Canadian Ice Service Arctic Regional Sea Ice Charts in SIGRID-3 Format, Version 2

USER GUIDE

How to Cite These Data

As a condition of using these data, you must include a citation:

Canadian Ice Service, 2026. *Canadian Ice Service Arctic Regional Sea Ice Charts in SIGRID-3 Format, Version 2*. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. https://doi.org/10.7265/9nbn-6a46. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT NSIDC@NSIDC.ORG

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/G02171

National Snow and Ice Data Center

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1 DATA DESCRIPTION

1.1 Summary

The Canadian Ice Service (CIS) is an operational data provider that produces digital regional sea ice charts for marine navigation and climate research. The ice charts are created through the manual analysis of satellite, in situ, and aerial reconnaissance data. The Manual of Standard Procedures for Observing and Reporting Ice Conditions (MANICE) is the authoritative guide, written by the CIS, that explains how sea ice charts are produced (Environment Canada, 2005).

The ice charts have information on ice concentration, stage of development, and ice form, following World Meteorological Organization (WMO) terminology. These sea ice charts begin in 1968 and cover the following regions of the Canadian Arctic: Northern Canadian waters (Western Arctic, Eastern Arctic, and Hudson Bay) and Southern Canadian waters (Great Lakes and East Coast). Each regional shapefile (.shp) (encoded in SIGRID-3 format) and associated metadata file (.xml) are combined into a tar archive file (.tar) for distribution.

Version 1 of this data set began with SIGRID-3 charts in 2006. Version 2 adds data back to 1968 and replaces the 2006-2020 V1 data files. The V2 1968-2020 segment of these regional chart data has been extensively quality controlled by CIS analysts. Data prior to 2006 were converted from their original GIS format to SIGRID-3. The 1968-2020 segment was provided to NSIDC in April 2026, by Angela Cheng. Important CIS documentation for this portion of the record can be found in the document Canadian Ice Service Regional Ice Charts in SIGRID-3 Format, Version 2 (Cheng, 2026). The 2021-present regional chart data have not received the same level of post-production quality control by CIS analysts as have earlier chart data. That portion of the data set is identical to Version 1. CIS plans to update 2021-present data when time and resources allow.

Note that the latest SIGRID-3 charts are available for operational or tactical users directly from CIS: https://ice-glaces.ec.gc.ca/prods/sigrids/.

1.2 Parameters

The parameters include total ice concentration, partial concentration, stage of development, and ice form. Stage of development is sometimes used as a proxy for sea ice thickness.

1.3 File Information

1.3.1 Format

These data are available as shapefiles using the SIGRID-3 format. The SIGRID-3 format includes several files: a shape file (.shp), with associated companion files (.cpg, .dbf, .sbn, .sbx, .shx, .dbf, and .prj), and a metadata file (.xml). Each set of files is combined into an archive file for distribution. The 1968-2020 segment is packaged as ZIP files (.zip) and the 2021-present segment is bundled into TAR files (.tar). Once the 2021-present segment has been QC'd in the same manner as the older segment, they will be released as ZIP files.

The CIS followed the SIGRID-3 (WMO, 2010) instructions for encoding sea ice but made a few modifications to the SIGRID-3 metadata files (.xml). See the document Canadian Ice Service (2006a) for a complete description of the differences between the CIS SIGRID-3 format and the official SIGRID-3 format (WMO, 2010).

Users should note that the CIS has produced regional ice charts in .e00 format in prior years. The SIGRID-3 format has replaced .e00 format, and .e00 files are not included in this SIGRID-3 data set.

1.3.2 SIGRID-3 Defined

Originally, operational data centers denoted ice characteristics by grouping ice with similar characteristics into polygons drawn on paper. Within each area or polygon, ice was identified by what was called an "egg code." The egg code, termed this way because of its shape, was a way to map ice characteristics such as total ice concentration, partial ice concentrations, stage of development, and form of ice on a paper map. Figure 1 shows the ice categories included in the egg code. When used on a chart, the categories would be filled with numbers that encoded the characteristics of ice in a polygon.

In the 1980s, a Sea Ice Grid (SIGRID) format was developed (Thomson, 1981) and adopted as a World Meteorological Organization (WMO) standard shortly thereafter. SIGRID provided a way to create a digital file for archival purposes by overlaying a grid on a paper chart and encoding the egg code information in alphanumeric strings for each grid element.

As the digital era emerged, operational centers shifted their focus from paper to digital ice charts and used GIS techniques to process data and produce charts. The SIGRID format evolved under cooperative international efforts by the WMO Joint Commission on Marine Meteorology Expert Team on Sea Ice and a task team of the International Ice Charting Working Group. SIGRID-3 (WMO, 2010) is a vector format and therefore does not require a grid overlay with a set resolution

as did the original SIGRID. In SIGRID-3, the alphanumeric string of a polygon egg code is represented in the shapefile attribute table.

Cheng (2026) briefly notes the history of evolution from paper charts to digital products at CIS.

