

Seasonal Summary
For Eastern Canada
Winter 2008-2009



Produced by the Canadian Ice Service
July 2009

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General Overview of the 2008-2009 Season

A slow start to the ice season was observed in both the Gulf of St Lawrence and the Newfoundland and Labrador waters. This was caused by above normal temperatures which generally predominated in December through mid-January as well as above normal sea surface temperatures especially over the east Newfoundland waters.

The second half of January was particularly cold especially in the Gulf of St Lawrence and along the Labrador coast. As a result, and despite a slow start of the ice season, the ice coverage in the Gulf of St Lawrence reached near normal values by the end of January. At that time the ice coverage in the east Newfoundland waters was well below normal. Temperatures in February were above normal and in some locations well above normal so the ice cover in the east Newfoundland waters remained below normal throughout the month. In the Gulf despite the persistence of above normal temperatures the ice conditions stayed very close to normal throughout February. March temperatures were close to normal except below along the Labrador coast. In the Gulf of St Lawrence the ice coverage remained close to normal during the first half of the month. However an episode of persistent west to north-westerly winds just before mid-March allowed the ice to exit through Cabot Strait and drift southward towards the Sable Island offshore energy production area. At the end of the third week of March the ice extent south-southeast of Cape Breton was close from setting a new record and was the second highest since 1993. The east Newfoundland waters area also experienced a period of persistent west to north-westerly winds at about the same time which caused the ice to drift eastward along the north side of the Grand Bank then southward to the vicinity of the Newfoundland offshore energy production area. That tongue of ice remained in that general area for much of the second half of March. At the end of March the ice coverage in the east Newfoundland waters was above normal.

Due to above normal temperatures in April break-up in the Gulf of St Lawrence was slightly earlier than normal. Above normal temperatures was also the norm in the east Newfoundland waters but the predominant westerly circulation kept pushing ice eastward towards the Grand Banks and as a result the ice coverage in the east Newfoundland waters remained above normal throughout the month of April. The same circulation pattern continued into the first half of May and ice kept drifting into the Grand Banks area. So much so that at mid-May a new record was set for the eastward limit of the ice east of Newfoundland. In the second half of May and the first half of June the ice retreated and the southern limit moved north of the Newfoundland waters during the second week of June which is 2 weeks later than normal.

The weekly ice analyses and the departure from normal ice concentration charts for the Gulf of St Lawrence and Newfoundland and southern Labrador waters are included at the end of this document (figure 31 to figure 59).

Gulf of St Lawrence

November 2008

Reported temperatures for the month of November have been above normal over the Gulf area. Water temperature at the end of month was above normal everywhere. As a result no ice was found in the gulf area at the end of November which is a normal situation.

December 2008

Above normal temperatures generally prevailed in the first half of December (Figure 1). Despite this, the ice started to develop in the St Lawrence River, in shallow bays along the New Brunswick coast and in coastal areas of Chaleur Bay during especially during the second week of the month. At mid-December ice conditions were close to normal (Figure 13) Temperatures turned colder during the third week of December but returned to above normal values in the last week of the month which prevented any significant ice development. Hence at the end of 2008 the ice coverage in the Gulf was a lot less than normal (Figure 13).

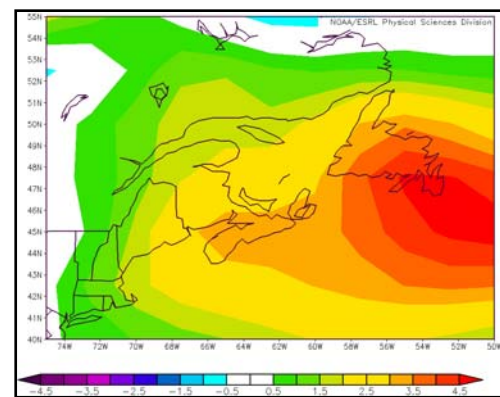


Figure 1: temperature anomaly, 01-15 December

January 2009

Near normal temperatures were generally reported during the first 2 weeks of January. Ice then developed at a near normal pace but the ice coverage remained well below normal at mid-January. Below to well below normal temperatures were generally reported in the second half of January (Figure 2) This allowed the ice to develop at an accelerated pace. At the end of January the ice coverage was now close to its normal value (Figure 13). The ice thicknesses were also close to normal except thicker than normal along the southern shore of the estuary and in western Gaspé Passage.

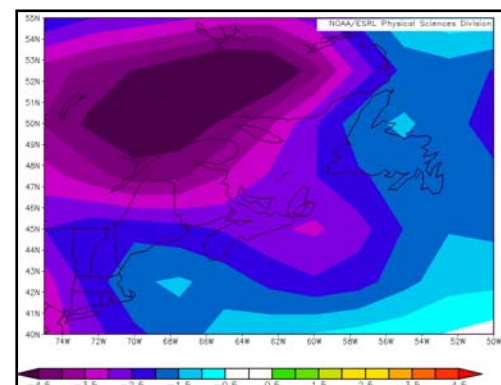


Figure 2: temperature anomaly, 16-31 January

February 2009

Above normal temperatures were generally reported over the Gulf of St Lawrence area during the first half of February (Figure 3). Despite milder than normal temperatures significant ice development was observed during the period and at mid-February all of gulf area was almost completely ice covered which is a normal situation for this time of the year. However the ice extent south southeast of Cape Breton was greater than normal. Also the area of first year ice in the south-western section of the gulf was more extensive than normal. Above normal temperatures continued to prevail during the second half of February (Figure 4) which prevented any significant ice development. The only noticeable change that occurred during the period was the melting of the ice area south-southeast of Cape Breton. At the end of February the ice cover in the Gulf of St Lawrence remained very close to normal (Figure 13). Break-up in the gulf normally begins during the second half of February which was the case this year as the overall ice cover decreased slightly in the last week of the month.

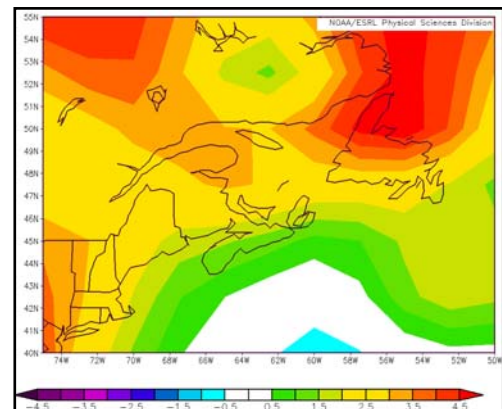


Figure 3: temperature anomaly, 01-14 February

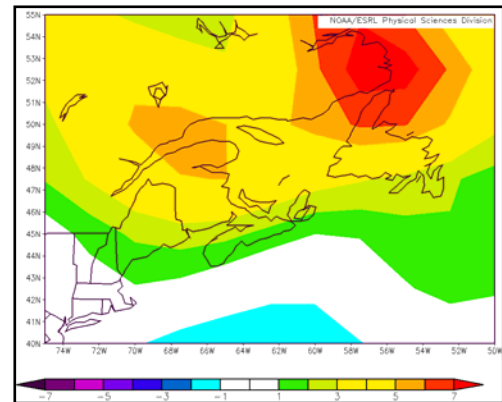


Figure 4: temperature anomaly, 15-28 February

March 2009

Near normal temperatures were generally observed in the Gulf of St Lawrence during the first half of March except below normal in the northern section of the Gulf. Little change regarding the ice situation occurred during the first week of the month except for a general thickening of the ice in the northern half of the Gulf. A shift in the wind pattern during the second week of March brought significant changes regarding the ice. As seen in (Figure 5) the winds during that week blew from a west to north-westerly direction pushing the ice out of the Gulf through Cabot Strait and then south-eastward. At mid-month the south-eastward extent of the ice southeast of Cape Breton was near record setting (Figure 6). Another effect of these winds is that it

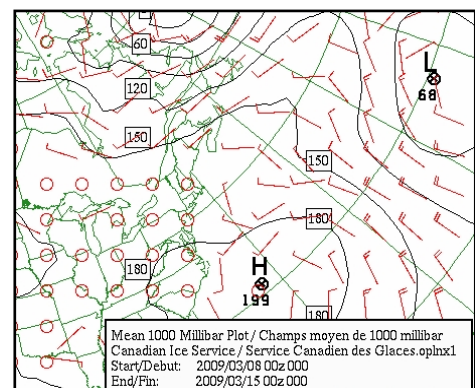


Figure 5: winds, 08-15 March

flushed almost all of the thicker out of the Estuary and Gaspé Passage which at mid-Month were covered mainly with newly formed ice. Below normal temperatures generally prevailed during the third week of March except near normal in the south-western section. While remaining near normal in the south-western section temperatures did climb to above normal in the rest of the Gulf for the last week of March. As west to north-westerly winds continue to predominate during the third week, the tongue of ice southeast of Cape Breton expanded further and its southern position remained close to record setting. The winds shift to a north-easterly direction in the last week of the month pushing the ice that was southeast of Cape Breton westward to south southwest of Cape Breton. In doing so a good portion of the ice melted as it moved onto warmer waters. The ice extent briefly jumped to above normal values during the third week of March (Figure 13) as colder than normal temperatures lead to new ice formation but it came back to near normal towards the end of the month as temperatures increased and the new ice melted. However at month's end there was still more ice than normal south of Cape Breton.

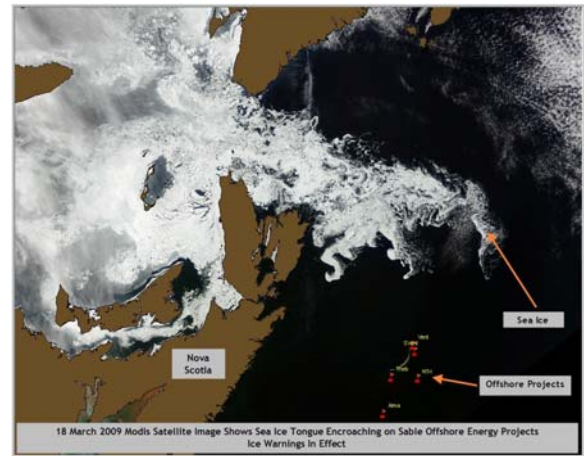


Figure 6: ice tongue south of Cape Breton

April 2009

Above normal temperatures was the norm in the first half of April (Figure 7). These above normal temperatures combined with predominant south-westerly winds allowed for moderate to rapid ice melt in the south-western portion of the Gulf. The ice south of Cape Breton also melted rapidly and most of it disappeared a few days into April. At mid-Month the ice conditions in the gulf in general was near normal but they were heavier than normal in the south-western section. The last two weeks of April was milder than normal in the south-western section of the gulf but colder in the northeast section. As a result all the ice in the south-western section melted during the third week of April which is a week late compared to the normal. At the end of April, the Northeast Arm and the Strait of Belle Isle were the only places where ice was evident.

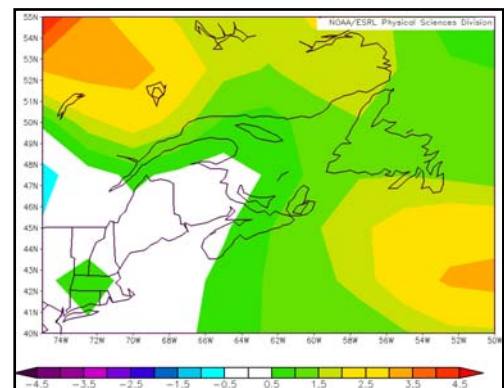


Figure 7: temperature anomaly, 01-15 April

May 2009

Near to above normal temperatures were generally observed in the northeast section of the Gulf during the first half of May. The ice continued to melt and by mid-month all the drifting ice as well as the fast ice along the northern shore had melted. The clearing of the ice in the northeast section of the Gulf occurred near its normal date.

