Environment Canada Environnement Canada

Seasonal Summary

Eastern Canada
Winter 2011-2012

By

Canadian Ice Service
Le service canadien des glaces

Canada

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General overview of the 2011-2012 Season

The 2011-2012 ice season in Eastern Canada (the Gulf of St Lawrence and Newfoundland and Labrador waters) was the third year in a row with below normal sea ice coverage; however, there was more than twice the ice coverage than that of the previous two years. This minor increase in the sea ice coverage was mainly due to colder than normal air temperatures in March along the Labrador coast, which led to near normal ice coverage in the East Newfoundland and Labrador waters late in the season. The peak of the season (i.e. maximum sea ice extents) for the Gulf of St. Lawrence and the East Coast in general occurred during the first week of March (Fig. 26); at this time the pack ice extended from the coast of New Brunswick to 60 nautical miles east of the Îles de la Madeleine and to about 50 nautical miles northeast of Sydney. The sea ice coverage in the Gulf then decreased markedly during the remainder of the month of March and little pack ice was left by the end of the month outside of the Northeast Arm. The peak ice coverage off eastern Newfoundland occurred at the end of March when the ice edge reached the latitude of Cape Race (although the pack remained offshore south of St. John's).

The daily and weekly ice charts for 2011-2012 season for the Gulf of St Lawrence and the Newfoundland and Labrador waters are available at the CIS Web site.

Climatological 30-year median of ice concentration charts are also available on the CIS web site.

Gulf of St Lawrence

November and December 2011

Average air temperatures in the Gulf were generally above normal in November and in the first week of December except near normal in the vicinity of the Northeast Arm. Sea surface temperatures (Fig.1) in early December were

above normal. A cold air outbreak over the northern half of the Gulf in the second week of December resulted in new ice development along the north shore from Baie-Comeau and eastward, and from Miramichi Bay to Gaspe. This was about a week earlier than normal. Average air temperatures in the northern portion of the Gulf remained cold into the early part of the third week of December before rising to above normal for the rest of December. At the end of the year 2011, new and some grey ice covered the estuary west of the Saguenay River and was present along the shores from the Saguenay to Baie Comeau and along most of the Gaspé Peninsula. New ice was observed along the shores near Gaspe and in Chaleur Bay, along most of the New Brunswick coast, along the coast of Prince Edward Island and the Îles de la Madeleine. The overall sea ice coverage in the Gulf of St. Lawrence was about a week behind seasonal values.

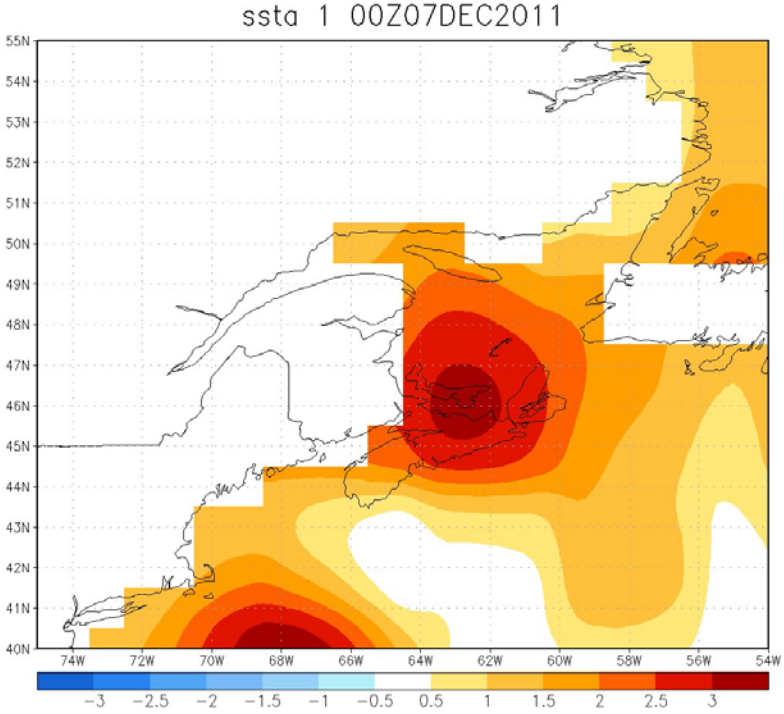

Figure 1: Sea surface temperature anomaly on December 7, 2011. Eastern Northumberland Strait waters were the highest above normal.

January 2012

Average air temperatures were above normal in the Gulf of St. Lawrence in January; they were much above normal in the south-western portion of the Gulf. Miramichi Bay consolidated with grey ice in the second week of January, more than a week later than normal. At that time, ice started to consolidate in Chaleur Bay, from Miscou Island to Caraquet, in the western end of Chaleur Bay, in the shallower waters around Prince Edward Island and around the Îles de la Madeleine; this was also more than a week later than normal. By mid-January, ice development in the Gulf was late by more than a week compared to normal. Less fast ice than normal was present along the shores, notably near Sept-Îles and the rest of the Quebec north shore. At the end of January, ice development in the Gulf of St. Lawrence was more than two weeks late compared to normal.

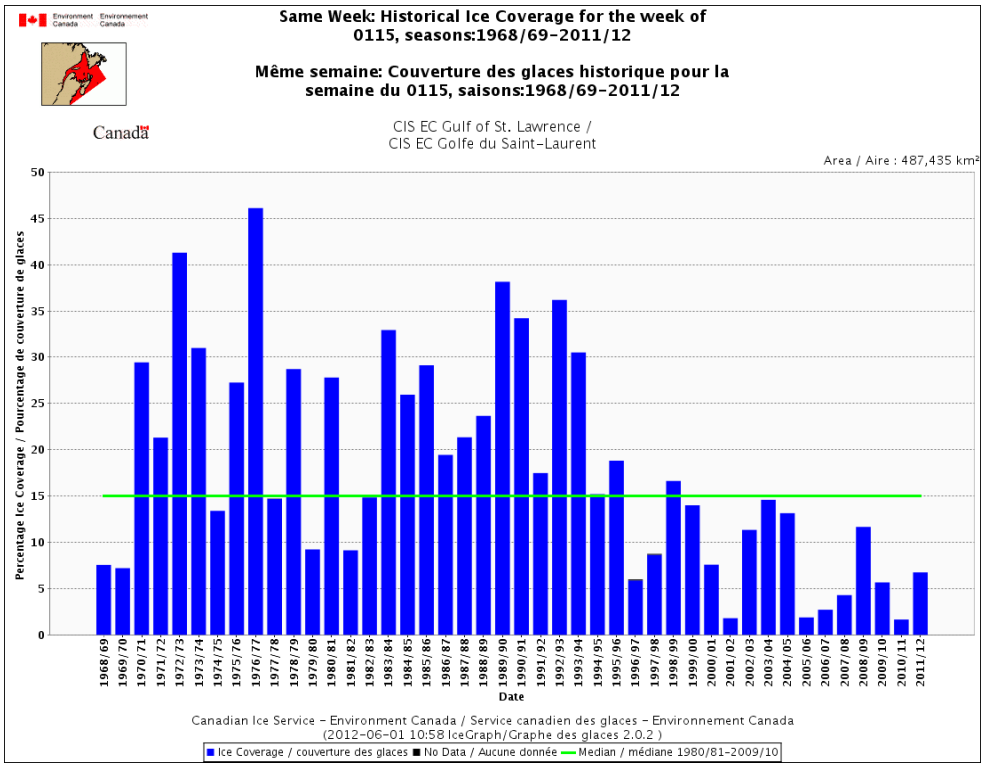

Figure 2: Mid-January ice coverage in the Gulf of St. Lawrence

February 2012

Cold air spilled over the eastern portion of the estuary in the first half of February and resulted in rapid ice development in the estuary and the western Gulf. Ice near Sept-Îles consolidated in the first week of February, more than two weeks later than normal. Near mid-February, some of the ice near the Îles de la Madeleine and in Northumberland Strait had thickened to the first-year ice stage. At that time, total ice coverage in the Gulf was much less than the climate normal. Much milder air moved into the eastern portion of the estuary in the second half of the month; on average, air temperatures were above normal over the Gulf of St. Lawrence in February and were much above normal in the eastern Gulf. At the end of the month, sea ice coverage was much less than the climate normal. A late February storm caused extensive ice destruction.

