month there was more ice than normal over these above mentioned areas.

The normal increase in air temperatures resulted in moderate ice melt over Foxe Basin during August but there was still significantly more ice than normal at the end of the month especially over the northern section.

Ice conditions as well as the departure from normal ice concentration chart, at mid-August, are shown on page 14, figure 17 and 18 respectively.

### **September 2004**

Generally a light to moderate northwesterly flow continue to predominate over the High and Central Arctic while a light and variable flow was generally reported over Baffin Bay and Foxe Basin (Figure 34, page 25). Temperatures have been near normal except above normal over Baffin Bay (Table 2, page 11).

Eureka Sound was mainly bergy water during the first half of September but loose ice drifted into the northern section just after mid-month and new and grey ice were covering most of the sound at the end of September. The patch of ice in the central section of Baffin Bay gradually shrunk and completely disappeared by the last week of the month which is about 10 days later than normal. New and grey ice developed between the floes in McDougall Sound, Wellington Channel, Lancaster Sound, Prince Regent Inlet as well as in Jones sound during the last 10 days of the month. At the end of September most of Pelly Bay was bergy water while old and thick first year ice prevailed in southern prince regent Inlet and in Committee Bay.

Foxe Basin experienced a significant decrease in ice concentration and extent but loose ice still persisted over the northern third of the basin at the end of September. Normally, at that time, Foxe Basin is mainly open water. At the end of September there was more old ice than normal in Lancaster Sound and Prince Regent Inlet. The onset of Freezing in the area was near normal.

Ice conditions and the departure from the normal ice concentration chart, at mid-September, are shown on page 15, figure 19 and 20 respectively.

Canadian Ice Service

Table 2: Temperatures and departures from normal (°C)

Stations	June		July		August		September	
	Temp.	Depart.	Temp.	Depart.	Temp.	Depart.	Temp.	Depart.
Eureka	2.3	0.6	4.5	-1.0	3.4	1.0	-7.8	0.1
Resolute	-1.6	-1.2	2.2	-1.8	1.6	0.2	-5.7	-0.7
Pond Inlet	2.3	0.7	5.1	-0.7	4.5	0.5	0.0	1.8
Clyde	1.1	0.6	4.2	0.0	4.9	1.1	0.8	1.1
Hall Beach	-1.2	-1.8	6.2	0.4	3.9	-0.6	0.0	0.5
Pelly Bay	0.9	-2.0	9.0	0.3	5.0	-1.4	0.7	0.6