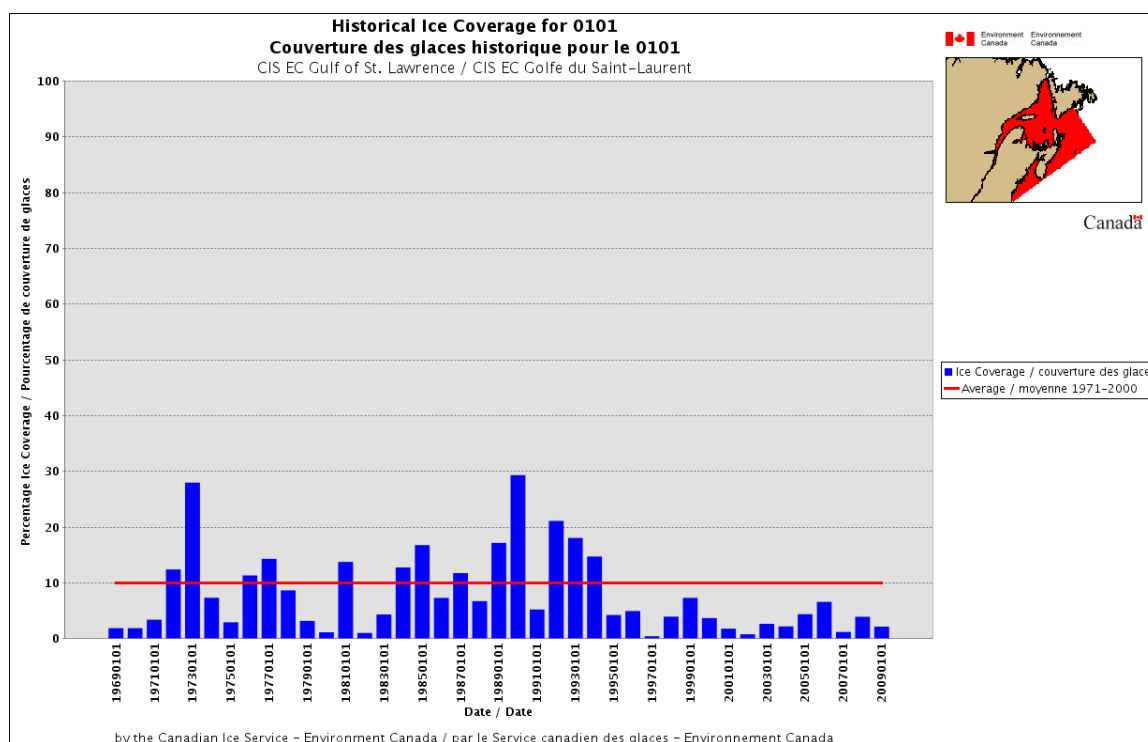


Figure 8: historical ice coverage, 01 January

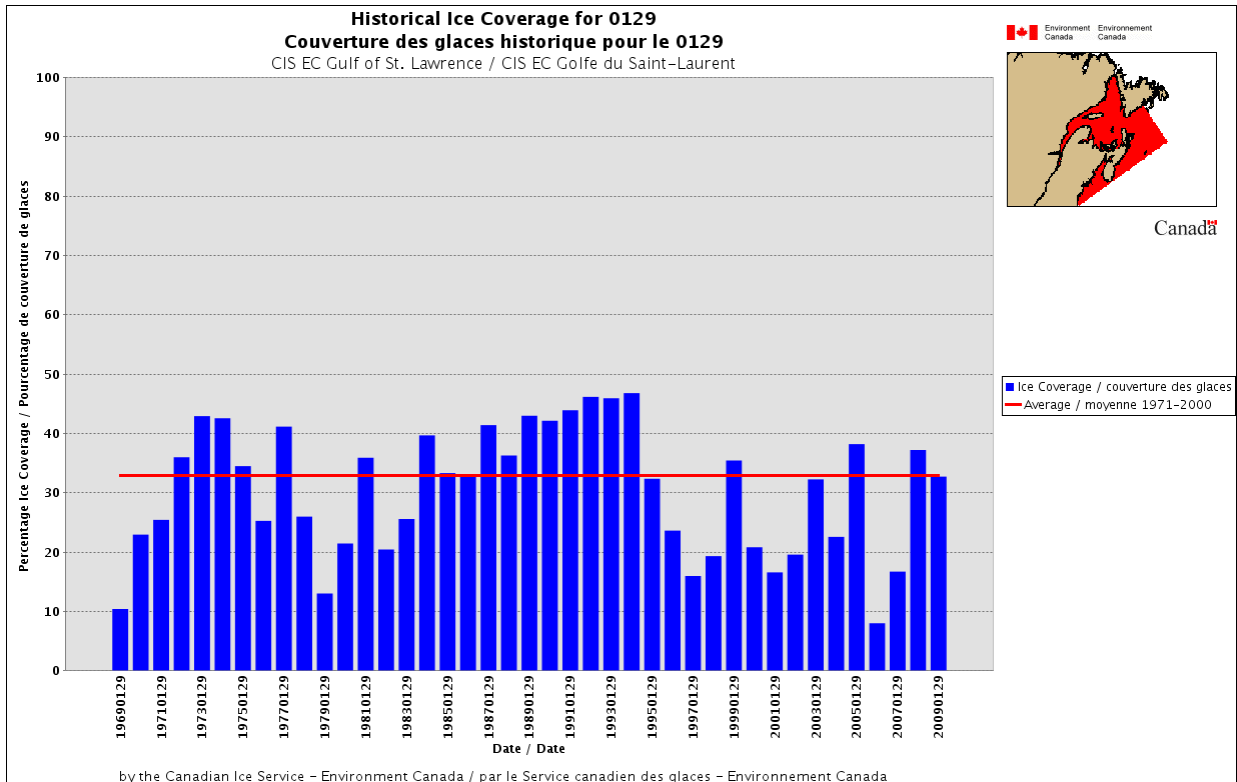


Figure 9: historical ice coverage, 29 January

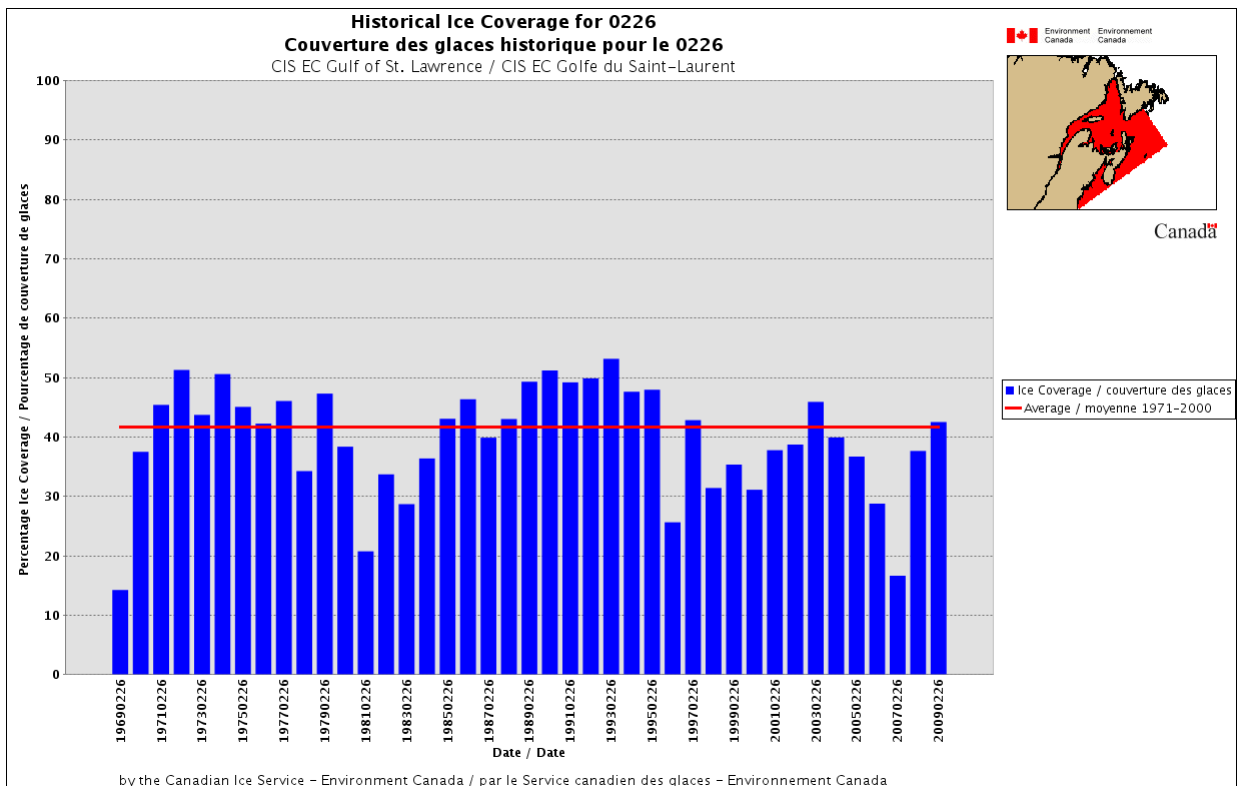


Figure 10: historical ice coverage, 26 February

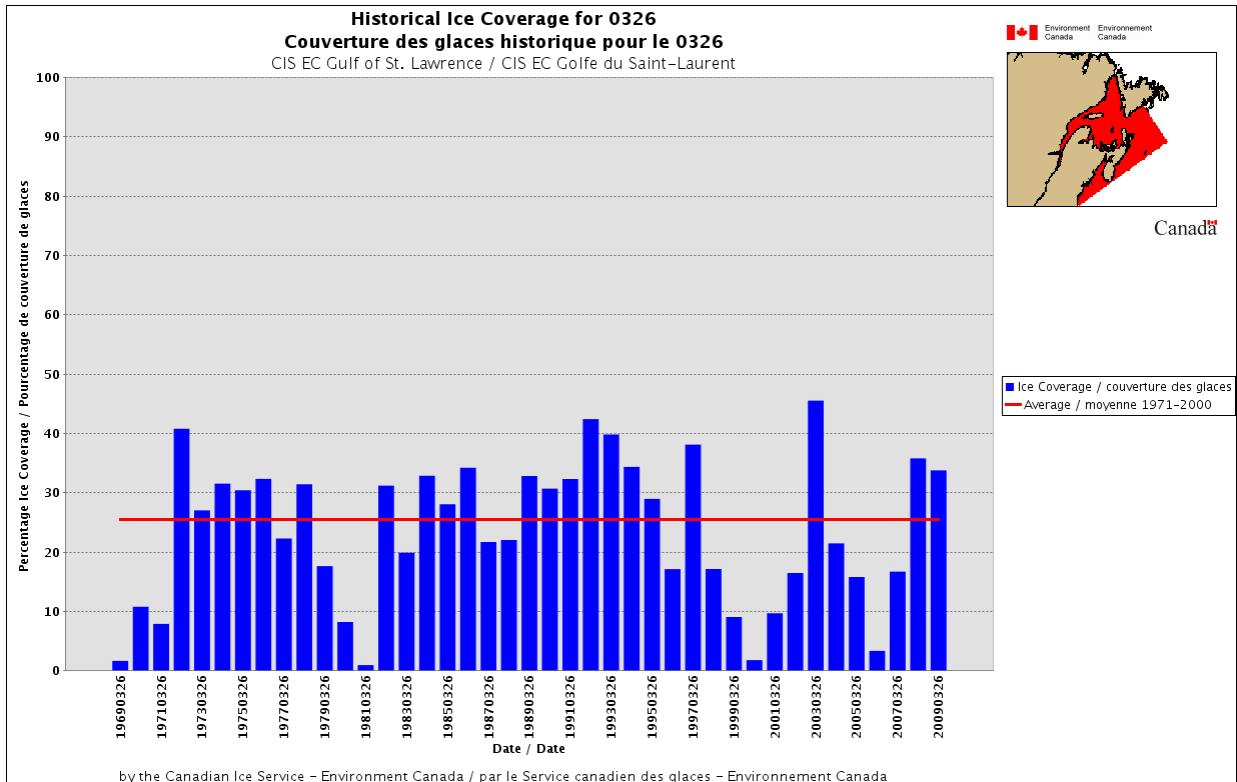


Figure 11: historical ice coverage, 26 March

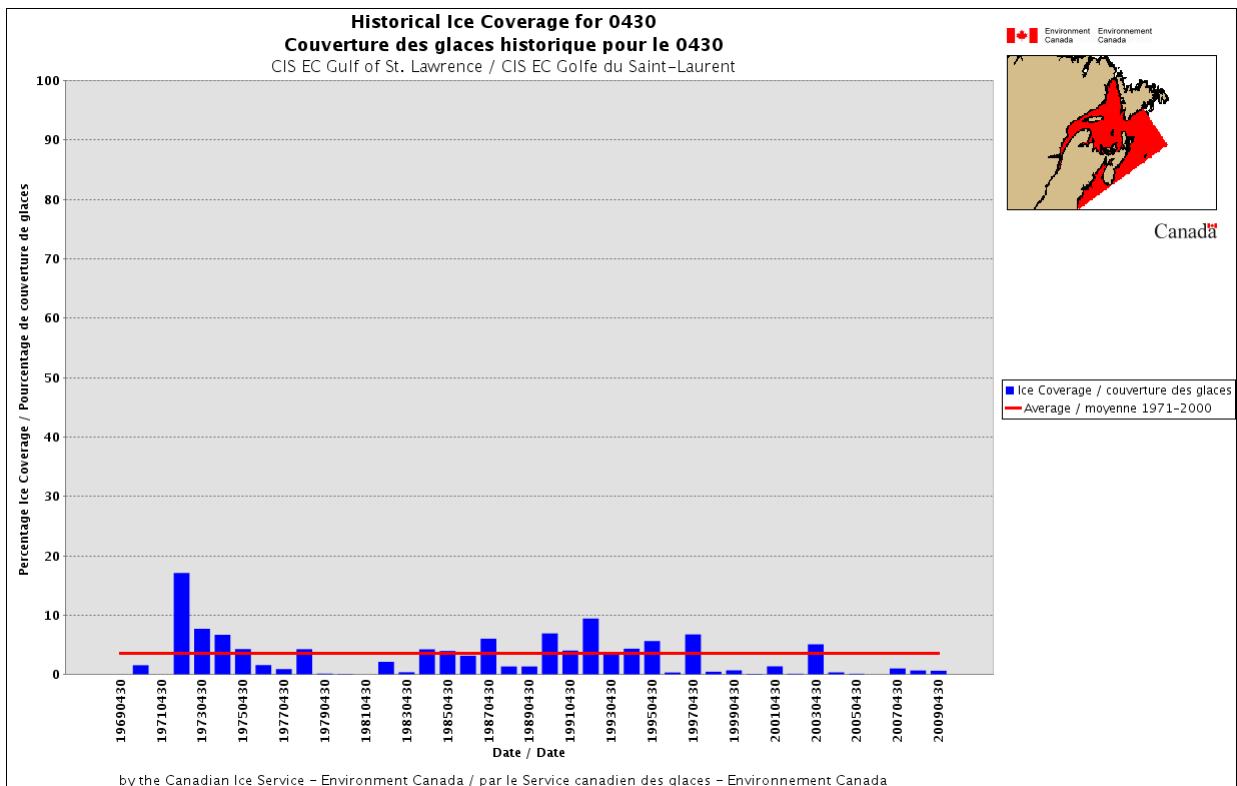


Figure 12: historical ice coverage, 30 April

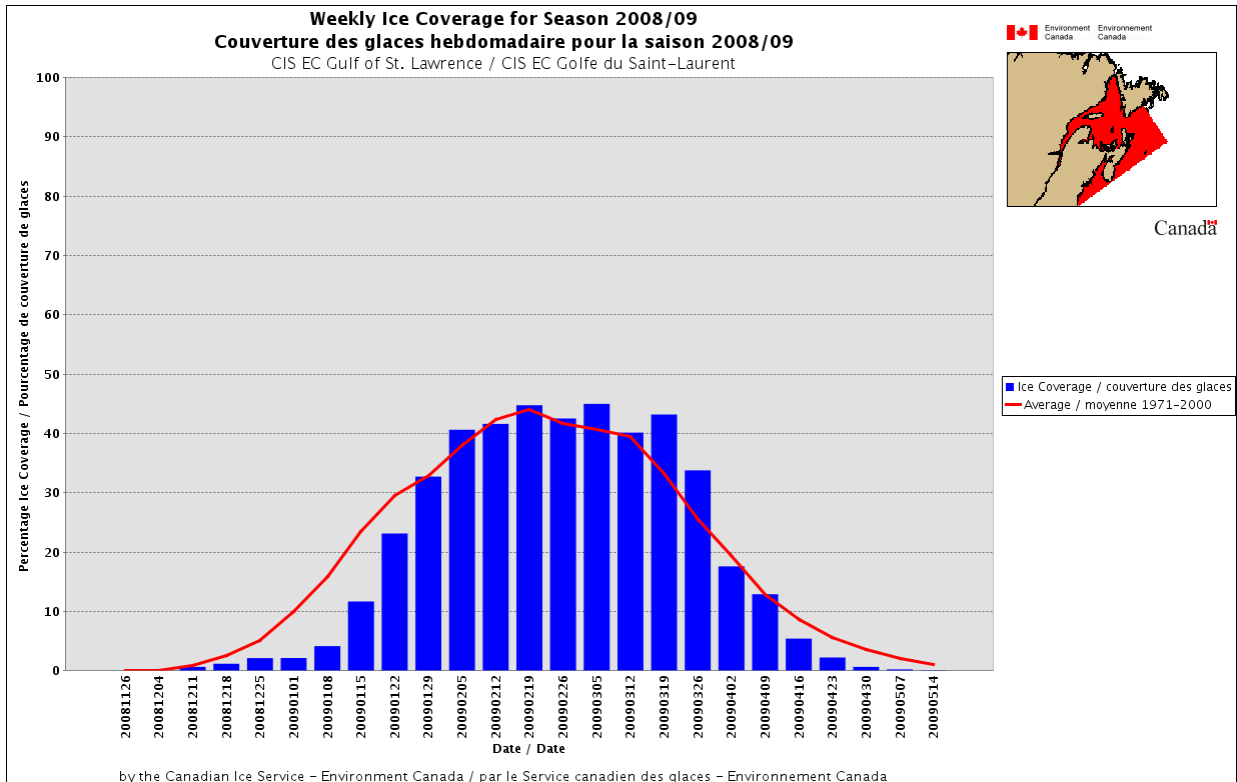


Figure 13: weekly ice coverage, 2008-09

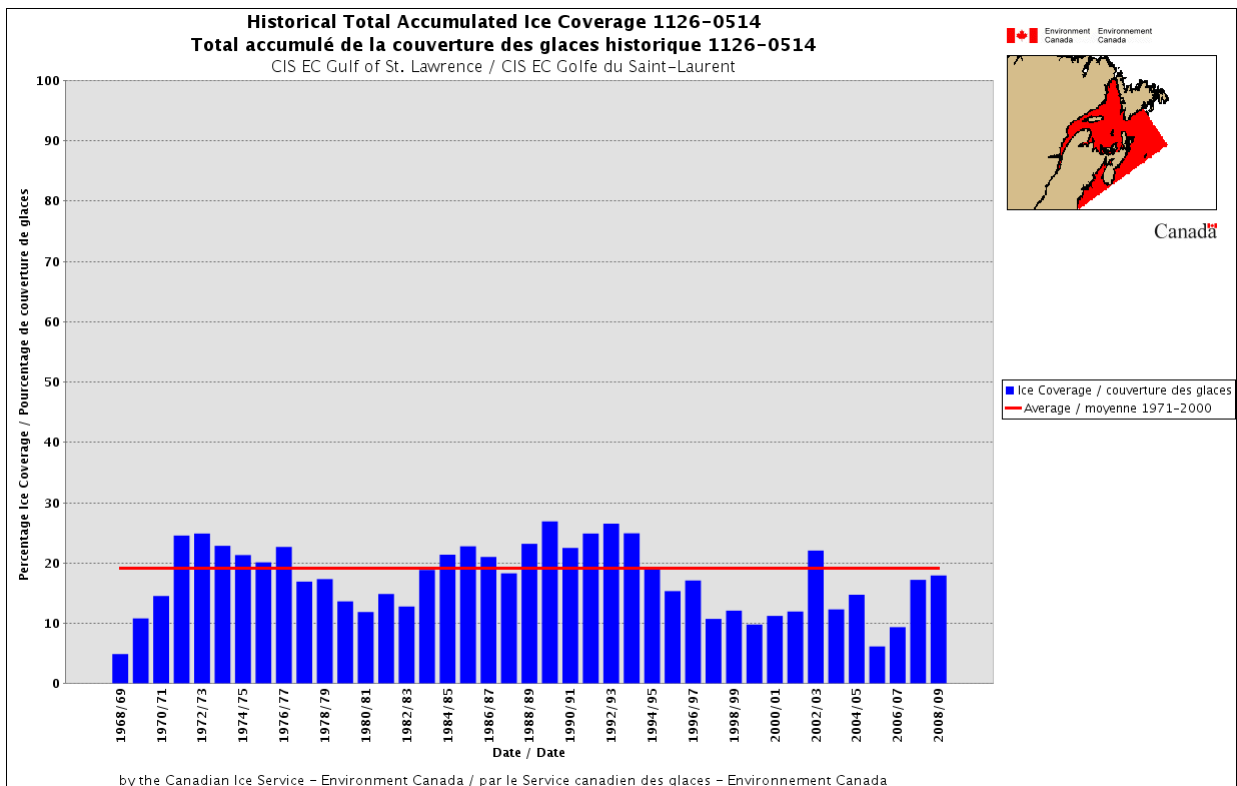


Figure 14: historical total accumulated ice coverage

Newfoundland and Labrador

November 2008

November's temperatures have generally been above normal in the Newfoundland and Labrador waters. At the end of November water temperatures along the Labrador coast was about 1°C above normal but near 3°C above normal in the Newfoundland waters (Figure 15). During the last week of the month, new and grey ice started to develop in shallow bays north of Groswater Bay and in the western end of Goose Bay. At month's end ice free was the norm in the Newfoundland waters.

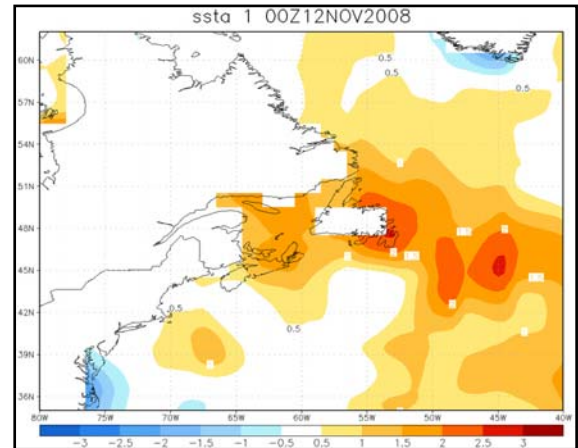


Figure 15: sea surface temperature anomaly, 12 Nov.

December 2008

Near to below normal temperatures were generally observed along the Labrador coast during the first half of December. For the same time period Newfoundland waters experienced above to well above normal temperatures (Figure 16). New and grey ice continued to develop but at a slow pace along the Labrador coast and in Goose Bay. At mid-Month new and grey ice was found in most of the bays north of Cartwright and in Goose Bay. The exception was an area of consolidated greywhite ice in the western end of Goose Bay. Ice conditions at mid-December were 7 to 10 days late compare to the normal. Below normal temperatures generally prevailed in the area in the last 2 weeks of December allowing the ice to develop at a more rapid pace. At the end of the month a band of new and grey ice was found all along the Labrador coast but the seaward extent was far less than normal. Goose Bay became consolidated with mostly greywhite ice in the last week of the month. At the end of 2008 no ice was observed in the Newfoundland waters.

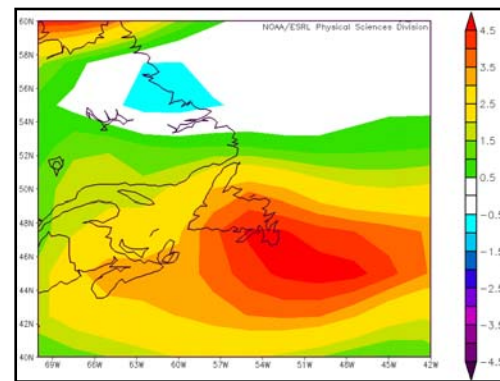


Figure 16: temperature anomaly, 01-15 December

January 2009

The first week of 2009 was exceptionally mild especially along the Labrador coast where temperatures have been in excess of 10°C above normal (Figure 17). In the

second week temperatures along the Labrador coast cooled to near normal values. In the Newfoundland waters temperatures averaged above normal in the first half of January. As a result little change was observed along the Labrador coast in the first week of January except for a slight increase of the ice thicknesses. Ice developed more rapidly in the second week of the month but at mid-January ice conditions along the southern Labrador coast was significantly below normal (Figure 29). At that time no ice was present in the Newfoundland waters except in Bay of Exploits and in shallow bays in south-eastern Notre Dame Bay. Below normal temperatures were generalized in the Newfoundland waters and along the Labrador coast in the second half of January (Figure 18) which allowed the ice to develop at a rapid pace. The pack along the southern Labrador coast thickened and expanded significantly. The ice started to move down the Northern Peninsula coast near mid-January and reached the northern section of Notre Dame Bay late in the month. Despite the rapid ice development ice conditions at month's end in the Newfoundland waters were far less severe than normal.