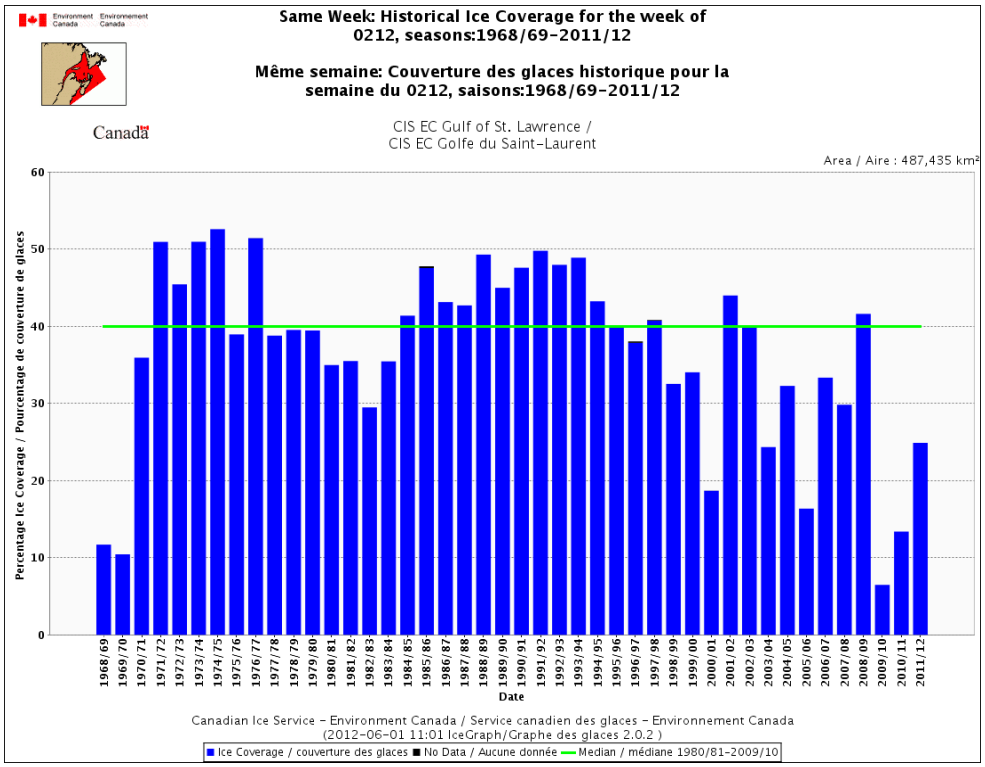

Figure 3: Mid-February ice coverage in the Gulf of St. Lawrence

March 2012

Normal to colder than normal temperatures prevailed in the Gulf in the first week of March when ice coverage reached its maximum (see Fig. 26). The peak ice coverage of the season was below the 1981-2010 climate average. Average air temperatures were above normal during the rest of the month, except near normal in the vicinity of the Northeast Arm. The warm temperatures kept the total ice coverage well below normal. By mid-March, much of the pack ice left outside of the Northeast Arm had melted or loosened up. Open water prevailed in the estuary west of Pointe-des-Monts. Fast ice break-up occurred at Sept-îles in the third week of March, about one week ahead of normal. Fast ice break-up occurred in Miramichi Bay, in Chaleur Bay from Miscou Island to Caraquet, in the western end of Chaleur Bay and in the shallower waters around Prince Edward Island in the last week of March, one to two weeks faster than normal. Fast ice break-up at les Îles de la Madeleine occurred in the first week of April, about a week faster than normal. At the end of March, the only pack ice left was in the Northeast Arm. Some decaying coastal ice still remained elsewhere. These conditions are normally seen around mid-April. A band of new ice appeared on March 31st from Baie-Comeau to Sept-Îles and lasted less than a day.

