Environment Canada Environnement Canada

Seasonal Summary

Eastern Canada
Winter 2010-2011

By

Canadian Ice Service
Le service canadien des glaces

Canada

Table of Content

Table of figures

General overview of the 2010-2011 Season

The 2010-2011 season in the Gulf of St Lawrence and the Newfoundland and Labrador waters was another season with very little ice; the total accumulated ice coverage (the TAC provides average conditions for the season) for the East Coast set a new record low for the season, due to the lack of ice along the Labrador coast. The TAC for the Gulf of St Lawrence and the TAC for Newfoundland were both the second lowest on record. More ice than last year was present in the Estuary; in part because normal temperatures were registered in its western portion during the months of January and February. Ice was present at times south of Anticosti Island but otherwise there was little ice in the main shipping route leading to the Estuary throughout the winter. The pack ice never reached the Îles de la Madeleine and remained much thinner than usual throughout the winter. In the east Newfoundland waters the shipping route along the east coast northward to Cape Freels remained open or bergy water throughout most of the ice season. Ice reached Notre Dame Bay in late March. This turned out to be the maximum ice extent of the season off East Newfoundland and the ice started retreating from that point on.

The daily and weekly ice charts for the Gulf of St Lawrence and the Newfoundland and Labrador waters are available at the following CIS Web site

http://www.ec.gc.ca/glaces-ice/

by clicking on "*Archive*" then on "*Archived charts*" (both on left hand side menu).

The median of ice concentration charts are available on the CIS web site by clicking on "*Archive*" then on "Archive charts" then on *"Regional Medians"* then on *"30-year Ice Atlases"* then finally on *"Sea Ice Climatic Atlas for the East Coast 1981-2010".*

Departure from normal sea ice concentration charts are often showed in this document; please note that on these charts, red means less ice than normal and blue more ice than normal.

Gulf of St Lawrence

November and December 2010

Average air temperatures in the Gulf were above normal in November and were much above normal in December. Sea surface temperatures in the first half of December were above normal. Average air temperatures were also above normal in the western portion of the estuary. A few brief periods of cold temperatures around mid-December helped new ice development in the third week of the month; which was near normal. Ice started developing in western Chaleur Bay and in Miramichi Bay in the last week of December, about a week later than normal. New ice areas, large enough to appear on our charts developed along the north shore, from Sept-Iles and eastward in the last week of December, which was near normal. However, by the end of December, ice cover along the shores and in Northumberland Strait was already lagging, with very little ice having developed compared to normal.

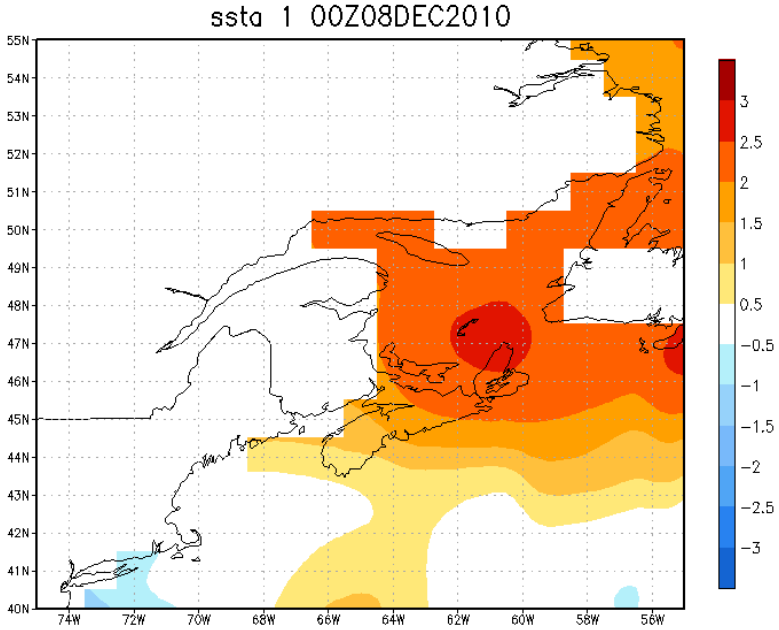

Figure 1: Sea surface temperature anomaly on December 8, 2010.

January 2011

The first half of January was much above normal and very little new ice development occurred. Sea surface temperatures remained warmer than normal. Total ice coverage in the Gulf was about 3 weeks behind normal. Ice cover in the Gulf of St. Lawrence for mid-January was the lowest on record (see Figure 6). A few cold outbreaks occurred in the estuary in the second half of January however temperatures in the eastern Gulf remained above normal during the second half of the month. By the end of the month, ice extent in the estuary, in Chaleur Bay,

along the New Brunswick coast and in Northumberland Strait was near normal. Ice cover everywhere else was less than normal. Shore fast ice development was behind normal; ice thicknesses were under normal values. Miramichi Bay was not completely consolidated as it usually is by late December - early January. Ice cover over the Gulf was the lowest on record for the end of January (see Figure 7).

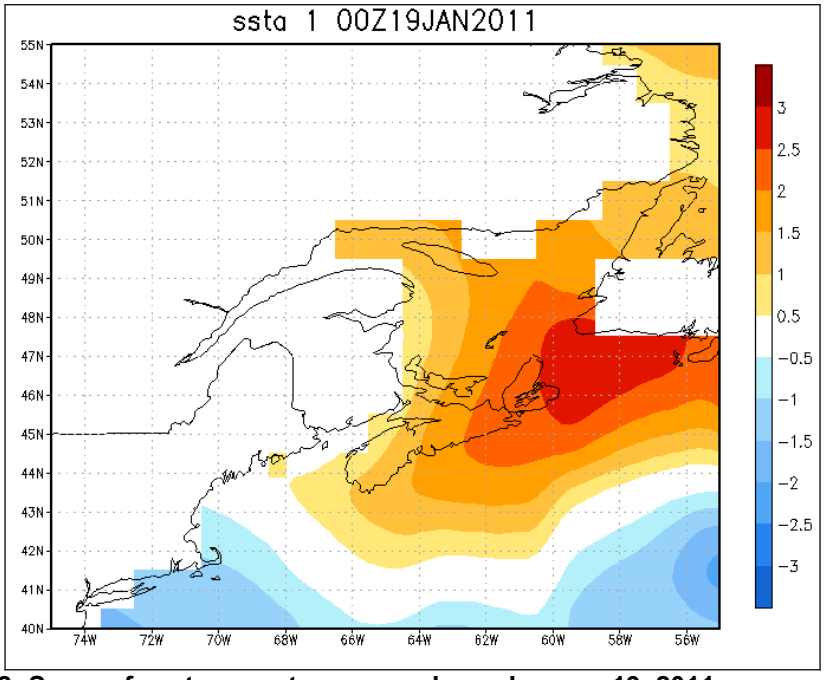

Figure 2: Sea surface temperature anomaly on January 19, 2011.

February 2011

Cold outbreaks occurred in the first part of February along the Quebec north shore and the Gaspe Peninsula. As a result ice coverage increased by mid-month, but still lagged normal values significantly (Figure 3). Warmer temperatures caused a diminution of the ice coverage in the third week of February but a cold air outbreak in the western half of the region, including the Estuary, New Brunswick and part of Nova Scotia, led to the maximum ice coverage of the winter occurring in the last week of February (the peak ice coverage is usually reached one week earlier in the season). A large area of predominantly first-year ice developed in the eastern portion of Northumberland Strait.

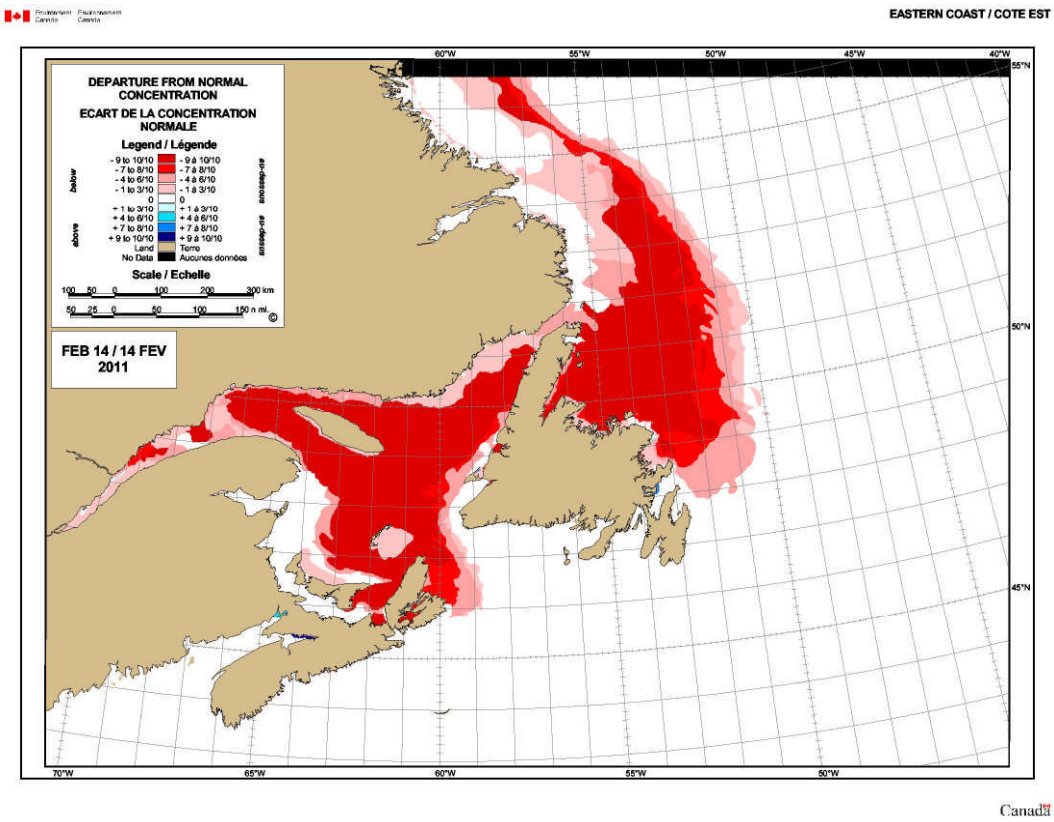

Figure 3: Departure from normal on February 14, 2011.

March 2011

While temperatures in March averaged near normal in the Estuary, they were above normal for the rest of the Gulf, and the ice coverage decreased during the period, as it normally does. By mid-March, more first-year ice developed in the southern Gulf, but ice thicknesses and extents remained well below normal (see Figure 4).

