Northern Hemisphere EASE-Grid 2.0 Weekly Snow Cover and Sea Ice Extent, Version 4

USER GUIDE

How to Cite These Data

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

Brodzik, M. J. and R. Armstrong. 2013. *Northern Hemisphere EASE-Grid 2.0 Weekly Snow Cover and Sea Ice Extent, Version 4*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/P7O0HGJLYUQU. [Date Accessed].

National Snow and Ice Data Center

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1 DATA DESCRIPTION

Snow cover extent for this data set is based on the NOAA/NCDC Climate Data Record (CDR) of Northern Hemisphere (NH) Snow Cover Extent (SCE) by D. Robinson (2012) and regridded to the EASE-Grid. The NOAA/NCDC CDR of Northern Hemisphere Snow Cover Extent data were derived from the manual interpretation of AVHRR, GOES, and other visible-band satellite data (Helfrich et al. 2007). Sea ice extent is regridded to EASE-Grid from Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data.

1.1 Parameters

1.1.1 Snow Cover

Binary, indicating snow or no snow

1.1.2 Sea Ice

Binary, indicating presence or absence of sea ice when sea ice concentration is greater than 15 percent in a majority of a given week's sea ice files. The 15 percent ice concentration isopleth is a conventionally accepted cutoff for the ice edge (Johannessen et al. 1996).

1.2 File Information

1.2.1 Format

Data are stored in flat binary files with arrays of 720 columns by 720 rows of 1-byte unsigned integers. Each data file contains one array with size of approximately 508 KB. Browse image files are also provided.

1.2.2 File Contents

1.2.2.1 Weekly Data

Data files represent weekly Northern Hemisphere snow cover and sea ice extent. They contain a binary array of unsigned byte (8-bit) data with the following data values (Table 1).

Table 1. Parameter Values

Data Value	Parameter
0	Snow-free land
1	Snow-covered land

Data Value	Parameter
2	Sea ice
3	QC sea ice: pixel set to sea ice via QC during regridding
4	QC ocean: pixel set to open ocean via QC during regridding
5	QC snow: pixel set to snow via QC during regridding
6-252	Not used
253	Unclassifiable water due to mask mismatches
254	Corner pixels (outside Northern Hemisphere)
255	Open ocean

The metadata for all weekly data files is consolidated in a single ASCII text file. Figure 1 shows a segment of the metadata file, which displays information such as pixel counts for two weekly data files in September 2008.

```
File_Name                  :EASE2_N25km.snowice.20080915-20080921.v04.bin
Start_Date                 :2008-09-15
Stop_Date                  :2008-09-21
Data_Set_Parameter_Name    :Northern Hemisphere Weekly Snow Cover and Sea Ice Extent Version 4.0
Bytes                      :1
Data_Type                  :UNSIGNED INTEGER
Map_Name                   :EASE2_N25km
Map_Scale                  : 25.0000 kilometers
Area_Per_Pixel             :625.0000 square kilometers
Columns                    :720
Rows                       :720
Snow_Pixels                :    5123
QC_Snow_Pixels             :    4040
Land_Pixels                :149545
Ice_Pixels                 :    6713
QC_Ice_Pixels              :     881
Ocean_Pixels               :241250
QC_Ocean_Pixels            :     213
Unclassifiable_Pixels      :     287
Corner_Pixels              :110348
Total_Pixels               :518400
Sea_Ice_Derived_From       :DMSP-F17 SSMIS
Sea_Ice_Climatology_Month:09
Sea_Ice_Files_Used         :nt_20080915_f17_v01_n.bin nt_20080916_f17_v01_n.bin nt_20080917_f17_v01_n.bin nt_20080918_f17_v01_n.bin
nt_20080919_f17_v01_n.bin nt_20080920_f17_v01_n.bin nt_20080921_f17_v01_n.bin

File_Name                  :EASE2_N25km.snowice.20080922-20080928.v04.bin
Start_Date                 :2008-09-22
Stop_Date                  :2008-09-28
Data_Set_Parameter_Name    :Northern Hemisphere Weekly Snow Cover and Sea Ice Extent Version 4.0
Bytes                      :1
Data_Type                  :UNSIGNED INTEGER
Map_Name                   :EASE2_N25km
Map_Scale                  : 25.0000 kilometers
Area_Per_Pixel             :625.0000 square kilometers
Columns                    :720
Rows                       :720
Snow_Pixels                :    5908
QC_Snow_Pixels             :    4070
Land_Pixels                :148730
Ice_Pixels                 :    6945
QC_Ice_Pixels              :     888
Ocean_Pixels               :241027
QC_Ocean_Pixels            :     197
Unclassifiable_Pixels      :     287
Corner_Pixels              :110348
Total_Pixels               :518400
Sea_Ice_Derived_From       :DMSP-F17 SSMIS
Sea_Ice_Climatology_Month:09
Sea_Ice_Files_Used         :nt_20080922_f17_v01_n.bin nt_20080923_f17_v01_n.bin nt_20080924_f17_v01_n.bin nt_20080925_f17_v01_n.bin
nt_20080926_f17_v01_n.bin nt_20080927_f17_v01_n.bin nt_20080928_f17_v01_n.bin
```

Figure 1. Sample of the Metadata File EASE2_N25km.snowice.metadata.1966-2010.v04.txt.