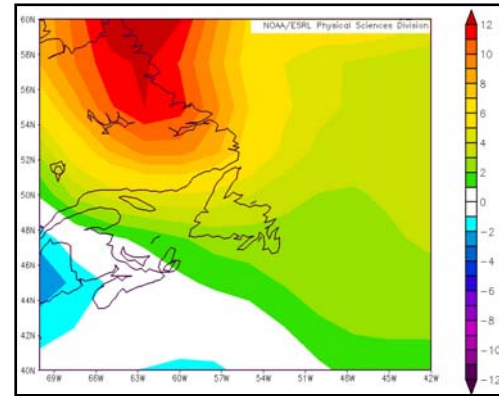


Figure 17: temperature anomaly, 01-07 January

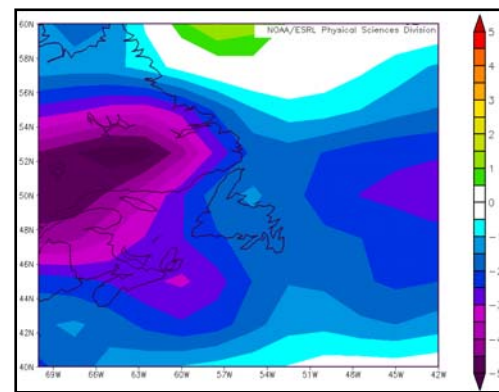


Figure 18 :temperature anomaly, 16-31 January

February 2009

Above normal temperatures predominated over the Newfoundland and Labrador areas during the first half of February (Figure 19). Of notes, were temperatures in excess of 5.0°C above normal over the Northern Peninsula and along the Labrador coast in the second week of the month. Little ice development was observed along the Labrador coast during the period. In the east Newfoundland waters the pack extended eastward to near 50W but predominant southerly winds prevented the pack to progress southward along the east Newfoundland coast. At mid-February the ice cover in the east Newfoundland waters as well as the seaward extent of the pack remained below normal. Milder than normal temperatures continued to be the norm in the second half of February. The ice pack did at first progress southward

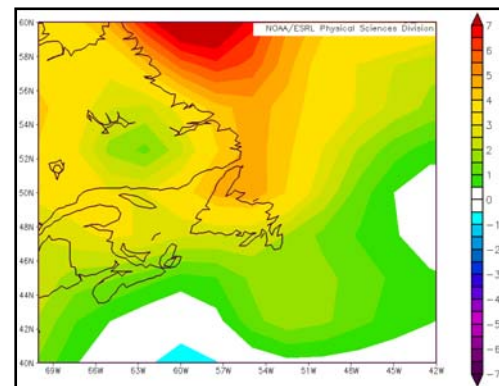


Figure 17: temperature anomaly, 01-14 February

reaching the entrance to Trinity Bay but strong southerly winds developed early in the last week of the month, pushing the pack northward to north of Cap Bonavista. At the end of February the ice extent, in the east Newfoundland waters, remained a lot less than normal (Figure 29).

March 2009

Below normal temperatures were generally reported in the first half of March along the Labrador coast. In the east Newfoundland waters, temperatures were above normal in the first week of the month (Figure 18) but below normal in the second week. A combination of above normal temperatures and predominant south-westerly winds during the first week of March prevented any significant southward progression of the ice pack in the east Newfoundland waters. In fact a slight retreat of the pack was observed.

However a return to colder than normal temperatures as well as a shift in the winds to west-northwest during the second week (Figure 21) allowed the ice pack to continue its southward progression along the east coast of Newfoundland and to move into the strong current along the north side of the Grand Banks. The ice extent in the east Newfoundland waters which was below normal at the beginning of March was approaching its normal value at mid-month. Along the Labrador coast little change was observed during the first two weeks of March except for a seaward expansion of the pack. Near normal temperatures prevail in the east Newfoundland waters during the second part of March. Along the Labrador coast temperatures have generally been below normal. The tongue of ice continued to drift along the north side of the Grand Banks then southward following the strong water current. The tongue of ice reached latitude 4500N during the last week of the month. While not a rare event the ice doesn't typically reach such low latitudes. Along the east coast of Newfoundland the pack continued its southward progression and the southern edge lay near Cape Race at the end of March. Episodes of onshore winds during the last week of March brought ice into Notre-Dame, Bonavista, Trinity and Conception Bays. Little change occurred along the Labrador coast in the last two week of March.