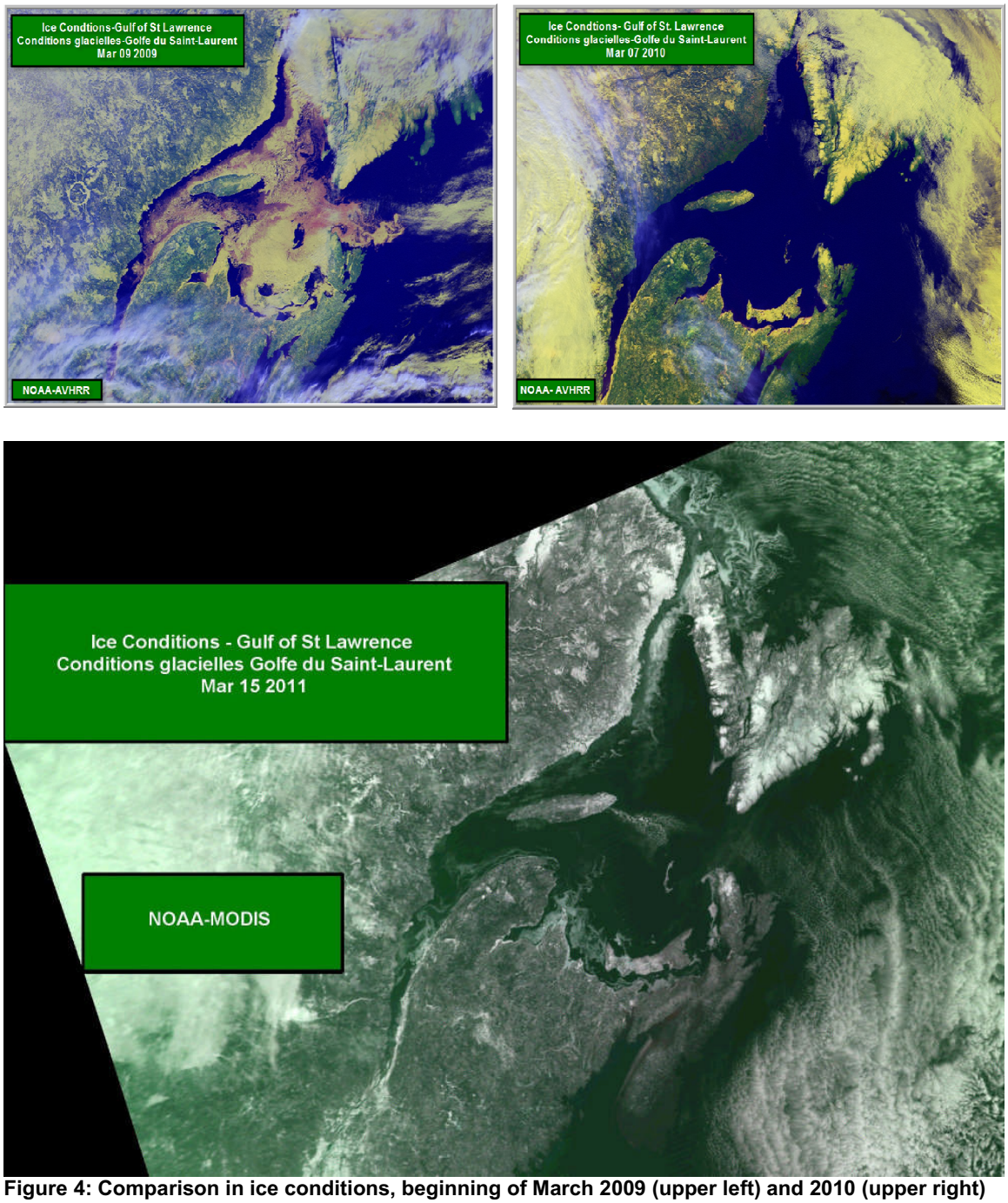

Figure 4: Comparison in ice conditions, beginning of March 2009 (upper left) and 2010 (upper right) and mid-March 2011 (bottom)

April and May 2011

At the beginning of April the Gulf of St Lawrence was essentially ice free except for areas of thick first year ice in the northeast end of the gulf and decaying fast ice along the New Brunswick and Prince Edward Island coasts. The Gulf of St

Lawrence became completely clear of ice at the end of the third week of April which was 3 weeks ahead of normal.

The total accumulated ice coverage (TAC) for the 2010-2011 season in the Gulf of St Lawrence was the second lowest on record (see Figure 5). Figure 6-11 shows the evolution of the ice coverage over the entire ice season in the Gulf.

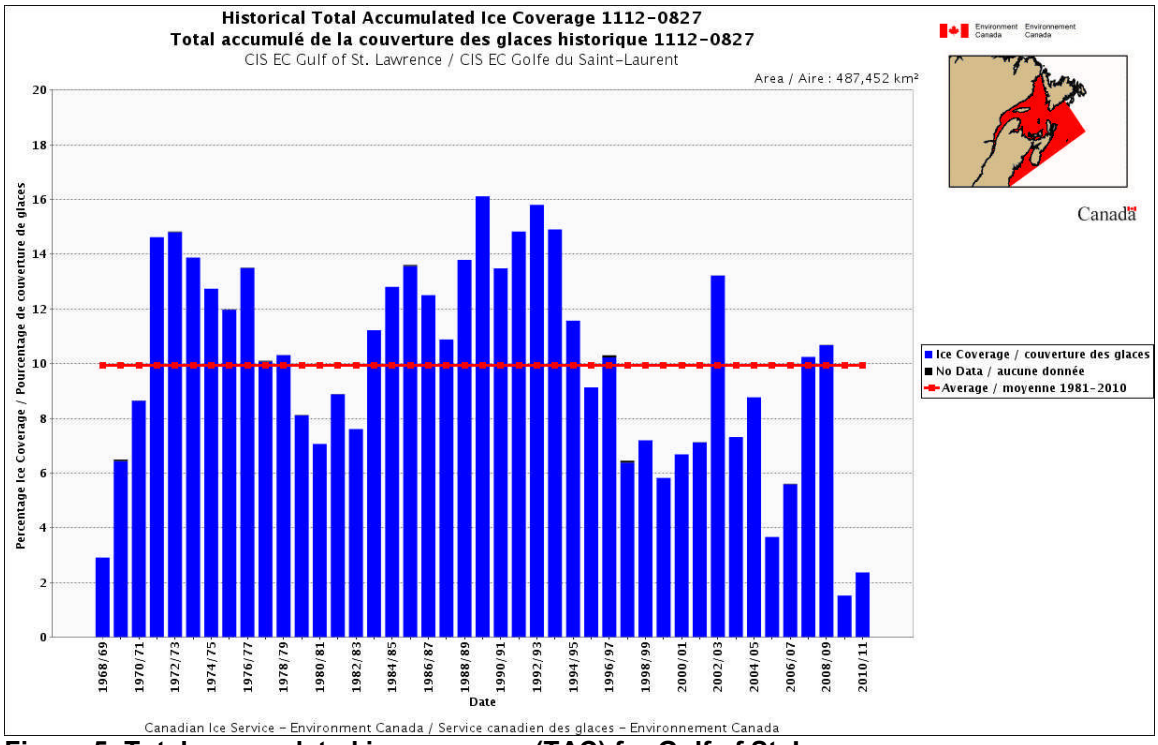

Figure 5: Total accumulated ice coverage (TAC) for Gulf of St. Lawrence

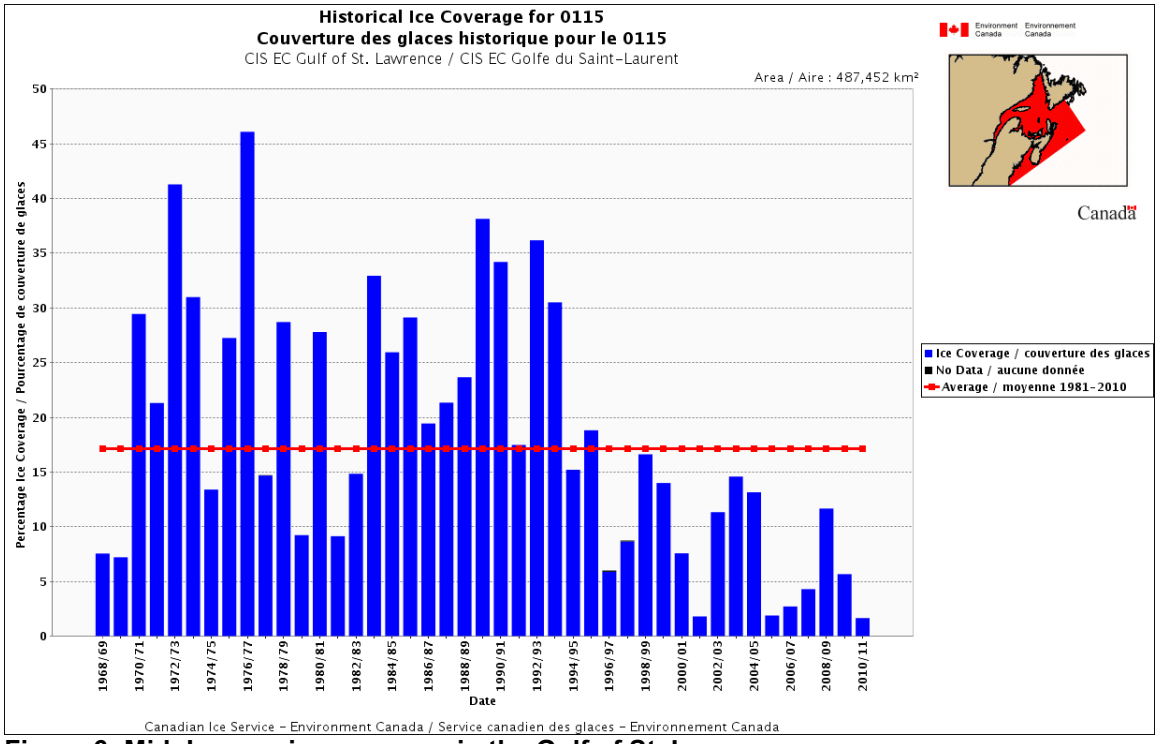

Figure 6: Mid-January ice coverage in the Gulf of St. Lawrence.

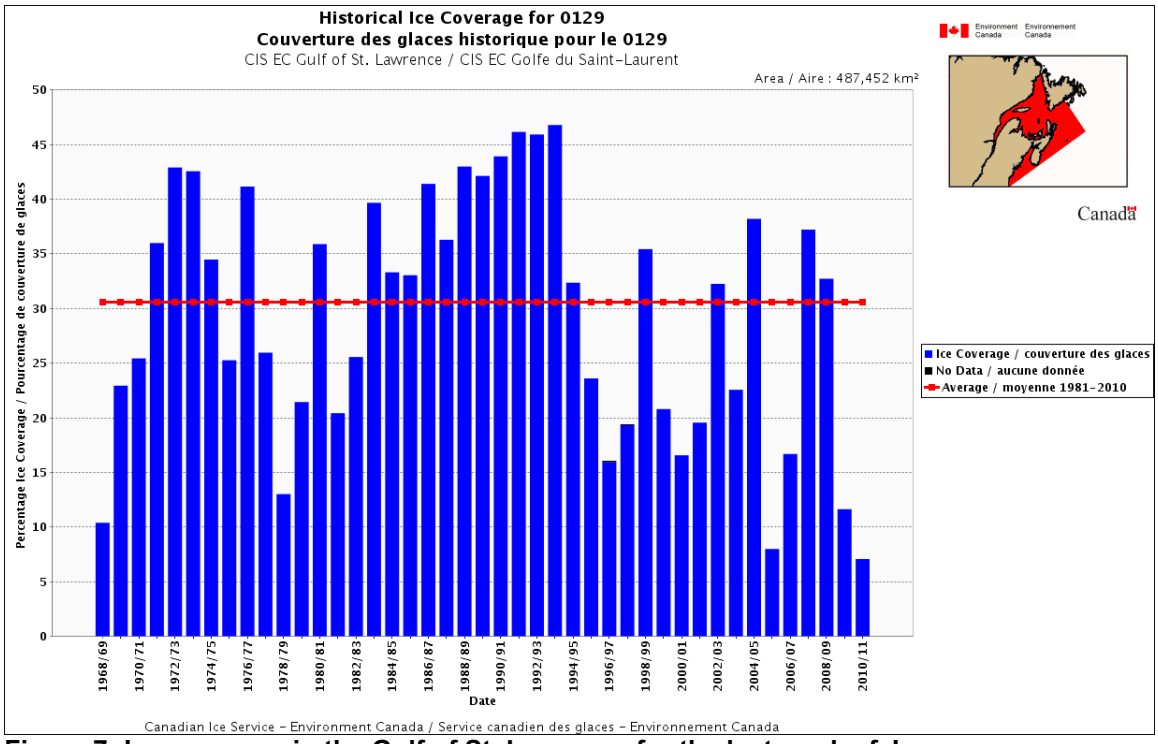

Figure 7: Ice coverage in the Gulf of St. Lawrence for the last week of January.