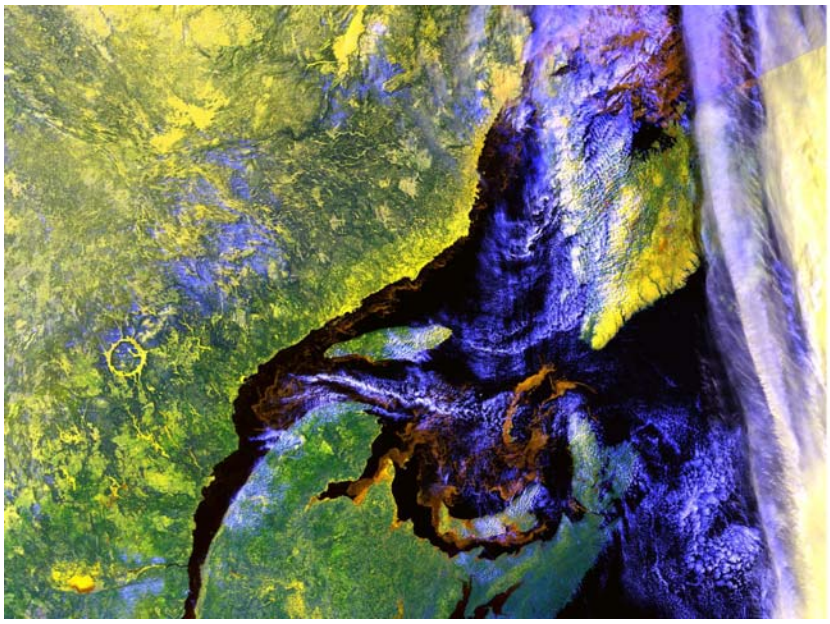

Figure 4: Ice in Gulf of St. Lawrence, March 10 2012

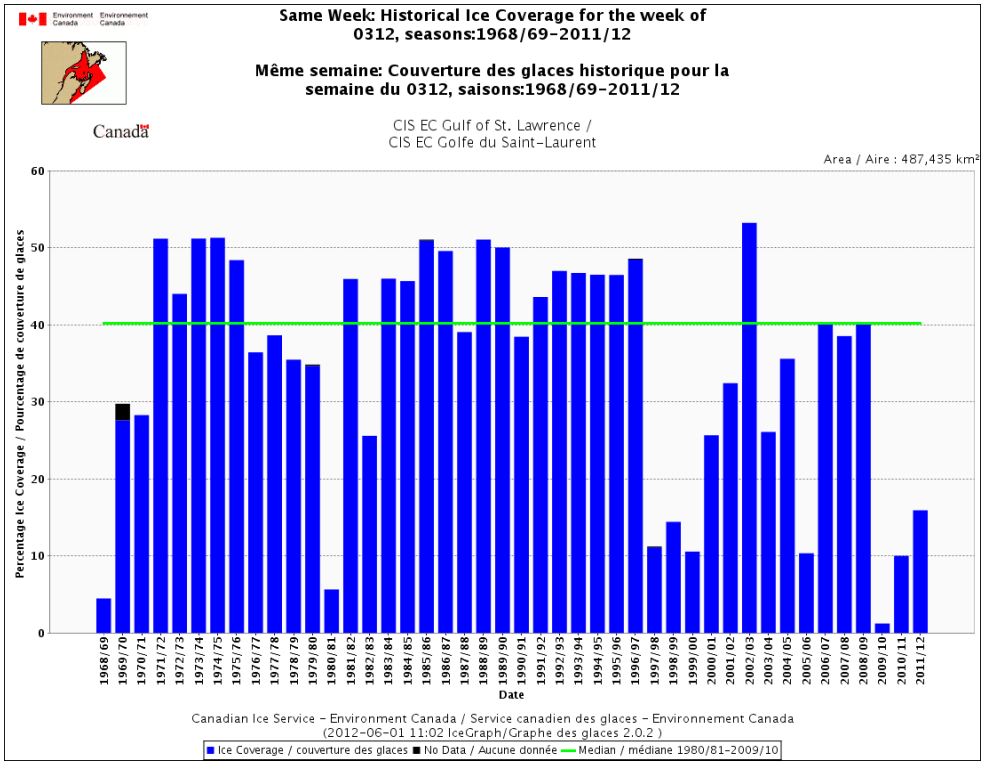

Figure 5: Mid-March ice coverage in the Gulf of St. Lawrence

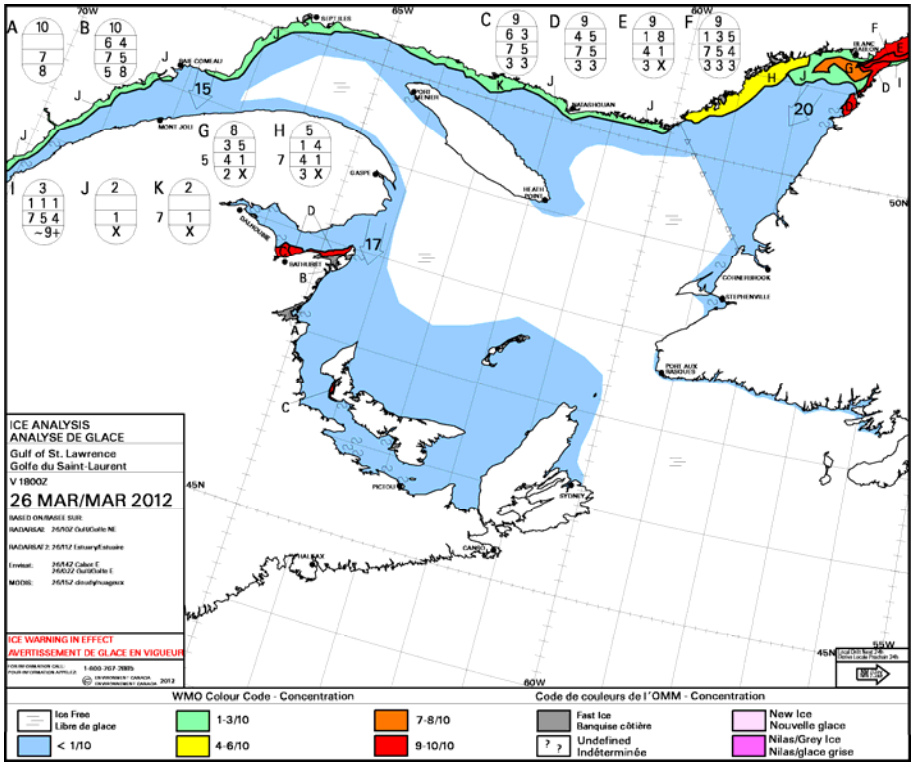

Figure 6: Actual ice conditions March 26, 2012

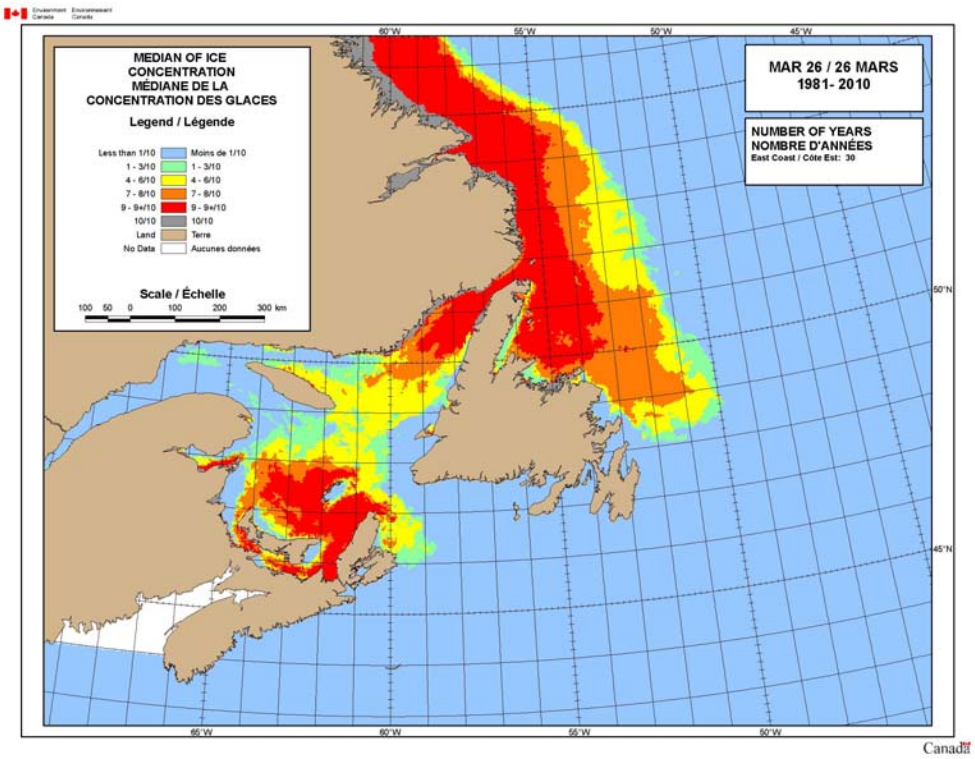

Figure 7: Normal ice conditions March 26

April to mid-May 2012

During that period, average air temperatures were near normal in the northern Gulf and above normal in the southern Gulf. Most of the coastal ice, except for the Northeast Arm, was gone by mid-April. This was two weeks ahead of normal. Pack ice remained in the Northeast Arm in higher concentrations than normal at the end of April, as more easterly winds than normal during that month helped ice drift into the area through the Strait of Belle Isle. By mid-May, no pack ice or coastal ice was left in the Northeast Arm or anywhere else in the Gulf. The coastal ice in the Northeast Arm melted about a week faster than normal.

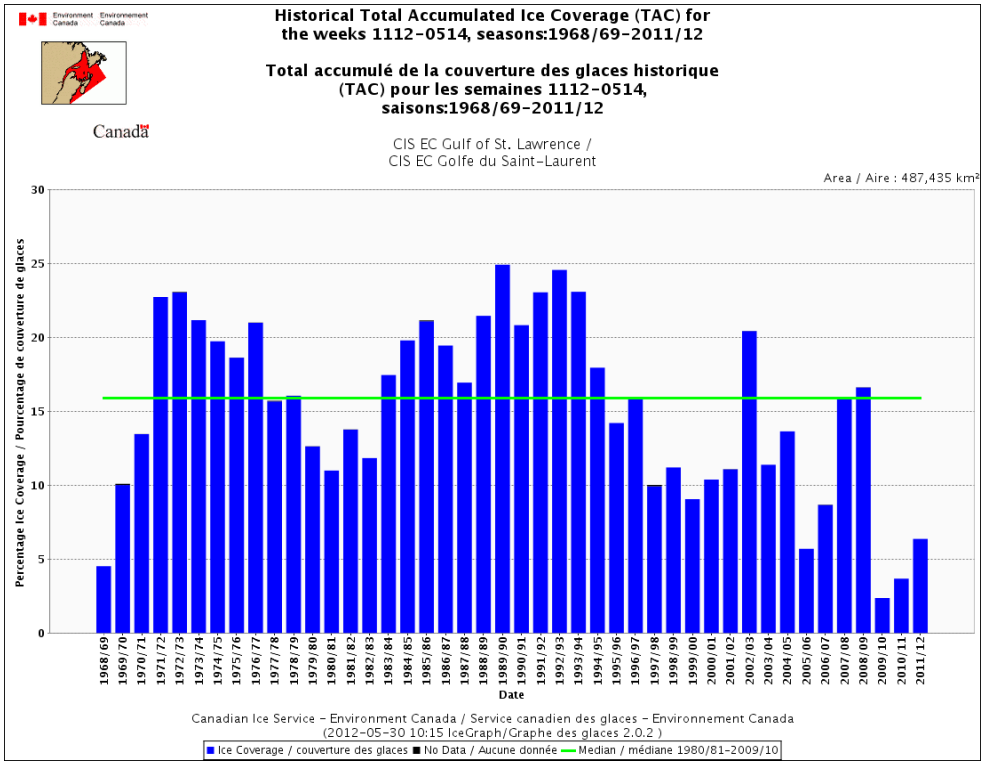

Figure 8: Total accumulated ice coverage (TAC) for the Gulf of St. Lawrence at mid-May

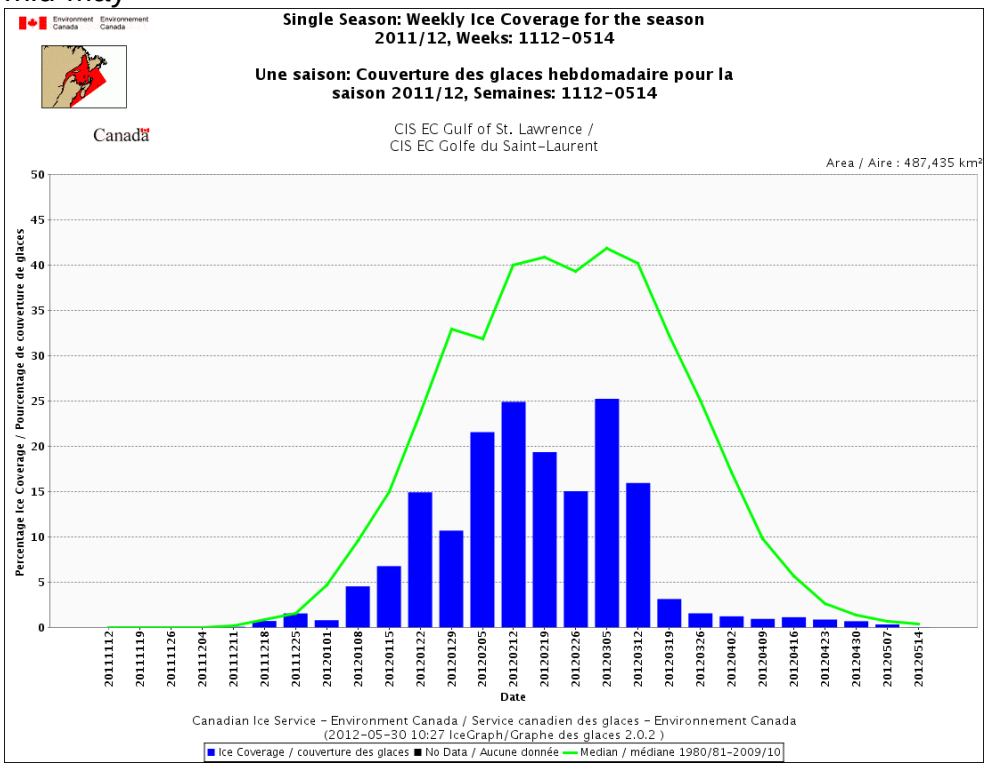

Figure 9: Weekly ice coverage in the Gulf of St. Lawrence during the 2011-2012 ice season

Newfoundland and Labrador waters

November 2011

Average air temperatures were slightly above normal along the Labrador coast and in east Newfoundland waters in November but a cold air outbreak in the last week of the month resulted in a vigorous start to the season, compared to the last few years. Ice formation was about a week and a half ahead of normal along the Labrador coast and in Lake Melville. Sea surface temperatures were above normal in east Newfoundland waters at the end of November (Fig. 10) and near normal along the mid and north coasts of Labrador.

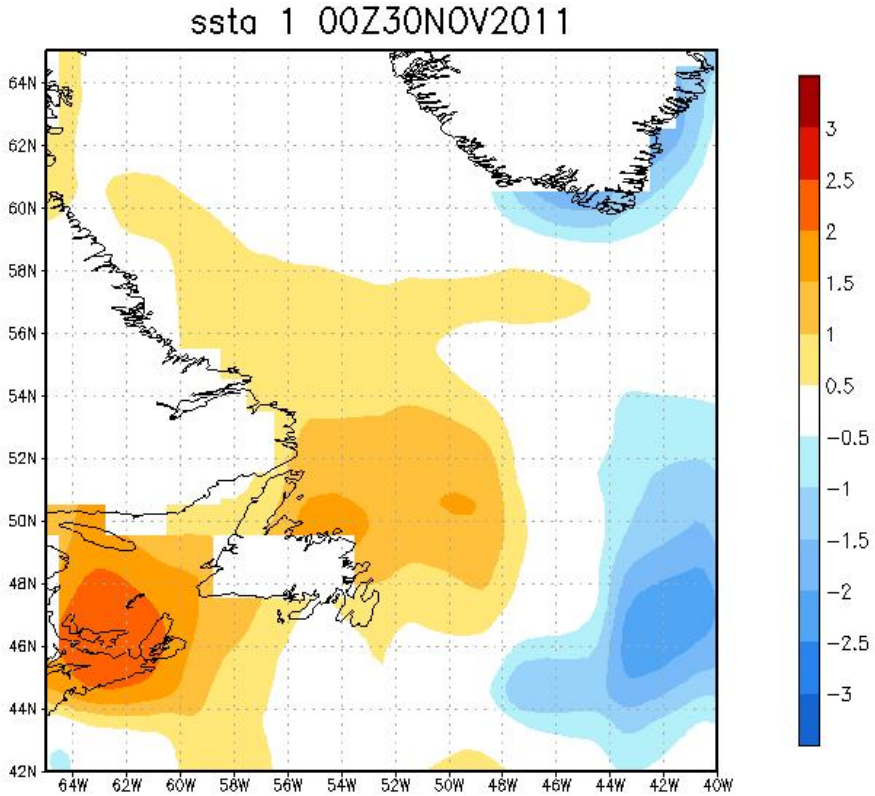

Figure 10: Difference between the observed sea surface temperature and climate normal on November 30, 2011

December 2011

Average air temperatures were near normal in December over the East Newfoundland waters and below normal over the southern Labrador Coast. As a result, total sea ice coverage along the southern Labrador coast remained slightly above normal at the end of December. Lake Melville became consolidated with grey-white ice at the end of December, a few days later then normal. At that time the southern portion of Bay of Exploits, near Botwood, consolidated with grey ice. This was a few days faster than normal.