1.2.2.2 Monthly Statistics

Average Extent

Monthly average extent is the binary value for each pixel, indicating 50 percent or greater probability of occurrence of snow or sea ice. Data are 1-byte values of 0 (probability of occurrence was less than 50 percent) or 1 (probability of occurrence was greater than or equal to 50 percent).

Frequency or Probability of Occurrence

Monthly probability of occurrence is the percentage of time in a given month that each pixel was either snow or sea ice. Data in these files are 1-byte values, ranging from 0 to 100 percent.

Variance

Monthly variance is the snow or sea ice probability of occurrence for each pixel, calculated as shown the following equation:

$$\frac{1}{n\text{-}1} \sum_i (\overline{P} - \overline{p}_i)^2$$

Where:

i = 1966 through current processing year for snow or 1978 through current processing year for ice
n = number of years

$\overline{P}$ = snow or sea ice probability of occurrence for data in this month for the period of record

$\overline{p}_i$ = snow or sea ice probability of occurrence for data in this month for year i

Data are 1-byte values, ranging from 0 to 26, representing variances of 0.0 (least variance, i.e. always or never snow or ice covered) to 0.26 (most variance).

1.2.3   Directory Structure

Data are available on the HTTPS site in the
https://daacdata.apps.nsidc.org/pub/DATASETS/nsidc0046_weekly_snow_seaice/ directory. Within this directory there are four folders: browse, data, metadata, and stats. Figure 2 image shows the directory structure.
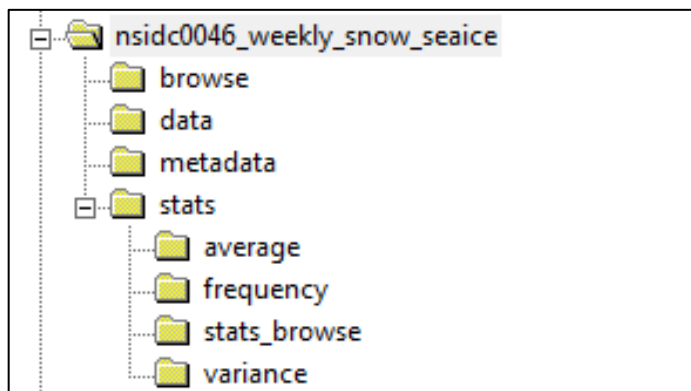

Figure 2. Directory Structure.

1.2.4   Naming Convention

1.2.4.1 Weekly Data, Browse, and Metadata Files

Weekly data and browse files are named according to the following convention, and as described in Table 2 and Table 3.

`EASE2_N25km.snowice.yyyymmd1-yyyymmd2.vVV.ext`

Table 2. File Naming Convention for Weekly Data, Browse, and Metadata Files

Variable	Description
`EASE2_N25km`	Indicates this is an EASE-Grid 2.0 Northern Hemisphere 25 km file
`snowice`	Indicates this is a snow and ice file
`yyyymmd1`	4-digit year, 2-digit month, and 2-digit day of month indicating the beginning of the NOAA week (d1)
`yyyymmd2`	4-digit year, 2-digit month, and 2-digit day of month indicating the end of the NOAA week (d2)
`vVV`	Version number (v04)
`.ext`	File extension: binary data file (`.bin`) or image (`.png`) browse file

Metadata for each weekly data file is provided in a single ASCII text file. The naming convention for this file varies only slightly from the above convention, for example:

`EASE2_N25km.snowice.metadata.yyyy-yyyy.vVV.txt`

1.2.4.2 Monthly Statistics Files

Monthly statistics files containing probability of occurrence, average extent, or variance data are named according to the following conventions, and as described below:

`EASE2_N25km.parm.stat.mm.yyyy-yyyy.vVV.bin`
`EASE2_N25km.parm.stat.yyyy-yyyy.vVV.png`
`EASE2_N25km.parm.stat.yyyy-yyyy.vVV.ps`

Where:

Table 3. File Naming Convention for Monthly Climatology Files

Variable	Description
`EASE2_N25km`	Indicates this is an EASE-Grid 2.0 Northern Hemisphere 25 km file
`parm`	Parameter (`sno` or `ice`)

Variable	Description
`stat`	Statistics file (`avg`: average extent; `frq`: frequency/probability of occurrence; `var`: variance)
`mm`	2-digit month
`yyyy-yyyy`	Indicates 4-digit start and end years, such as 1966-2023
`vVV`	Version number (`v04`)
`.bin`	Indicates this is a binary data file
`.png`	Extension indicating a PNG file (viewable in any Web browser)
`.ps`	Extension indicating a color PostScript file (viewable in any Web browser)

1.3 Spatial Information

1.3.1 Coverage

Northern Hemisphere.

1.3.2 Resolution

Source data are resampled to the 25-km resolution EASE-Grid 2.0.