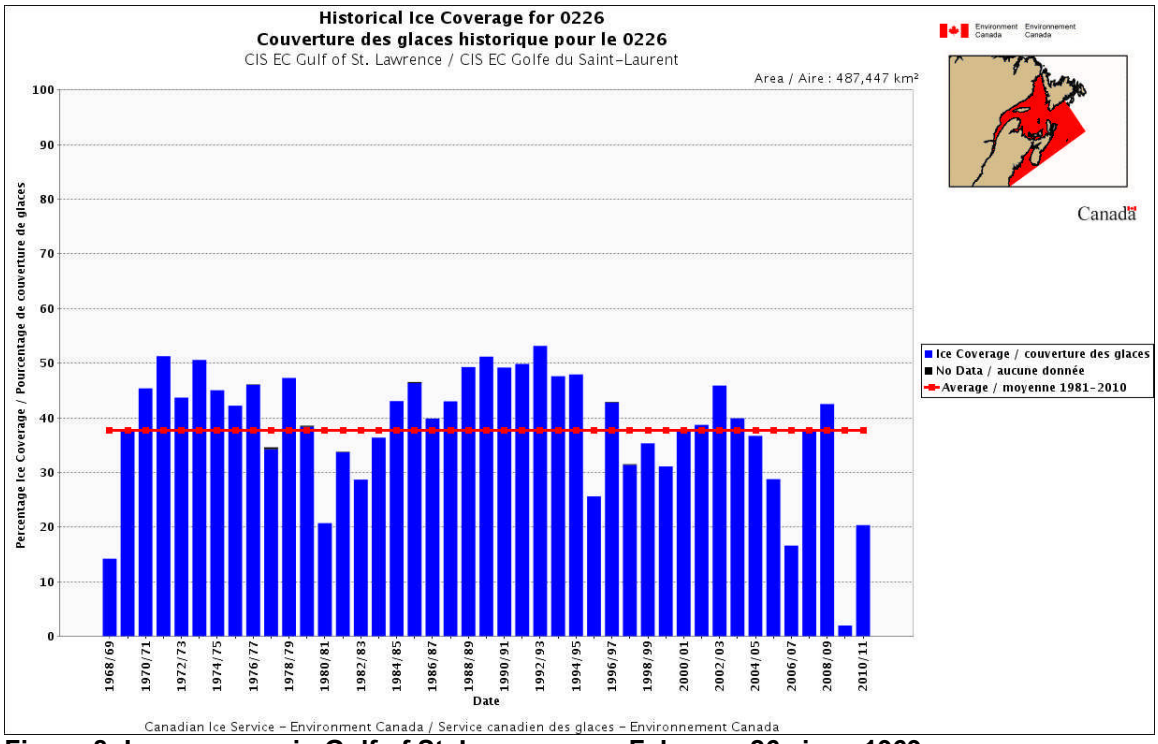

Figure 8: Ice coverage in Gulf of St. Lawrence on February 26 since 1969.

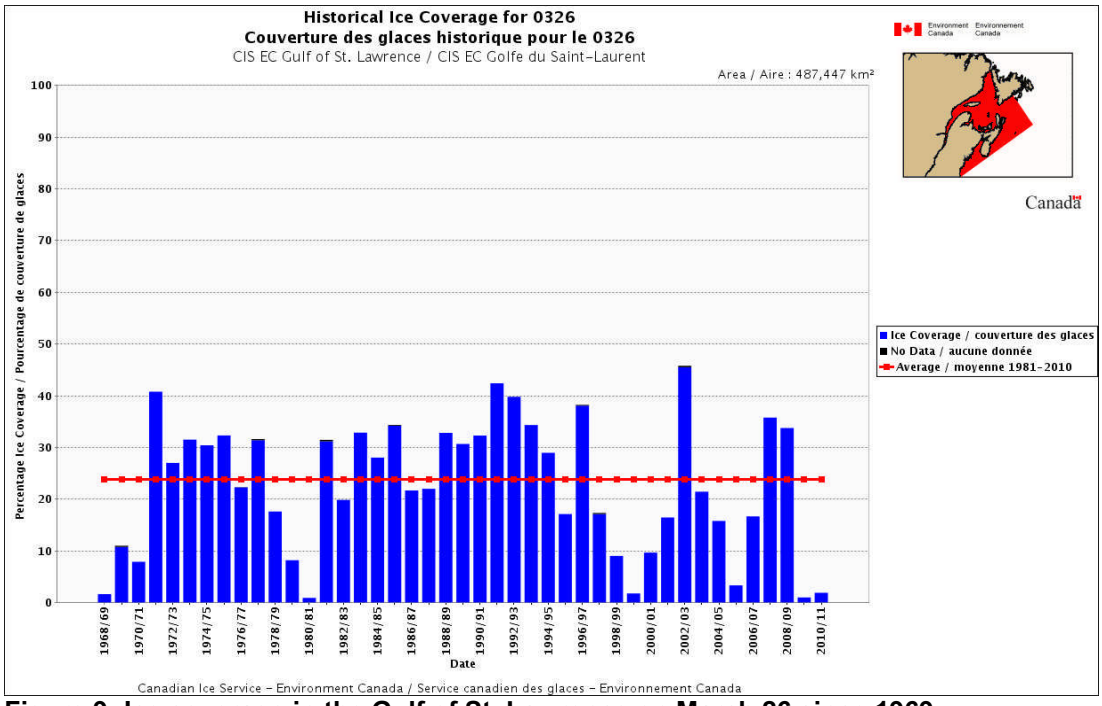

Figure 9: Ice coverage in the Gulf of St. Lawrence on March 26 since 1969.

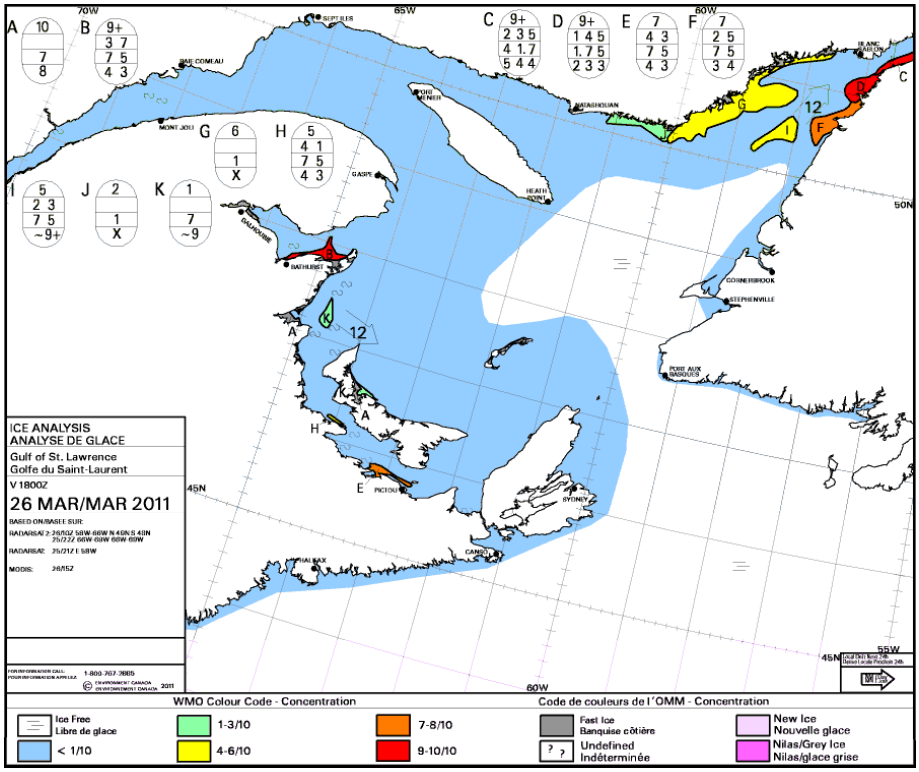

Figure 10 (a): Actual ice conditions near the end of March 2011.

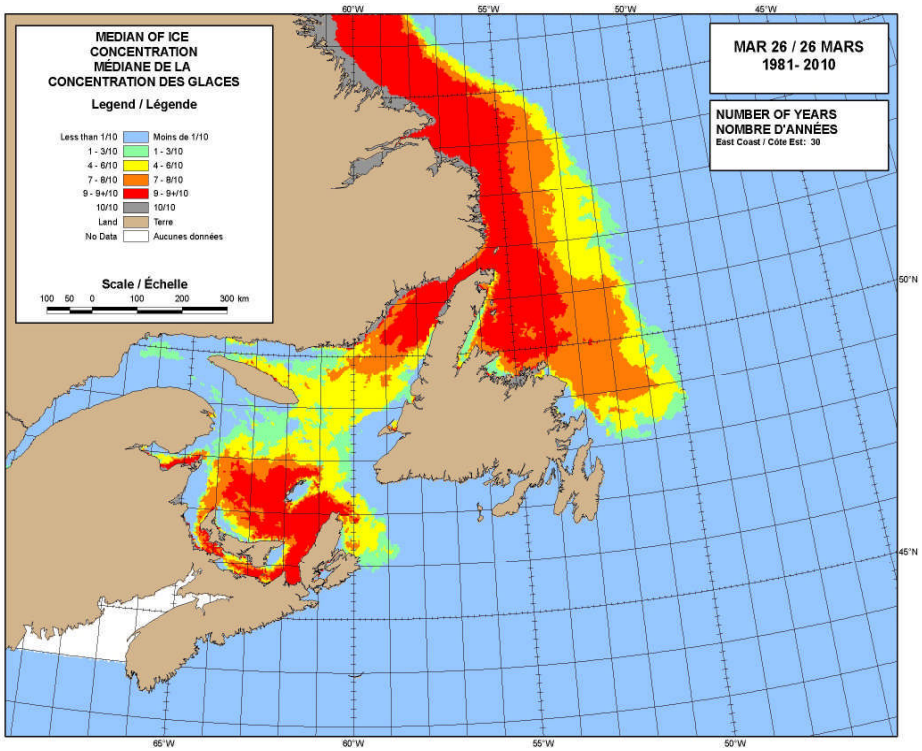

Figure 10 (b): Median of ice concentration near the end of March 2011.