For a more general history of the egg code and ice chart digitization, including a summary of the SIGRID-3 format, see the *History of Ice Chart Digitization* Section in the U.S. National Ice Center Arctic Sea Ice Charts and Climatologies in Gridded Format documentation and the material in the Global Digital Sea Ice Data Bank Special Report (Fetterer, 2022).

Prior to 1982, CIS used a ratio code, and not the egg code, to encode ice information on charts. See the document Canadian Ice Service Regional Ice Charts in SIGRID-3 Format, Version 2 Technical Report (Cheng, 2026) for more information on the ratio code and how it differs in information content from the egg code.

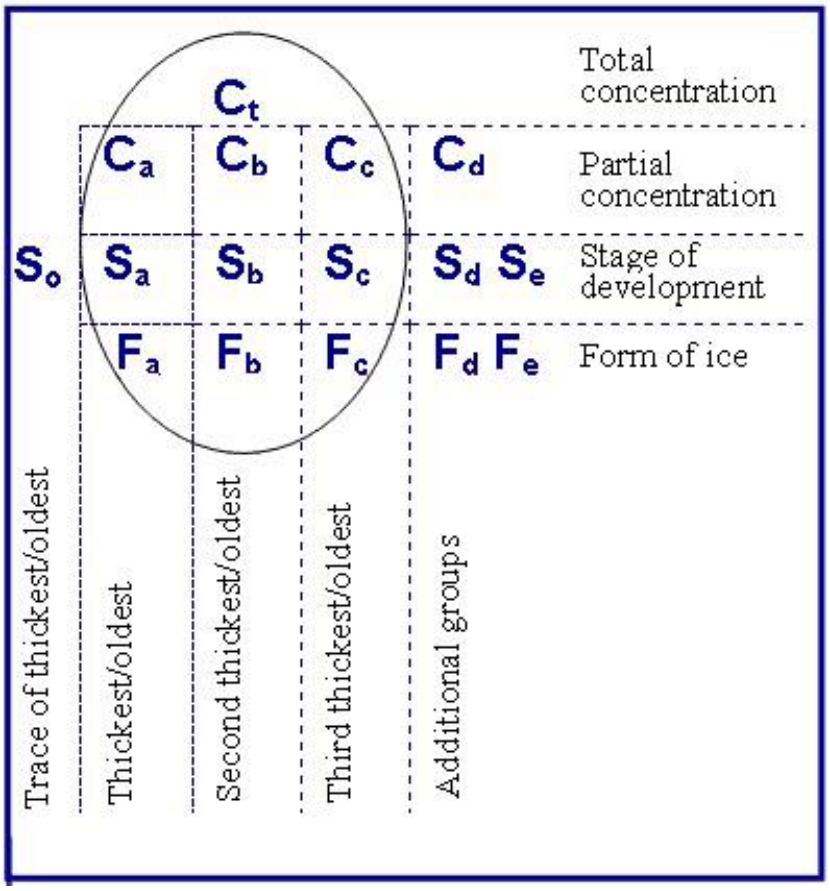

Figure 1. This shows ice categories in the Egg Code that depicts ice in an area by total concentration, partial concentration, stage of development, and form of ice. Image courtesy of Environment Canada. Used with permission.

1.3.3 File Contents

The SIGRID-3 shapefiles contain multiple attributes that provide data for total ice concentration, partial concentration by ice type, stage of development, ice form, and others. See Appendix A and Appendix B of Canadian Ice Service Regional Ice Charts in SIGRID-3 Format, Version 2 Technical Report (Cheng, 2026) for a description of each sea ice and lake ice attribute, respectively.

SIGRID-3 files issued from CIS contain coastline vector features which are derived from the Digital Chart of the World (DCW) data set of 1993. The DCW was originally created by the Environmental Systems Research Institute (ESRI) at the request of the US Defense Mapping Agency (DMA) using aeronautical charts at a 1:1,000,000 scale as the primary data source. CIS introduced a new coastline for the winter of 2008. This was a modified version of the 1:1,000,000 scale data set from World Vector Shoreline Plus (WVS+), 3rd Edition, 2004. WVS+ is a digital database product consisting of country, coastline, and ocean coverage for the entire world.

Figure 2 and Figure 3 show samples of the SIGRID-3 shapefiles in QGIS for the Great Lakes and Hudson Bay, respectively. Each shapefile is accompanied by an associated metadata file that briefly describes the data and how it was processed.