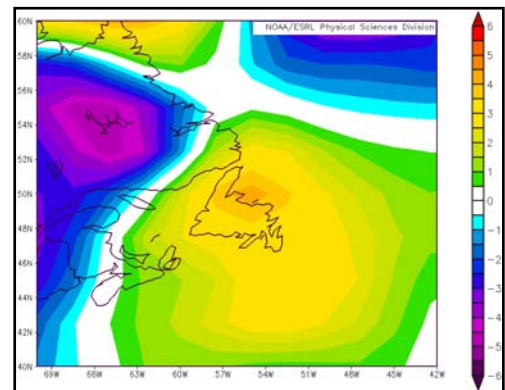


Figure 18: temperature anomaly, 01-07 March

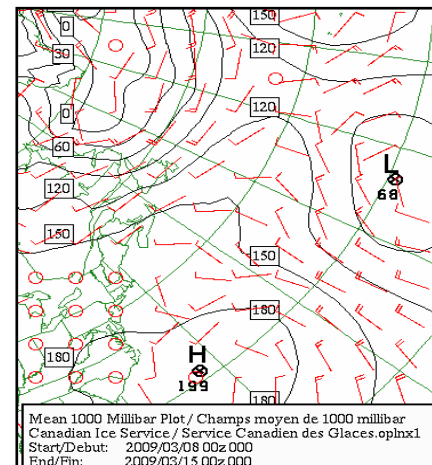


Figure 19: winds, 08-15 March

April 2009

In the first half of April, near to above normal temperatures were predominant in the east Newfoundland waters as well as along the Labrador coast (Figure 20). The tongue of ice that rounded the Grand Banks and drifted southward as far south as 4500N 4800W at the beginning of April melted by the end of the first week of the month. In the first week of April, the main pack remained generally very close to the east Newfoundland coast, with some ice drifting into Bonavista, Trinity and Conception Bays.

However, offshore winds during the second week pushed the ice out of the bays and farther offshore. At mid-April the ice conditions in the east Newfoundland waters was heavier than normal (Figure 29) with the southern ice edge lying near the latitude of St John's which is about 60 nautical miles farther south than the long term average. Below normal temperatures prevailed in the east Newfoundland waters during the third week of April followed by above normal temperatures in the last week. Near to below normal temperatures were generally reported along the Labrador coast during the second half of April. Little change was notice during the third week of the month in the Newfoundland waters but a significant decrease in the ice concentration has been observed during the following week. As the predominant winds remained generally from a westerly direction the ice stayed away from the east coast of Newfoundland but at the same time drifted eastward along the north side of the Grand Banks to near record setting position. At the end of April signs of breakup were evident along the Northern Peninsula and the southern Labrador coast. At that time the ice coverage in the east Newfoundland waters was still above normal (Figure 29) and the highest on record since 1994 (Figure 27).

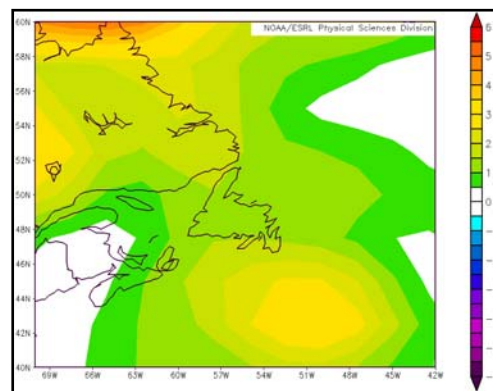


Figure 20: temperature anomaly, 01-14 April

May 2009

In the east Newfoundland waters temperatures have generally been near to above normal in the first two weeks of May (Figure 23). For the same time period, along the Labrador coast, near normal temperatures generally prevailed except below normal along the northern half. The band of ice which was extending along the north side of the Grand Banks at the beginning of May persisted through the first half of the month as winds remained

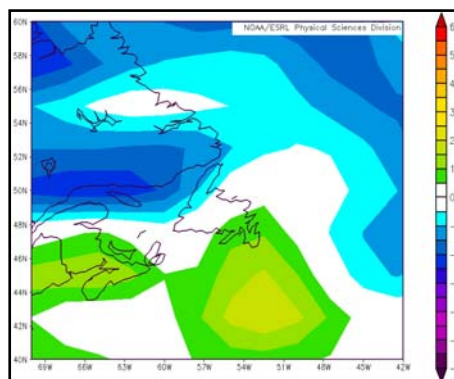


Figure 21: temperature anomaly, 01-15 May

generally from a westerly direction. However the width of the band and the concentration inside diminished a lot during the period. These westerly winds also caused the ice to stay away from the coast so no coastal pressure was observed. The ice along the southern Labrador coast loosened up considerably in the first part of May. At mid-May the ice cover in the east Newfoundland waters was just above normal (Figure 29). Above normal temperatures predominated in the second half of May in the east Newfoundland waters. Near to below normal temperatures were generally reported along the Labrador coast. Rapid melting has been evident in the east Newfoundland waters during the second half of May and at the end of the month only patchy areas of thick first year with a trace of old ice were present. Normally at this time of the year there is no ice left in the east Newfoundland waters. Along the south Labrador coast the ice continued to melt but heavier than normal ice conditions still prevailed at the end of May.

June 2009

Near to below normal temperatures predominated along the Northern Peninsula and Labrador coast in the first half of June. The ice along the Northern Peninsula gradually melted and the southern ice limit moved to north of the Strait of Belle Isle during the second week of the month. Normally the ice edge moved north of the strait during the last week of May. The ice concentration decreased noticeably along the southern Labrador coast and at mid-month, areas of very loose ice were generally found north of Belle Isle Island. Break up along the southern Labrador coast was 2 to 3 weeks late. At the end of June only isolated strips of rotten ice were found along the southern Labrador coast which all melted during the first few days of July.