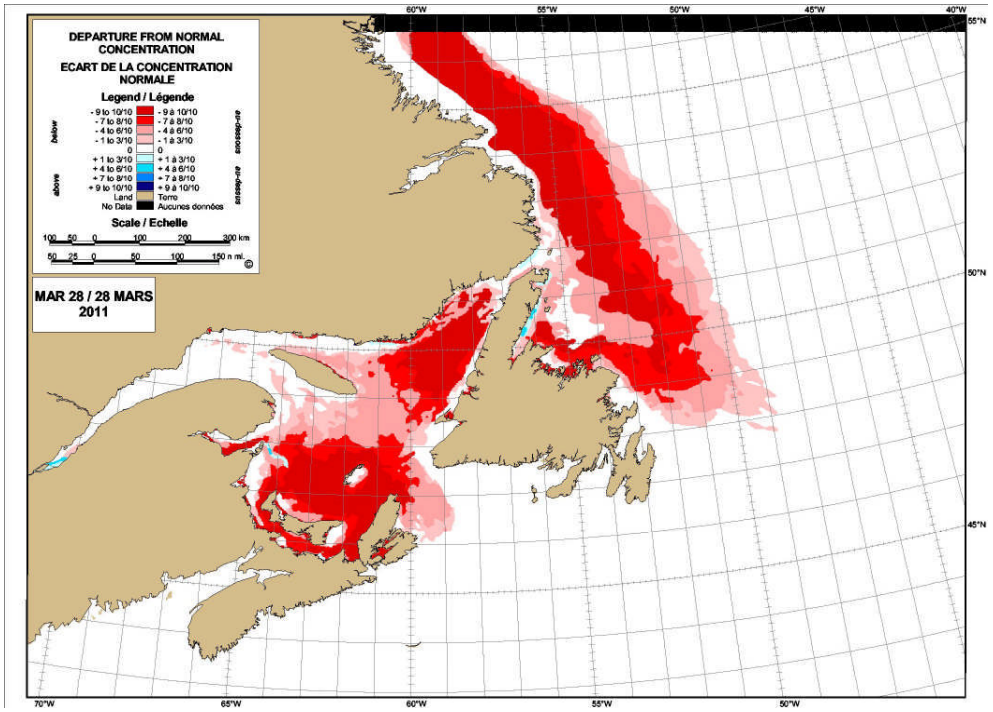

Figure 10 (c): Departure from normal near the end of March 2011.

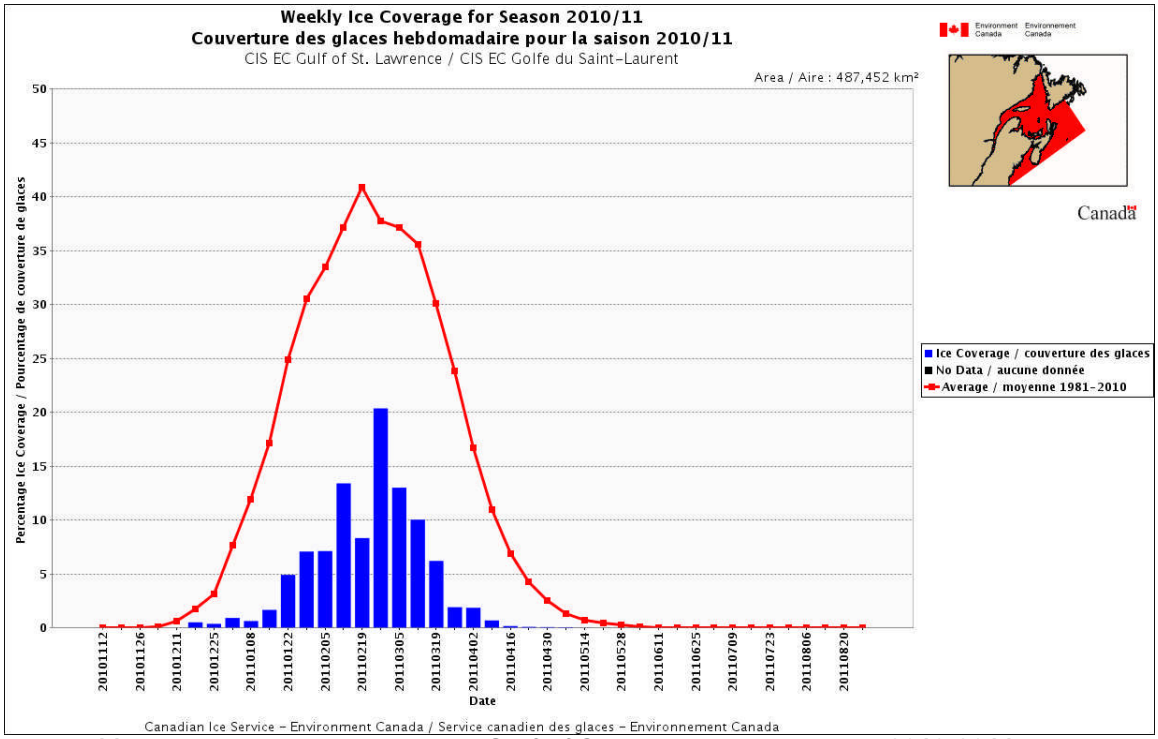

Figure 11: Weekly ice coverage in the Gulf of St. Lawrence during the 2010-2011 ice season.

Newfoundland and Labrador waters

November 2010 to Late January 2011

Air temperatures were much above normal from early November to late January (see Figure 14). Average sea surface temperatures were also above normal in Canadian waters and in the Northern Atlantic (Figure 12). Also, winds in December and January along the east Newfoundland and Labrador coasts were much more easterly than normal. As a result, ice along the Labrador Coast was much delayed (Figures 14 and 15). The first permanent ice in Lake Melville formed in early December, one week later than normal. New ice started forming along the Labrador Coast in late December, three weeks later than normal. Ice started forming more rapidly in late January as temperatures turned colder, but ice thicknesses and extents were much lower than normal. New ice started to develop near Fogo Island in late January, 3 weeks later than normal.

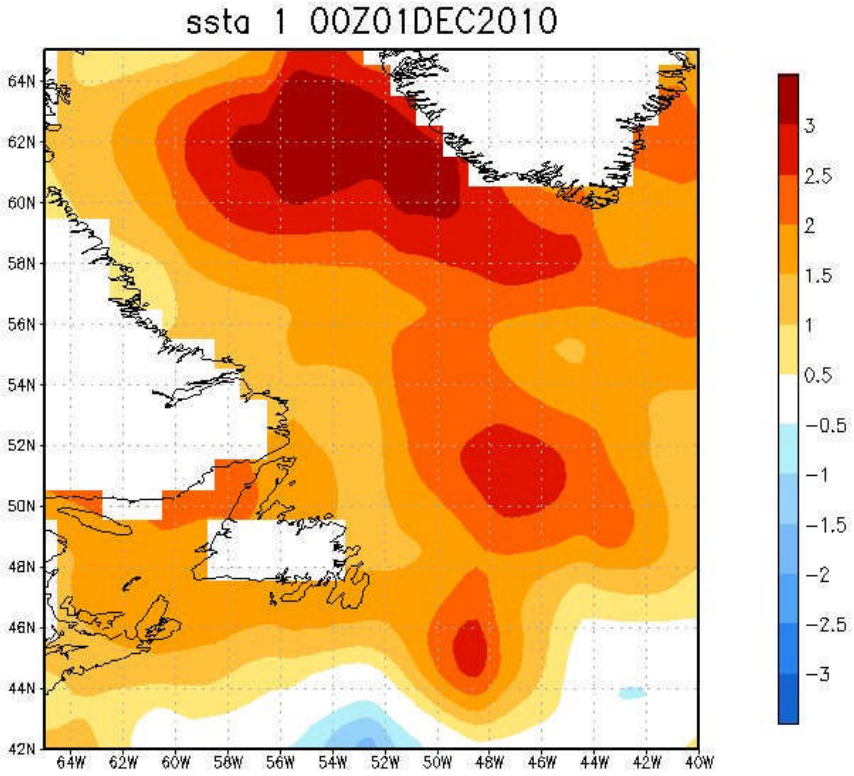

Figure 12: Sea surface temperature anomaly on December 1st, 2010.

Ice coverage along the Labrador coast on January 1st and also on January 29 were the lowest in CIS records, which date back to the winter of 1968-1969 (Figure 13). The ice coverage in Newfoundland Waters was one of the lowest on record.

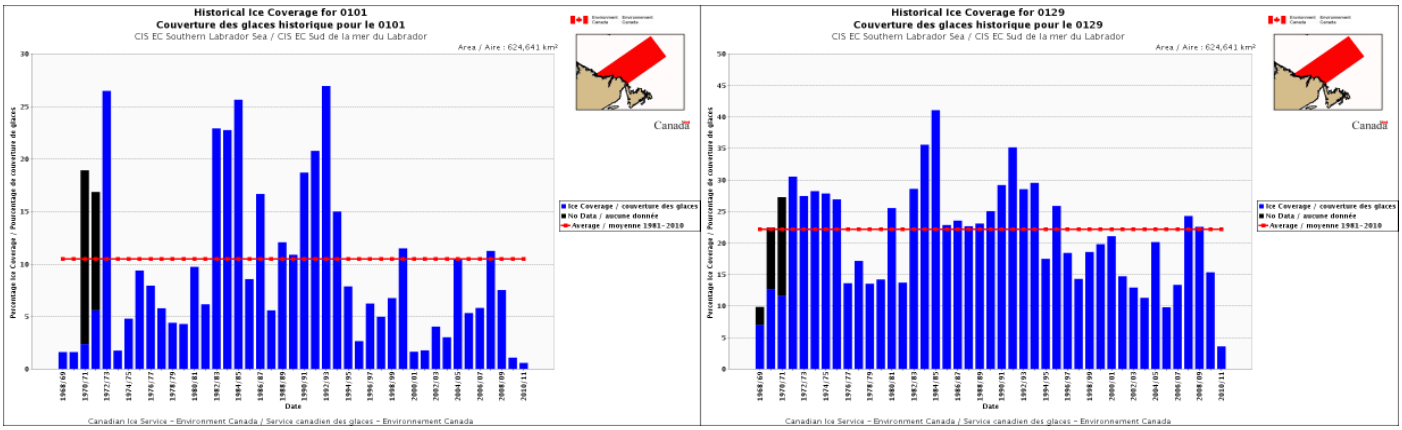

Figure 13: Ice coverage over the southern Labrador coast January 1 and January 29, compared to previous years.