Figure 11: Temperature trend at Resolute, June - September 2004

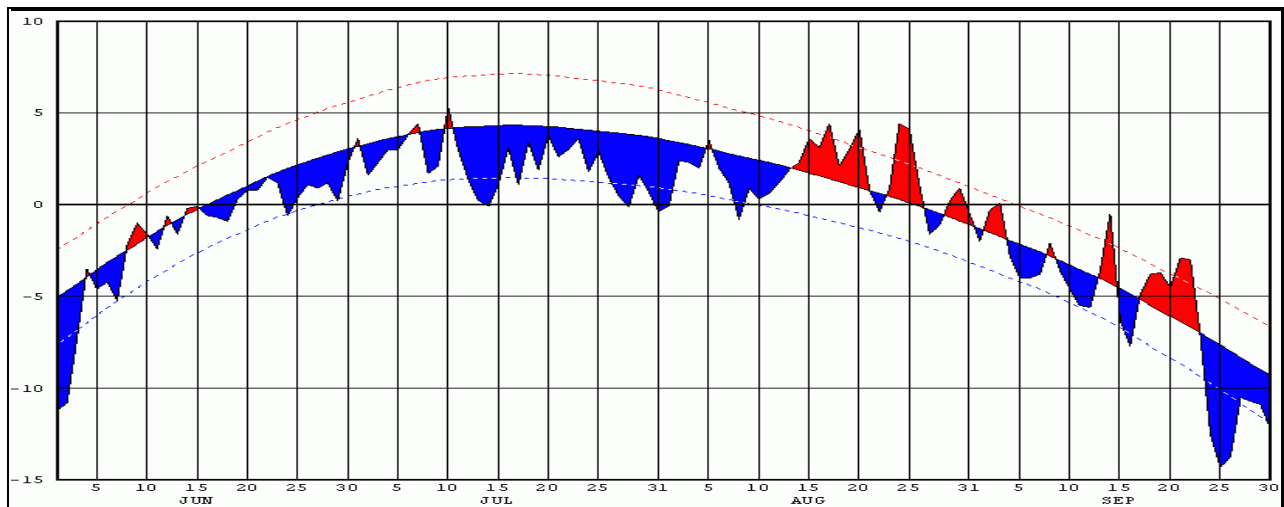


Figure 12: Temperature trend at Hall Beach, June - September 2004

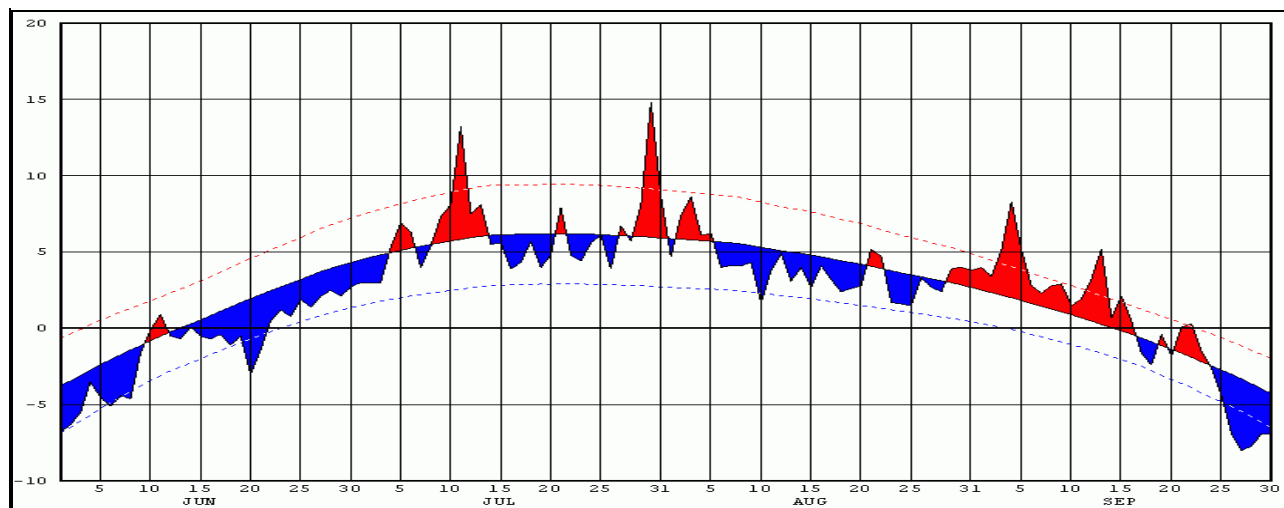


Figure 13: Eastern Arctic regional chart – 14 June 2004

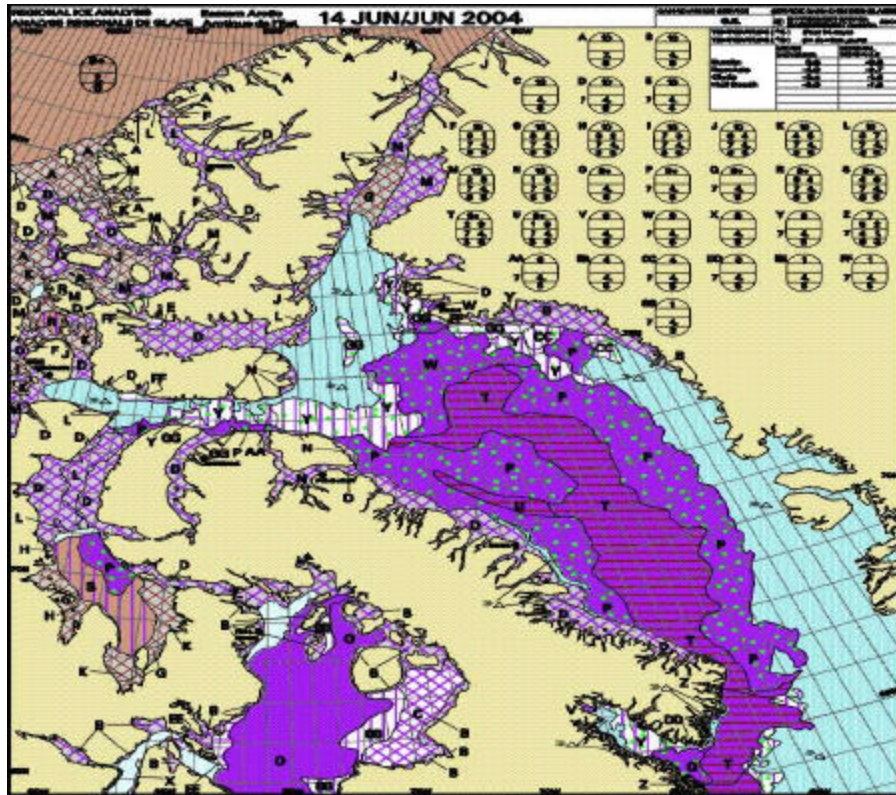


Figure 14: Departure from normal ice concentration, Eastern Arctic-14 June 2004

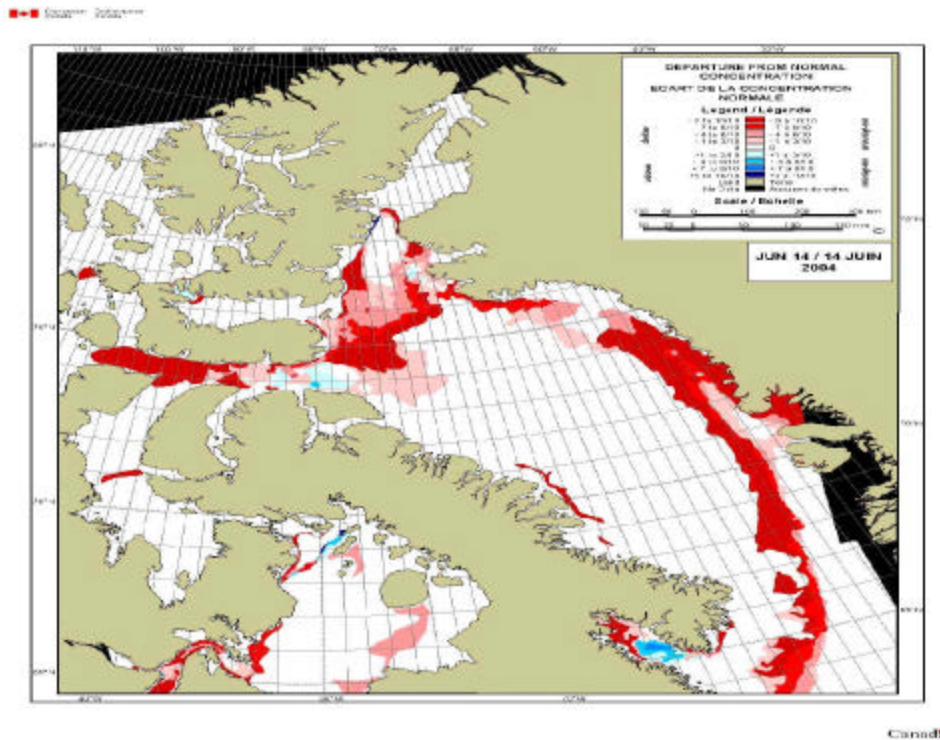




Figure 15: Eastern Arctic Regional chart – 12 July 2004

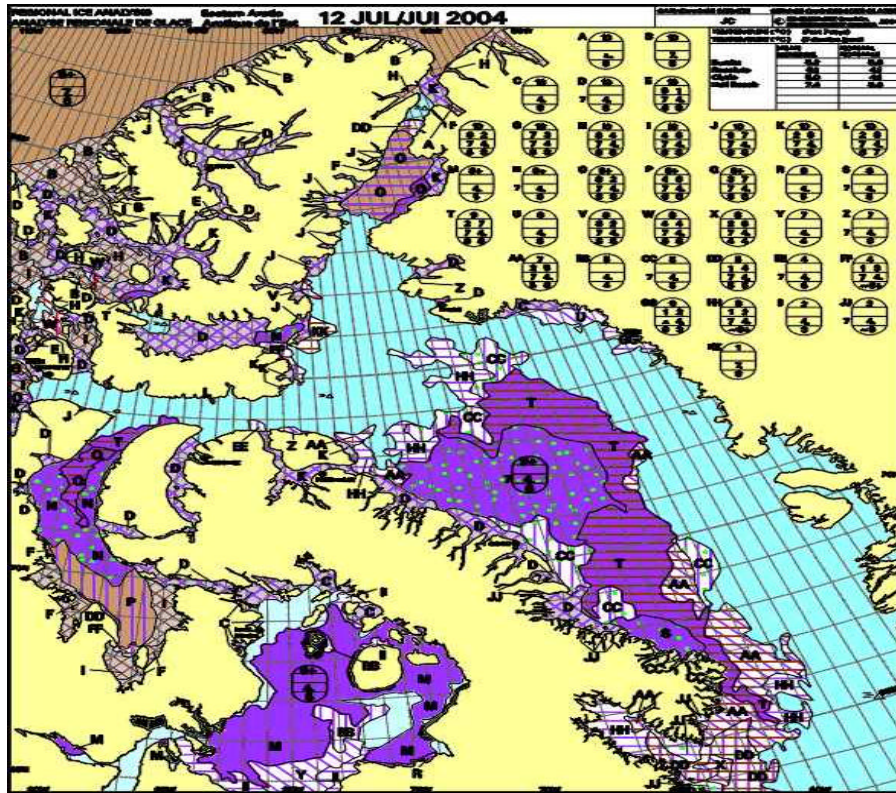


Figure 16: Departure from normal ice concentration, Eastern Arctic – 12 July 2004