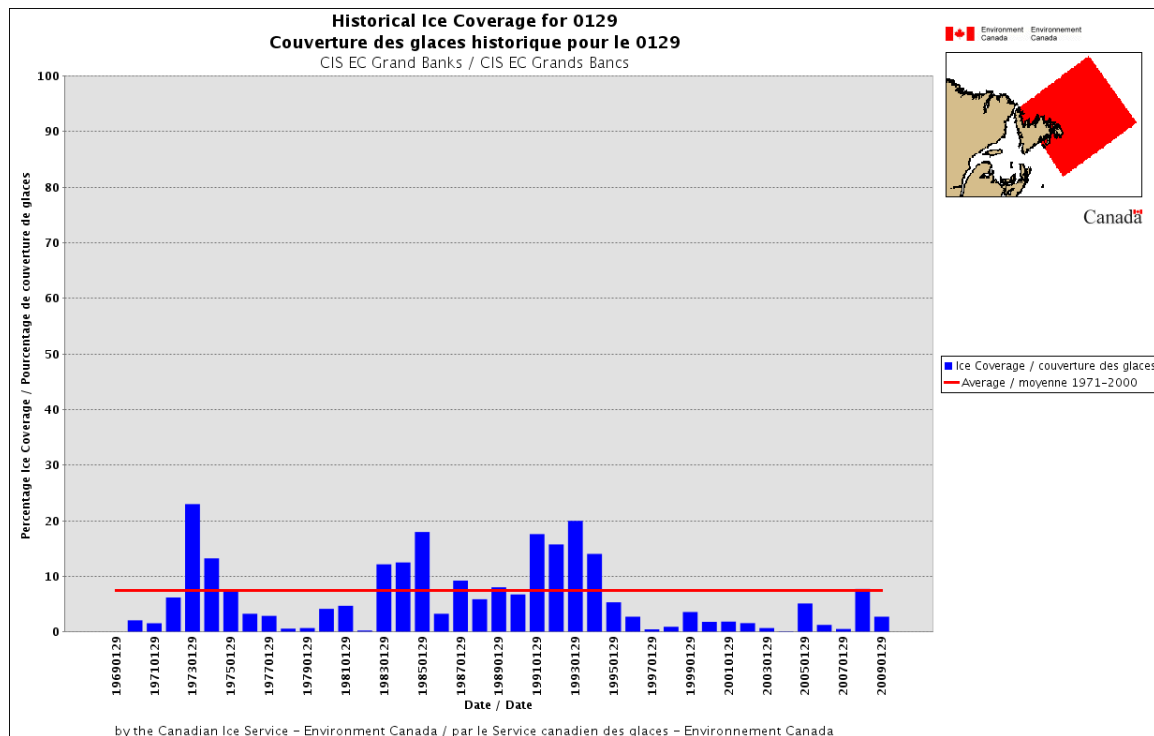


Figure 22: historical ice coverage, 29 January

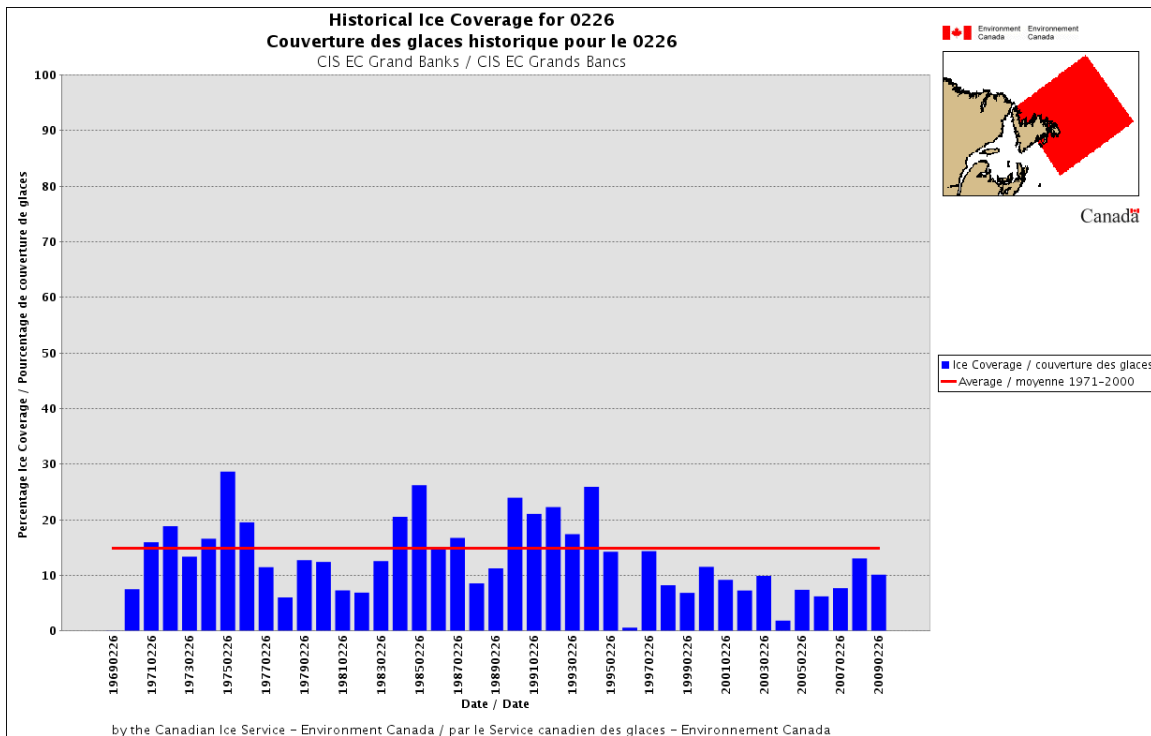


Figure 23: historical ice coverage, 26 February

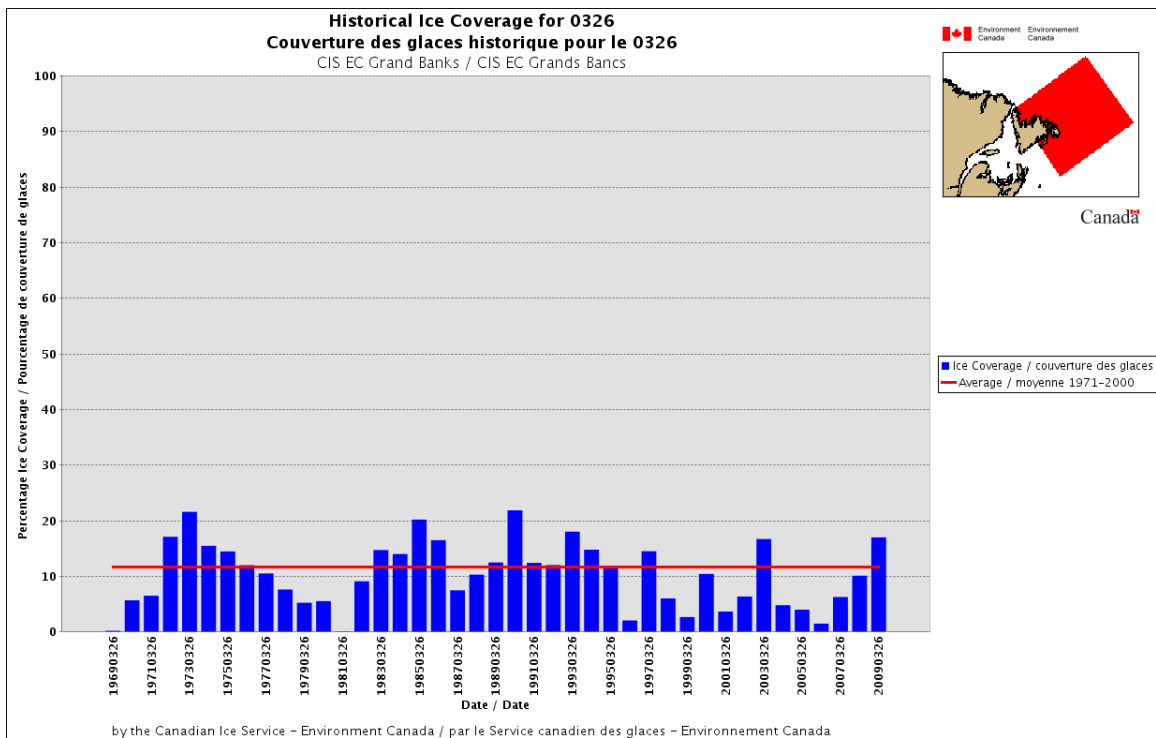


Figure 24: historical ice coverage, 26 March

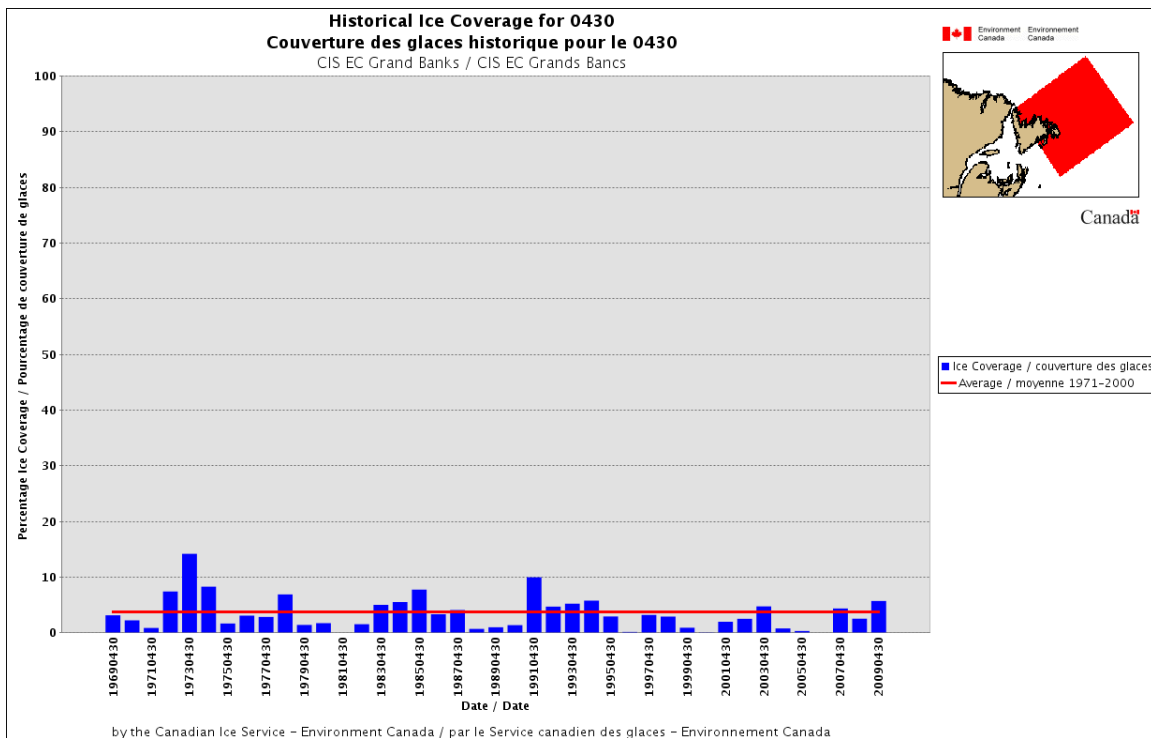


Figure 25: historical ice coverage, 30 April

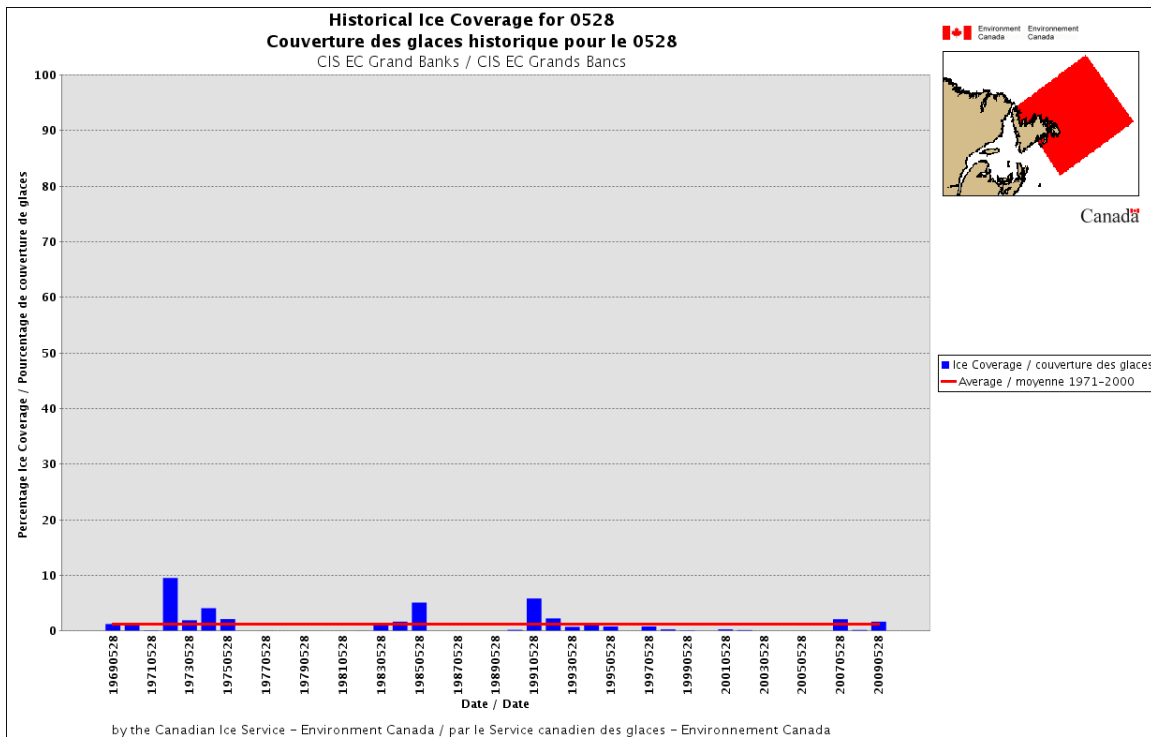


Figure 26: historical ice coverage, 28 May

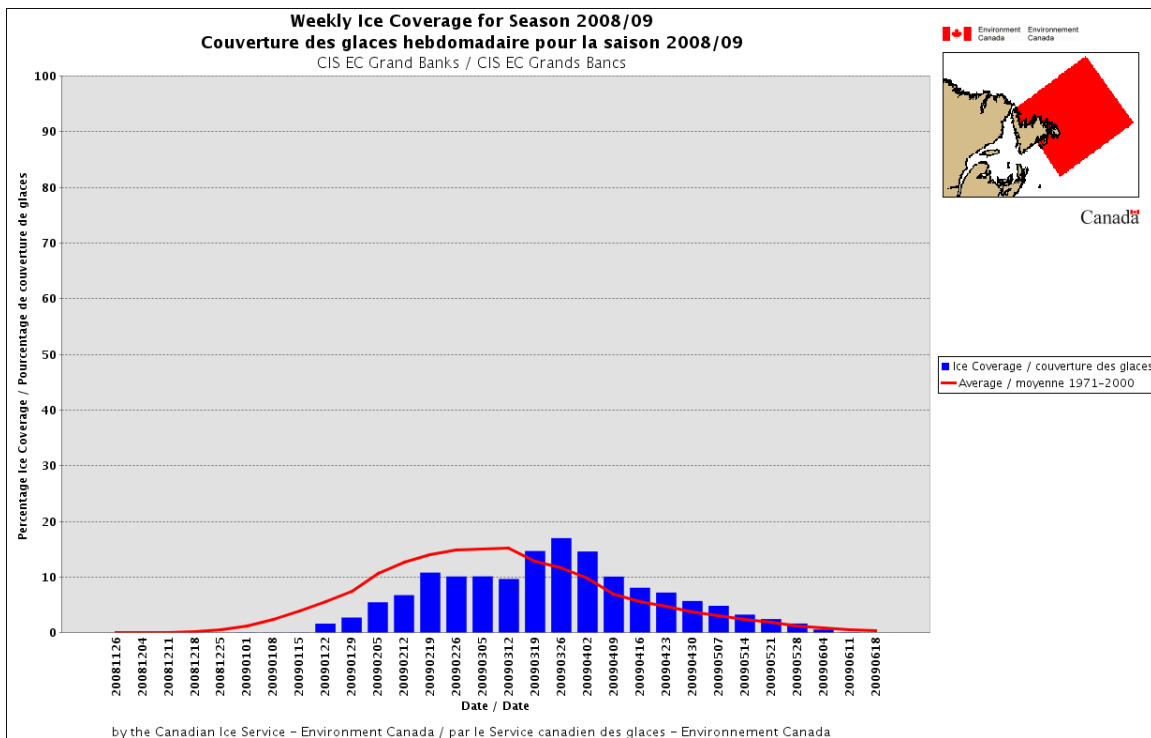


Figure 27: weekly ice coverage, season 2008/09

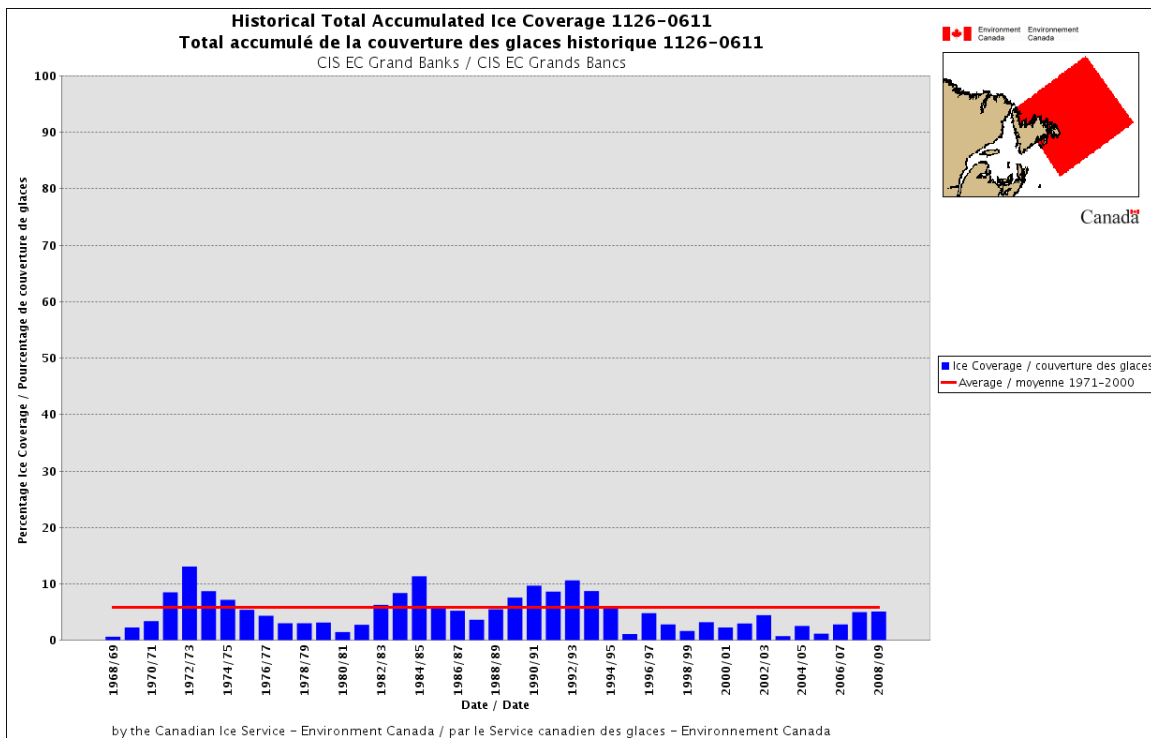


Figure 28: historical accumulated total ice coverage

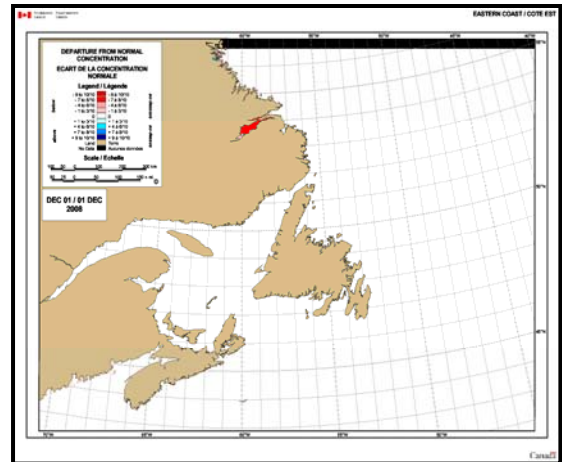
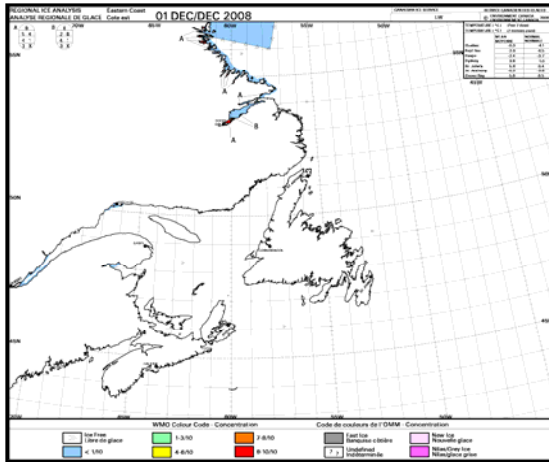


Figure 29: Departure from normal ice concentration and ice conditions – December 01st, 2008