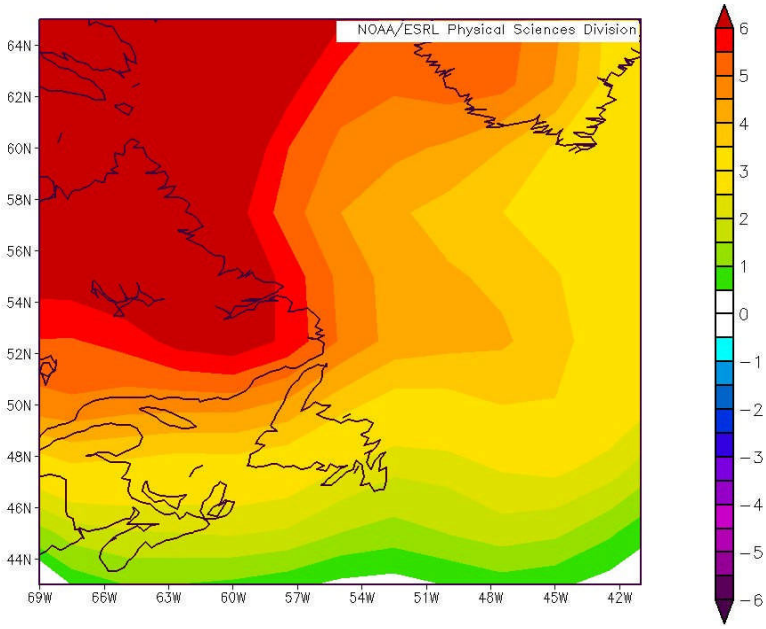

Figure 14 (a): Departure from normal temperatures from November 1, 2010 to January 15, 2011.

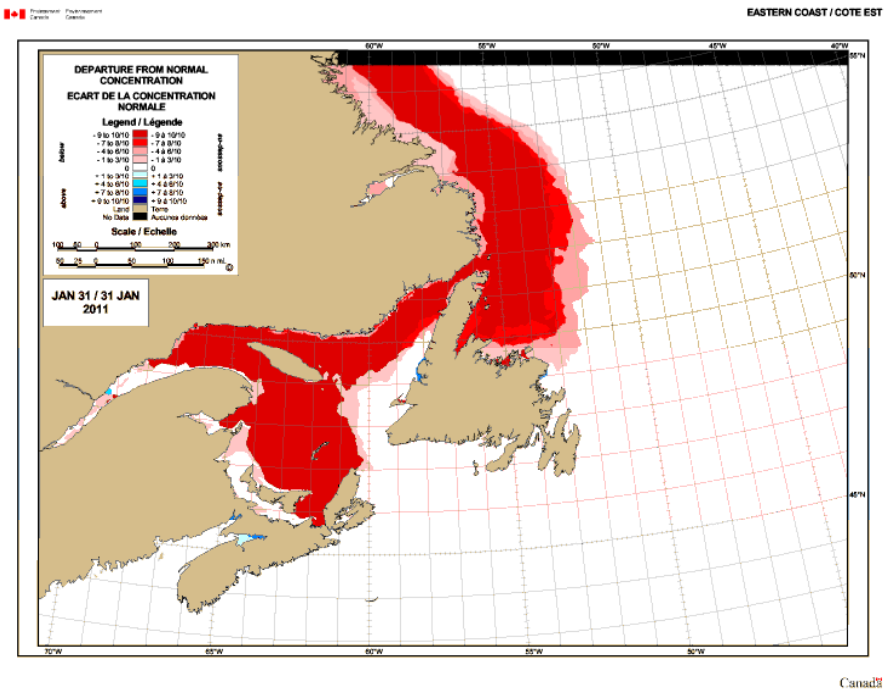

Figure 14 (b): Departure from normal ice conditions on January 31, 2011.

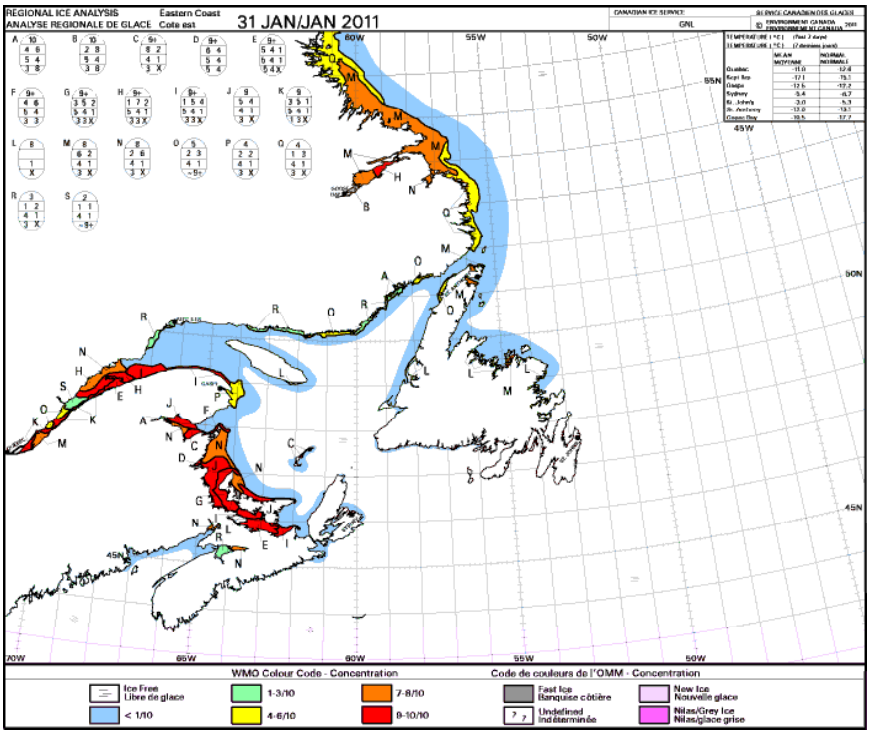

Figure 15 (a): Reported ice conditions at the end of January 2011.

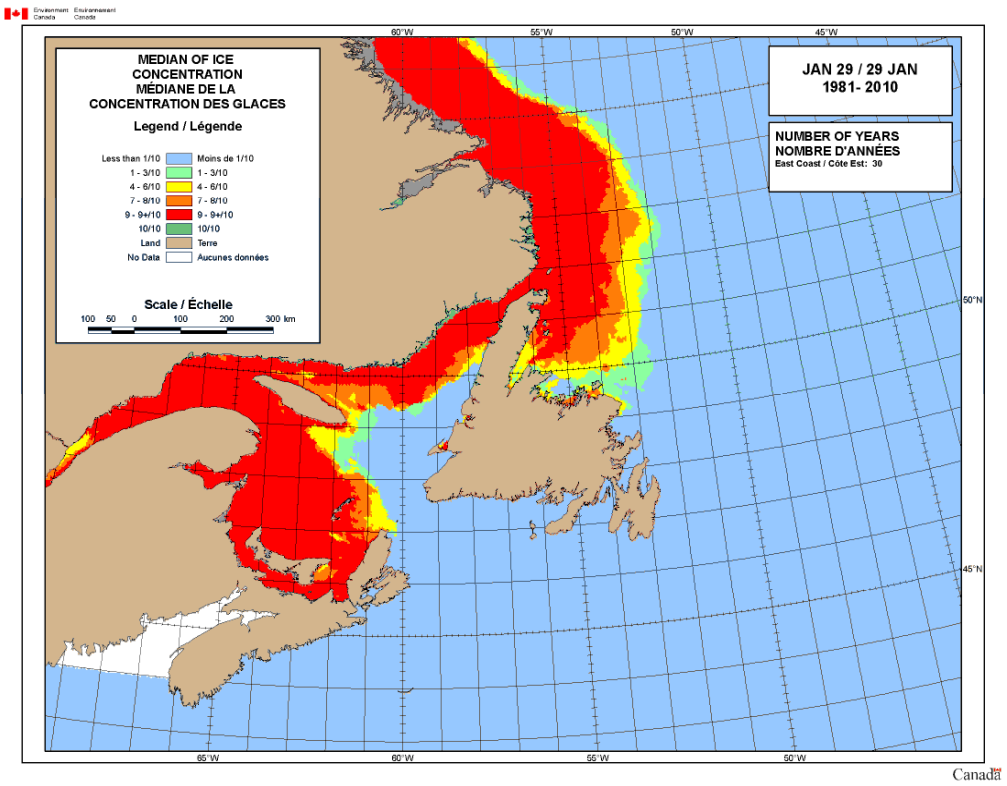

Figure 15 (b): Normal ice conditions at the end of January 2011

February 2011

Cold outbreaks occurred in the first half of February along the southern Labrador coast; this turned out to be the coldest period of the winter, relative to normal, for the area (Figure 16). As a result, ice grew more rapidly along the southern and mid-Labrador coast and it started forming in the Strait of Belle-Isle during the first week of February. Lake Melville consolidated in the second week of the month, later than the usual time of the end of December. By mid-month, new ice was present along the Newfoundland coast from Baie Verte Peninsula to Cape Freels. Early in the second half of the month, strong easterly winds pushed the ice against the shore and the ice coverage off the Labrador coast was significantly reduced. The second half of the month was warmer than normal.

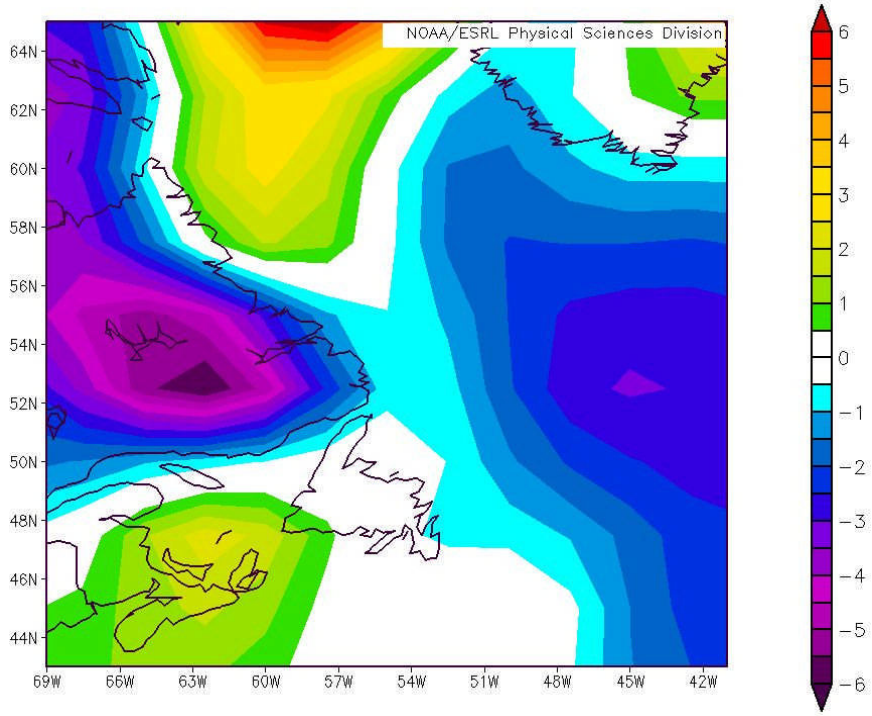

Figure 16 (a): Temperature Anomaly first half of February 2011.