1.3.3 Geolocation

Data are gridded using EASE-Grid 2.0, which is defined with the WGS 84 ellipsoid rather than the spherical Earth model in the original EASE-Grid. The grid is 720 columns by 720 rows (0,719). For a detailed comparison between the two versions of EASE-Grid, refer to the EASE Grid web page.

1.4 Temporal Information

1.4.1 Coverage

Snow cover data are available from 03 October 1966 to 01 January 2023, whereas sea ice data are available from 23 October 1978 through 01 January 2023.

1.4.2 Resolution

Each file represents weekly data corresponding with the weekly NOAA/NCDC snow cover extent CDR data. A week is defined here as seven days.

Weekly sea ice extent was derived from an average of three or four sea ice source files for the SMMR time period. For the SSM/I–SSMIS time period, weekly sea ice extent was derived from an average of seven ice source files.

1.4.3   Missing Data

No files exist for the following weeks:

- Four weeks spanning 01 July – 28 July 1968
- 21 weeks spanning 02 June – 26 October 1969
- 12 weeks spanning 05 July – 26 September 1971

Files for the following weeks have no sea ice information:

- All weeks prior to 23 October 1978
- Five weeks spanning 07 December 1987 – 10 January 1988
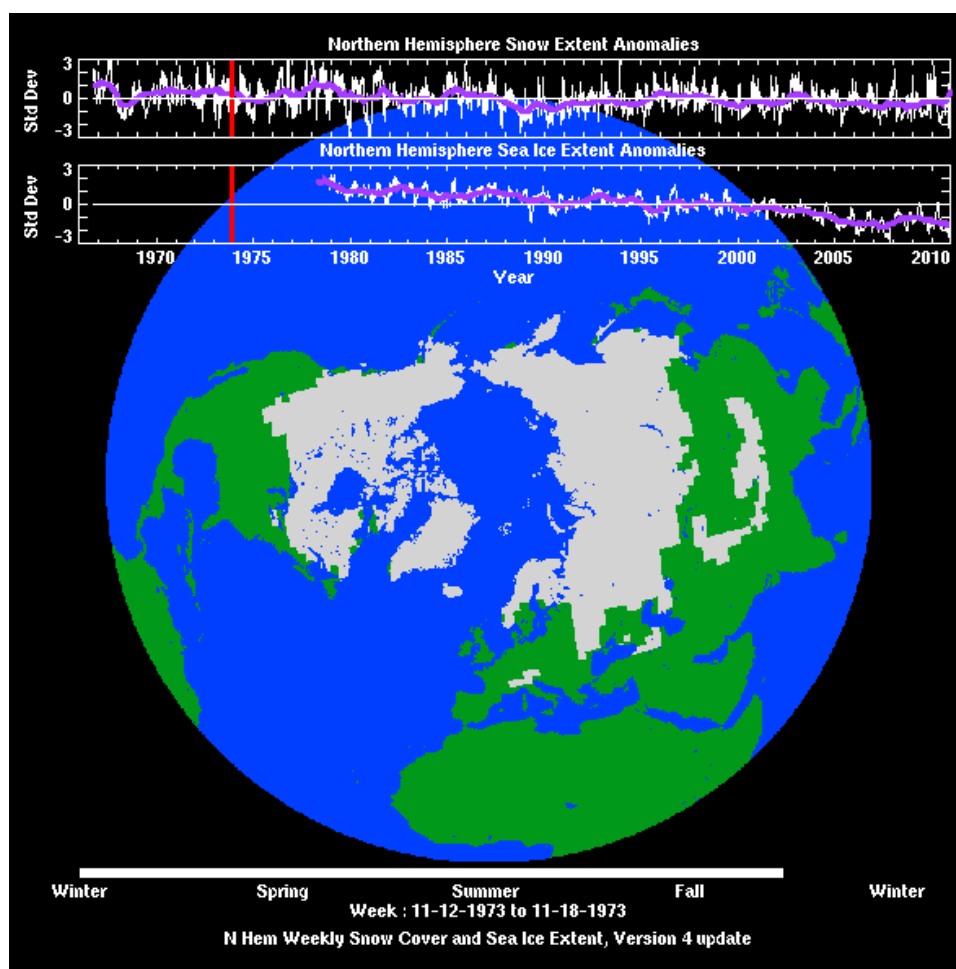
1.5 Sample Data Images