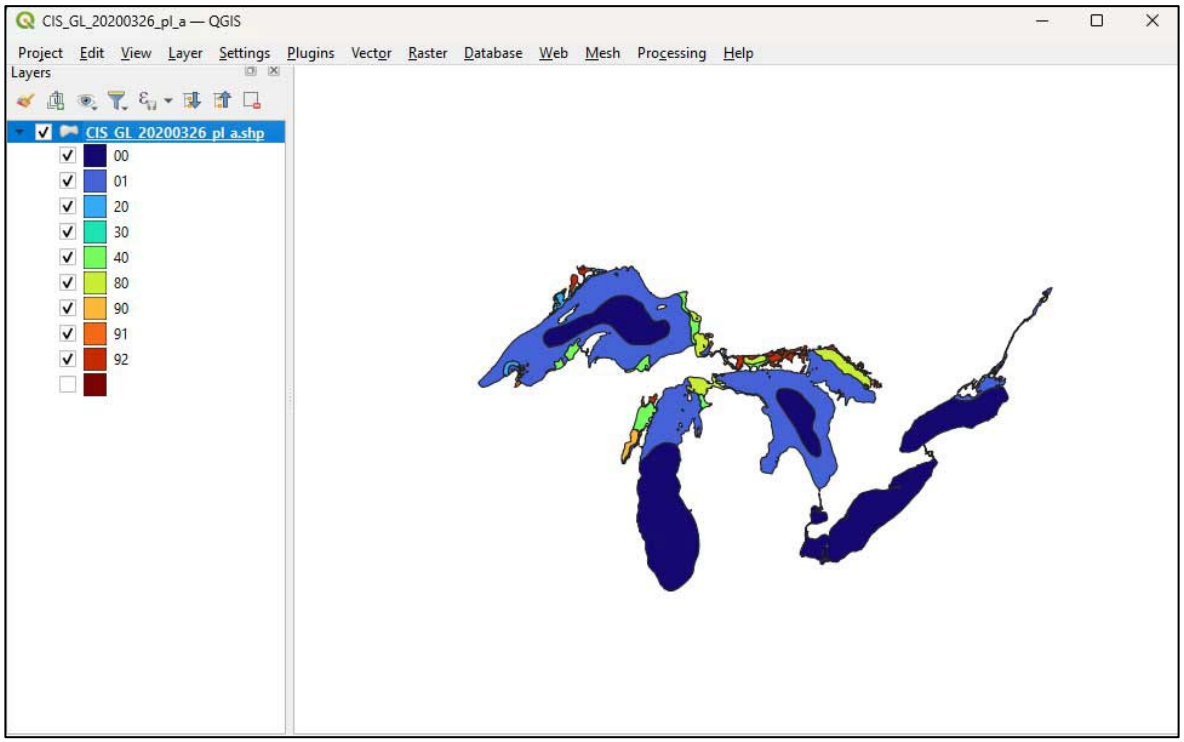

Figure 2. CIS_GL_20200326_pl_a.shp shapefile opened in QGIS shows the varying ice concentration (CT) around the Great Lakes for 26 March 2020.