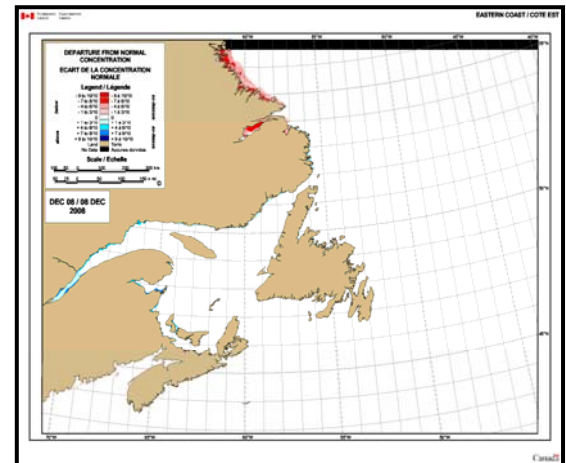
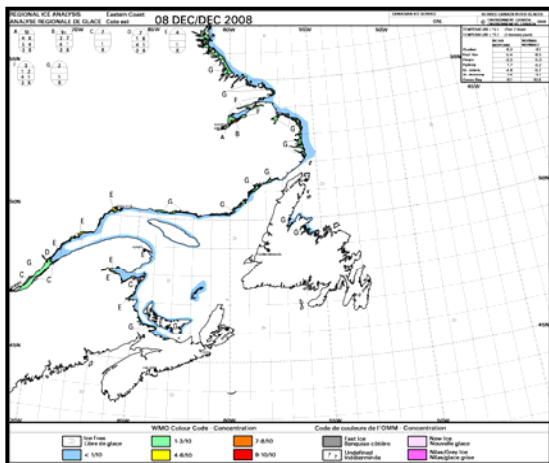


Figure 30: Departure from normal ice concentration and ice conditions – December 08th, 2008

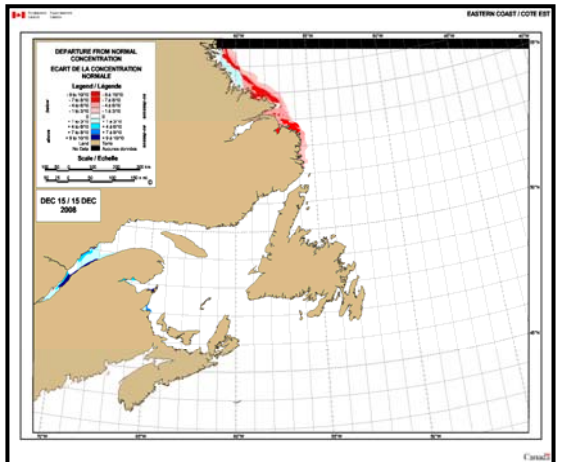
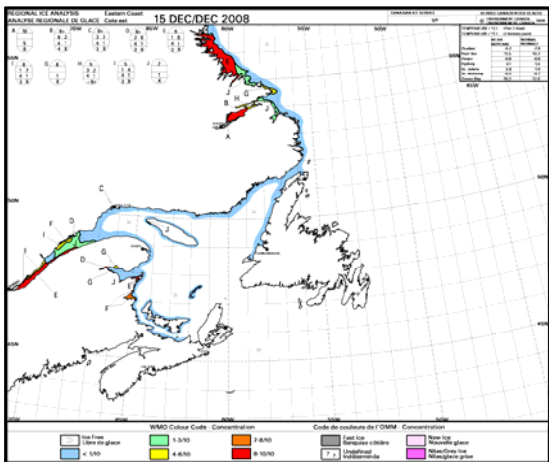


Figure 31: Departure from normal ice concentration and ice conditions – December 15th, 2008

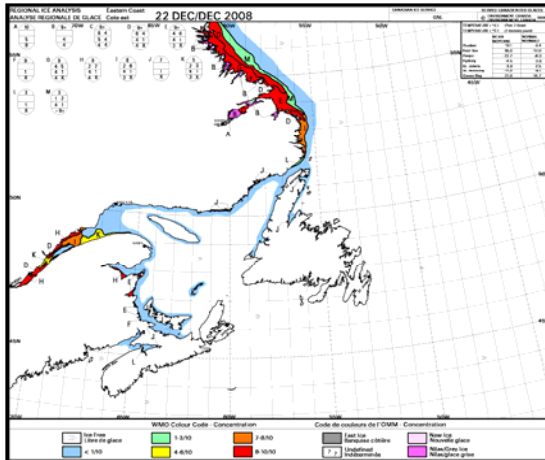


Figure 32: Departure from normal ice concentration and ice conditions – December 22nd, 2008

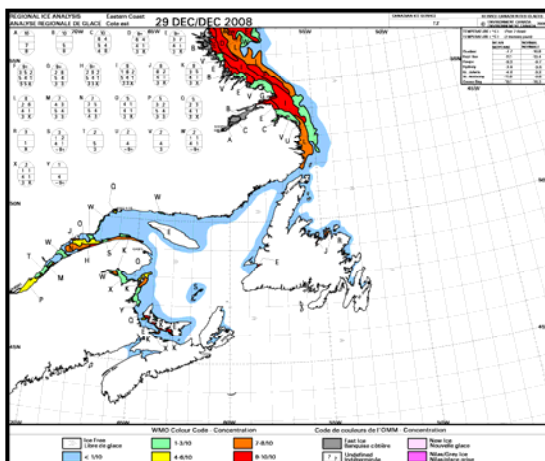
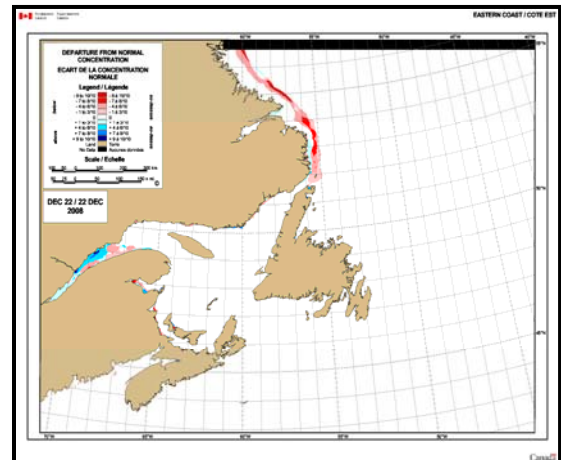


Figure 33: Departure from normal ice concentration and ice conditions – December 29th, 2008

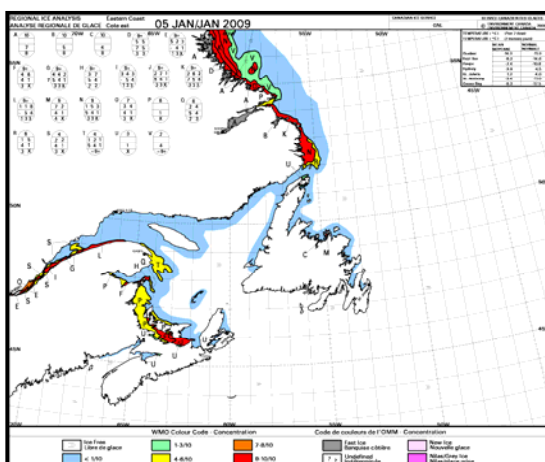
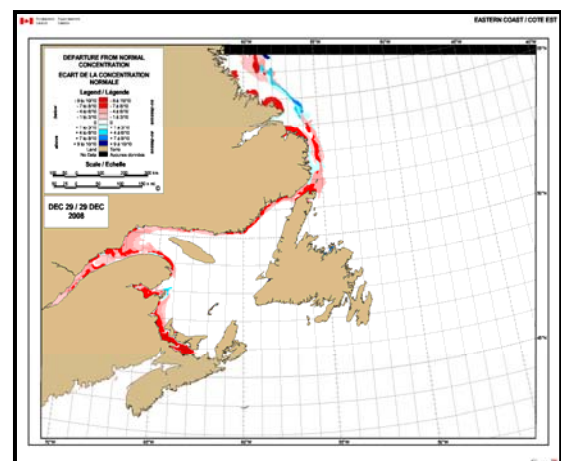
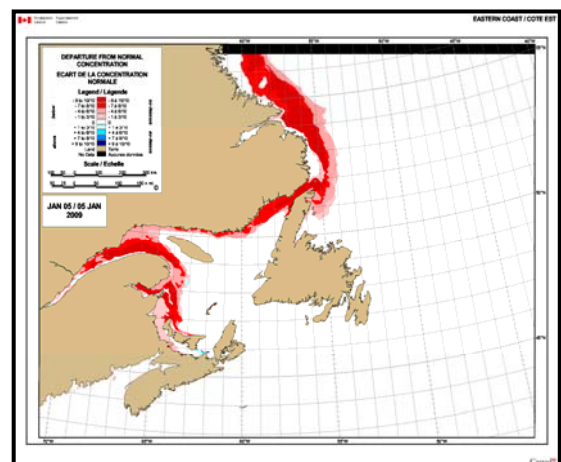
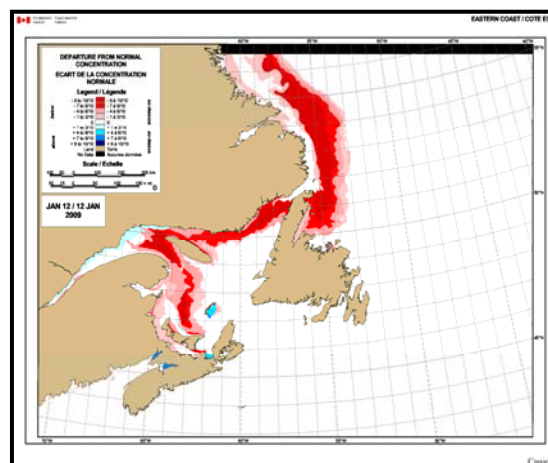


Figure 34: Departure from normal ice concentration and ice conditions – January 05th, 2009





Seasonal Summary- For the East Canadian waters – Winter 2008-2009

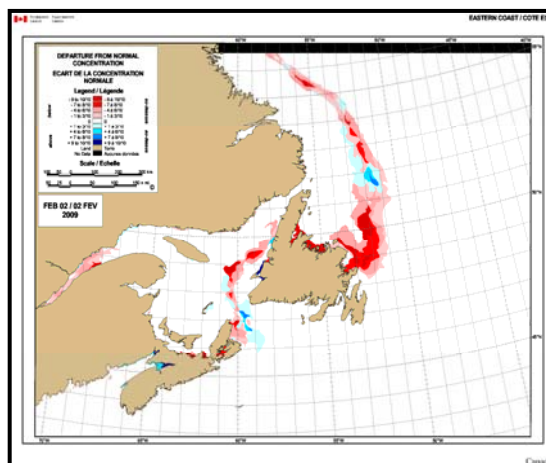
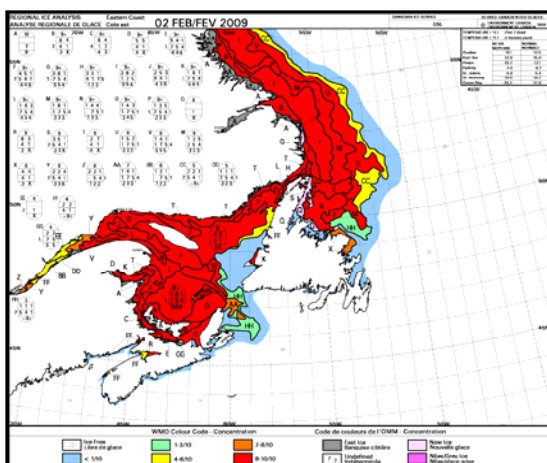


Figure 38: Departure from normal ice concentration and ice conditions – February 02nd, 2009

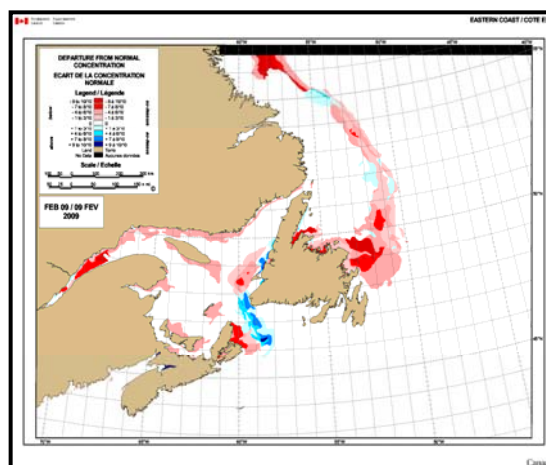
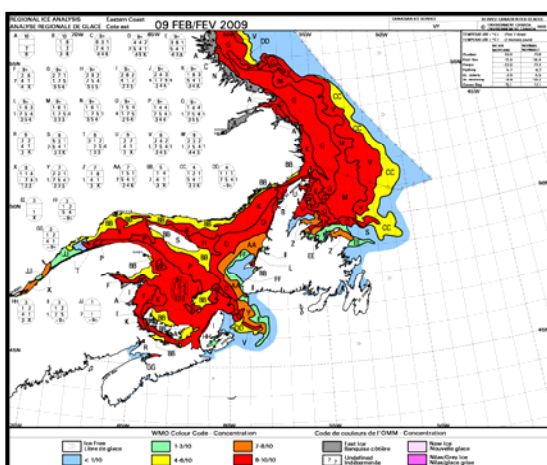


Figure 39: Departure from normal ice concentration and ice conditions – February 09th, 2009

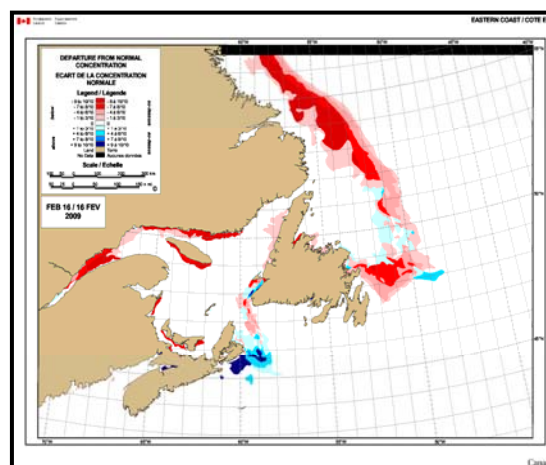
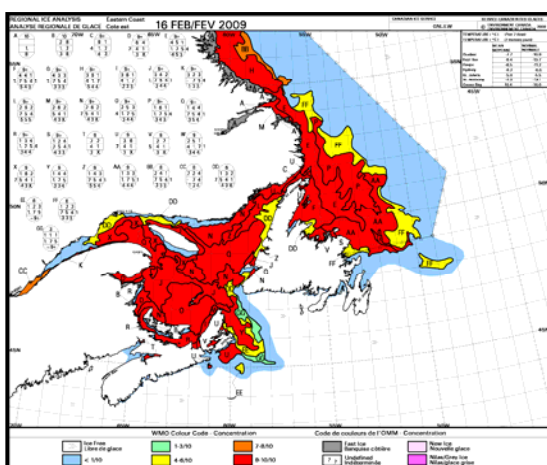