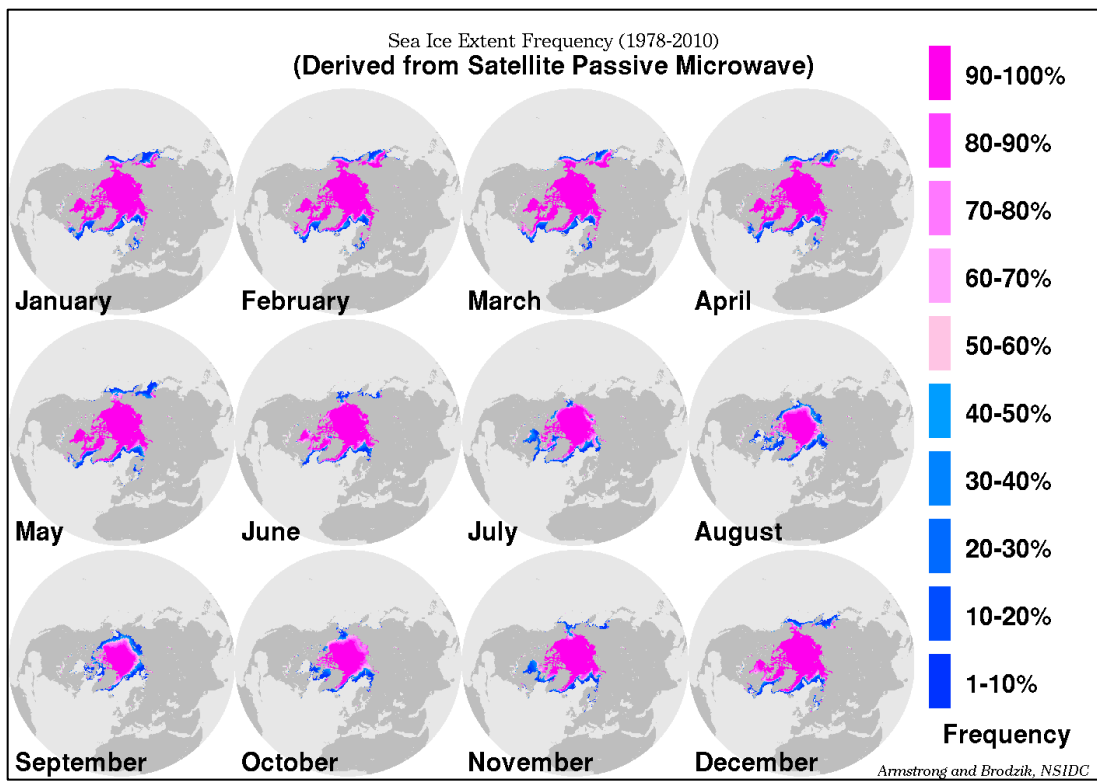Figure 3. Snow Cover and Sea Ice Extent Data for One Week

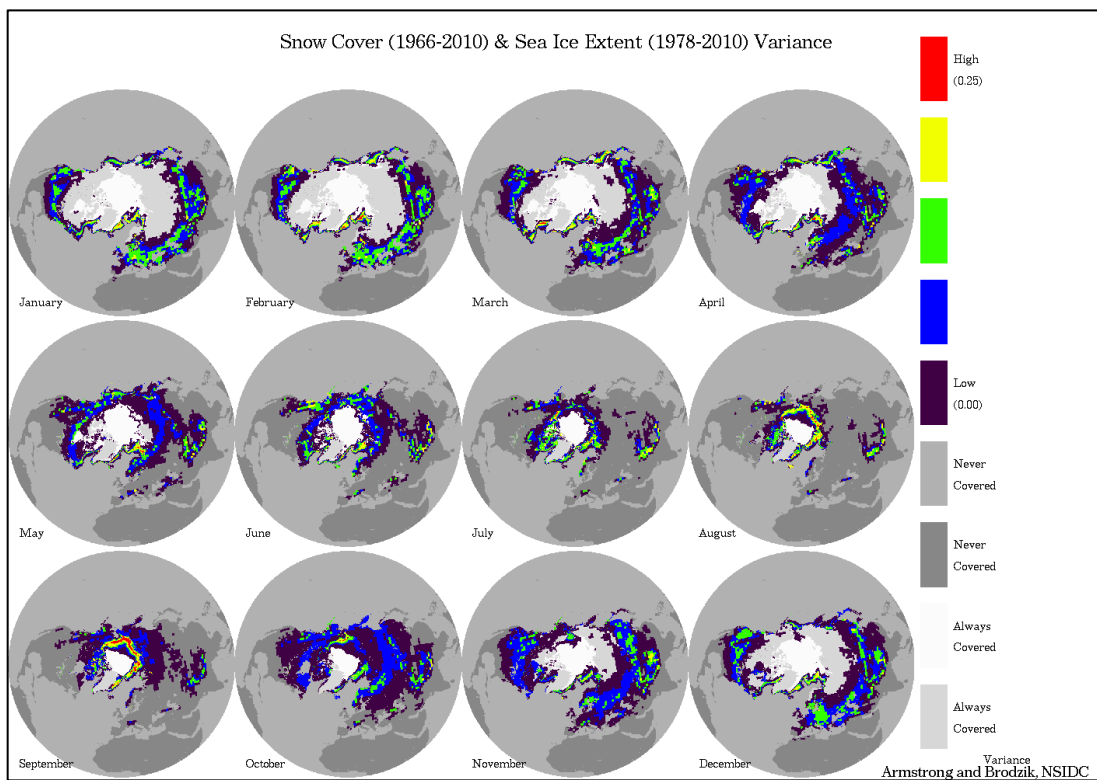Figure 4. Twelve-month Average Probability of Occurrence for Sea Ice