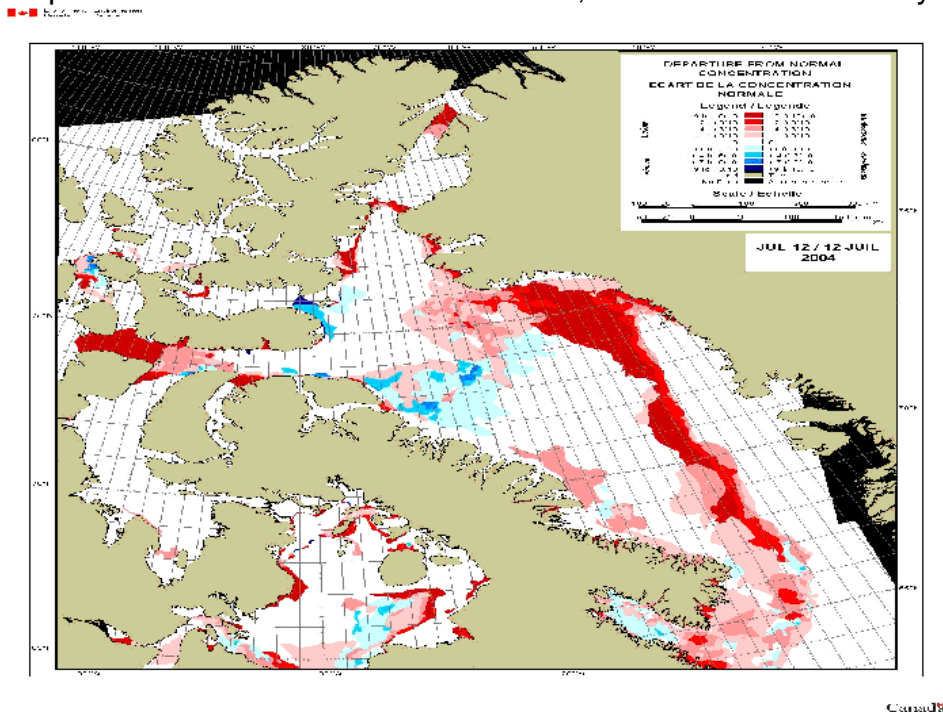


Figure 17: Eastern Arctic regional – 16 August 2004

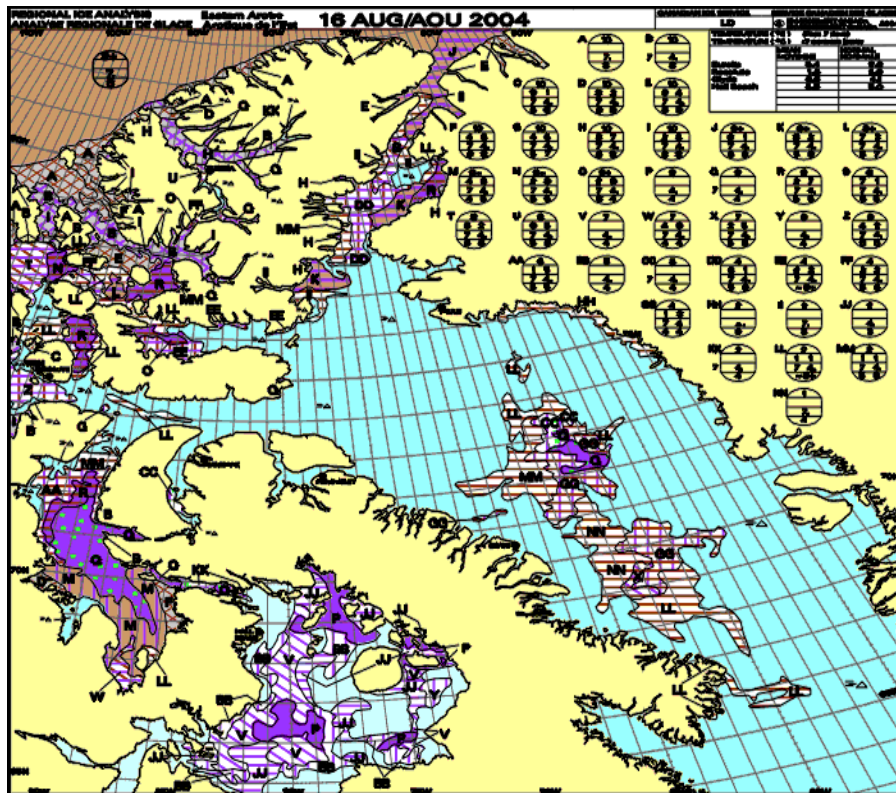


Figure 18: Departure from normal ice concentration, Eastern Arctic–16 August 2004

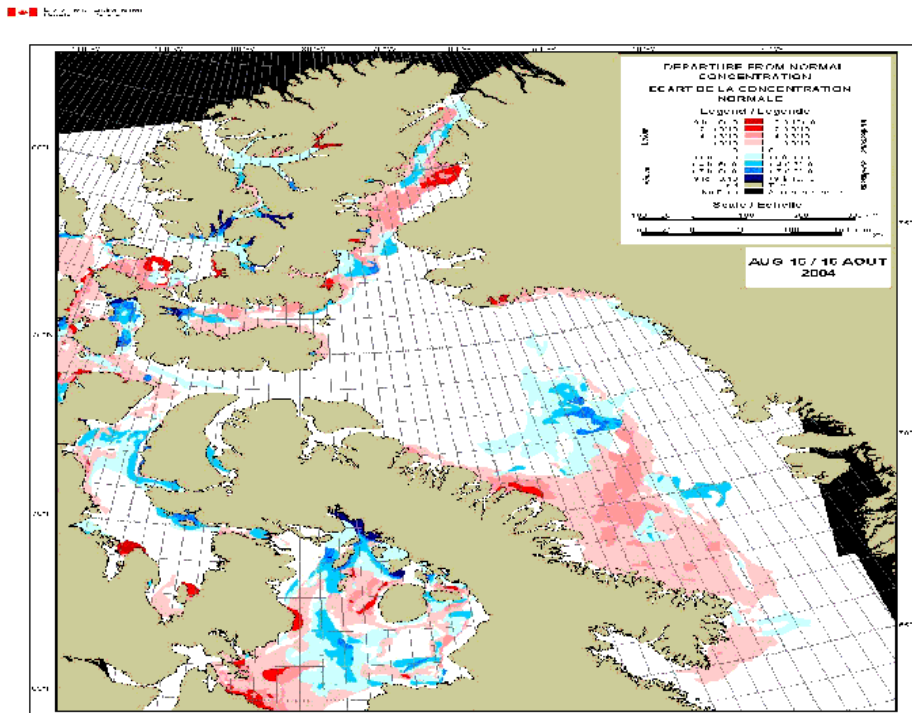


Figure 19: Eastern Arctic regional chart – 13 September 2004

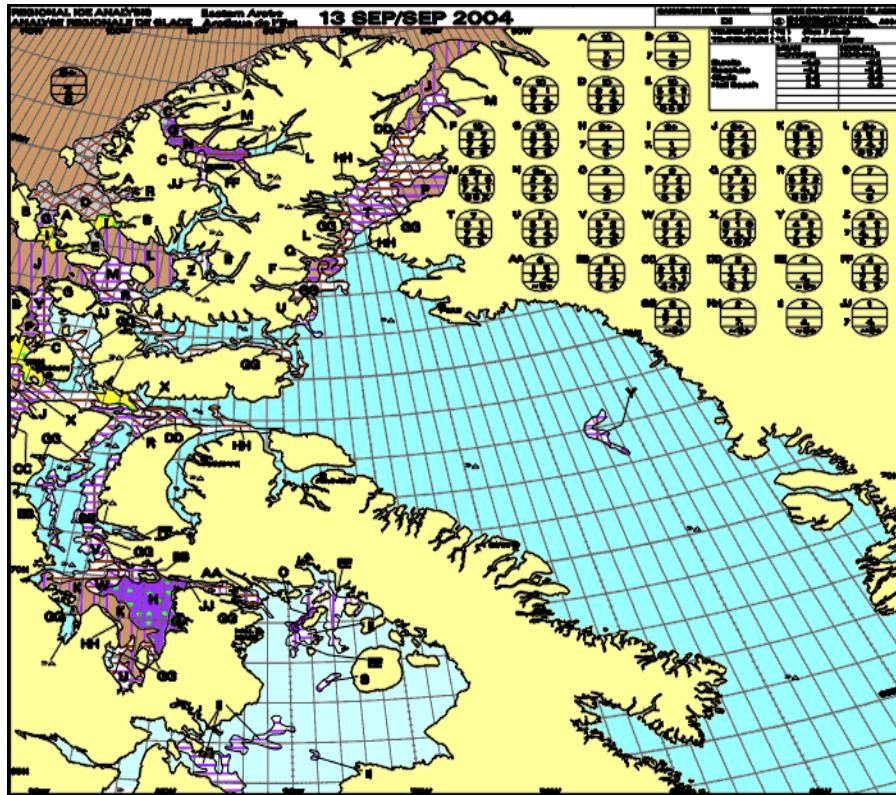
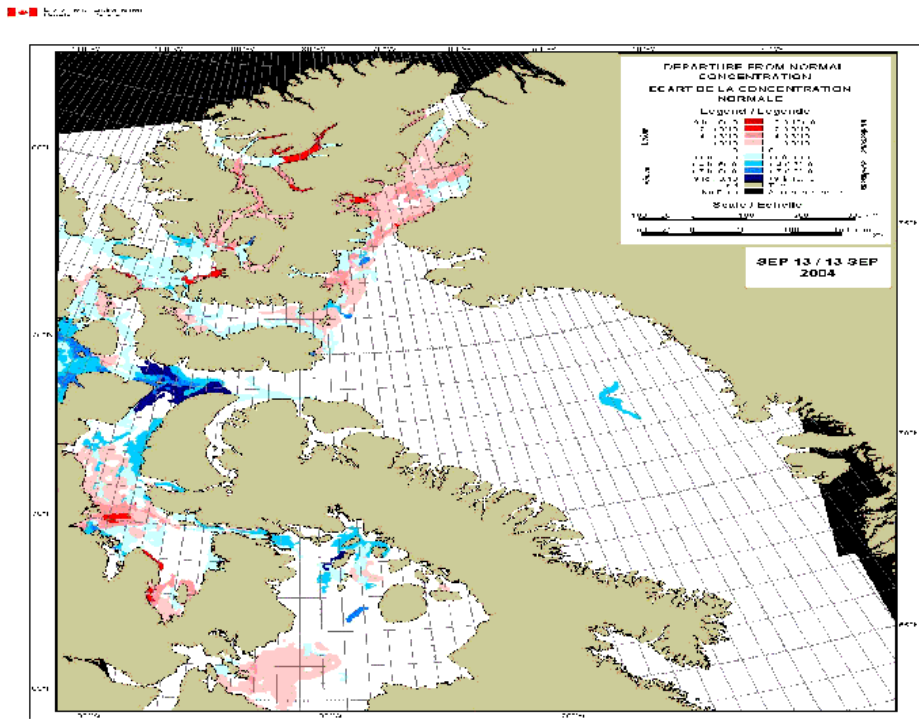


Figure 20: Departure from normal ice concentration Eastern Arctic-13 September 2004



## **Western Arctic**

### **June 2004**

Winds were generally light to moderate northwesterly over the central Arctic. Over the southern Beaufort Sea winds were moderate southeasterly during the first half of June but light and variable during the second half (Figure 31, page 24). Temperatures were below normal over Peel Sound and Queen Maud Gulf areas, near normal along the Waterways but above normal over the southern Beaufort Sea area (Table 3, page 19).