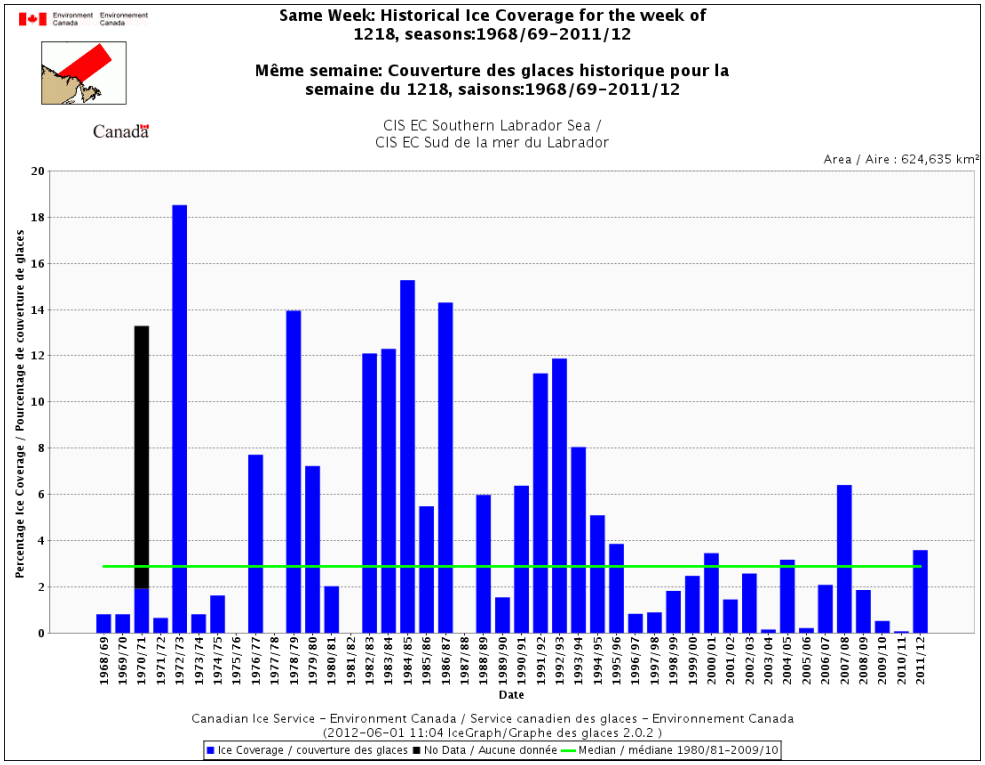

Figure 11: Mid-December ice coverage for the Southern Labrador Coast

January 2012

Average air temperatures were above normal over the east Newfoundland waters and along the southern Labrador coast during the month of January and ice growth lagged behind normal values. Sea ice covered the Strait of Belle Isle by mid-January, about a week later than normal. Near the end of January, the pack ice was 50 and 30 nautical miles north of Baie Verte Peninsula and north of Fogo Island, respectively. That southern motion of the pack ice was more than a week late compared to the climate normal. Ice coverage over the East Newfoundland waters remained well below normal. Consolidated ice started forming near Fogo Island in the first week of January, a little faster than normal.

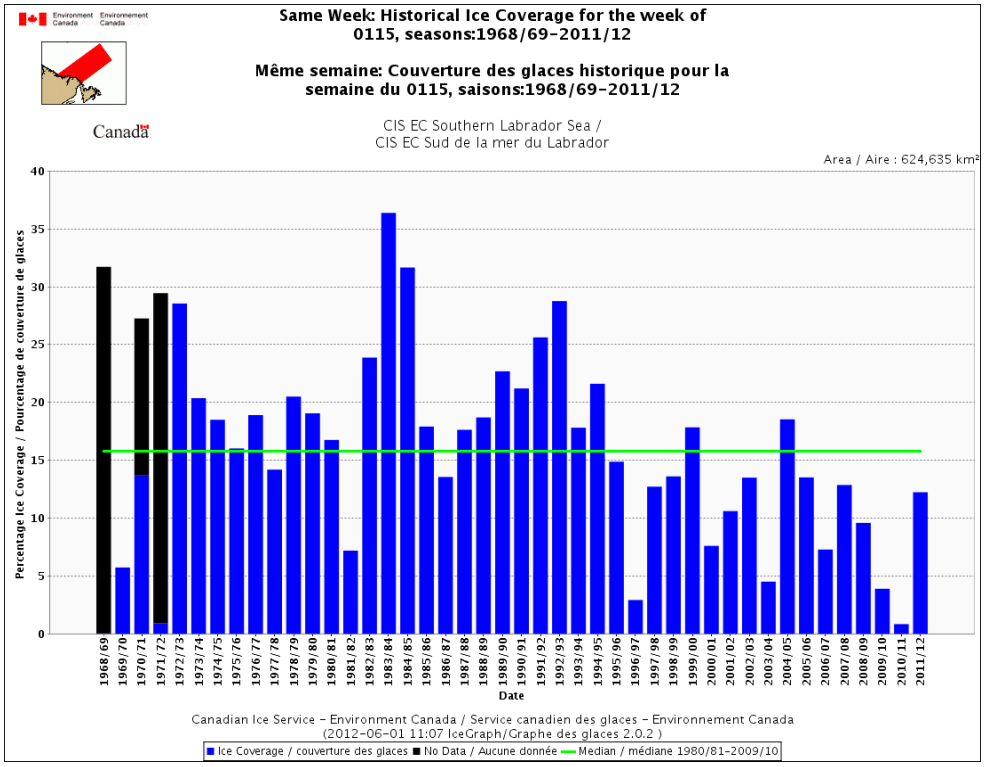

Figure 12: Mid-January ice coverage for the Southern Labrador Coast

February 2012

Strips and patches of grey and grey-white ice reached the shores of Notre Dame Bay in the first week of February. At that time, the pack ice off the southern Labrador coast thickened to include some first-year ice. A storm caused the main ice edge to retreat northward in the second week of February, to about the Grey Islands. Fast ice became more extensive in Notre Dame Bay in the second half of the month. Near the end of the February, ice had reached the shores of Notre Dame Bay again, and White Bay was covered with ice. At that time, first-year ice dominated in the pack ice. The ice edge extended to about 80 nautical miles east of Cape Freels at its southern limit. It extended up to about 140 nautical miles east of the Northern Peninsula and up to 120 nautical miles east of the south coast of Labrador.

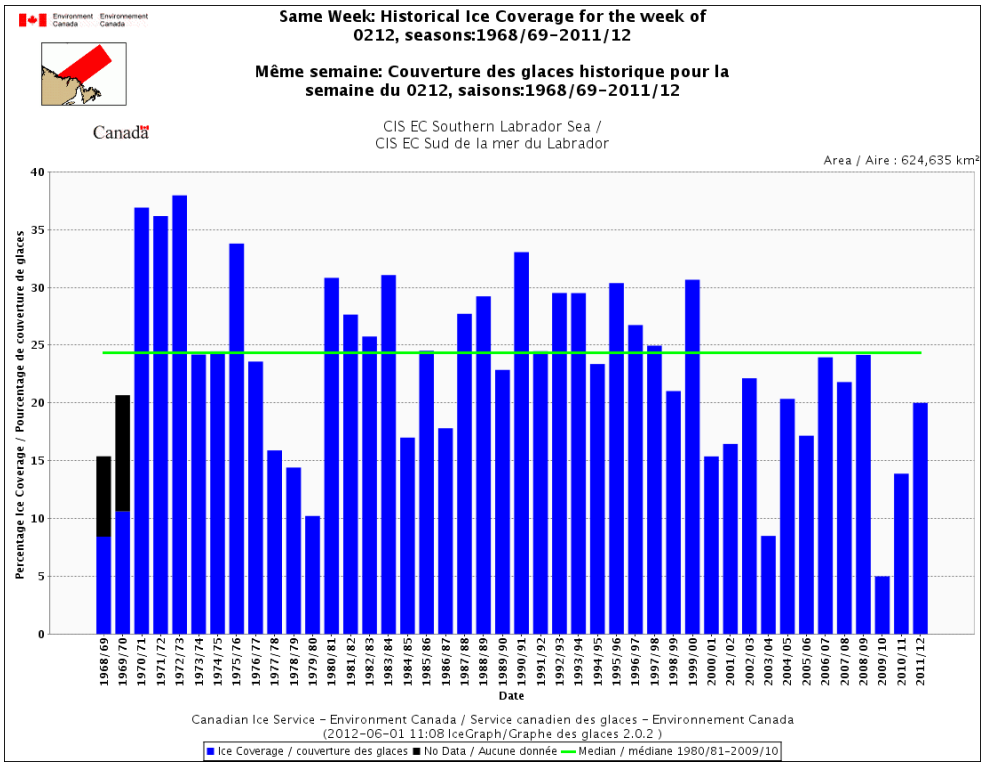

Figure 13: Mid-February ice coverage for the southern Labrador coast

March and April 2012

Average air temperatures turned colder than normal in March along the Labrador coast and they were much colder than normal over the Labrador Sea. Normal temperatures were recorded over the East Newfoundland waters. Around mid-March, the pack ice was east of St. John's and the ice edge extended to about 120 nautical miles northeast of St. John's at its south-eastern limit. At that time, the total sea ice coverage in East Newfoundland waters was below the climate average but much higher than the total mid-March coverage of the last two years. A trace of old ice was present in the pack ice off the south coast of Labrador in late March. The ice edge reached its maximum southern extent of the season in the last week of March, to about 4640°N (which is farther south than the climate average), and its maximum eastern limit in early April, near 4720°W (around 48°N), farther to the east than the climate average. From late March to mid-April the total ice extent in Newfoundland waters was near or slightly above the climate average. Average air temperatures over Newfoundland waters were near normal in the first half of April and above normal in the second half of the month. More easterly winds than the climate normal for April resulted in higher ice concentrations than normal north of Baie Verte Peninsula, in White Bay and near the Northern Peninsula throughout the month. Break-up of the fast ice near Fogo Island started in late March, which is near normal, but the extent of the fast ice in Notre Dame Bay was generally less than normal throughout the winter. Break-up of the fast ice in Bay of Exploit started in the second week of April, about a week faster than normal. At the end of April, there was less ice coverage than normal off the eastern shores of Newfoundland but ice concentrations just north of the Baie Verte Peninsula remained higher than normal.