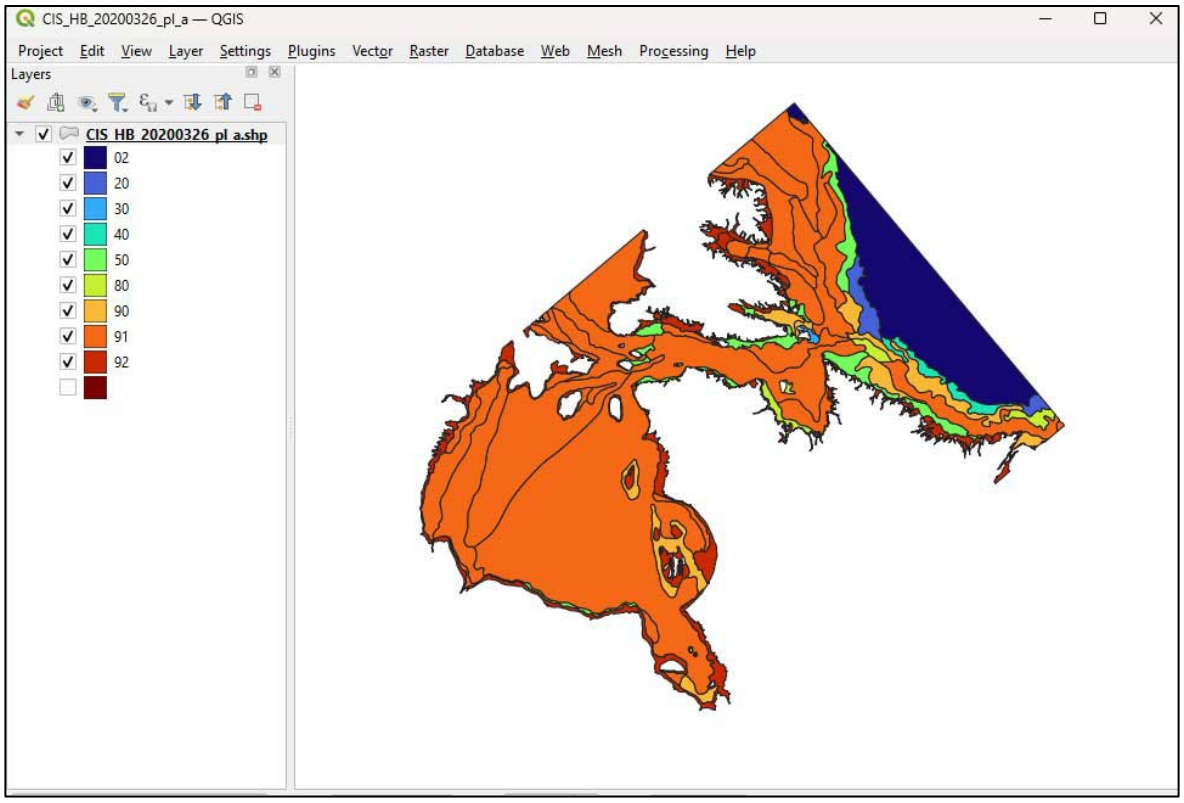

Figure 3. CIS_HB_20200326_pl_a.shp shapefile opened in QGIS shows the varying ice concentration in the Hudson Bay for 26 March 2020.

1.3.4 Directory Structure

The data files in this data set are available via HTTPS: https://noaadata.apps.nsidc.org/NOAA/G02171_V2.

The top level of the directory structure, G02171_V2, is divided into five main directories (one for each region of this data set): East_Coast, Eastern_Arctic, Great_Lakes, Hudson_Bay, and Western_Arctic. Each region's directory is further broken down by the four-digit year (Figure 4). Within each year are the zip files that contain the shapefile and the associated files.

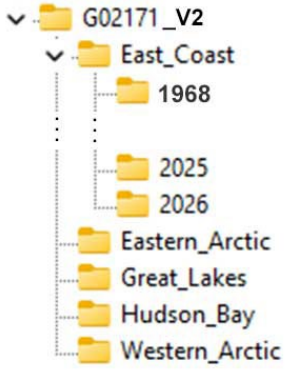

Figure 4. Directory Structure

1.3.5 Naming Convention

The data files are named according to the following convention:

1968-2020: `CIS_RR_YYYYMMDD_pl_v.xxx`

2021-present: `cis_SGRDRXX_YYYYMMDDThhhhZ_pl_v.xxx`

Where:

Table 1. File Naming Convention

Variable	Description
cis (2021 - present) CIS (1968-2020)	Denotes that this file is from the Canadian Ice Service
SGRD	SIGRID-3 format (used for 2021 to present files only)
RR	Region name abbreviation: GL: Great Lakes EC: East Coast WA: Western Arctic EA: Eastern Arctic HB: Hudson Bay
YYYY	4-digit year
MM	2-digit month For 1968-2020 files, this corresponds to the historical date. For 2021-present files this corresponds to the publication date. See the Temporal Information section for a definition of these time stamps.
DD	2-digit day For 1968-2020 files, this corresponds to the historical date. For 2021-present files this corresponds to the publication date. See the Temporal Information section for a definition of these time stamps.

ThhhhZ	4-digit hour in GMT
pl	Feature type (pl: polygon)
v	Version number. This is generally “a” which refers to original issue versus a correction (subsequent corrections use the letters b, c, etc. in place of a)
.xxx	File extension: .cpg, .dbf, .sbn, .sbx, .shp, .shx, .dbf, .prj, and .xml Note: not all archive files contain all these file types

Note: For 2021 to present data files, in some rare cases, the original files needed to be replaced with newer files. These newer files contain a timestamp appended to the end of the file name as YYYYMMDDhhmmss. The time stamp is GMT and corresponds to the time that the file was recreated.

1.4 Spatial Information

1.4.1 Coverage

This data set covers the Canadian Arctic regions including Northern Canadian waters (Western Arctic, Eastern Arctic, and Hudson Bay) and Southern Canadian waters (Great Lakes and East Coast). Table 2 lists the regions along with their bounding boxes and Figure 5 displays them.

Table 2. Regions and Lat/Lon Bounding Boxes

Region	Abbreviation	Bounding Box (degrees)
Eastern Arctic	EA	Northernmost Latitude: 62.641 Southernmost Latitude: 78.333 Easternmost Longitude: -112.675 Westernmost Longitude: -91.171
Eastern Coast	EC	Northernmost Latitude: 41.509 Southernmost Latitude: 55.698 Easternmost Longitude: -74.914 Westernmost Longitude: -70.387
Great Lakes	GL	Northernmost Latitude: 39.023 Southernmost Latitude: 50.098 Easternmost Longitude: -95.584 Westernmost Longitude: -92.767
Hudson Bay	HB	Northernmost Latitude: 53.765 Southernmost Latitude: 68.243 Easternmost Longitude: -99.237 Westernmost Longitude: -85.462

Western Arctic	WA	Northernmost Latitude: 66.349 Southernmost Latitude: 80.396 Easternmost Longitude: -164.024 Westernmost Longitude: -138.02