A moderate southeasterly flow in late May and early June developed an open lead along the fast ice edge in southern Beaufort Sea which is an earlier than normal event. The lead gradually expanded during the month. The ice in the Mackenzie Delta started to melt during the second week in June and has completely melted during the last week of the month. Fast ice was still reported along the Tuk Peninsula at the end of June but the aerial extent of that fast ice gradually decreased specially during the second half of the month.

Ice conditions and the departure from normal ice concentration chart, at mid-June, are shown on page 20, figure 23 and 24 respectively.

### **July 2004**

A light to moderate northwesterly flow generally prevailed except for a light and variable flow over the southwestern section of the Beaufort Sea (Figure 32, page 24). Below normal temperatures were generally reported except near normal over the Beaufort Sea area (Table 3, page 19).

The fast ice north of the Tuk peninsula, as well as most of Amundsen Gulf, fractured during the first week of July. Both events occurred near its normal date. The fast ice along the Alaskan coast, including Point Barrow area, fractured also during the first week of June and a slow but gradual decrease in coastal ice concentration was noted during the following three weeks. Dolphin and Union Strait and Coronation Gulf fractured during the second and third week in July while the rest of the Waterways did so during the last week of the month. Those events occurred about one to two weeks later than normal due to colder than normal temperatures. The open water area in southeastern Beaufort Sea was more extensive than normal at the end of July. Queen Maud Gulf started to fracture early in the last week of July but the eastern section was still consolidated at the end of the month. Break up in Queen Maud Gulf was about a week late.

The main consequence of the predominant northwesterly flow over the Beaufort Sea was to bring the pack of old ice towards the Banks Island coast and southward into the western section of Amundsen Gulf. As a result more old ice than normal was reported

north of Cape Bathurst which caused significant problems to shipping activities in the area. At the end of July, more ice than normal was also found in Dolphin and Union Strait, Coronation Gulf but especially in Amundsen Gulf because of prevailing below normal temperatures.

Ice conditions and the departure from normal ice concentration chart, at mid-July, can be seen on page 21, figure 25 and 26 respectively.

### **August 2004**

Winds were generally moderate northwesterly except light and variable over the southern Beaufort Sea area (Figure 33, page 25). Below normal temperatures were generally reported except slightly higher than normal over the southern Beaufort Sea area (Table 3, page 19).

At the beginning of August open water was generally predominant along the coast from Mackenzie Bay to Point Barrow except for the portion between Demarcation Point and Prudhoe Bay where close pack old and thick first year ice were predominant. This ice gradually shrunk during the period and the coast route to Point Barrow was entirely open water just before the end of August. At that time the main ice pack was much further offshore than normal along the Alaskan coast.

As the predominant flow continued to be from the northwest old ice continue to drift into the western section of Amundsen and at the end of August more ice than normal was still found in this area. At the beginning of August more ice than normal was found in Eastern Amundsen Gulf and in sections of the waterways but the normal increase in air temperatures melted this ice during the second week of the month.

Queen Maud Gulf experienced a general decrease in ice concentration during the month but isolated ice areas were still found in the Gulf at the end of August. Normally Queen Maud Gulf is entirely open water in the third week of the month. Franklin Strait, McClintock Channel and southern Peel Sound fractured just before mid-August while the northern section of Peel Sound fractured during the last week. The fracture events in Franklin Strait and Peel Sound were about 2 weeks later than normal due mainly to colder than normal temperatures reported over the summer. Due to the late departure of the ice in Queen Maud Gulf, the open water route to Taloyoak developed in late August which is 2 weeks later than normal. At the end of the month much more ice than normal was found in Peel Sound and in eastern Franklin Strait.

Ice conditions and the departure from normal ice concentration chart, at mid-August, can be seen on page 22, figure 27 and 28 respectively.

### **September 2004**

In the Beaufort Sea area a moderate northwesterly flow continued to predominate during the first half of September but changed to a moderate easterly flow over the second half of the month. Over the rest of the area light northwesterly flow generally prevailed (Figure 34, page 25). Temperatures have generally been slightly below normal (Table 3, page 19).

During the month of September the main pack off the Alaskan coast remained much further offshore than normal, which has been the trend over the last few years. Conditions remained difficult in western Amundsen Gulf and in the vicinity of Cape Bathurst as the flow of old ice into these areas continued. However ice conditions improved significantly during the second half of September as the prevailing winds shift to the southeast.

Ice conditions remained more severe than normal in Victoria Strait northward to Peel Sound throughout the month and shipping activities into these areas were significantly hindered. However a period of easterly winds during the third week of the month developed a lead along the eastern sides of Franklin Strait and Peel Sound allowing for the safe passage of some ships. New ice started to form between the old and first year ice floes just before mid-September and thickened to grey ice during the last week of the month. The start of the freeze up in the western Arctic area occurred near its normal date.

Ice conditions and the departure from normal ice concentration chart, at mid-September, can be seen on page 23, figure 29 and 30 respectively.

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Table 3: Temperatures and departures from normal (°C)

Stations	June		July		August		September	
	Temp.	Depart.	Temp.	Depart.	Temp.	Depart.	Temp.	Depart.
Gjoa Haven	-0.4	-1.9	6.1	-1.4	4.6	-1.0	-0.9	-0.6
Cambridge Bay	1.9	-0.3	6.8	-1.3	5.7	-0.5	-0.8	-0.2
Kugluktuk	5.7	0.8	11.0	0.6	7.6	-1.0	2.2	-0.4
Tuktoyaktuk	8.6	2.4	12.2	1.2	9.8	0.7	2.1	-0.6
Point Barrow	3.6	1.3	6.0	1.7	6.9	3.8	0.7	1.4