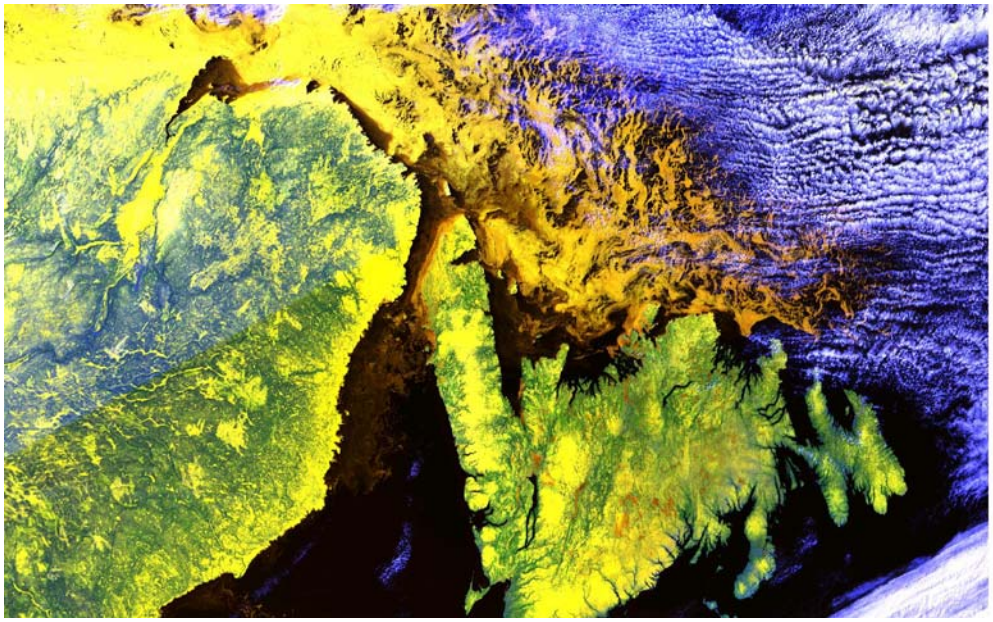

Figure 14: Ice off Newfoundland and southern Labrador, March 14 2012 (NASA)