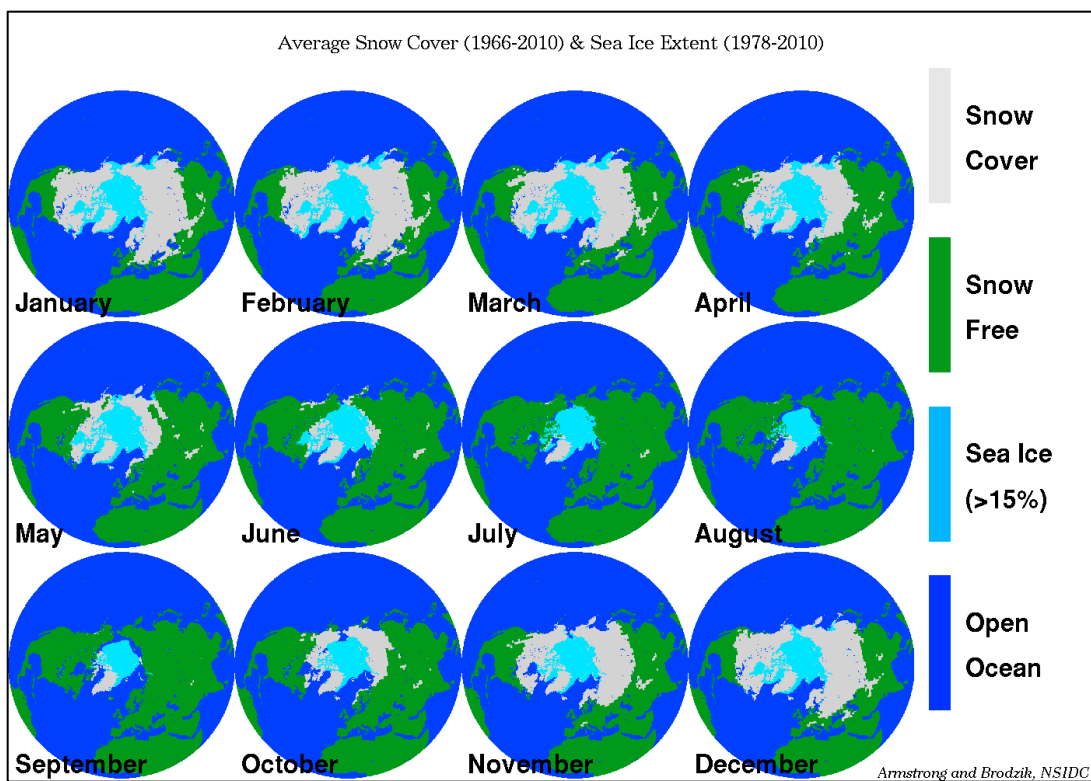Figure 5. Twelve-month Variance for Snow Cover and Sea Ice Extent

Figure 6. Twelve-month Average of Snow Cover and Sea Ice Extent

2 DATA ACQUISITION AND PROCESSING

2.1 Acquisition

2.1.1 Snow Data

The snow data used for Version 4 are from NOAA/NCDC Climate Data Record (CDR) of Northern Hemisphere (NH) Snow Cover Extent (SCE) (Robinson et al. 2012, Estilow et al. 2015). The snow cover extent CDR uses an improved algorithm to produce pseudo-weekly snow charts from the daily, 24 km IMS product (NOAA/NESDIS/OSDPD/SSD 2004; Ramsay 1998; Helfrich et al. 2007). The snow cover extent CDR corrects spatial inconsistencies in snow-covered cells between the original weekly product and the pseudo-weekly data, primarily in mountainous regions, including the Himalayas, during specific months of the year. For data during the 1970s and early 1980s, the snow cover extent CDR also eliminates cells from the weekly data that were previously identified as patchy snow. D. Robinson and colleagues have determined that the early, coarser product depicted too much snow cover in these areas (personal communication to M. J. Brodzik, 23 December 2012). Robinson's statistical comparisons indicate that these adjustments are small, influencing previously published assessments of continental snow extent variability, by at most a few percent in several years in the late 1970s and early 1980s. Recent analysis of the snow cover

extent CDR indicates a 95% confidence interval uncertainty in snow cover extent of plus or minus 3–5% during Northern Hemisphere spring for 1966–2010 (Brown and Robinson 2011).

2.1.2   Sea Ice Data

The sea ice data set used for Version 4 is the Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data.

2.2 Processing

The majority of data values were derived via nearest-neighbor interpolation from the respective source grids. Pixels with QC data values were determined by more complex algorithms as described in the Processing Steps section of this document.

Processing Steps

1. Define an EASE-Grid 2.0 Northern Hemisphere land/ocean/permanent ice mask.
2. Identify source land mask mismatches with the EASE-Grid 2.0 Northern Hemisphere land mask.
3. Define EASE-Grid 2.0 sea ice climatology mask.
4. Combine sea ice data for the given week and regrid sea ice from source grid (polar stereographic projection) to EASE-Grid 2.0 via nearest-neighbor interpolation.
5. Set one-neighbor category mismatch pixels to QC sea ice if at least one of the surrounding eight source grid pixels was sea ice.
6. Set two-neighbor category mismatch pixels to QC sea ice if at least one of the surrounding twenty-four source grid pixels was sea ice.
7. Set the others category mismatch pixels to unclassifiable water.
8. Set all regridded open ocean pixels above 83 degrees north latitude to QC sea ice.
9. Set all regridded sea ice pixels outside the defined sea ice climatology mask area to QC ocean.
10. Regrid digitized snow extent data from source (polar stereographic projection) grid to EASE-Grid 2.0 via nearest-neighbor interpolation.
11. Set lower latitude snow neighbor category mismatch pixels to QC snow if at least one of the adjacent lower latitude source grid pixels was snow.
12. Set any snow neighbor category mismatch pixels to QC snow if any of the adjacent source grid pixels were snow.