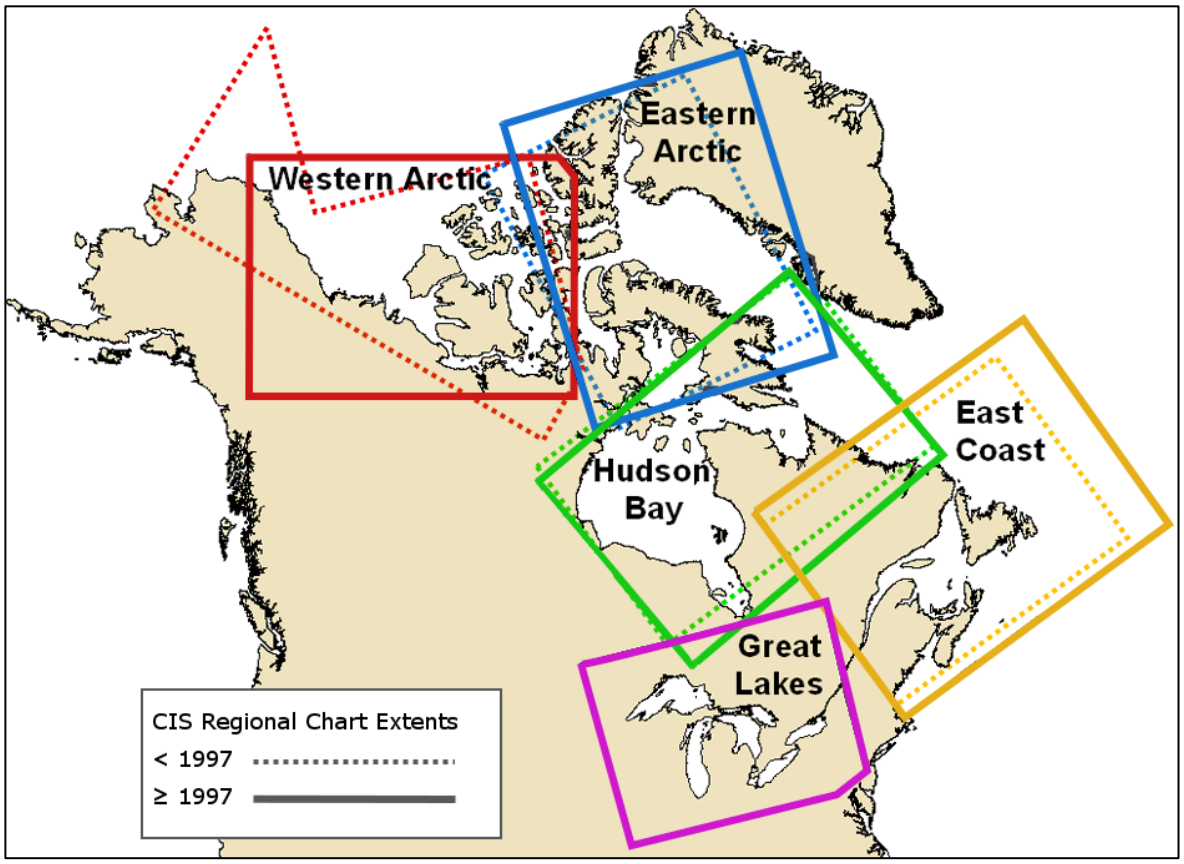

Figure 5. Spatial Coverage Map, taken from the document Canadian Ice Service Regional Ice Charts in SIGRID-3 Format, Version 2 (Cheng, 2026). The spatial extent of some regions evolved over time as charting practices and operational requirements changed, except for the Great Lakes, whose coverage remained consistent throughout the record.

1.4.2 Resolution

Because this data set is provided as vector shapefiles, there is no inherent resolution. The resolution of the observations used to generate the charts has changed over time. For an overview, see the document Canadian Ice Service Digital Archive (CISDA) – Regional Charts: History, Accuracy, and Caveats (Canadian Ice Service, 2006b). It contains a 1968-1998 chronology of chart preparation systems and surface observations, aerial reconnaissance, and satellite reconnaissance sources used by CIS analysts.

1.4.3 Projection

Shapefiles are produced using the Lambert Conformal Conic map projection. Starting in 2020, charts were created using the World Geodetic System 1984 (WGS84) datum. Charts created prior to 2020 were produced using the North American Datum of 1927 (NAD27). During the QC process of the 1968-2020 charts, they were reprojected using the WGS84 datum to be consistent with newer charts. The specific projection parameters and datum information for each chart are documented in the associated projection (prj) file included with each shapefile.

1.5 Temporal Information

1.5.1 Coverage

Temporal coverage spans from 1968 to the present. The start date of the data for each region differs, but all regions go to the present. See Table 3 for a list of start dates by region.

Table 3. Start Dates by Region

Region	Start Date
Eastern Arctic	25 Jun 1968
East Coast	26 Nov 1968
Great Lakes	20 Dec 1972
Hudson Bay	21 Jun 1971
Western Arctic	25 Jun 1968

1.5.2 Resolution

The resolution of the data are generally weekly, however, there are exceptions earlier in the record. See Appendix D through H in Cheng (2026) for figures describing the temporal resolution in detail.