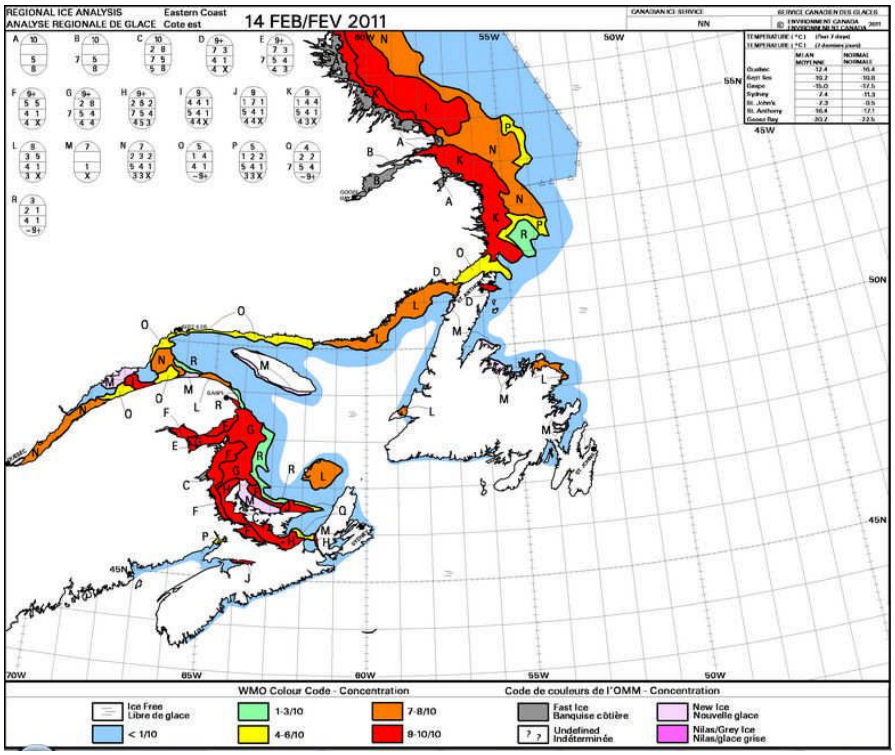

Figure 16 (b): Ice conditions near mid-month of February 2011.

By the end of February the ice coverage over the Newfoundland waters and off southern Labrador remained low but not at record level.

March 2011

The ice coverage usually begins to diminish after mid-March off East Newfoundland and even earlier off the southern Labrador coast. Temperatures remained generally above normal off southern Labrador and in the East Newfoundland waters in March. Ice continued to grow at a slower than normal pace until the third week of March, after which a normal seasonal decline in ice coverage occurred. The maximum ice coverage East of Newfoundland was reached near March 19, with some ice moving into Notre Dame Bay in the following week.

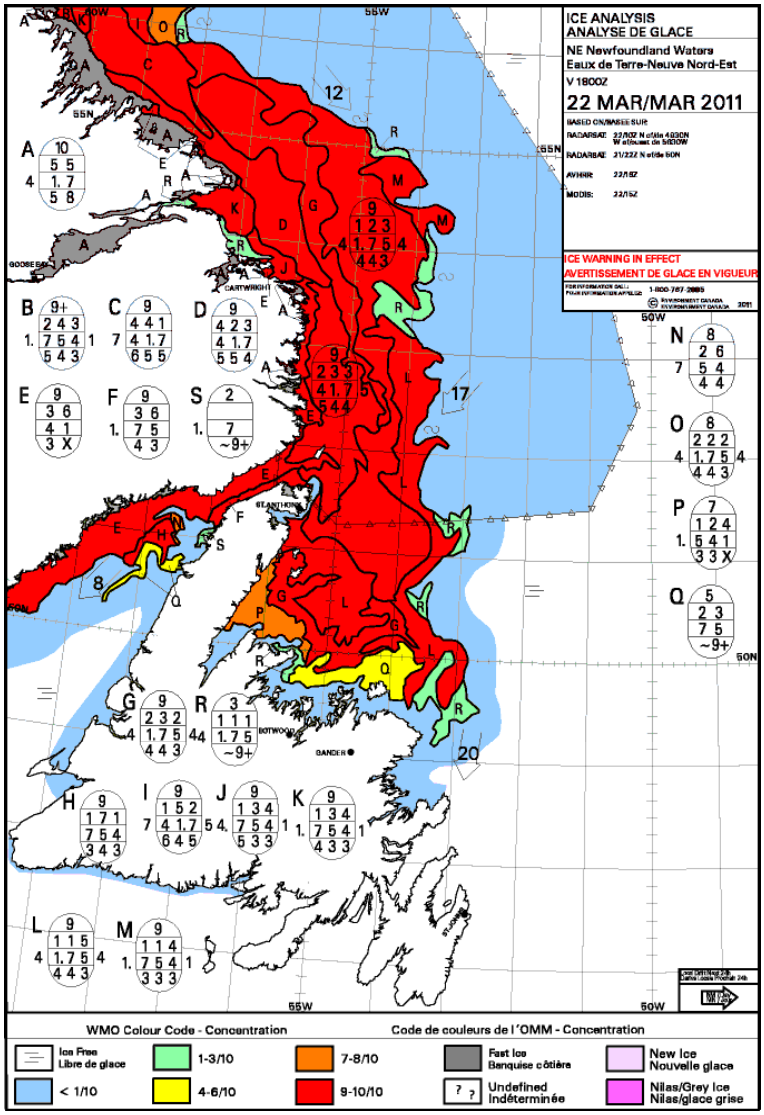

Figure 17 (a): Ice conditions on March 22, 2011.

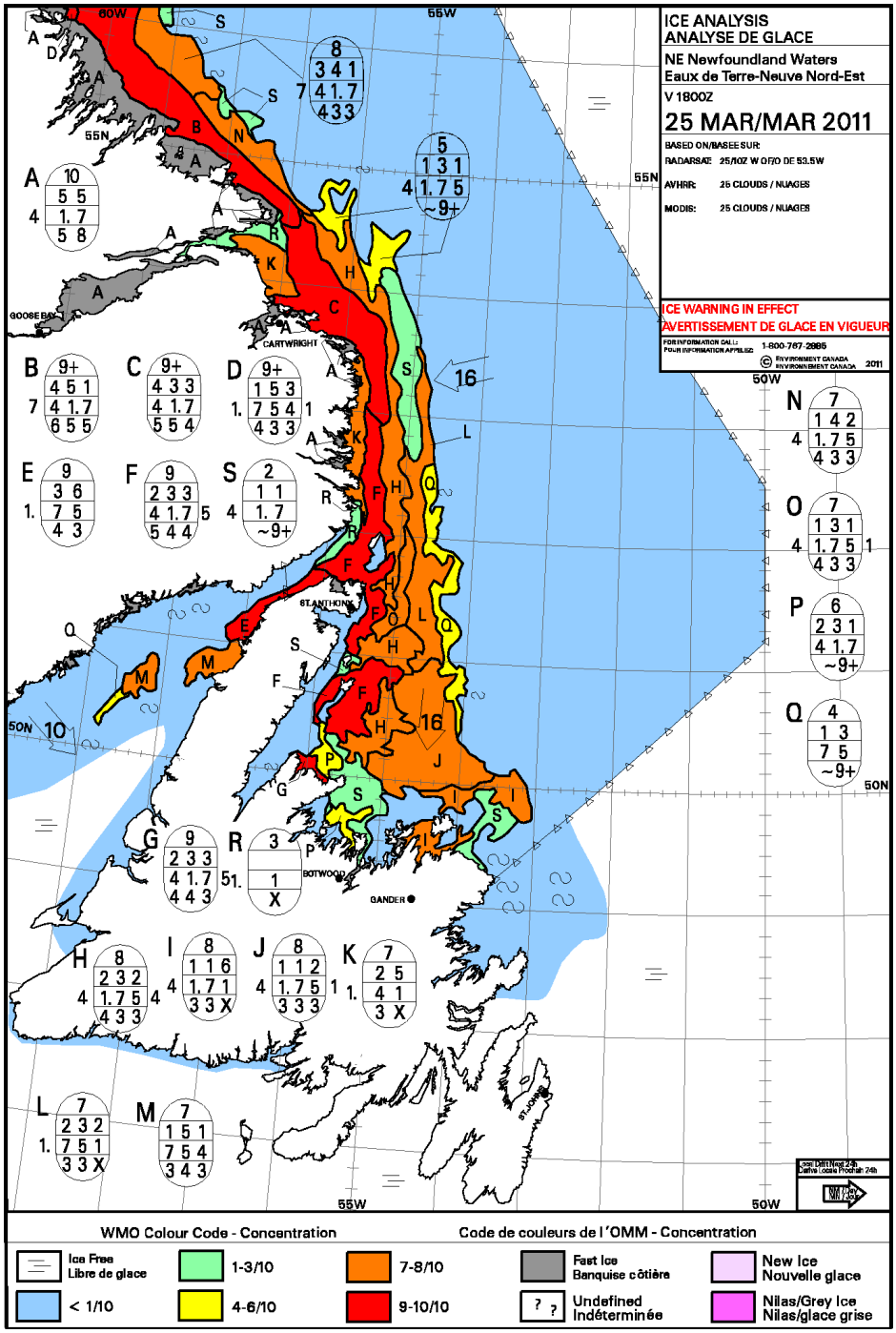

Figure 17 (b): Ice conditions on March 25, 2011.

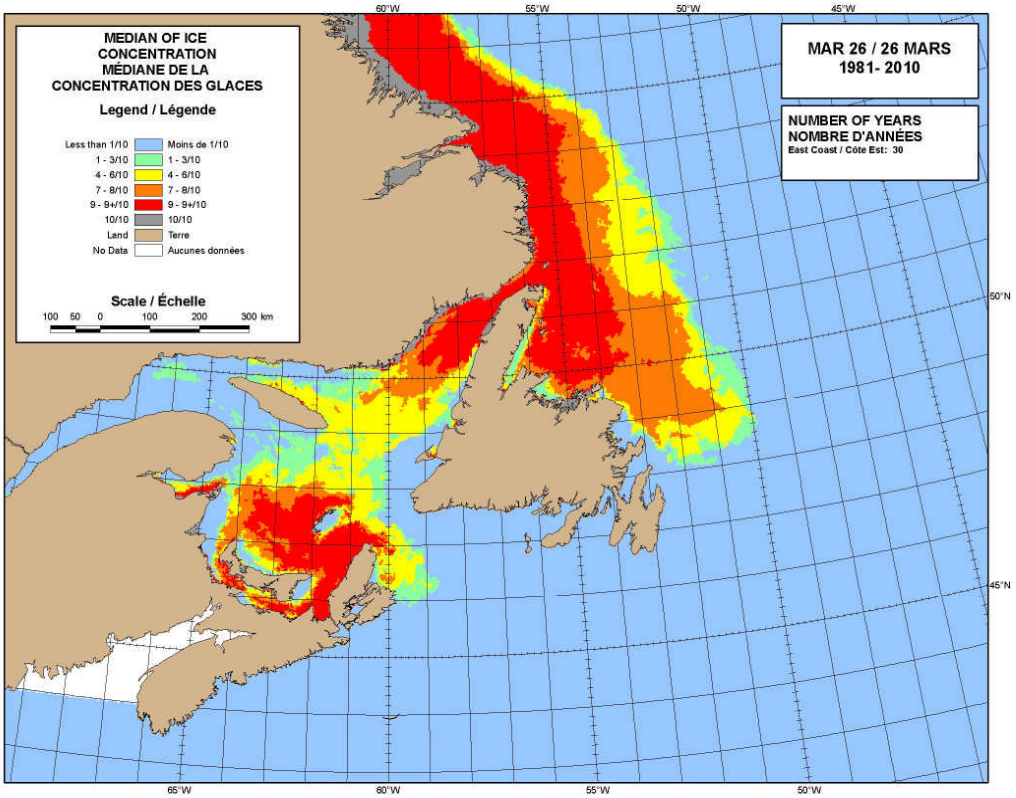

Figure 17 (c): Median conditions on March 26, 2011.