The EASE-Grid land-ocean-coastline-ice (LOCI) mask was derived from the Boston University version of global 1 km land cover from MODIS 2001 (Knowles 2004), courtesy of K. Knowles, National Snow and Ice Data Center.

NSIDC used American National Standards Institute (ANSI) C and Research Systems' Interactive Data Language (IDL) Version 8.2 to develop software for this data set.

2.3 Quality, Errors, and Limitations

NSIDC observed and manually inspected selected files in this data set, and performed spot checks against the original hand-drawn NOAA/NESDIS snow charts and the original sea ice data.

2.3.1 Limitations of the Data

These data are most appropriate for large area studies. Users should note that source grid snow pixels range in size from approximately 16,000 km^2 to 42,000 km^2, and source grid ice concentration pixels range in size from approximately 485 km^2 to 664 km^2.

2.3.2 Known Problems with the Data

Pixels with values of unclassifiable water are undetermined because of mismatches between the various source and target land masks.

3   SOFTWARE AND TOOLS

The following table lists the tools that are available for this data set. Tools are accessible from the EASE-Grid Tools website.

Table 4. Tool Details

Tool	Description
Type: Geocoordinate File name: EASE2_N25km.lats.720x720x1.double EASE2_N25km.lons.720x720x1.double (Located within gridloc.EASE2_N25km.tgz)	These are geolocation files containing double-precision (8-byte) floating point arrays (720 columns x 720 rows) representing latitude or longitude at the center of each cell in the EASE2_N25km grid. Cells in the grid that are not in the Northern Hemisphere are designated with the value -999.0.
Type: Geocoordinate File name: EASE2_N25km.gpd	This is a Northern Hemisphere grid parameter definition file that contains projection and grid resolution information specifying a 25 km grid resolution in EASE-Grid 2.0.

Type: Geocoordinate File name: easeconv.pro (Located within easeconv-0.3.tgz)	Easeconv.pro is an IDL program containing routines to convert between latitude/longitude and row/column coordinates.
Type: Region Mask File name: EASE2_N25km.LOCImask_land50_coast0km.720x720.bin	This is the EASE-Grid 2.0 land-ocean-coastline-ice (LOCI) mask; it contains a flat, binary array (dimensions 720x720 pixels) of 1-byte unsigned integers. See the EASE-Grid 2.0 Land-Ocean-Coastline-Ice Masks Derived from Boston University MODIS/Terra Land Cover Data documentation (Knowles 2004) for more information.

4   RELATED DATA SETS

- NOAA/NCDC Climate Data Record (CDR) of Northern Hemisphere (NH) Snow Cover Extent (SCE) by D. Robinson (2012), Rutgers University Global Snow Lab
- Global Monthly EASE–Grid Snow Water Equivalent Climatology
- Nimbus–7 SMMR Polar Gridded Radiances and Sea Ice Concentrations
- Sea Ice Concentrations from Nimbus–7 SMMR and DMSP SSM/I–SSMIS Passive Microwave Data
- Sea Ice Index

5   ACKNOWLEDGMENTS

Acknowledgments

6   REFERENCES

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Johannessen, O. M., M. W. Miles, E. Bjørgo. 1996. Global Sea Ice Monitoring from Microwave Satellites. *In IGARSS '96. 1996 International Geoscience and Remote Sensing Symposium. Remote Sensing for a Sustainable Future*, ed. T. I. Stein, Vol. II: 932–934. Piscataway, NJ: Institute of Electrical and Electronics Engineers, Inc. https://doi.org/10.1109/IGARSS.1996.516525.

Knowles, K. 2004. *EASE-Grid Land-Ocean-Coastline-Ice Masks Derived from Boston University MODIS/Terra Land Cover Data*. Boulder, Colorado USA: National Snow and Ice Data Center. https://doi.org/10.5067/YR21Q0Q8IPR6.

NOAA/NESDIS/OSDPD/SSD. 2004. IMS Daily Northern Hemisphere Snow and Ice Analysis at 4 km and 24 km Resolution. Boulder, Colorado USA: National Snow and Ice Data Center. https://doi.org/10.7265/N52R3PMC.

Ramsay, B. H. 1998. The Interactive Multisensor Snow and Ice Mapping System. *Hydrological Processes* 12:1537-1546. https://doi.org/10.1002/(SICI)1099-1085(199808/09)12:10/11<1537::AID-HYP679>3.0.CO;2-A.