The metadata (.xml) file for each chart states the following about temporal resolution:

> The Regional Ice Analyses for the Northern Canadian Waters (Western Arctic, Eastern Arctic and Hudson Bay) are produced on a weekly basis during the summer season and since 1982 on a monthly basis for the winter season. Beginning in March 2006, for the International Polar Year, that frequency was increased to twice a month during the winter. Since the fall of 2011, the Arctic charts have been issued weekly year-round. The Regional Ice Analyses for the Southern Canadian Waters (East Coast and Great Lakes) are produced on a weekly basis during the winter season only.

Charts represent an integrated assessment of estimated ice conditions over several days rather than instantaneous observations whereby data have been compiled from numerous sources.

The CIS Ice Climate Normals web page states the following:

> Although the date specified on the charts is the Monday of each week, they represent a rough approximation of ice conditions for a seven-day period centered on this day and are finalized and issued on the Wednesday of that week. Satellite imagery up to 2 to 3 days on either side of the Monday may be consulted during the production of a regional chart but preference is given to images 2 to 3 days before to 1 day after the Monday (CIS, 2002).

The data are described by two different time stamps:

- **Publication date**: This is the date that the chart is considered valid. For data from 2007 onward, this always falls on a Monday. For charts older than 2007, this can be another day of the week. The publication date is also sometimes called the valid date or the chart date in documentation. This date is listed in the <pubdate> tag as YYYYMMDD in the metadata (.xml files) for the entire time series and is also the date in the filenames for the 2021-present portion of the database.

  Note: As of 2007, CIS releases these charts on Wednesday every week. Even though this is technically the publication date, that is, the date the chart was released, the Monday date is still considered the publication date because it is the date for which the chart is truly valid.

- **Historical date**: Since the Monday of any given week does not fall on the same calendar date each year, the quality-controlled charts in the 1968 to 2020 portion of the database are assigned a standardized historical date for consistency between years. The historical date is defined by month and day (MMDD), with one date per week (every 7 days) beginning January 1 (0101, 0108, 0115, 0122, etc.). Each chart is assigned to the historical date closest to its actual chart date (publication date).
  In the metadata (.xml files), this information is stored in the <histdate> tag as YYYYMMDD. The MMDD portion is the standardized historical date described above. The YYYY portion identifies the year to which the chart is assigned within the historical dataset. In most cases, this is the year in which the chart was produced. However, where an analogue chart from another year has been used to represent a missing chart, YYYY indicates the year being represented rather than the year in which the source chart was originally produced. For example, a chart assigned to historical date 0108 for 2020 would have <histdate>20200108</histdate>.
  The standardized historical dates allow charts from different years to be compared using a common weekly reference. For example, to examine ice conditions during the first week of January across multiple years, a user can select charts with a historical date of 0101 rather than determining the appropriate chart independently for each year from its publication date.
  There are two exceptions to this weekly (7-day) progression:
    - The 8-day period between February 26 and March 5 that occurs in leap-years.

- The 8-day period between November 26 and December 4 that accounts for the fact that there are 365 days in a year, not 364. The week of November 26 is chosen to have 8 days because it is a week after the shipping season in northern waters has ended and before the ice forming in southern waters has an impact on shipping.

Further information on temporal coverage, including a review of data sources that were available for analysts to use when creating the charts, can be found in Cheng (2026), CISAD (CIS, 2006b), and the appendix of Tivy et al. (2011).

2 PROCESSING AND ERROR ASSESSMENT

2.1 Processing

Charting techniques have changed over time, moving from paper charts prior to the late 1980s to partially digitized production from 1989 to 1996, and finally to fully digital chart production in 1996. The CIS uses charting systems are an extension of ESRI ArcGIS and follow MANICE procedures (Environment Canada, 2005). The CIS takes input from various sources such as satellites, aerial reconnaissance, and ship reports based on data availability. They create coverages and then convert the coverages to shapefiles with corresponding metadata.

The metadata (.xml) file for each chart states the following about input data sources:

> The Regional Ice Analyses are based on an analysis and integration of all available data on ice conditions, including weather and oceanographic information, visual observations from shore, ship and aircraft, airborne radar, satellite imagery and climatological information. The analysis shows the estimated ice conditions at publication date (which corresponds to the valid date).

See the document Canadian Ice Service Regional Ice Charts in SIGRID-3 Format, Version 2 (Cheng, 2026) and the section on “Chart preparation: methodology and quality assurance” from the Ice Climate Normals for 1991-2020 (CIS, 2022) web page for more information.

2.2 Quality, Errors, and Limitations

2.2.1 Error Sources

See the document Canadian Ice Service Regional Ice Charts in SIGRID-3 Format, Version 2 (Cheng, 2026), Canadian Ice Service (2006b), and the section on “Chart preparation: methodology

and quality assurance" from the Ice climate normals for the northern Canadian waters 1991 to 2020 (CIS, 2022) web page for information on error sources. Users can also refer to MANICE (Environment Canada, 2005) for information about potential error sources.