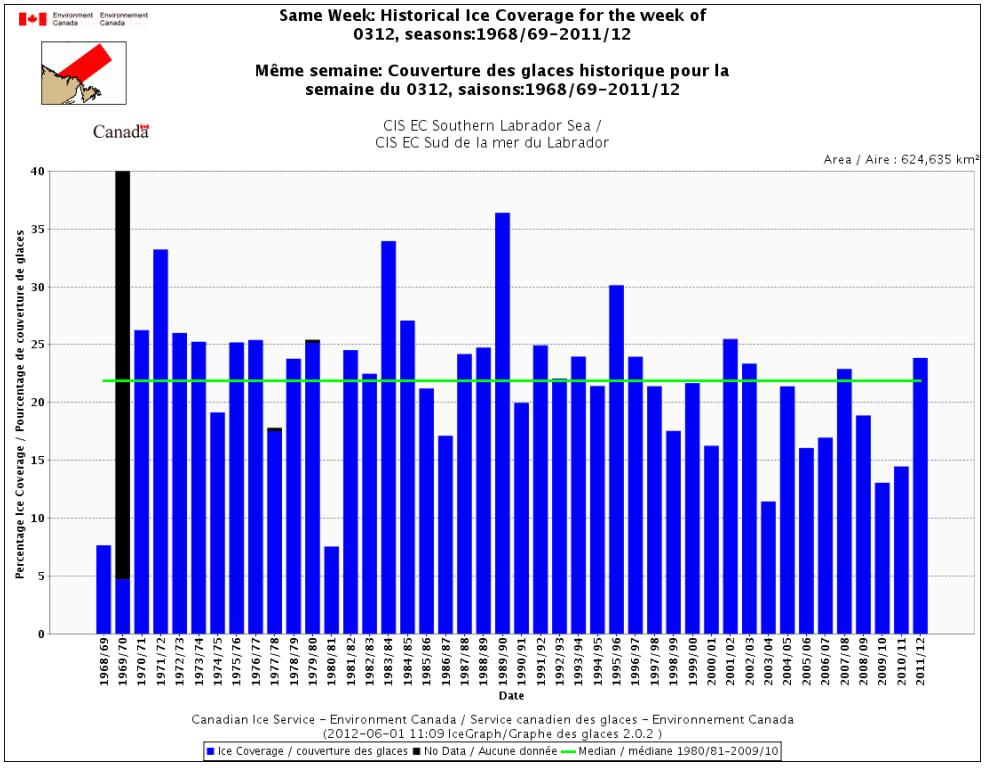

Figure 15: Mid-March ice coverage for the Southern Labrador Coast

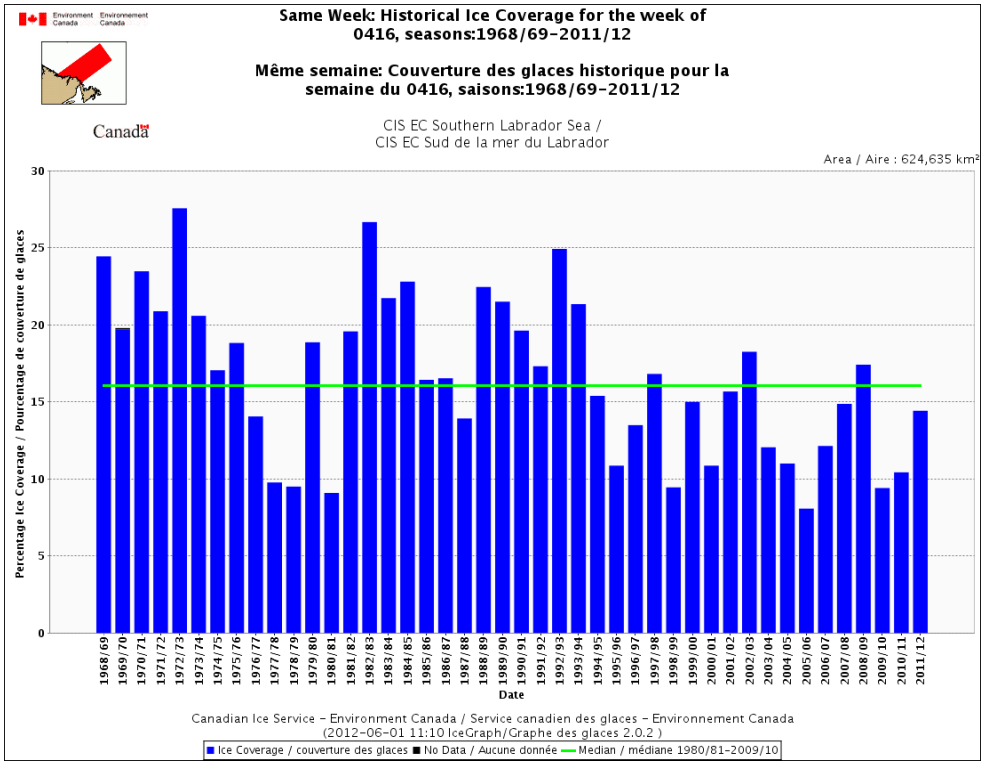

Figure 16: Mid-April ice coverage for the Southern Labrador Coast

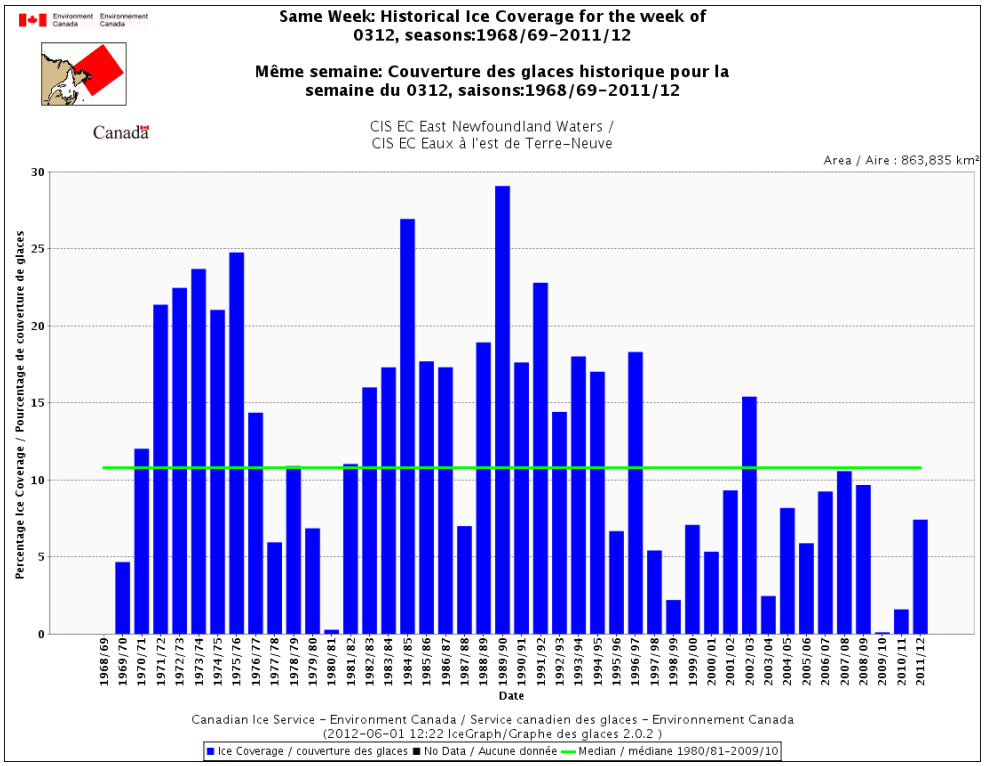

Figure 17: Mid-March ice coverage, East Newfoundland waters

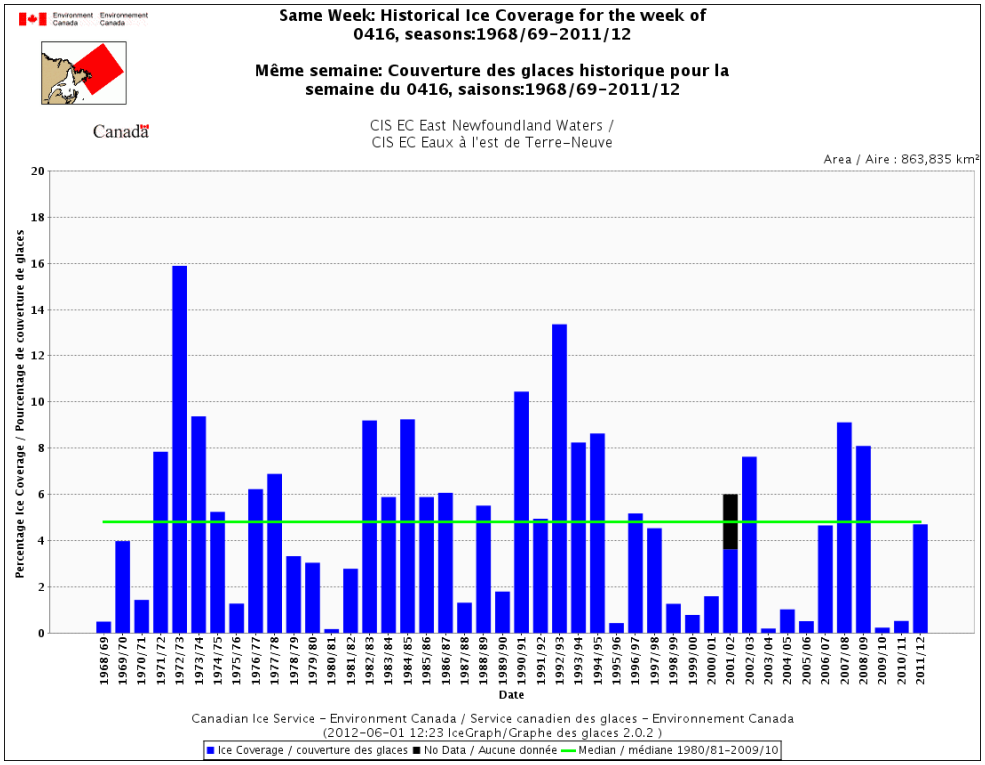

Figure 18: Mid-April ice coverage, East Newfoundland waters

First half of May 2012

Air temperatures were slightly higher than normal off the eastern shores of Newfoundland and near normal off the south coast of Labrador. A trace of old ice was found in the pack ice in Notre Dame Bay in early May. By mid-month the main pack ice had retreated to about 53^{o}N but patches of first-year and old ice were still present in White Bay and Notre Dame Bay (Fig. 19). The total accumulated ice coverage off southern Labrador (the TAC, which is representative of the seasonal average) was just below the climate normal (Fig. 21).

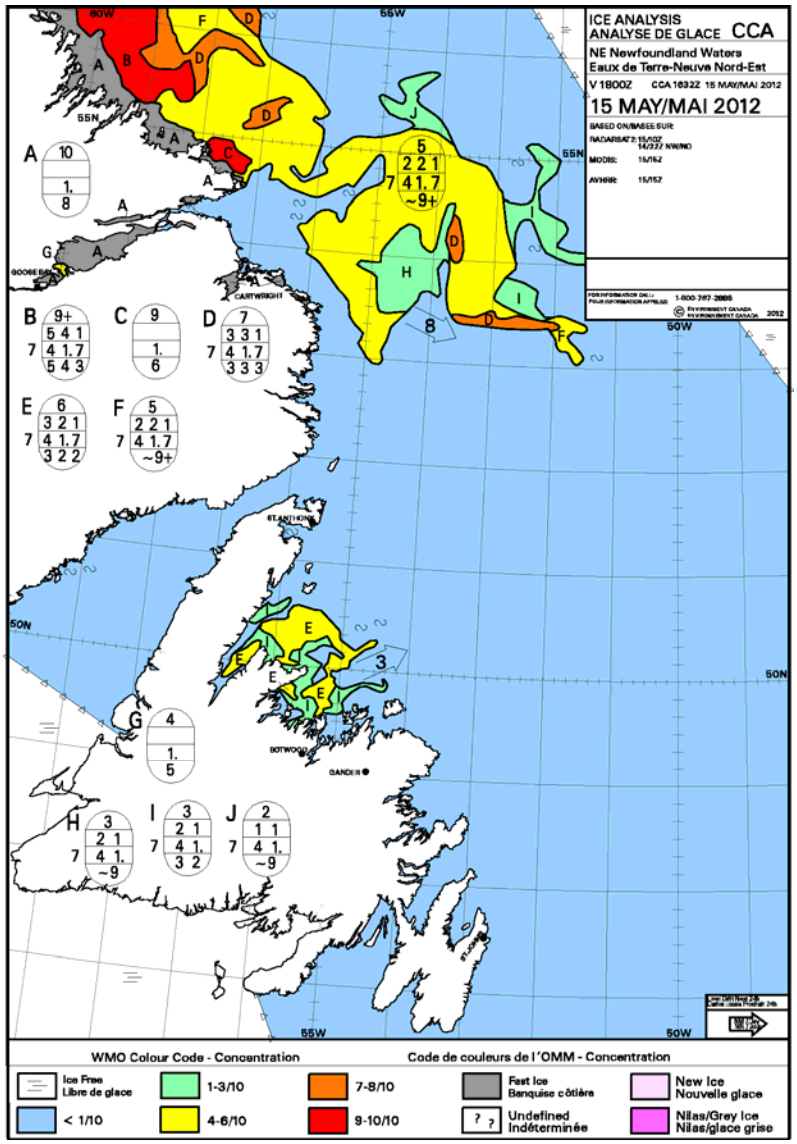

Figure 19: Actual ice conditions, Newfoundland and southern Labrador, May 15 2012

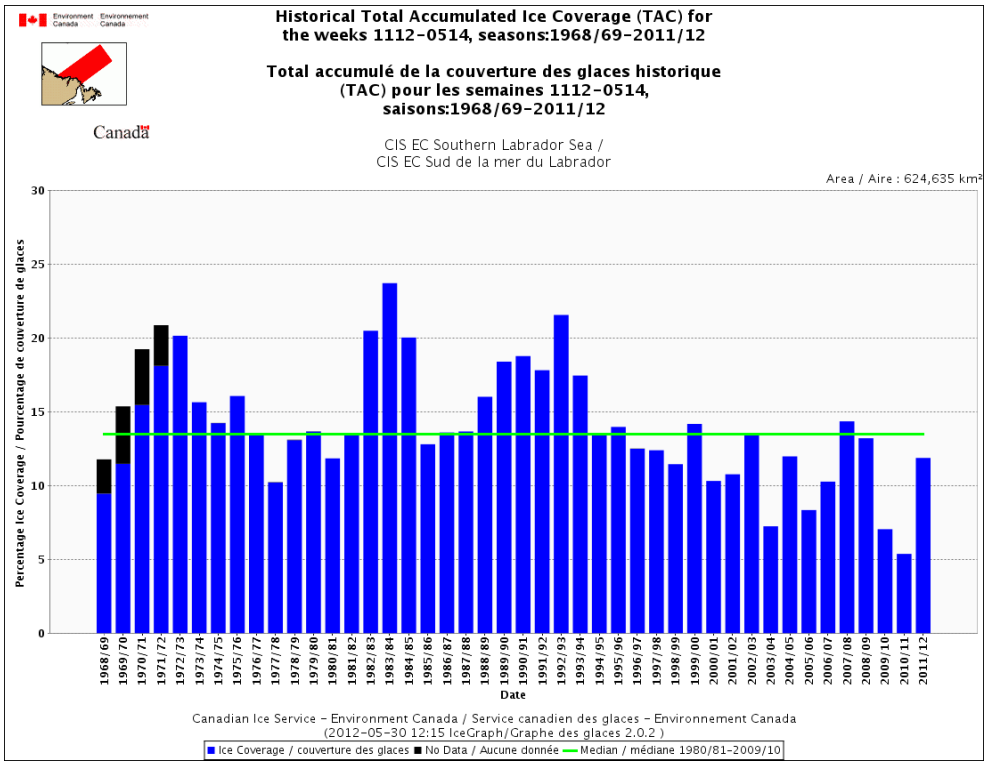

Figure 20: Total accumulated ice coverage (TAC), Southern Labrador Coast (until mid-May)