Figure 21: Temperature trend at Tuktoyaktuk, June – September

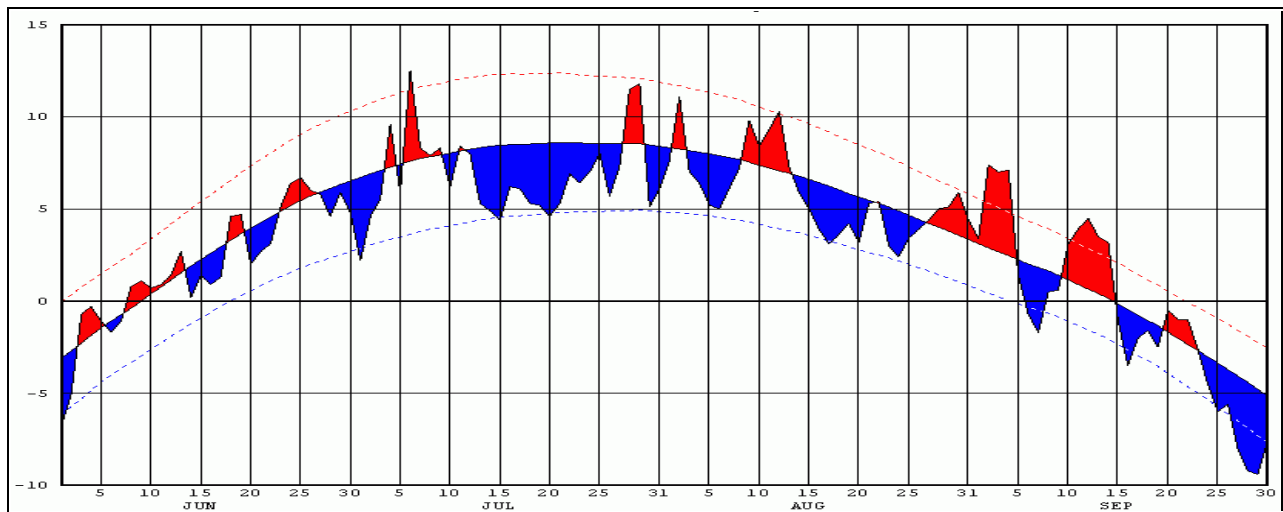


Figure 22: Temperature trend at Cambridge Bay, June – September

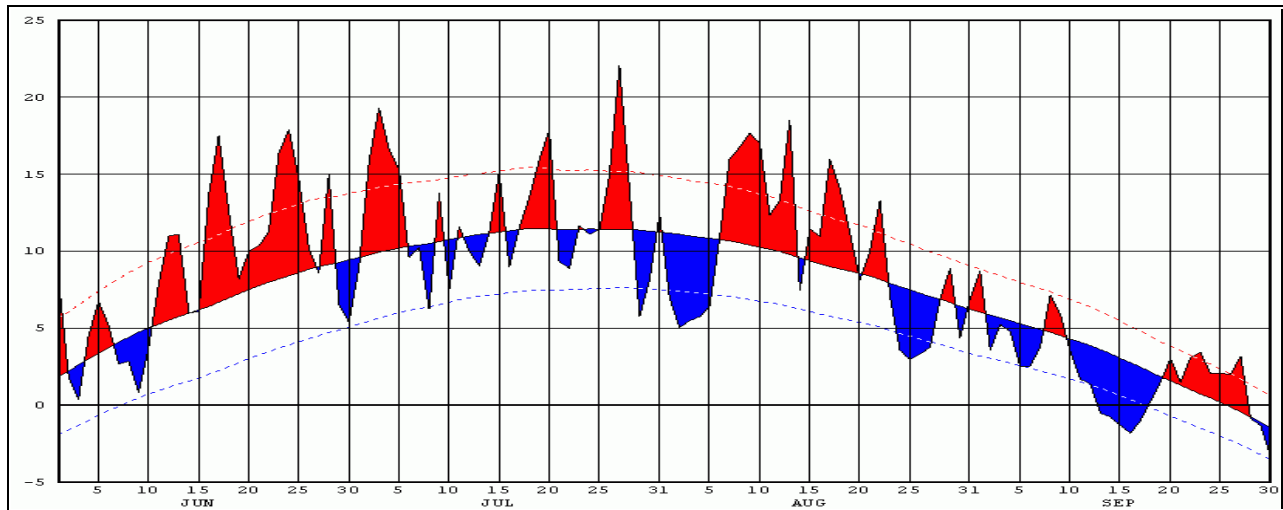


Figure 23: Western Arctic regional chart - 14 June 2004

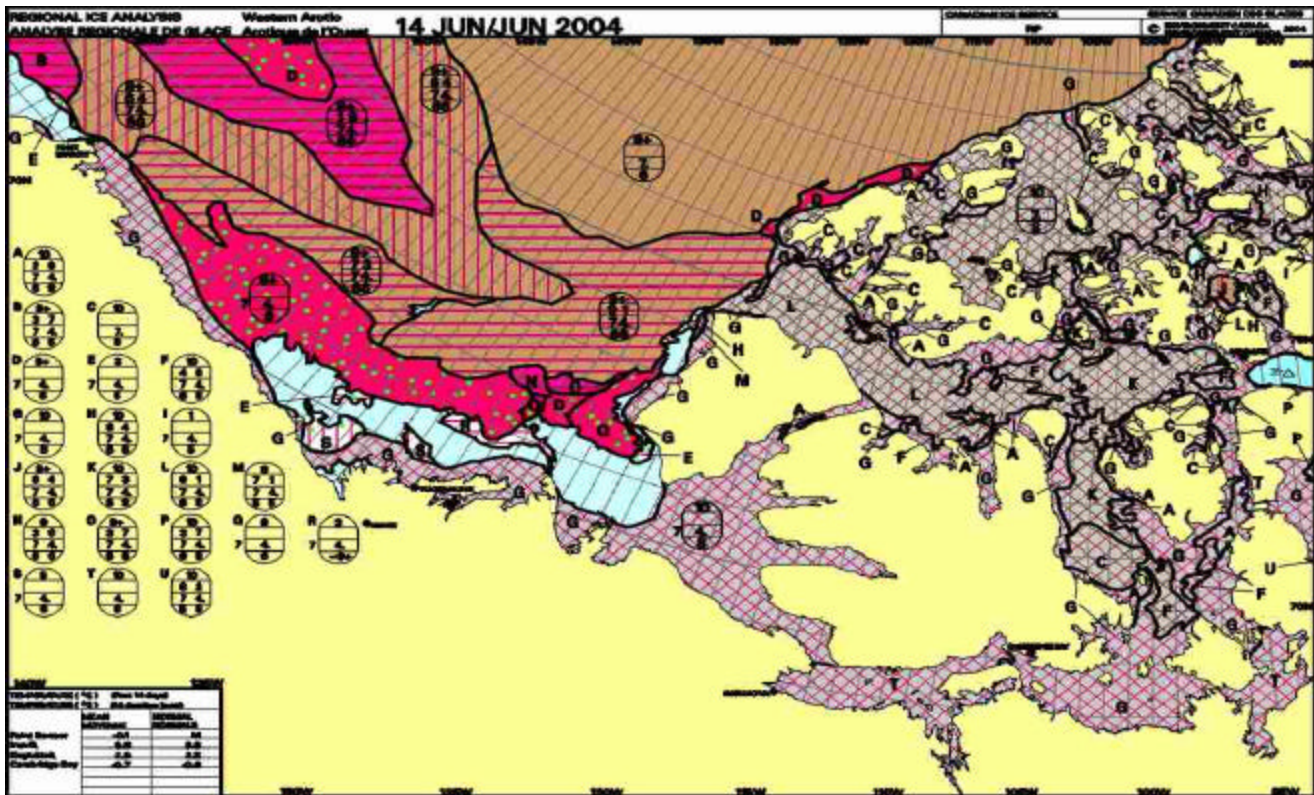


Figure 24: Departure from normal ice concentration, western Arctic – 14 June