2.2.2 Quality Assessment and Quality Control

A full quality assessment of this data set was not completed. However, the metadata files state the following:

"The reliability and accuracy of the data set is directly related to the availability, resolution and the effects of atmospheric (cloud, daylight, etc.) and ground (snow, rain, sea state, etc.) conditions on the source information. The source information is incorporated in the Regional Ice Analysis if the source information publication or acquisition date is plus or minus three days of the Regional Ice Analysis publication date."

See the document Canadian Ice Service Regional Ice Charts in SIGRID-3 Format, Version 2 (Cheng, 2026), Canadian Ice Service (2006b), and the section on "Chart preparation: methodology and quality assurance" from the Ice climate normals for the northern Canadian waters 1991 to 2020 (CIS, 2022) web page for more information.

3 VERSION HISTORY

Table 4 provides a summary of this data products' version history.

Table 4. Data Version History Summary

Version	Release Date	Description of Changes	Citation
2	Sep 2026	• Version 2 adds data back to 1968 and replaces the 2006-2020 V1 data files. • The V2 1968-2020 segment of the chart data has been extensively quality controlled by CIS analysts and data prior to 2006 was converted to SIGRID-3.	Canadian Ice Service (2026). *Canadian Ice Service Arctic Regional Sea Ice Charts in SIGRID-3 Format, Version 2*. (G02171, Version2) [Data Set]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. https://doi.org/10.7265/9nbn-6a46.

		• All charts prior to 2020 were reprojected using the WGS84 datum to be consistent with newer charts. • Charts from 2021 to present are identical to the Version 1 charts. In a future update, these charts will be QC'd and replaced.	
1	Oct 2009	Initial NSIDC Release	Canadian Ice Service. (2009). *Canadian Ice Service Arctic Regional Sea Ice Charts in SIGRID-3 Format*. (G02171, Version 1). [Data Set]. Boulder, Colorado USA. National Snow and Ice Data Center. https://doi.org/10.7265/N51V5BW9.

4 RELATED DATA SETS

Canadian Ice Service. Sea Ice Climatic Atlas: Northern Canadian Waters 1971-2000/Atlas climatique des glaces de mer: Eaux du nord canadien 1971-2000, Canadian Ice Service, ISBN 0-662-61973-3.

Konig Beatty, C.S. (2012). Arctic Landfast Sea Ice 1953-1998. (G02195, Version 1). Boulder, Colorado USA. National Snow and Ice Data Center. https://doi.org/10.7265/N5ZW1HV4.

National Snow and Ice Data Center (comp.). (2005). The Dehn Collection of Arctic Sea Ice Charts, 1953-1986, Version 1. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. https://doi.org/10.7265/N5F769GD.

U.S. National Ice Center. 2020. U.S. National Ice Center Arctic and Antarctic Sea Ice Concentration and Climatologies in Gridded Format, (G10033, Version 1. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. https://doi.org/10.7265/46cc-3952.

U.S. National Ice Center. 2022. U.S. National Ice Center Arctic and Antarctic Sea Ice Charts in SIGRID-3 Format. (G10013, Version 1). Boulder, Colorado USA. National Snow and Ice Data Center. https://doi.org/10.7265/4b7s-rn93.

U.S. National Ice Center. Compiled by F. Fetterer and C. Fowler. 2006, updated 2009. U.S. National Ice Center Arctic Sea Ice Charts and Climatologies in Gridded Format, 1972-2007, Version 1. . Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. https://doi.org/10.7265/N5X34VDB.

5 RELATED WEBSITES

- Latest ice conditions from the Canadian Ice Service
- Historical and current ice cover from the NOAA Great Lakes Environmental Research Laboratory (GLERL)
- Historical Sea Ice Atlas For Alaska & The Arctic, 1850 To December 2025, by University of Alaska Fairbanks
- The International Ice Charting Working Group: a forum where the world's national ice services meet to share and improve methods of serving maritime clients.

6 CONTACTS AND ACKNOWLEDGMENTS

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6.1 Acknowledgments

NSIDC thanks Richard Chagnon and Dan Fequet from the Canadian Ice Service for originally providing digital ice charts that form this data set in 2009. We thank Angela Cheng and Adrienne Tivy for providing the extensively quality-controlled version of chart data covering 1968-2020 to NSIDC in 2026 and acknowledge Trudy Wohlleben's contribution to the quality control work performed at CIS.

Distribution of the data set from NSIDC is supported by funding from NOAA.

7 REFERENCES

Canadian Ice Service. (2022). Ice Climate Normals for 1991-2020. Web page accessed: September 2026. https://www.canada.ca/en/environment-climate-change/services/ice-forecasts-observations/latest-conditions/climatology/ice-climate-normals.html

Canadian Ice Service. (2019). Canadian Ice Service Digital Archive – Regional Charts: Canadian Ice Service Ice Regime Regions (CISIRR) and Sub-Regions with Associated Data Quality Indices. January 2019. CIS Archive Documentation Series No. 3. 107pp. https://nsidc.org/sites/default/files/documents/technical-reference/cisads_no_003_regionalcharts.pdf.