Robinson, David A., Estilow, Thomas W., and NOAA CDR Program. 2012. NOAA Climate Data Record (CDR) of Northern Hemisphere (NH) Snow Cover Extent (SCE), Version 1. NOAA National Centers for Environmental Information. http://dx.doi.org/10.7289/V5N014G9.

7 DOCUMENT INFORMATION

7.1 Publication Date

2013

7.2 Date Last Updated

August 2023

APPENDIX A – VERSION HISTORY TABLES

Table A - 1: Version 1 History

NSIDC Data Use Recommendations	
Projection, Dimensions, and Spatial Resolution	EASE-Grid 721 x 721 25.067525 km
Temporal Coverage	1971-01-04 to 1995-09-03
Missing Weeks	1972-12-18 to 1972-12-24 (1 week)
Weeks with No Ice	All weeks prior to 1978-10-23 1984-08-13 to 1984-08-19 (1 week) 1986-03-31 to 1986-04-13 (2 weeks) 1987-12-07 to 1988-01-10 (5 weeks)
Weeks with Incomplete Ice	1979-06-04 to 1979-06-17 (2 weeks) 1990-10-22 to 1990-10-28 (1 week) 1991-12-16 to 1991-12-29 (2 weeks)
Sensor Changeover Dates	SMMR to SSM/I F08: 1987-08-03 SSM/I F08 to F11: 1991-12-30 SSM/I F11 to F13: n/a (no F13 data in V1) For details regarding sensors, refer to the SMMR, SSM/I, and SSMIS Sensors Summary.
Sea Ice Data Set Used	N/A
Ice Climatology	Static climatology, a "best guess" at likely sea ice locations, bounded by lat/lon boxes
Polar Stereographic Maps Earth Model	Spherical, would have caused slight errors in regridded ocean/ice locations; the model error would cause geolocation errors of up to 8 km, which would result in errors of at most one pixel when sea ice was regridded using nearest-neighbor to the NL EASE-Grid
EASE-Grid Land Mask Source	Original NSIDC EASE-Grid mask, all of Greenland was mapped to QC snow.
Manual Snow Chart Corrections	1978-03-20 1983-03-21 1983-07-11 1984-05-07 1987-03-16 1987-04-20 1991-12-02

Table A - 2: Version 2 History

NSIDC Data Use Recommendations	
Projection, Dimensions, and Spatial Resolution	EASE-Grid 721 x 721 25.067525 km
Temporal Coverage	1966-10-03 to 2001-06-24
Missing Weeks	1968-07-01 to 1968-07-28 (4 weeks) 1969-06-02 to 1969-10-26 (21 weeks) 1971-07-05 to 1971-09-26 (12 weeks) Version 1 included snow charts for these weeks, but D. Robinson removed them from Version 2 as a result of his most recent reanalysis. He does not recommend using the Version 1 files to fill in this gap (Robinson, personal communication).
Weeks with No Ice	Same as Version 1
Weeks with Incomplete Ice	1979-06-04 to 1979-06-17 (2 weeks) 1990-10-22 to 1990-10-28 (1 week)
Sensor Changeover Dates	SMMR to SSM/I F08: 1987-08-03 SSM/I F08 to F11: 1991-12-09 SSM/I F11 to F13: 1995-05-08
Sea Ice Data Set Used	N/A
Ice Climatology	Monthly climatology, derived from historical record of SMMR and SSM/I sea ice data from 1978 to 1999
Polar Stereographic Maps Earth Model	Elliptical, this is the correct Earth model for the input sea ice data
EASE-Grid Land Mask Source	Original NSIDC EASE-Grid mask, all of Greenland was mapped to QC snow.
Manual Snow Chart Corrections	1967-12-11 1983-03-21 1983-07-11 1984-05-07 1987-03-16

Table A - 3: Version 3 History

NSIDC Data Use Recommendations	NSIDC believes that those time periods using the Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data should replace previous versions and updates using near-real-time and preliminary sea ice input data. Extensive quality-control, reducing the number of pixels misclassified as sea ice due to weather effects and/or coastal contamination as well as the long-term calibrated time-series extending back to the SMMR era makes this input data a higher quality product.
Projection, Dimensions, and Spatial Resolution	EASE-Grid 721 x 721 25.067525 km
Temporal Coverage	1966-10-03 to 2005-06-05
Missing Weeks	Same as Version 2
Weeks with No Ice	All weeks prior to 1978-10-23 1987-12-07 to 1988-01-10 (5 weeks)
Weeks with Incomplete Ice	None
Sensor Changeover Dates	SMMR to SSM/I: 1987-07-13 SSM/I F08 to F11: 1991-12-09 SSM/I F11 to F13: 1995-05-08
Sea Ice Data Set Used	1978-10-23 to 2003-12-28:Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data 2003-12-29 to 2005-06-05:Near-Real-Time DMSP SSM/I-SSMIS Daily Polar Gridded Sea Ice Concentrations
Ice Climatology	Monthly climatology, derived from historical record of SMMR and SSM/I sea ice data from 1978 to 2003
Polar Stereographic Maps Earth Model	Same as Version 2
EASE-Grid Land Mask Source	EASE-Grid land-ocean-permanent ice mask derived from BU-MODIS land cover (Knowles 2004)
Manual Snow Chart Corrections	Rutgers corrected all previously noted irregularities. However, a previously undetected irregularity was found and manually corrected in the chart for 1972-04-03.