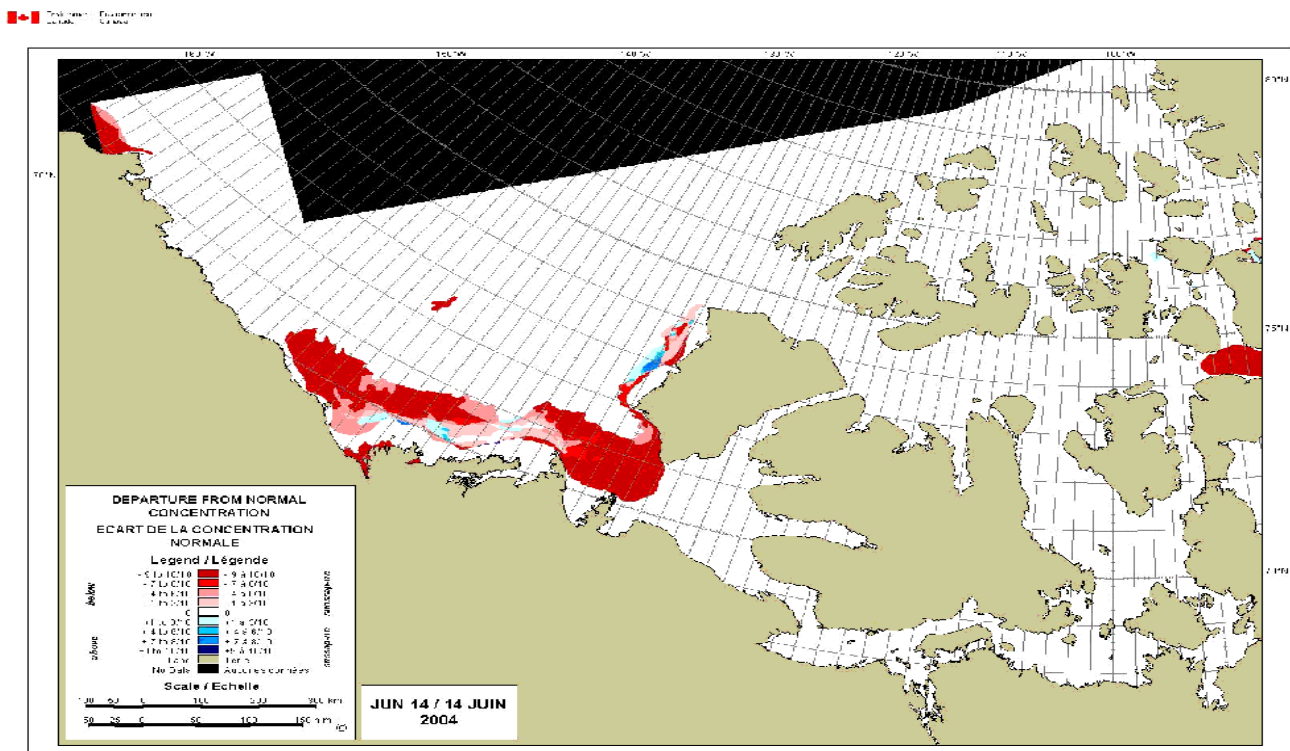




Figure 25: Western Arctic regional – 12 July 2004

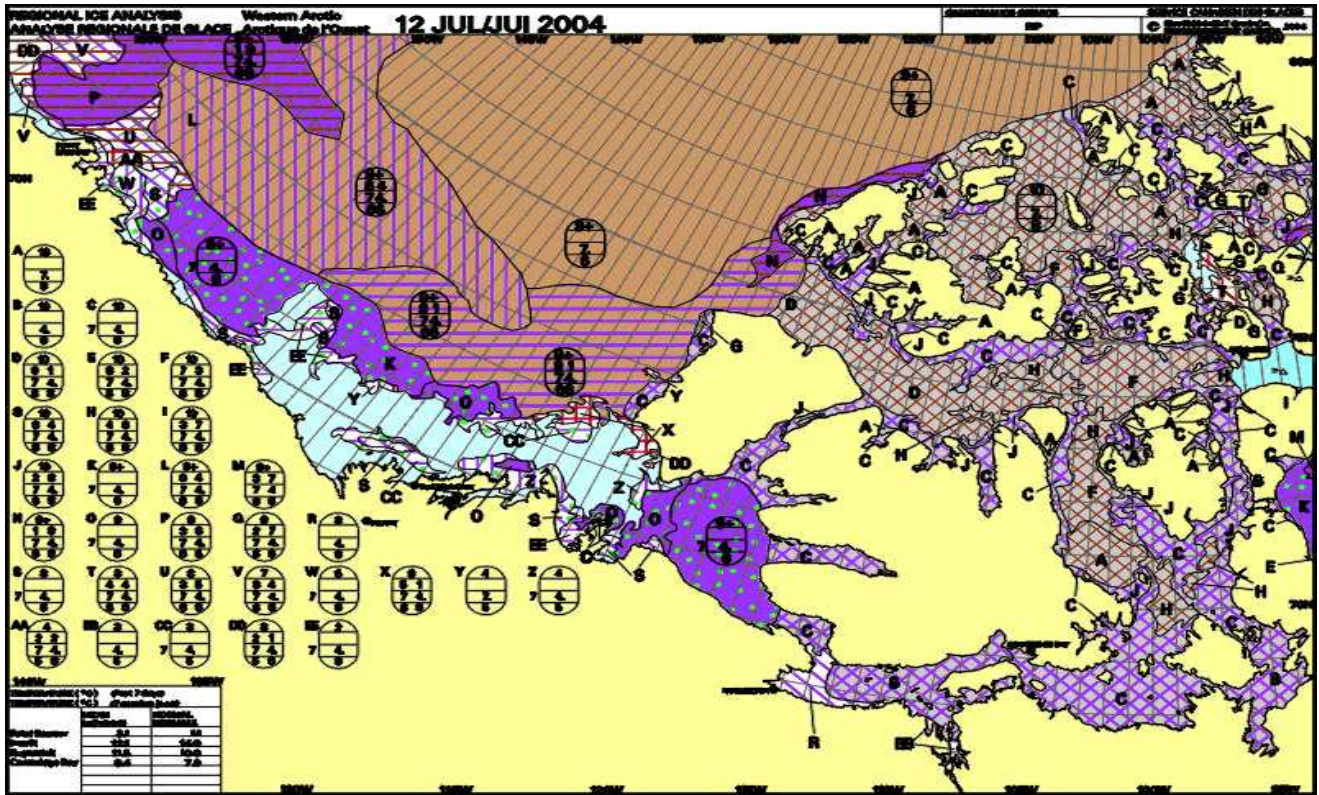


Figure 26: Departure from normal ice concentration, Western Arctic – 12 July

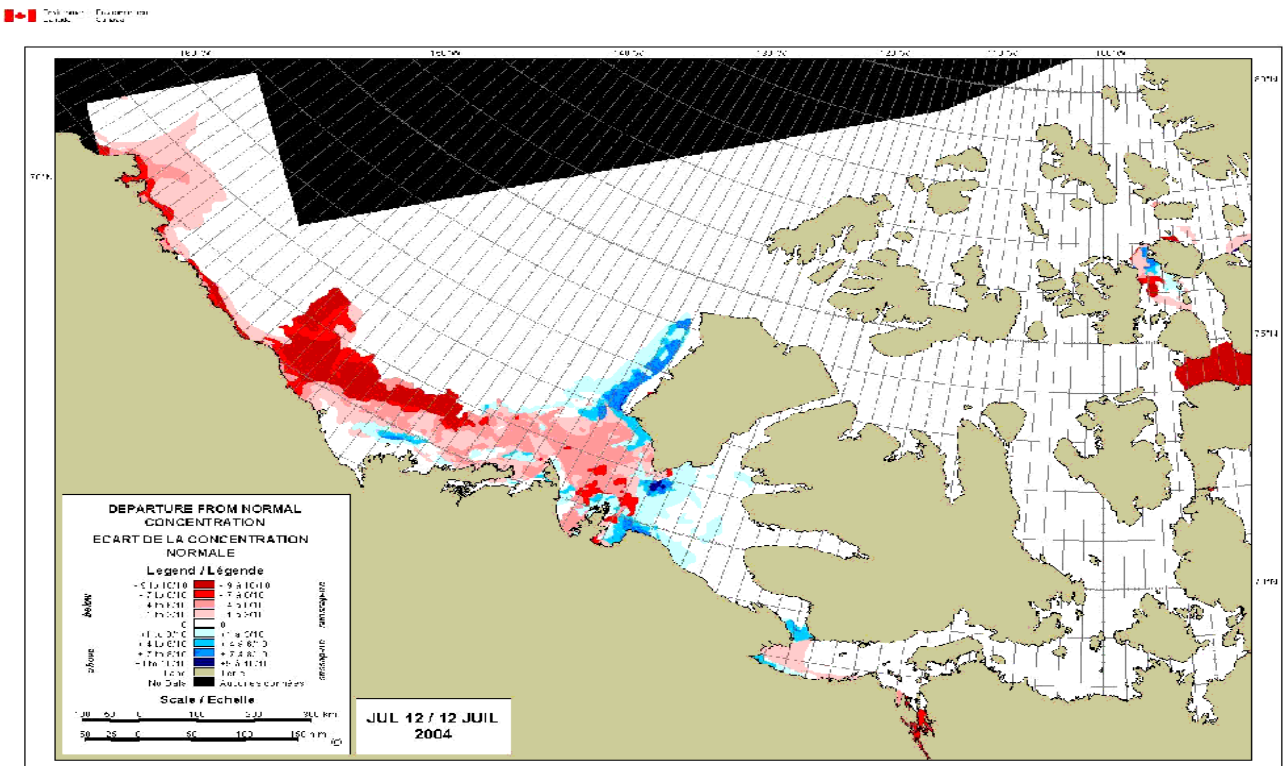


Figure 27: Western Arctic regional chart – 16 August 2004