Canadian Ice Service. 2006a. Canadian Ice Service SIGRID-3 Implementation 2006. Environment Canada, 14 pp. https://nsidc.org/sites/default/files/documents/other/cis_sigrid3_implementation.pdf.

Canadian Ice Service. 2006b. Canadian Ice Service Digital Archive – Regional Charts: History, Accuracy, and Caveats. September 2006. CIS Archive Documentation Series No. 1. 60pp. https://nsidc.org/sites/default/files/documents/technical-reference/cisads_no_001_regionalcharts.pdf.

Cheng, A. 2026. Canadian Ice Service Regional Ice Charts in SIGRID-3 Format, Version 2, Technical Report. Canadian Ice Service Report. https://nsidc.org/sites/default/files/documents/technical-reference/cis-regional-sea-ice-charts-sigrid-3-final.pdf.

Environment Canada. 2005. Manual of Standard Procedures for Observing and Reporting Ice Conditions (MANICE). Issuing authority: Assistant Deputy Minister, Meteorological Service of Canada. https://nsidc.org/sites/default/files/documents/technical-reference/manice.pdf.

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Thompson, T. (1981). Proposed Format for Gridded Sea Ice Information (SIGRID). Unpublished report prepared for the WMO World Climate Programme. 28pp. https://nsidc.org/sites/default/files/documents/technical-reference/sigrid-format-gridded-sea-ice-data_0.pdf.

Tivy, A., S.E.L. Howell, B. Alt, S. McCourt, R. Chagnon, G. Crocker, T. Carrieres, and J.J. Yackel. (2011). Trends and variability in summer sea ice cover in the Canadian Arctic based on the Canadian Ice Service Digital Archive, 1960-2008 and 1968-2008. J. Geophys. Res. 116: C03007, doi:10.1029/2009JC005855.

World Meteorological Organization. (2010). SIGRID-3: A Vector Archive Format for Sea Ice Charts, Revision 2. JCOMM Technical Report No. 23, WMO/TD-No. 1214. https://nsidc.org/sites/default/files/documents/technical-reference/wmo1214-sigrid3.pdf.

Additional references and related publications can be found in the References section of the user guide for U.S. National Ice Center Arctic and Antarctic Sea Ice Concentration and Climatologies in Gridded Format.

7.1 Research Papers That Use These Data

The publications in this section cite the use of this data set. They are listed here to give examples of ways in which the data can be used in research. The list is the result of a search in 2026 and is not exhaustive. For more publications, see the bibliography of reports and published papers compiled by the Canadian Ice Service: http://ice-glaces.ec.gc.ca/IA_DOC/cisda_biblio.pdf and a list of studies compiled by Angela Cheng: https://nsidc.org/sites/default/files/documents/technical-reference/studies-using-cis-charts-cheng.pdf.

Cheng, A., Casati, B., Tivy, A., Zagon, T., Lemieux, J.-F., & Tremblay, L. B. (2020). Accuracy and inter-analyst agreement of visually estimated sea ice concentrations in Canadian Ice Service ice charts using single-polarization RADARSAT-2. The Cryosphere, 14, 1289–1310. https://doi.org/10.5194/tc-14-1289-2020.

Galley, R. J., Babb, D., Ogi, M., Else, B. G. T., Geilfus, N.-X., Crabeck, O., Barber, D. G., and Rysgaard, S. (2016). Replacement of multiyear sea ice and changes in the open water season duration in the Beaufort Sea since 2004. J. Geophys. Res. Oceans 121: 1806–1823. https://doi.org/10.1002/2015JC011583.

Gully, K., Iacozza, J., and Dunmall, K.M. (2022). Development of a small-scale approach to assess sea ice change using weekly ice charts, with application to Anguniaqvia Niqiqyuam Marine Protected Area. Arctic Science 9(1): 198-208. https://doi.org/10.1139/as-2021-0045.

Henderson, E. M., Derocher, A. E., Lunn, N. J., Montpetit, B., Merrill, E. H., & Richardson, E.S. (2021). Polar bear Ursus maritimus use of the western Hudson Bay flaw lead. Marine Ecology Progress Series, 664, 227–242. https://www.jstor.org/stable/27060577.

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8 DOCUMENT INFORMATION

8.1 Author

Prepared by A. Windnagel, A. Tivy, and F. Fetterer

8.2 Publication Date

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8.3 Revision History

August 2026: Version 2 User Guide prepared by A. Windnagel, A. Tivy, and F. Fetterer by updating the Version 1 User Guide to reflect the changes in the Version 2 data.
October 2009: Version 1 document prepared by L. Ballagh based on SIGRID-3 guidelines (WMO, 2010), CIS SIGRID-3 implementation (CIS, 2006a), the metadata files, and on correspondence with R. Chagnon and F. Fetterer.