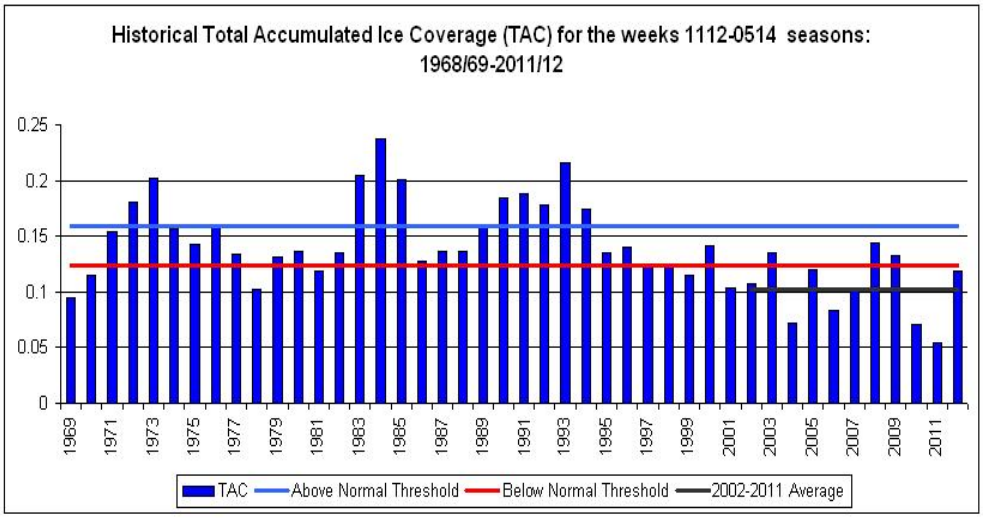

Figure 21: TAC for the southern Labrador coast was below climate normal

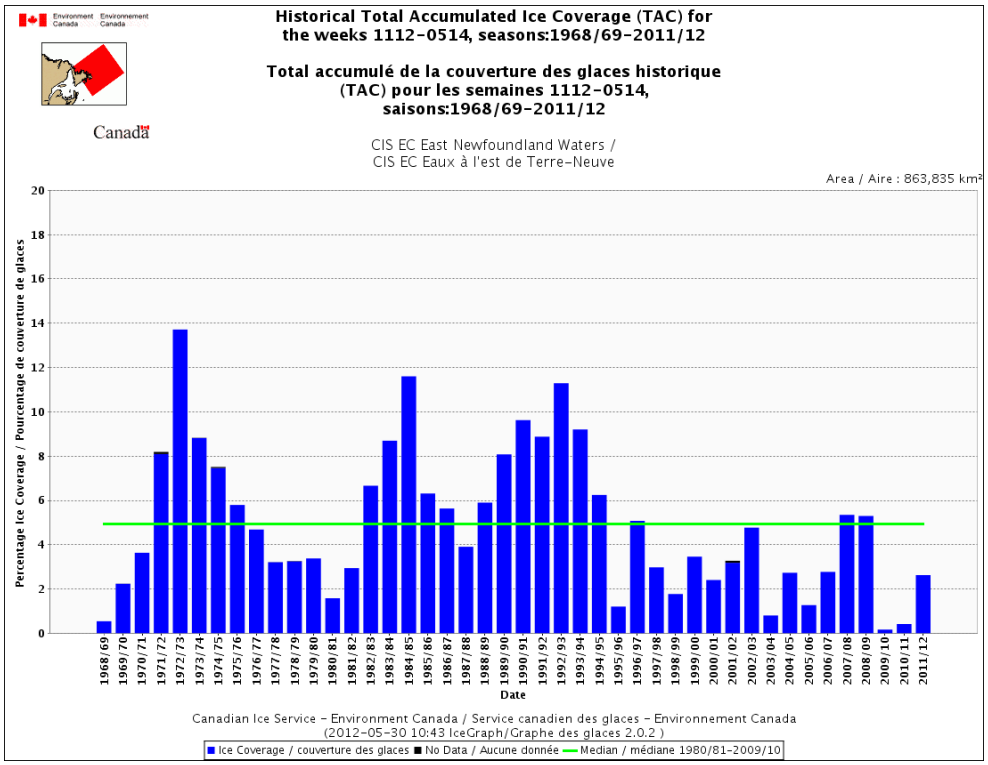

Figure 22: Total accumulated ice coverage (TAC) for East Newfoundland waters (until mid-May)

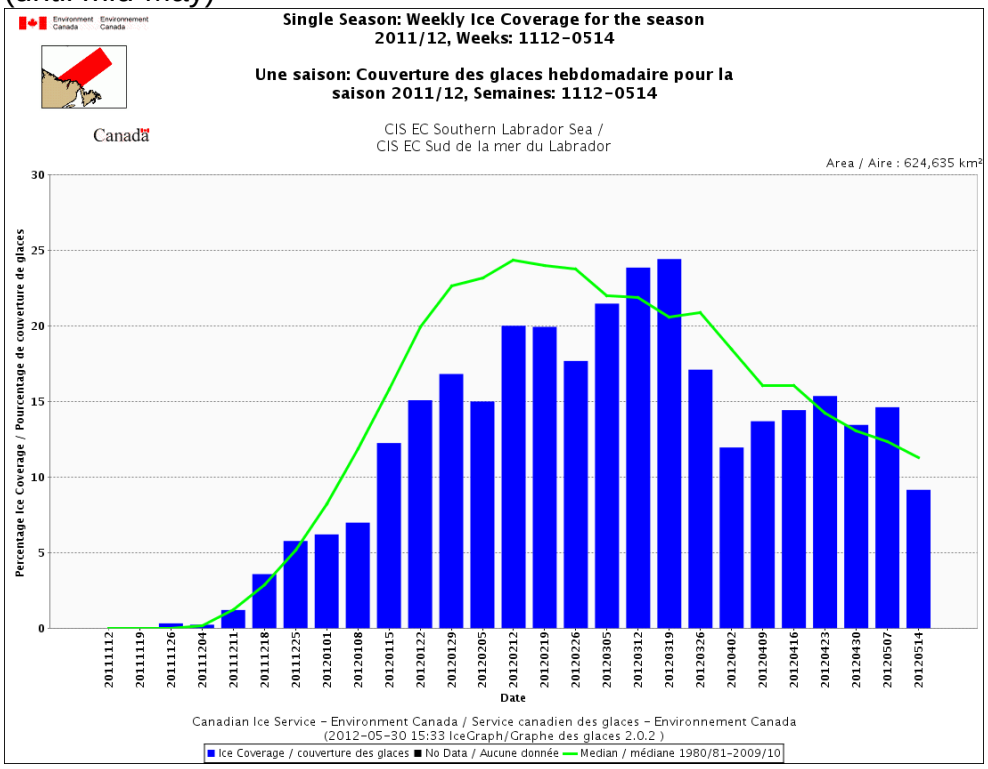

Figure 23: Weekly ice coverage for the Southern Labrador Coast during the 2011-2012 ice season

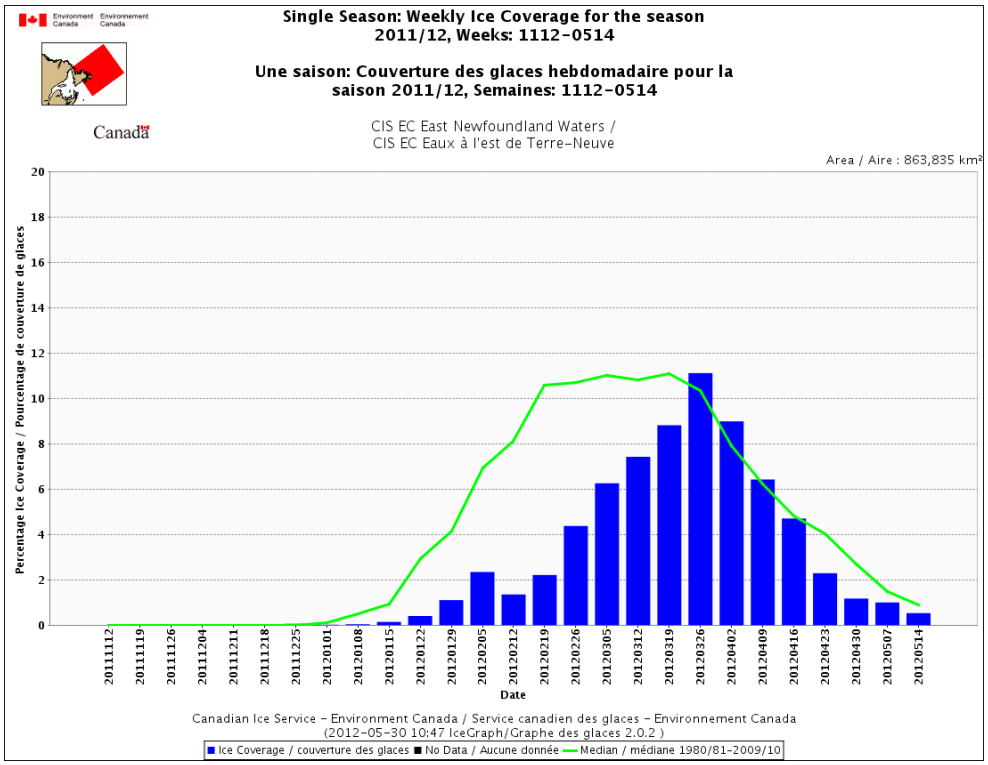

Figure 24: Weekly ice coverage for the East Newfoundland waters during the 2011-2012 ice season