Figure 40: Departure from normal ice concentration and ice conditions – February 16th, 2009

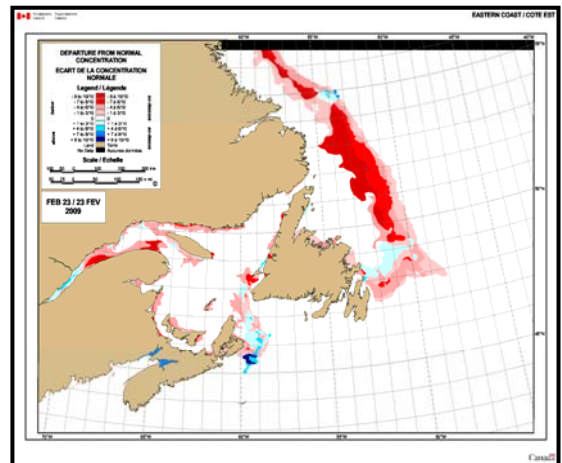
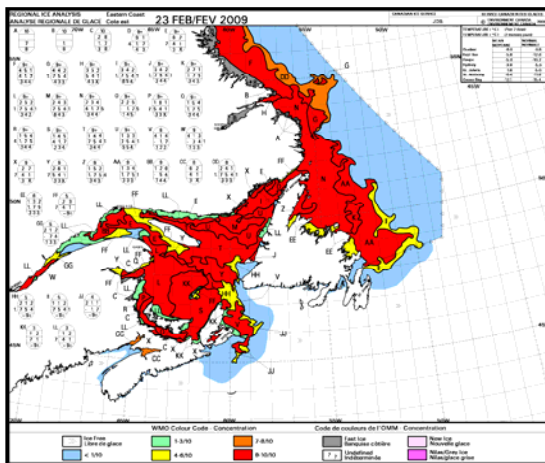


Figure 41: Departure from normal ice concentration and ice conditions – February 23rd, 2009

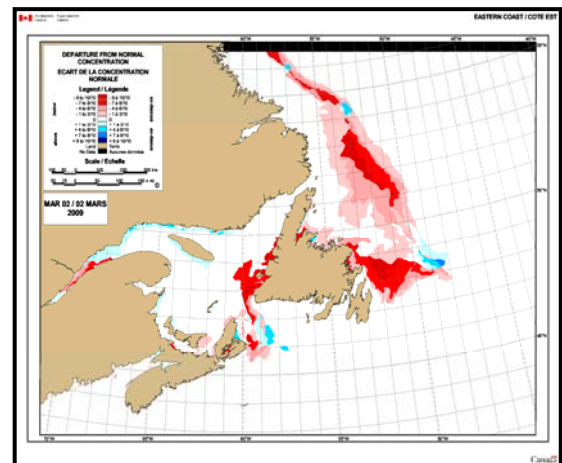
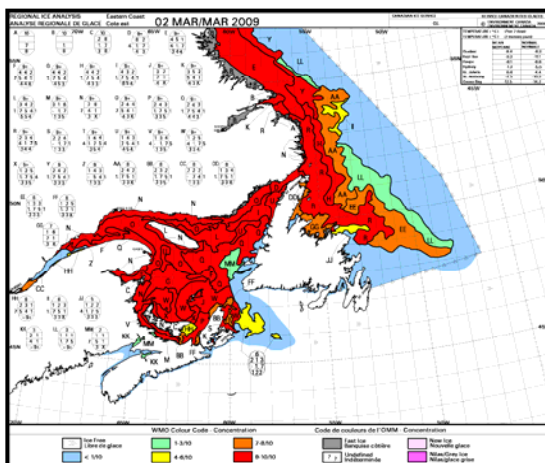


Figure 42: Departure from normal ice concentration and ice conditions – March 02nd, 2009

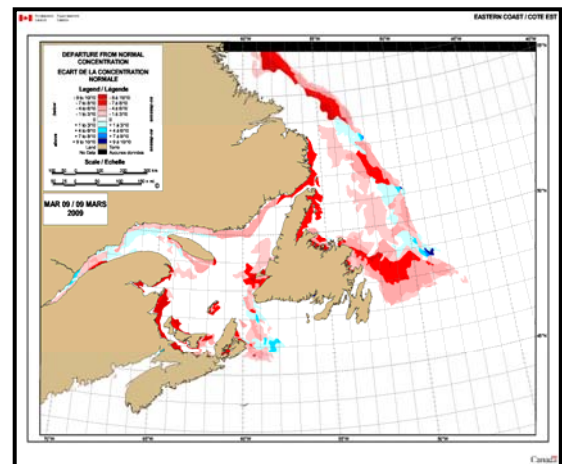
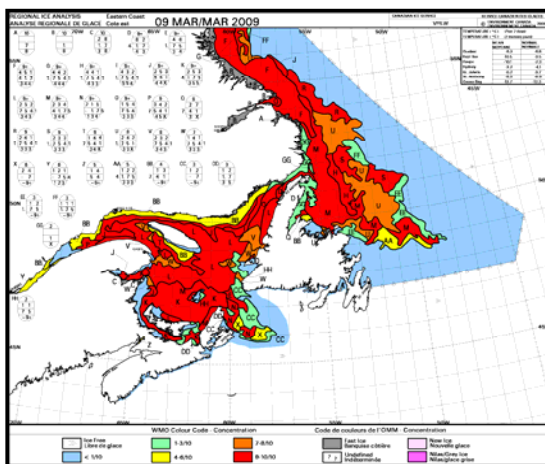


Figure 43: Departure from normal ice concentration and ice conditions – March 09th, 2009

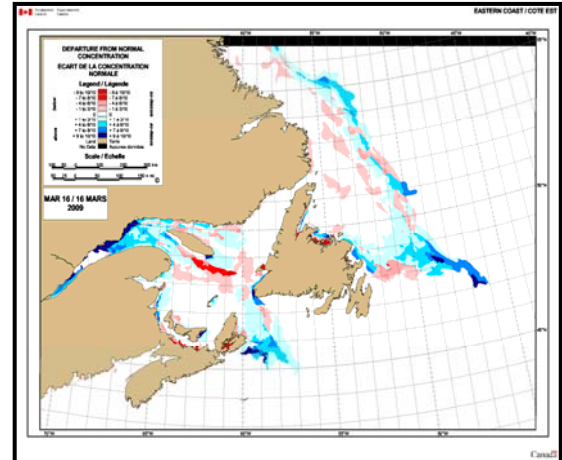
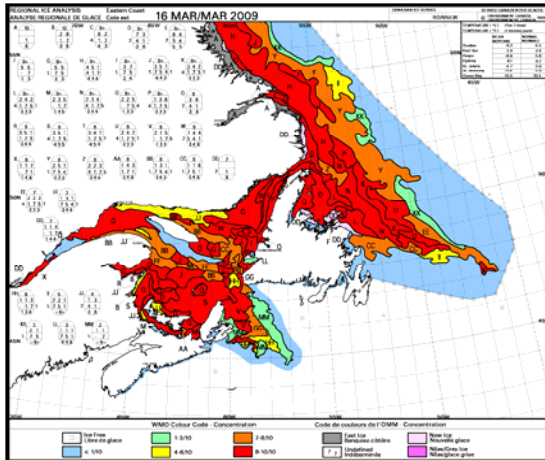


Figure 44: Departure from normal ice concentration and ice conditions – March 16th, 2009

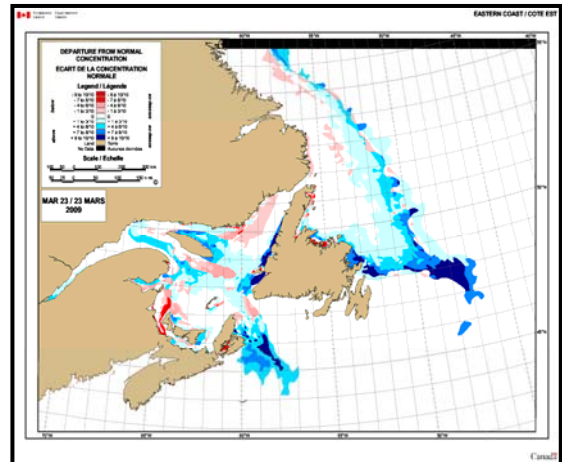
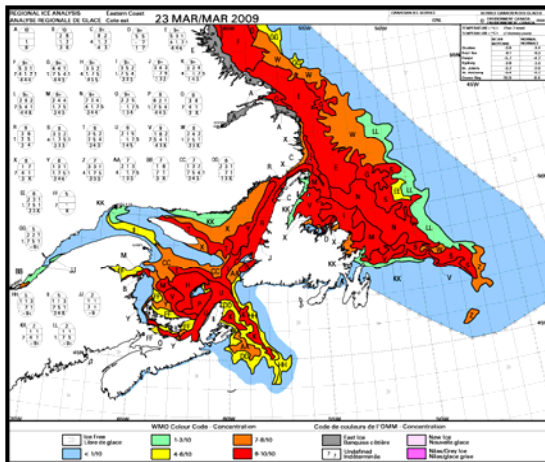


Figure 45: Departure from normal ice concentration and ice conditions – March 23rd, 2009

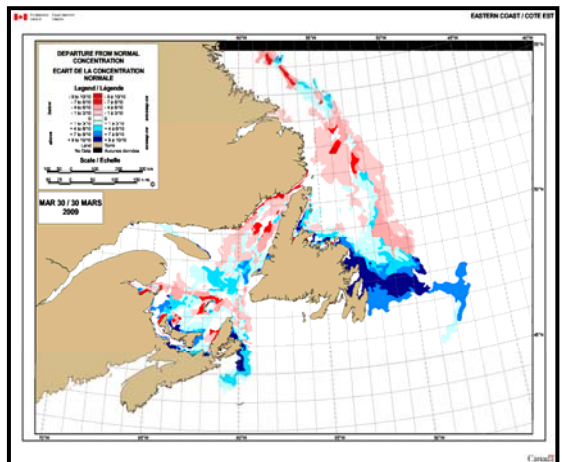
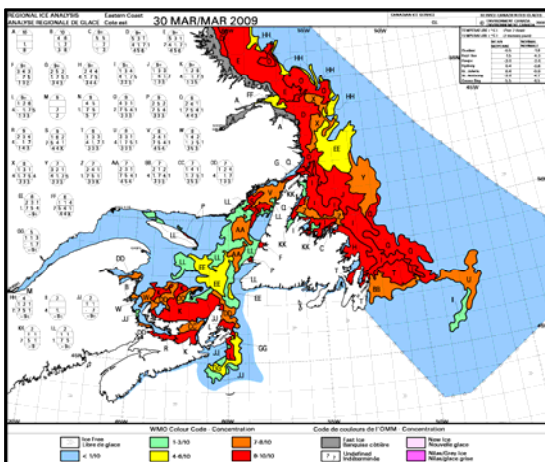


Figure 46: Departure from normal ice concentration and ice conditions – March 30th, 2009

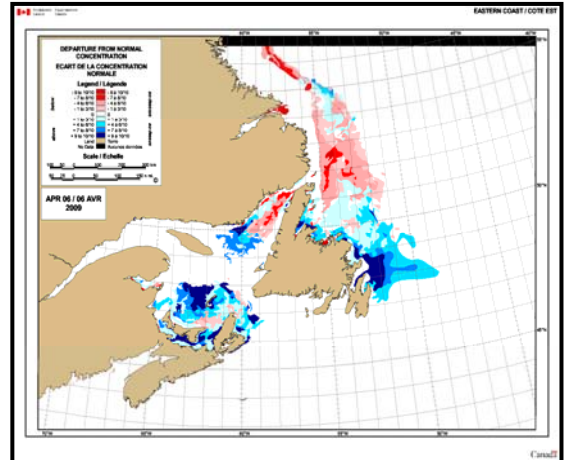
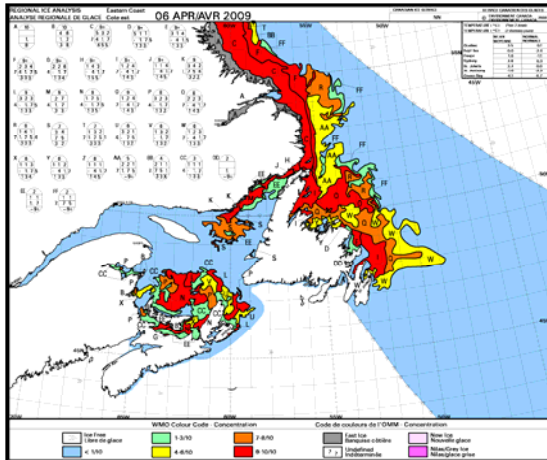


Figure 47: Departure from normal ice concentration and ice conditions – April 06th, 2009