Table A - 4: Version 3.1 History

NSIDC Data Use Recommendations	Users already making use of the original v03 data would not likely see significant changes in the overlap period in the new data because the processing differences are small. New users of these data are recommended to use v03.1 files for the overlap period 27 December 2003 to 05 June 2005. NSIDC believes that those time periods using the Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data should replace previous versions and updates using near-real-time and preliminary sea ice input data. Extensive quality control, reducing the number of pixels misclassified as sea ice due to weather effects and/or coastal contamination as well as the long-term calibrated time-series extending back to the SMMR era makes this input data a higher quality product.
Projection, Dimensions, and Spatial Resolution	EASE-Grid 721 x 721 25.067525 km
Temporal Coverage	2003-12-27 to 2007-06-24 (v3.1 files whose dates overlap v3.0 dates should replace them.)
Missing Weeks	Same as Version 3
Weeks with No Ice	Same as Version 3
Weeks with Incomplete Ice	Same as Version 3
Sensor Changeover Dates	Same as Version 3
Sea Ice Data Set Used	2003-12-27 to 2006-06-30: Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data (final) 2006-07-01 to 2006-12-31: Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data(preliminary) 2007-01-01 to 2007-06-24: Near-Real-Time DMSP SSM/I-SSMIS Daily Polar Gridded Sea Ice Concentrations
Ice Climatology	Same as Version 3
Polar Stereographic Maps Earth Model	Same as Version 3
EASE-Grid Land Mask Source	Same as Version 3
Manual Snow Chart Corrections	During data set quality control procedures, NSIDC noted a NOAA pixel at the western end of Baffin Island that became snow-free beginning with the week of 31 May to 06 June 1999, and that remained snow-free for the remainder of the current time series (through May 2005).

Table A - 5: Version 4 History

NSIDC Data Use Recommendations	NSIDC believes the improvements to the snow CDR data and the update to EASE-Grid 2.0 represent the best available analyses and presentation of these data sets, and warrant the complete reprocessing of this product. Refer to the Data Source section of this document. Users of previous versions are recommended to move to Version 4 data.
Projection, Dimensions, and Spatial Resolution	EASE-Grid 2.0 720 x 720 25.000000 km
Temporal Coverage	1966-10-03 to 2014-06-29
Missing Weeks	Same as Version 3.1
Weeks with No Ice	Same as Version 3.1
Weeks with Incomplete Ice	Same as Version 3.1
Sensor Changeover Dates	SMMR to SSM/I: 1987-07-03 SSM/I F08 to F11: 1991-12-09 SSM/I F11 to F13: 1995-05-08 SSM/I F13 to SSMIS F17: 2008-01-01
Sea Ice Data Set Used	1978-10-23 to present: Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data
Ice Climatology	Same as Version 3.1, regridded to EASE-Grid 2.0 (Brodzik et al. 2012)
Polar Stereographic Maps Earth Model	Same as Version 3.1
EASE-Grid Land Mask Source	Same as Version 3.1, regridded to EASE-Grid 2.0 (Brodzik et al. 2012)
Manual Snow Chart Corrections	Rutgers corrected all previously noted irregularities. However, NSIDC has discovered an irregularity in one file starting 03 April 1972 (EASE2_N25km.snowice.19720403-19720409.v04.bin); a number of pixels in the Great Lakes region are showing a snow-free pattern. This has been reported to Rutgers.

Table A - 6: Version 4.1 History

NSIDC Data Use Recommendations	The input data to this data set, Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data, NSIDC-0051, was updated causing a minor update, 4.1, to this data set. The temporal coverage for this data set was also updated to 31 December 2015. Users of previous versions are recommended to move to Version 4.1 data.
Projection, Dimensions, and Spatial Resolution	EASE-Grid 2.0 720 x 720 25.000000 km
Temporal Coverage	03 October 1966 to 31 December 2015
Missing Weeks	Same as Version 3.1
Weeks with No Ice	Same as Version 3.1
Weeks with Incomplete Ice	Same as Version 3.1
Sensor Changeover Dates	SMMR to SSM/I: 1987-07-03 SSM/I F08 to F11: 1991-12-09 SSM/I F11 to F13: 1995-05-08 SSM/I F13 to SSMIS F17: 2008-01-01
Sea Ice Data Set Used	1978-10-23 to present: Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data
Ice Climatology	Same as Version 3.1, regridded to EASE-Grid 2.0 (Brodzik et al. 2012)
Polar Stereographic Maps Earth Model	Same as Version 3.1
EASE-Grid Land Mask Source	Same as Version 3.1, regridded to EASE-Grid 2.0 (Brodzik et al. 2012)
Manual Snow Chart Corrections	In October 2018, Rutgers corrected 7 pixels int he Great Lakes region that previously showed a snow-free patterns to now show snow. The impacted file is EASE2_N25km.snowice.19720403-19720409.v04.bin.