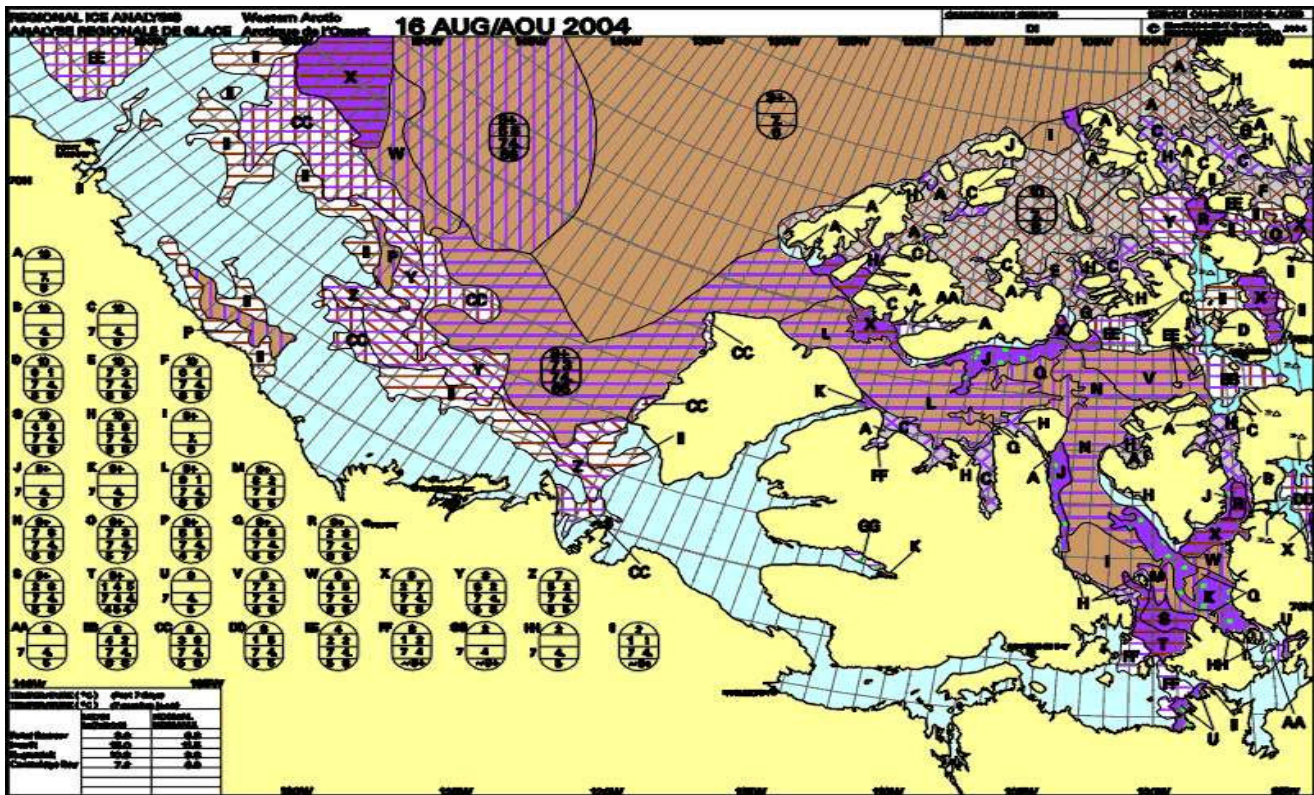


Figure 28: Departure from normal ice concentration, Western Arctic – 16 August

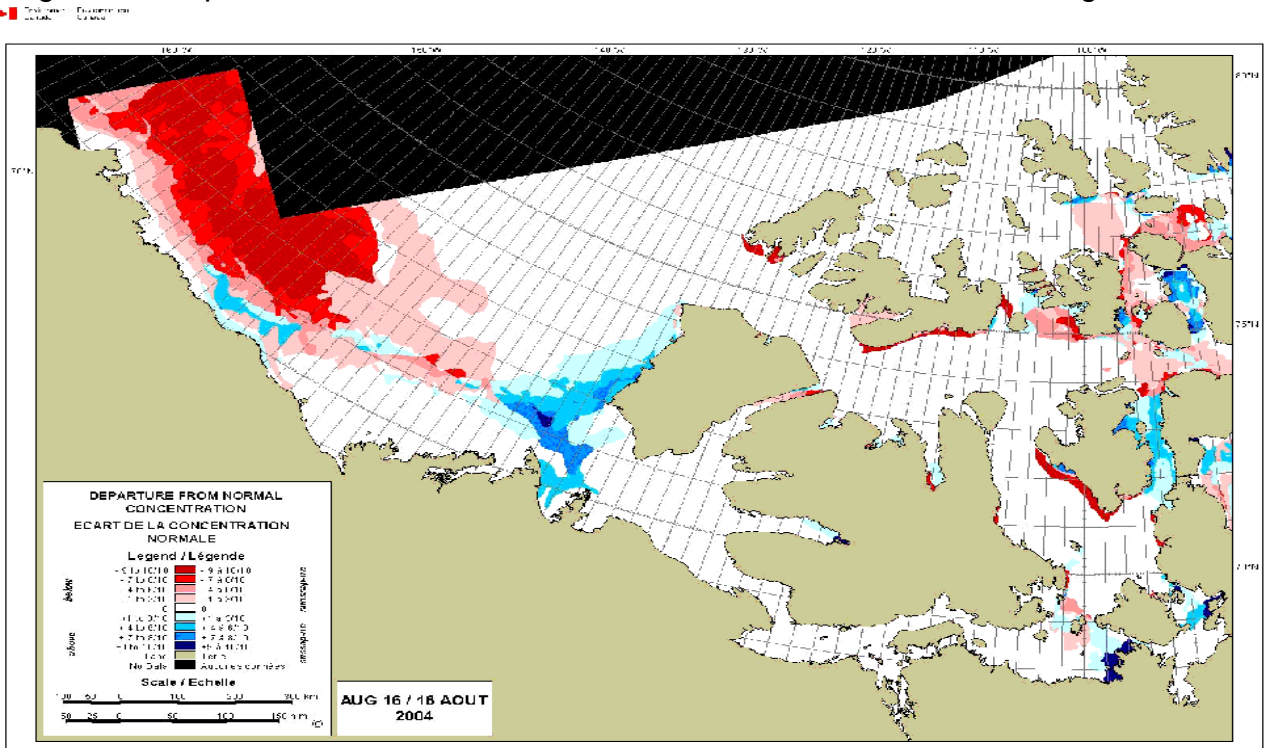


Figure 29: Western Arctic regional chart – 13 September 2004

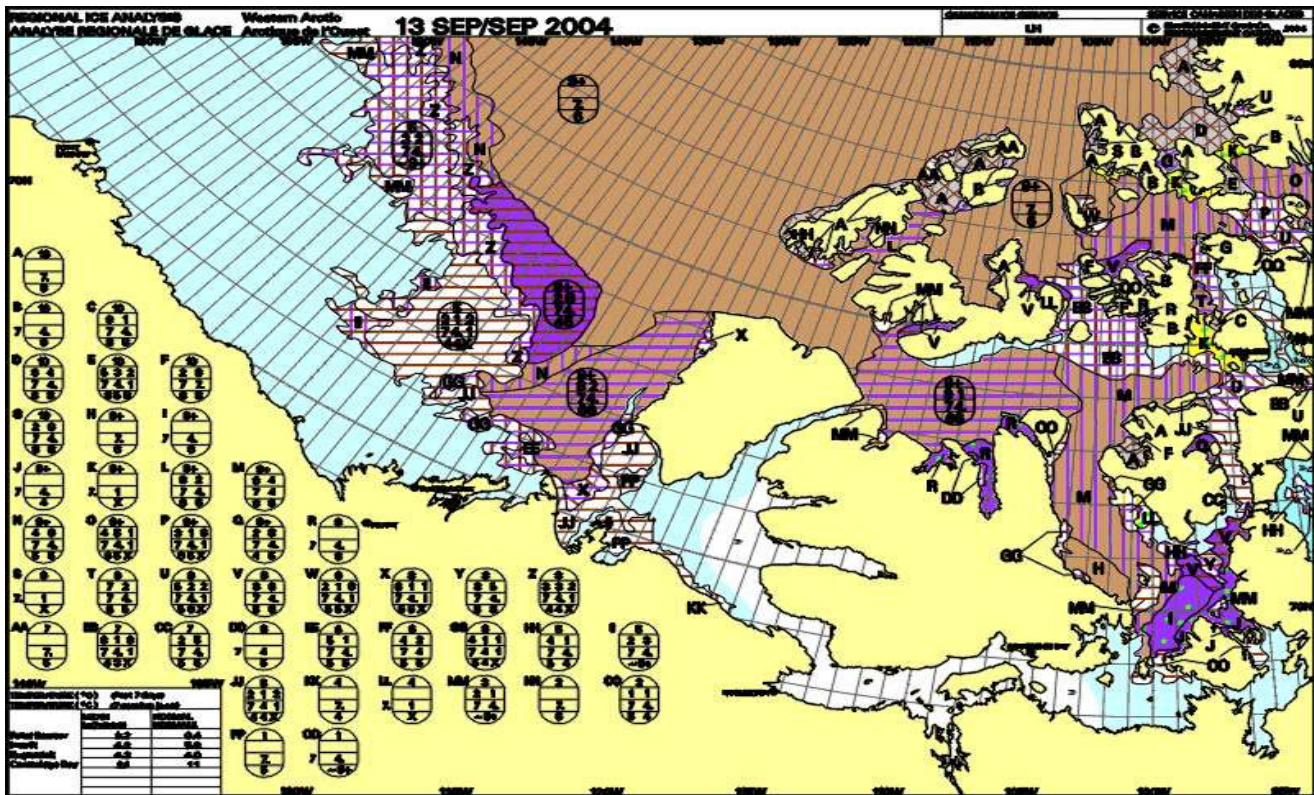


Figure 30: Departure from normal ice concentration, Western Arctic – 13 September