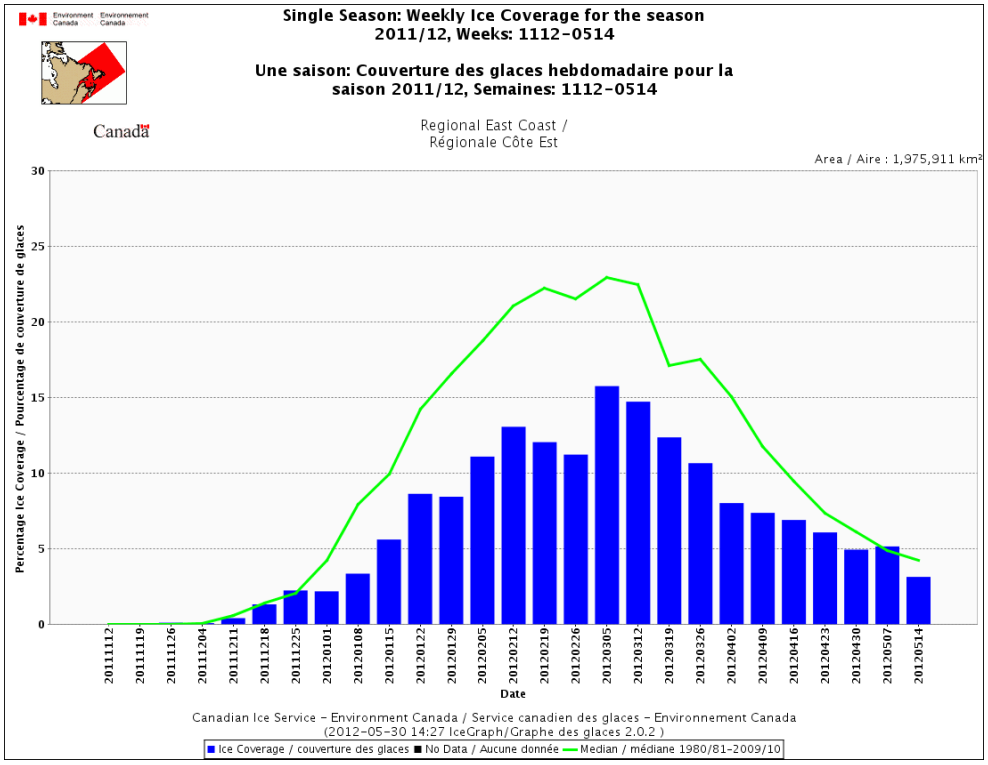

Figure 25: Weekly ice coverage for the East Coast of Canada during the 2011-2012 ice season

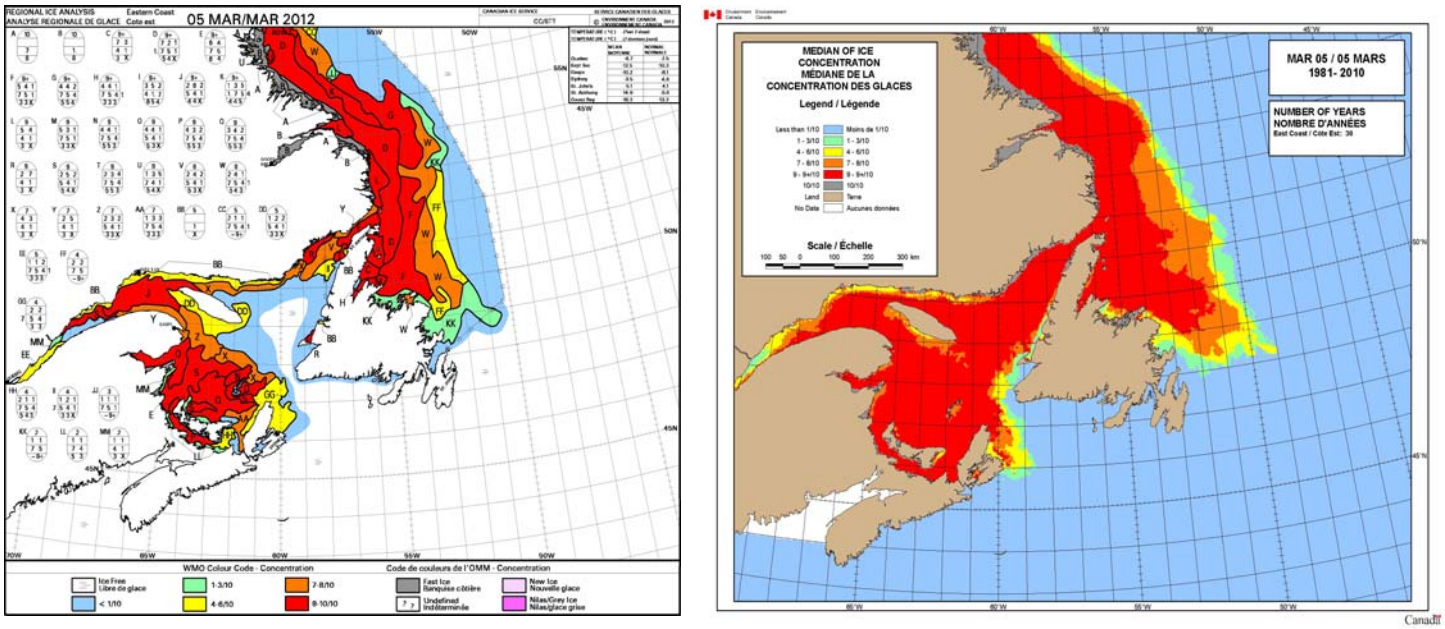

Figure 26: Maximum ice coverage for the Gulf of St. Lawrence and the Newfoundland East Coast in general was reached in early March

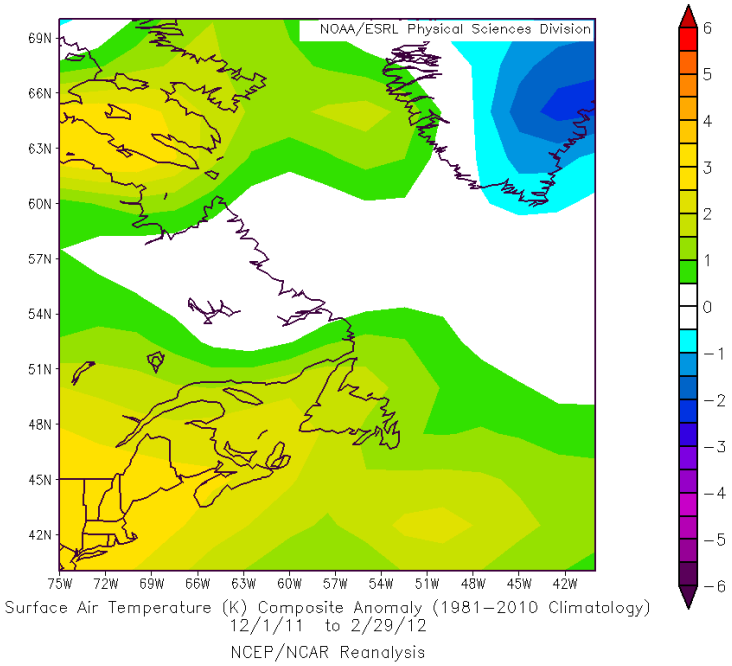

Figure 27: Difference between the observed air temperature and the climate normal: Dec 2011 to Feb 2012

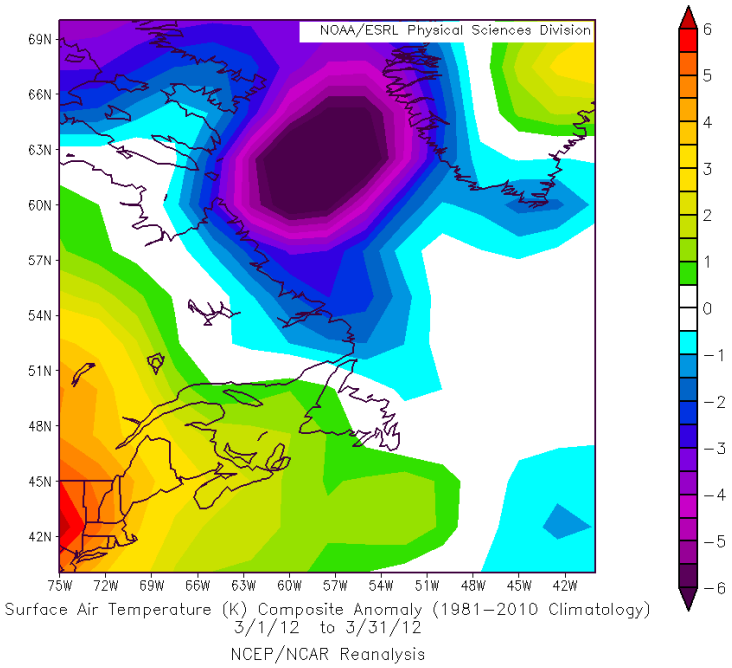

Figure 28: Difference between the observed air temperature and the climate normal: March 2012

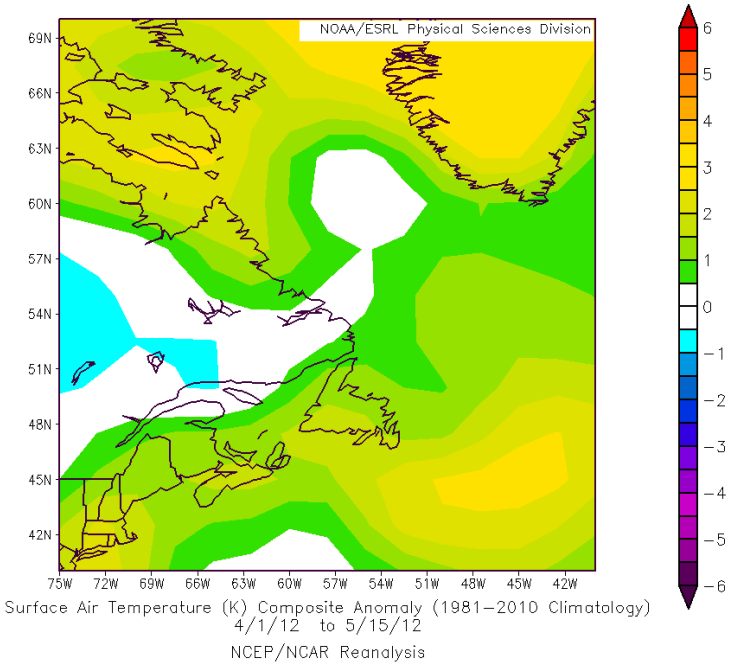

Figure 29: Difference between the observed air temperature and the climate normal: April to mid-May 2012