April 2011

Temperatures in April were below normal but stormy weather in late March and early April caused a rapid diminution of the ice coverage.

By late April the only ice left off East Newfoundland was east of St. Anthony, while the ice coverage off the southern Labrador coast was the 4th lowest on record (Figure 18).

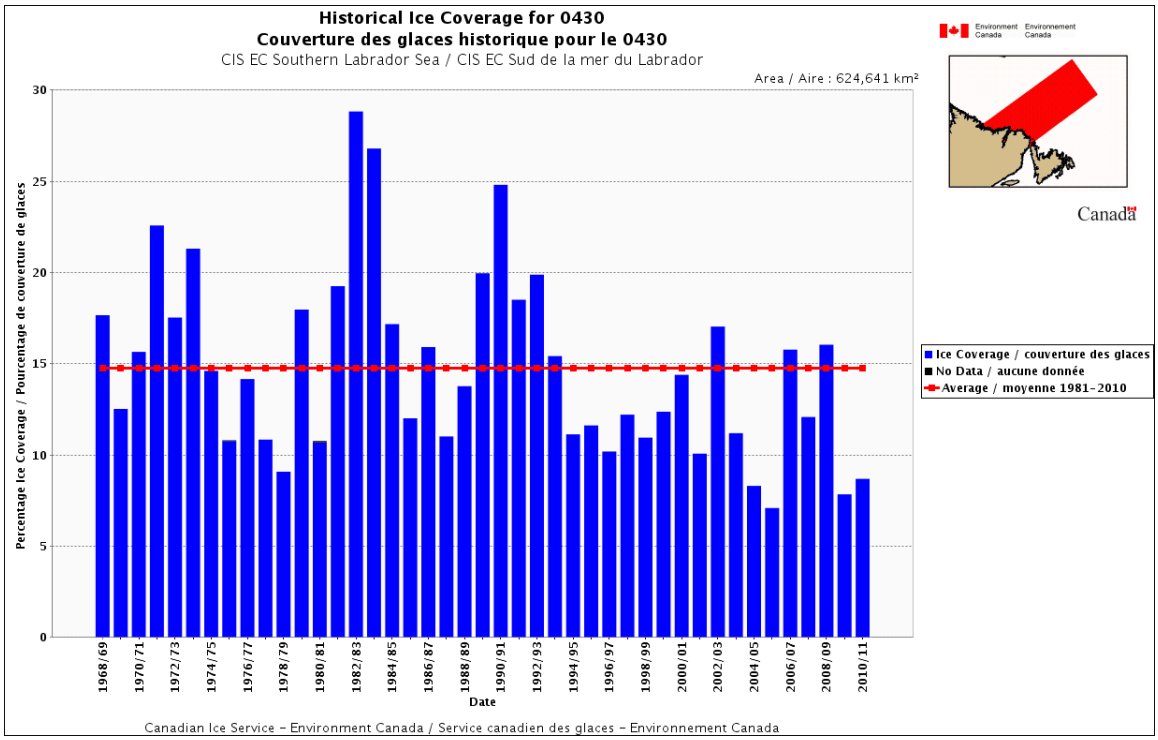

Figure 18: Ice coverage off Southern Labrador Coast at the end of April.

May 2011

Below normal temperatures prevailed along the southern Labrador coast in May. Seasonal ice melt continued and by the end of the first week of May there was no ice off the east coast of Newfoundland except for some rotted fast ice near St. Anthony. This shore fast ice was gone before mid-month. At that time, the ice coverage off the south coast of Labrador was well below normal, as it had been all winter. Break-up in Lake Melville occurred shortly after mid-month. The ice continued to retreat rapidly northward during the rest of May (Figure 19).

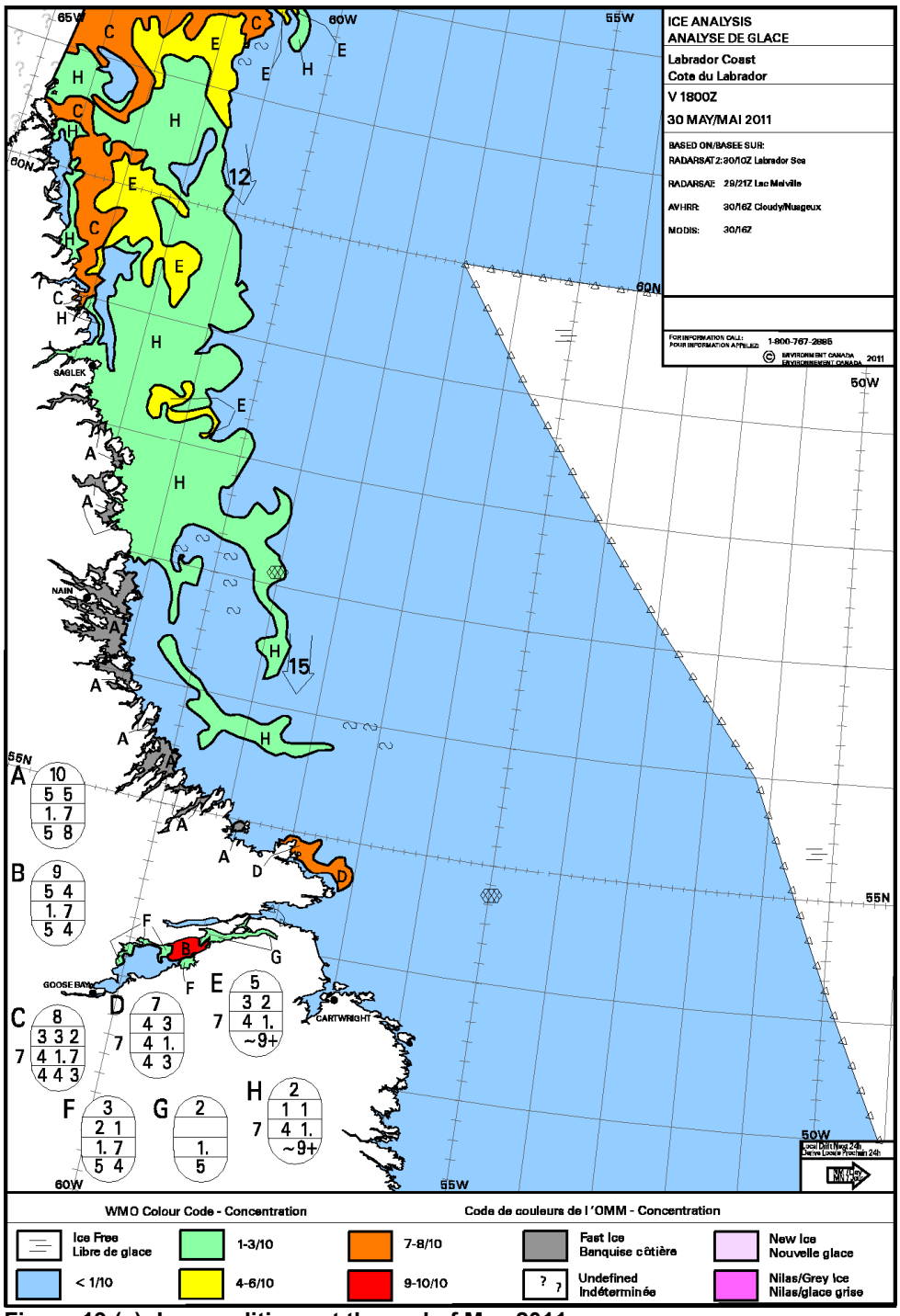

Figure 19 (a): Ice conditions at the end of May 2011.

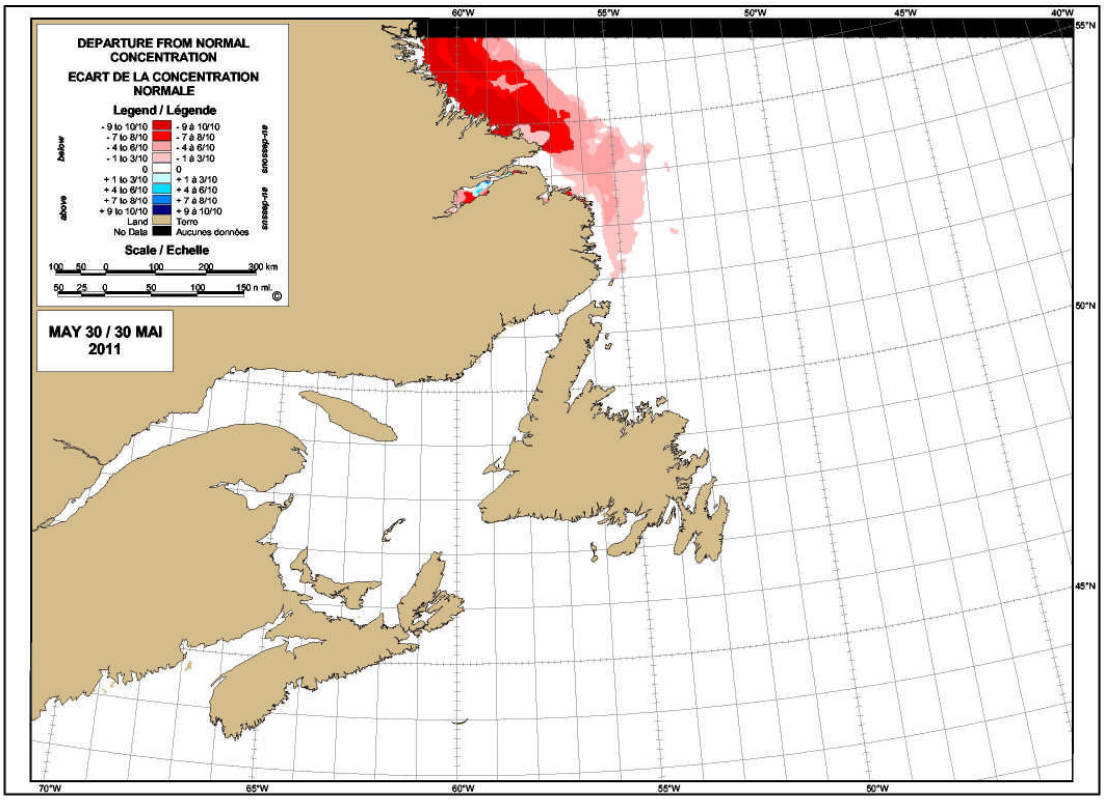

Figure 19 (b): Departure from normal at the end of May 2011.

June and July 2011

Temperatures were near normal in June along the Labrador coast and warmer than normal in July. Lake Melville became open water in the second week of June, about a week later than normal, due to the cold weather of the previous month. By mid-June, the pack ice had retreated to north of 60N. Some rotted fast ice remained along the Labrador coast near 56N. No ice was left along the Labrador Coast at the end of June; this was about two weeks faster than normal. A new record low was set for the total accumulated ice coverage off the south coast of Labrador (Figure 21) while the second lowest total accumulated ice coverage on record was registered off east Newfoundland (Figure 20).