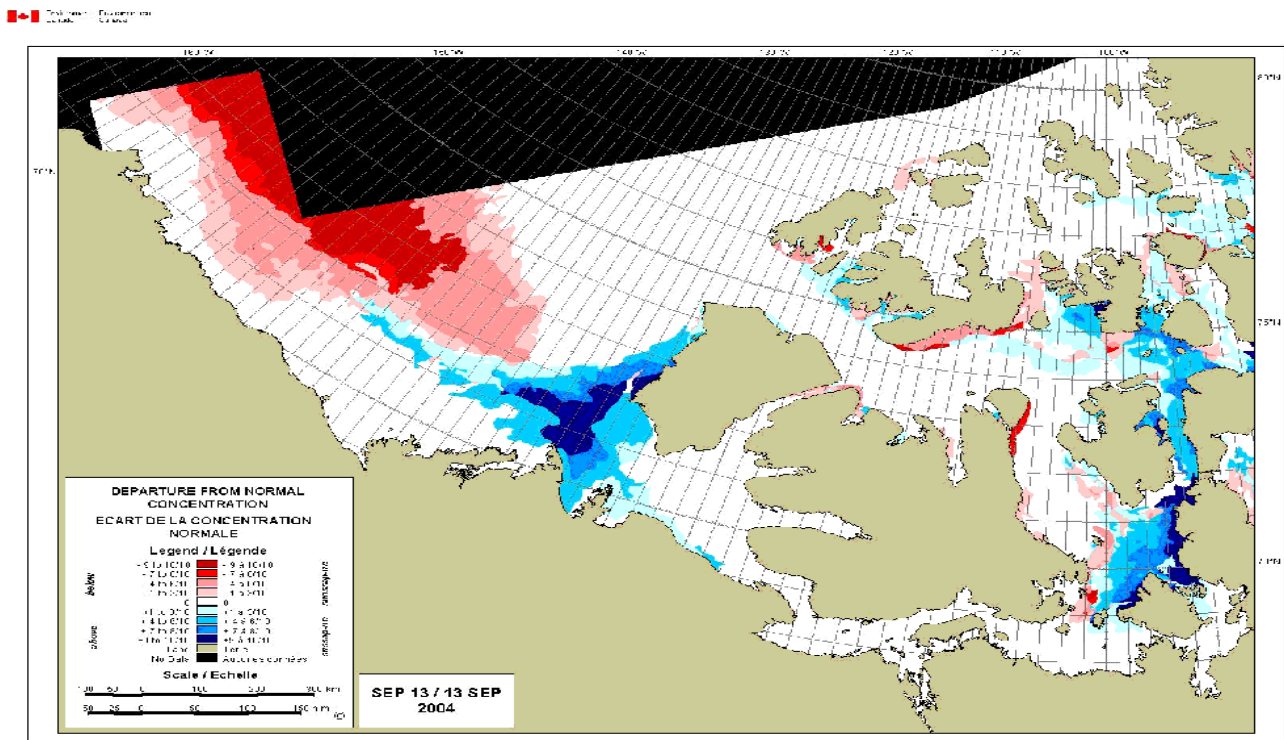


Figure 31: 1000 mb pattern for June 1-15 and 16-30

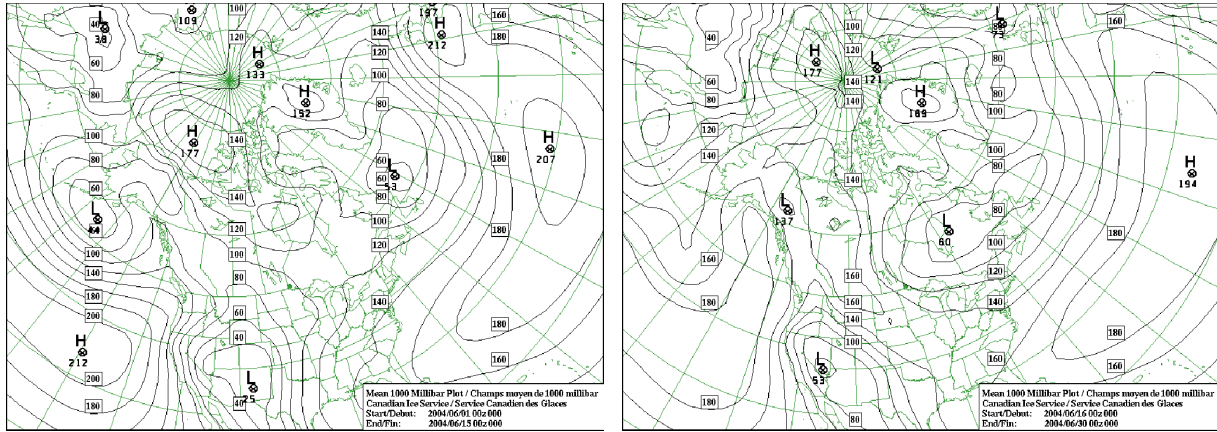


Figure 32: 1000 mb pattern for July 1-5 and July 16-31

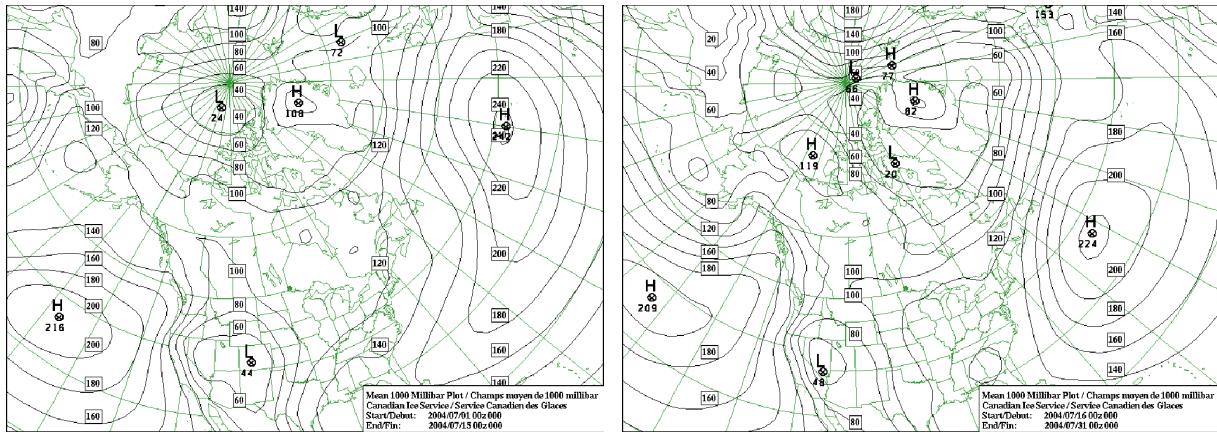


Figure 33: 1000 mb pattern for August 1-15 and 16-31

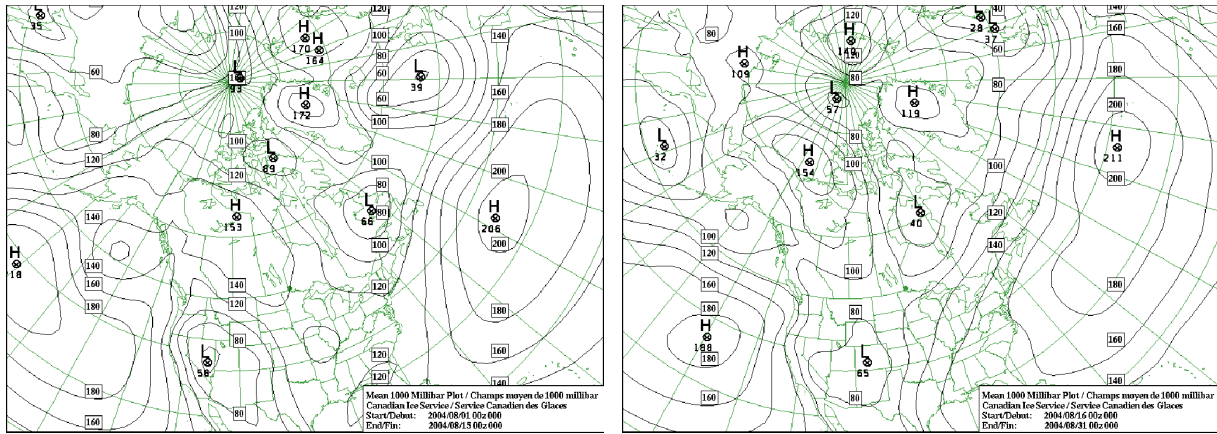


Figure 34: 1000 mb pattern for September 1-15 and 16-30