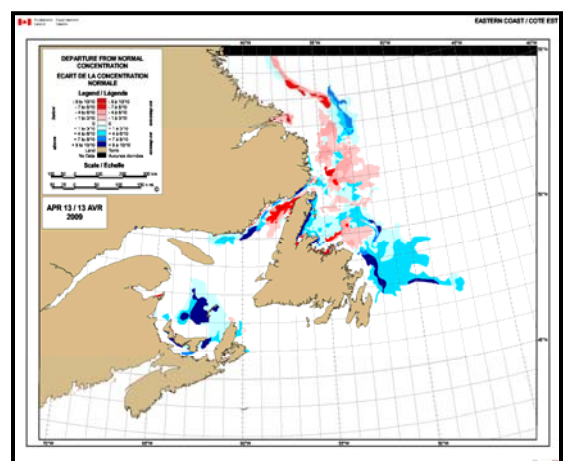
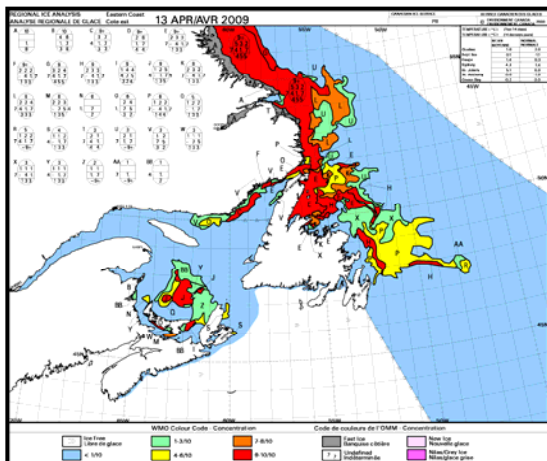


Figure 48: Departure from normal ice concentration and ice conditions – April 13th, 2009

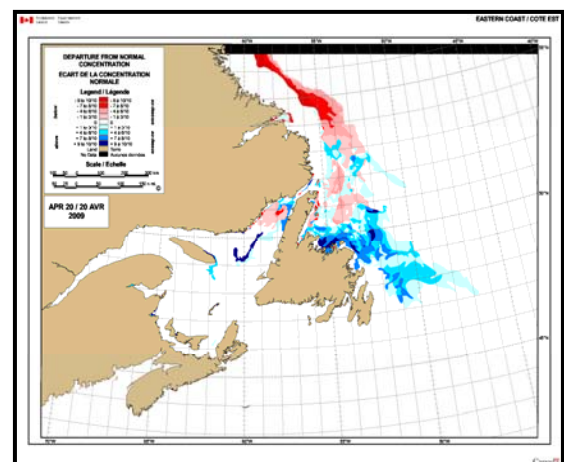
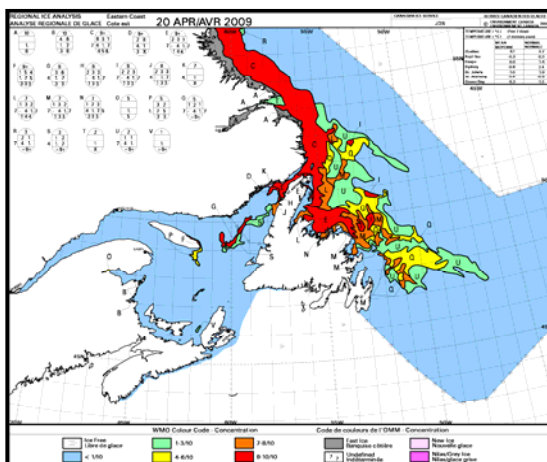


Figure 49: Departure from normal ice concentration and ice conditions – April 20th, 2009

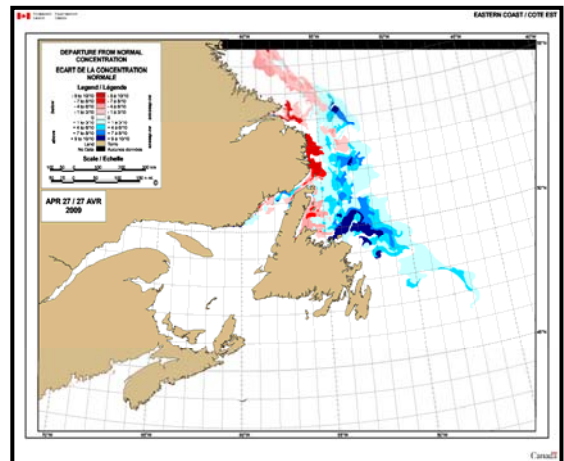
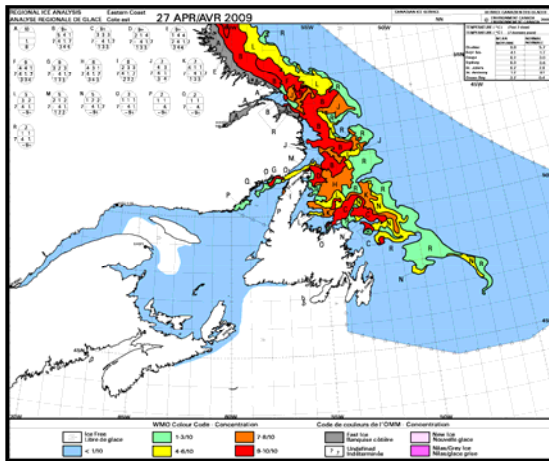


Figure 50: Departure from normal ice concentration and ice conditions – April 27th, 2009

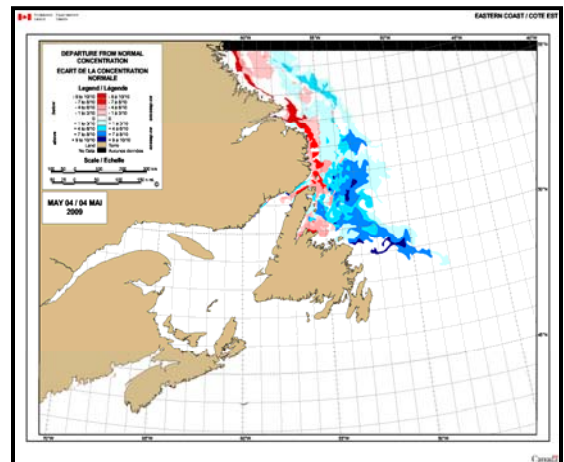
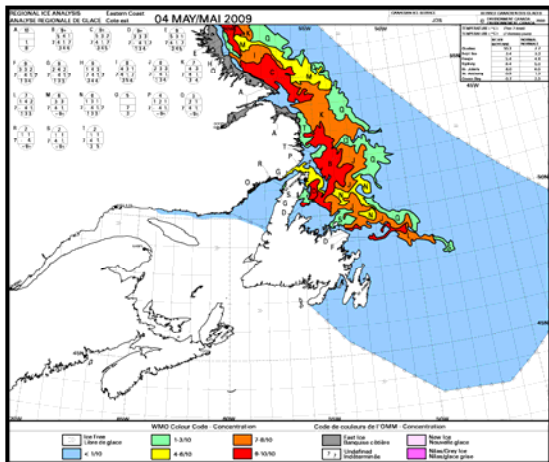


Figure 51: Departure from normal ice concentration and ice conditions – May 04th, 2009

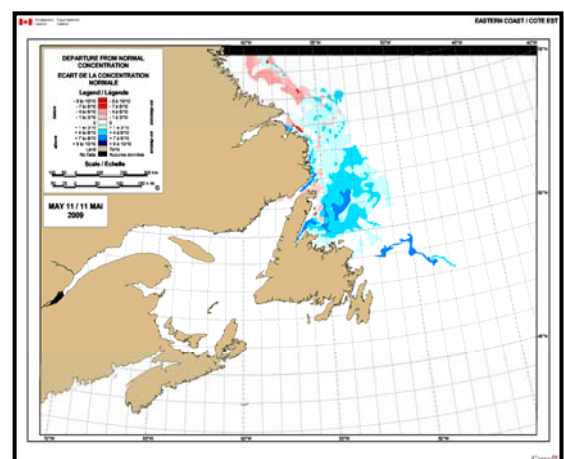
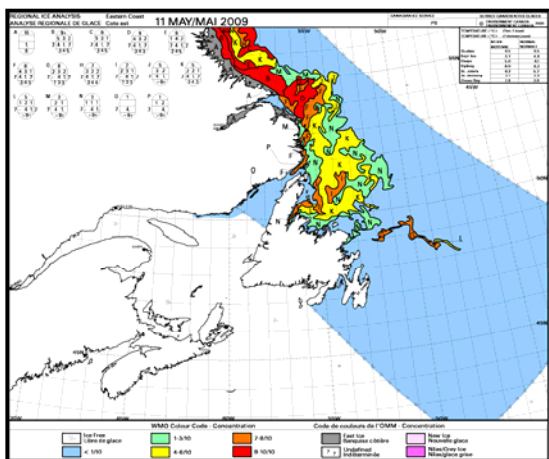
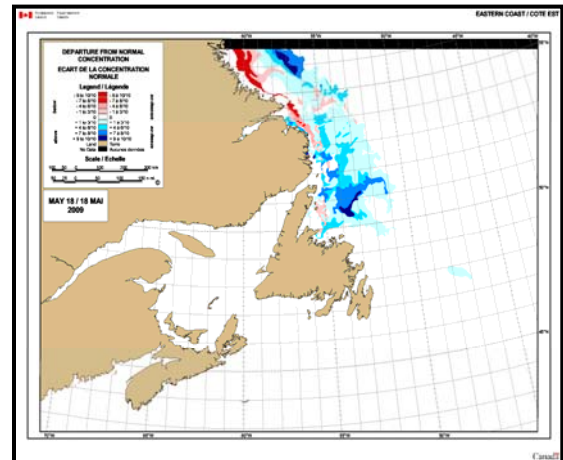
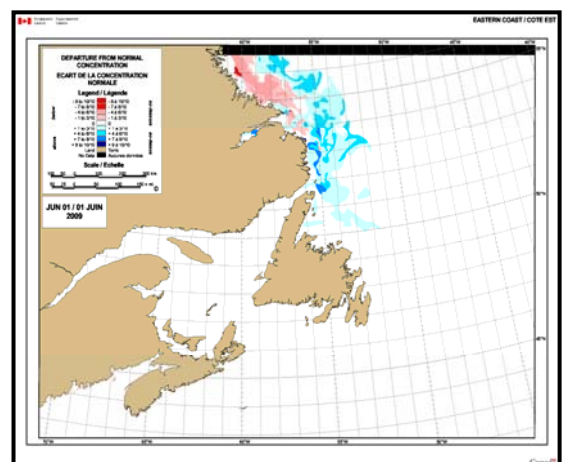


Figure 52: Departure from normal ice concentration and ice conditions – May 11th, 2009

[illegible]

Seasonal Summary- For the East Canadian waters – Winter 2008-2009

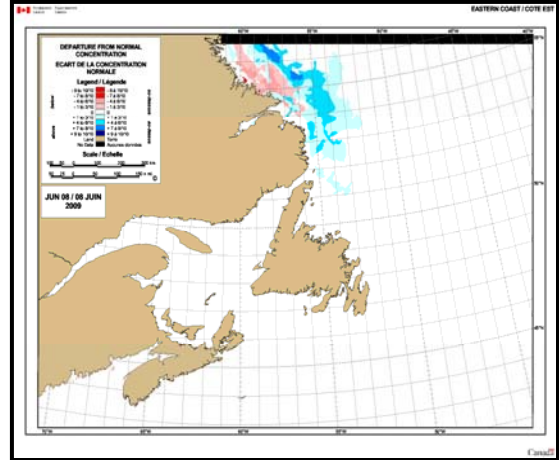
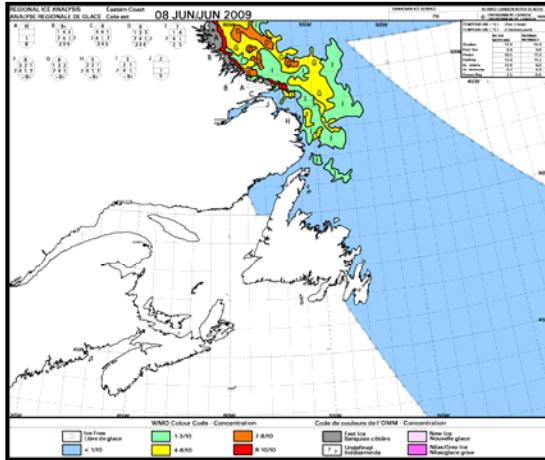


Figure 58: Departure from normal concentration and ice conditions – June 08th, 2009

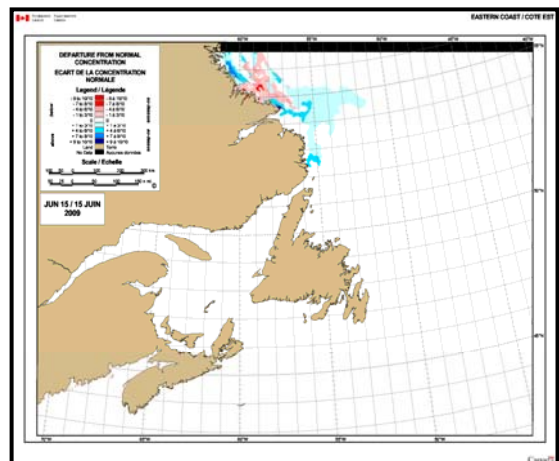
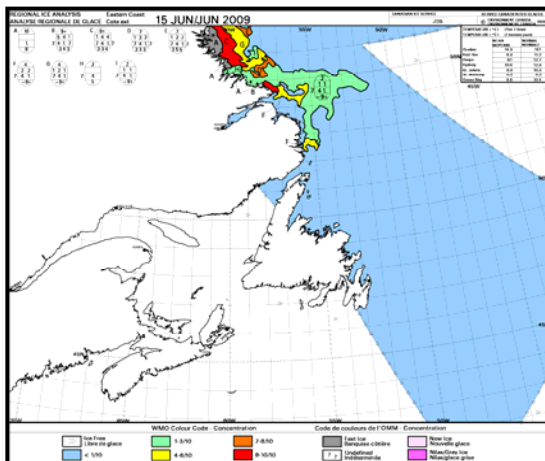


Figure 59: Departure from normal concentration and ice conditions – June 15th, 2009