A notable ice island, Petermann Ice Island (PII-A), was indicated on CIS Regional ice charts near mid-May. By the end of the Month it was about 90 nautical miles east of Groswater Bay. It then drifted to 25 nautical miles north of Belle Isle by the end of July.

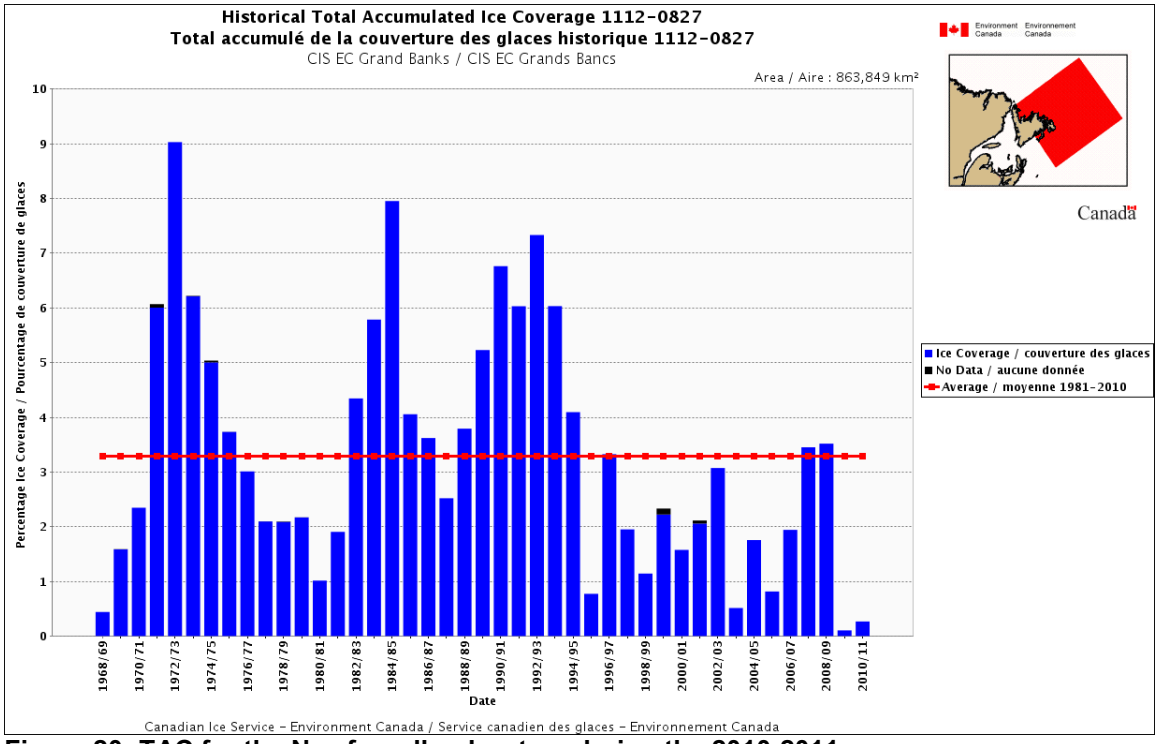

Figure 20: TAC for the Newfoundland waters during the 2010-2011 season.

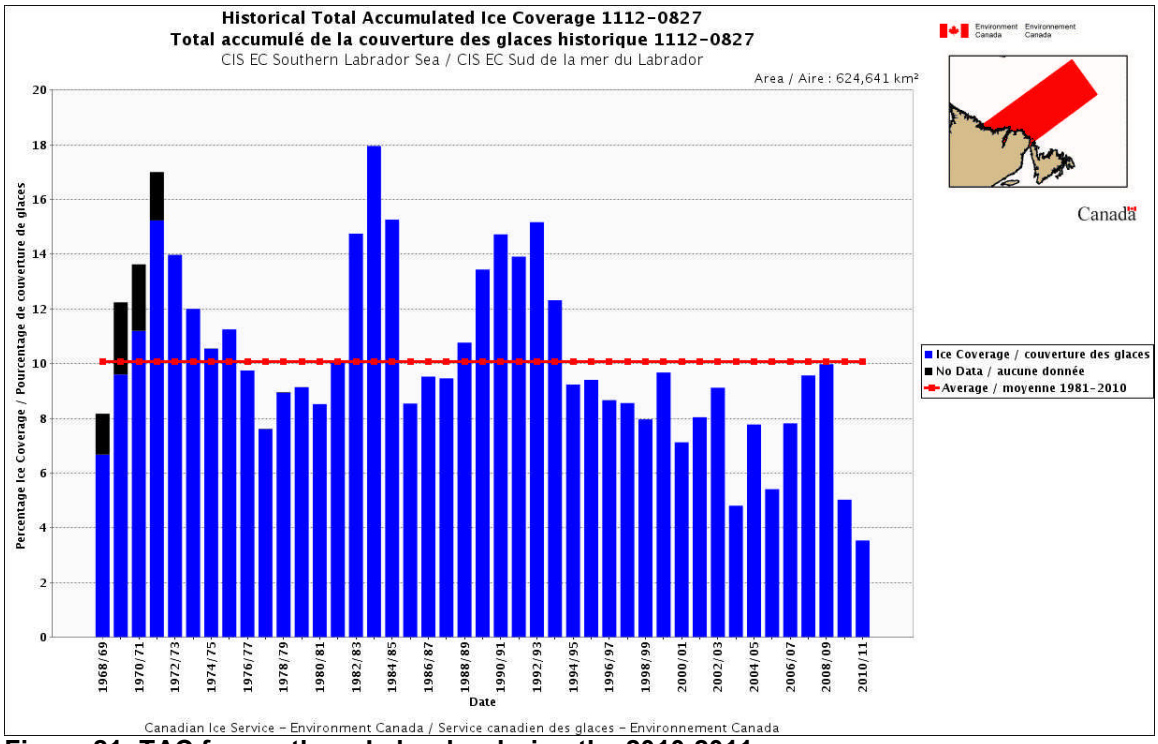

Figure 21: TAC for southern Labrador during the 2010-2011 season.

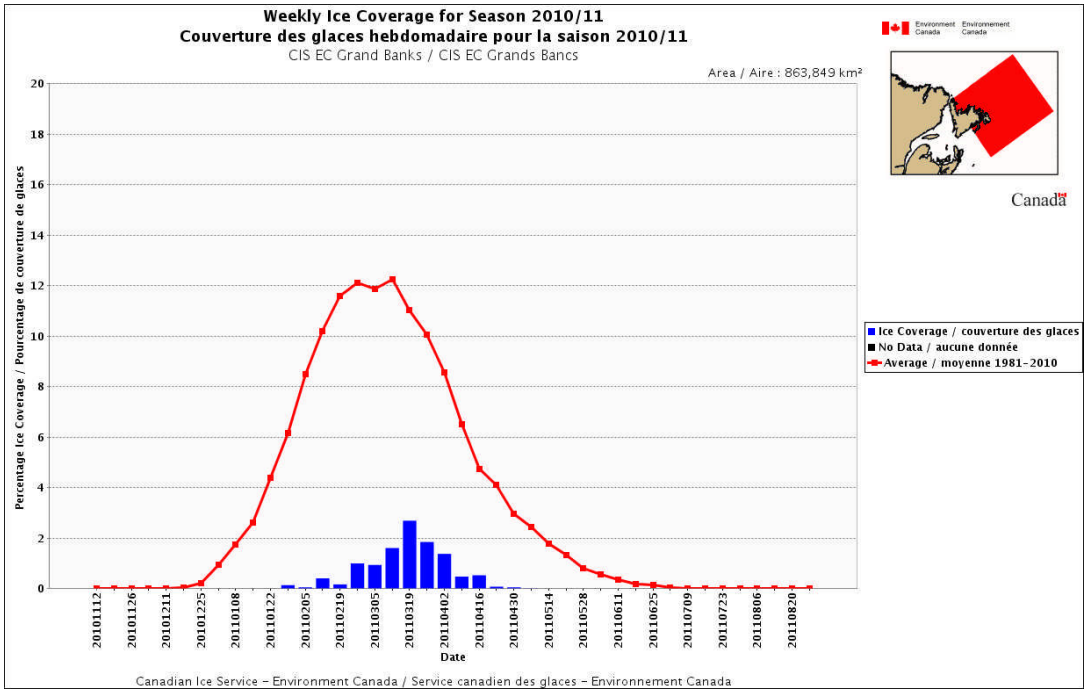

Figure 22: Weekly ice coverage for the Grand Banks during the 2010-2011 season.

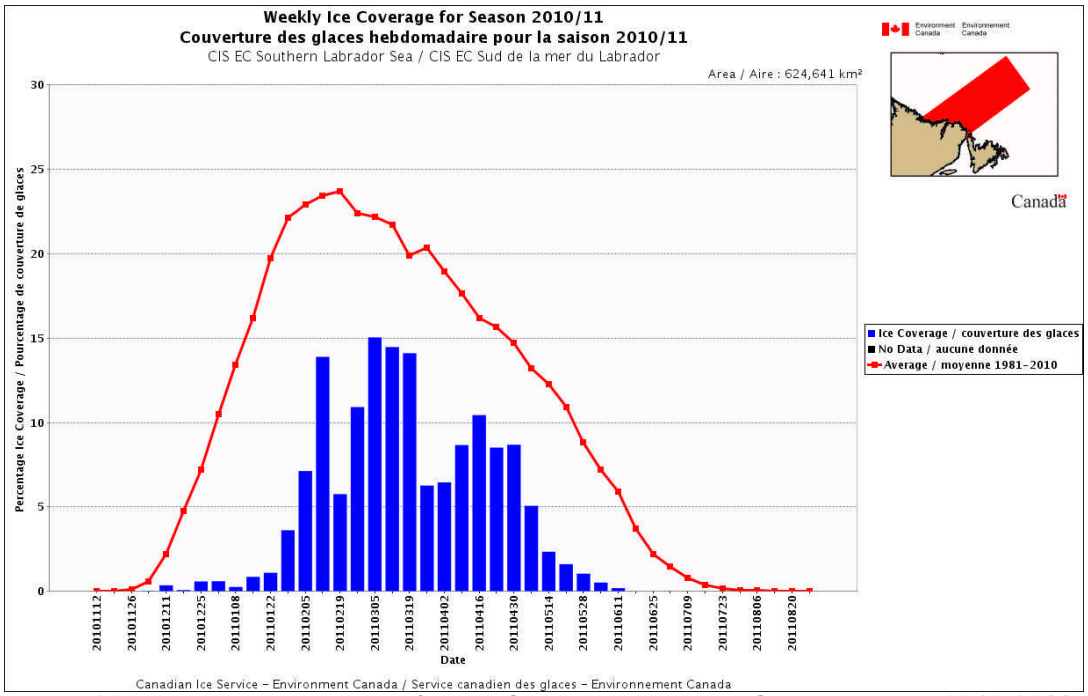

Figure 23: Weekly ice coverage for the Southern Labrador Sea during the 2010-2011 season.