Sea Ice Trends and Climatologies from SMMR and SSM/I-SSMIS, Version 2

USER GUIDE

How to Cite These Data

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

Stroeve, J. and W. N. Meier. 2017. *Sea Ice Trends and Climatologies from SMMR and SSM/I-SSMIS, Version 2*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/EYICLBOAAJOU. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/NSIDC-0192

National Snow and Ice Data Center

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1 DATA DESCRIPTION

NSIDC provides this data set to aid in the investigations of the variability and trends of sea ice cover. Ice cover in these data are indicated by sea ice concentration: the percentage of the ocean surface covered by ice. The ice-covered area indicates how much ice is present; it is the total area of a pixel multiplied by the ice concentration in that pixel. Ice persistence is the percentage of months over the data set time period that ice existed at a location. The ice-extent indicates whether ice is present; here, ice is considered to exist in a pixel if the sea ice concentration exceeds 15 percent. This data set provides users with data about total ice-covered areas, sea ice extent, ice persistence, and monthly climatologies of sea ice concentrations.

Daily and Monthly Total Ice-Covered Area and Total Sea Ice Extent Data

Daily Arctic and Antarctic ice-covered area and total sea ice extent ASCII text data files list the total ice-covered area (km^2) and total sea ice extent (km^2) for both the Bootstrap Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS and/or the NASA Team Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data algorithms.

Monthly mean sea ice concentrations were used to derive monthly extents for both the NASA Team and Bootstrap algorithms. Monthly ice concentration extents are provided because they will tend to average out the effects of storms and other short-term events on the location of the ice edge. However, this has not been verified by NSIDC.

Regional Graphs: Time-Series Plots

The total ice-covered area and sea ice extent data are used to create .png images of regional graphs showing monthly time-series plots of ice-covered areas, area anomalies, ice extent, and extent anomalies for both the NASA Team and Bootstrap algorithms. The methods and sources for how these regions were geographically defined are discussed in Parkinson and Cavalieri (2012), Cavalieri and Parkinson (2008), and Parkinson et al. (1999).

Ice Persistence

Monthly climatologies of ice persistence binary data files with corresponding .png images are intended for users interested in persistence of ice over a particular month during the time series, which includes January 1979 through current processing. Ice persistence fields provide information on how frequently ice occurs in a region during a given month over the time period of the data. The ice extent climatologies are derived each month from monthly-averaged sea ice concentrations using the NASA Team data.

Monthly Climatology of Sea Ice Concentration

Monthly sea ice concentration climatology binary data files with corresponding .png images represent mean ice concentration percentages for each month over the entire time period of January 1979 through current processing. The data are derived from the NASA Team data.

1.1 Parameters

Sea Ice Concentration

Total Ice-covered Area (km^2)

Total Sea Ice Extent (km^2)

1.1.1 Parameter Description

Ice Persistence

The ice persistence data indicate the historical frequency of the presence of ice with at least 15 percent concentration in each pixel of the 25 km polar stereo grid in a binary file.

The Northern Hemisphere binary files are 304 x 448 byte data.

Southern Hemisphere binary files are 316 x 332 bytes.

The following table lists the Data Values for the ice persistence files:

Table 1. Data Values for the Ice Persistence Files

Value	Description
0	Water, no ice
1 - 100	Historical frequency of the presence of ice, as a percentage
253	Coastlines (land adjacent to water)
254	Land

Monthly Climatology of Sea Ice Concentration

The monthly climatology data give the average sea ice concentration for each polar stereo pixel. A minimum concentration value of 15 percent is imposed. When concentrations are lower than this, the grid cell is considered to be free of ice.

The Northern Hemisphere binary files are 304 x 448 byte data.

The Southern Hemisphere binary files are 316 x 332 byte data.

The following table lists the Data Values for the Monthly Climatology of Sea Ice Concentration Files.

Table 2. Data Values for the Monthly Climatology of Sea Ice Concentration Files

Value	Description
0	Water, no ice
15 - 100	Average ice concentration. Minimum concentration is 15 percent
251	Pole hole, no direct satellite observation
253	Coast (land adjacent to water)
254	Land

Total Ice-Covered Areas and Sea Ice Extent Data

The daily and monthly total sea-ice extent and sea-ice area data for specified Arctic and Antarctic regions are displayed in ASCII text tables. Anomalies are also provided, which indicate departures from the long-term averages.

1.2 File Information

1.2.1 Format

This data set has several data formats:

Total Ice-Covered Areas and Sea Ice Extent Data

Data are stored in ASCII text and PNG browse files.

Ice Persistence Data

Data are stored in binary two-byte integer format and PNG browse files.

Monthly Climatology of Sea Ice Concentration

Data are stored in flat binary one-byte integer format and PNG browse files.

1.2.2 File Contents

Total Ice-Covered Areas and Sea Ice Extent

Refer to the following figures for Bootstrap sample data images for the Total Ice-Covered Areas and Sea Ice Extent data files.

Year	Mon	Day	DOY	Ver	TotalArc	Okhotsk	Bering	Hudson	Baffin	Grnland	BarKara	ArctOcn	CanArch	StLawr
1978	11	1	305	v02	9124575	0	11838	368424	514839	449528	1173910	5863843	742190	0
1978	11	3	307	v02	9150738	0	15547	346038	550806	457167	1181536	5856762	742879	0
1978	11	5	309	v02	9299006	0	7003	390244	555634	477701	1245651	5880963	741807	0
1978	11	7	311	v02	9528439	0	15282	496152	581214	482290	1271710	5939355	742433	0
1978	11	9	313	v02	9553892	0	12337	531939	624273	492326	1229110	5926217	737687	0
1978	11	11	315	v02	9591397	0	3229	567163	647898	518421	1209015	5900749	744920	0
1978	11	13	317	v02	9816890	0	6015	654283	677444	506800	1279570	5949430	743344	0
1978	11	15	319	v02	9889642	0	29870	677254	718648	523623	1237478	5963175	739591	0
1978	11	17	321	v02	9924935	0	46980	720856	712857	541954	1230941	5931567	739777	0
1978	11	19	323	v02	10212517	0	29168	897044	743948	574728	1277376	5950398	739853	0
1978	11	21	325	v02	10361690	0	32636	960350	767589	611240	1339061	5913073	737737	0
1978	11	23	327	v02	10563681	0	53951	1059671	760252	585429	1411006	5953451	739919	0
1978	11	25	329	v02	10800735	0	63997	1103472	783131	615149	1517886	5978058	739038	0
1978	11	27	331	v02	10985122	0	67305	1122610	748754	704073	1575691	6022456	744229	0
1978	11	29	333	v02	11063032	41110	74963	1158649	735224	669277	1595011	6038921	736592	0
1978	12	1	335	v02	11024497	31993	68893	1186292	807140	678534	1461653	6021755	739855	0
1978	12	3	337	v02	11110463	54510	78101	1193905	811621	650508	1470697	6039008	741666	32027
1978	12	5	339	v02	11178828	68945	56693	1193393	839419	665590	1499255	6041243	737427	27944

Figure 1. Total Ice-Covered Areas and Sea Ice Extent ASCII Text Bootstrap Sample Data File for the Northern Hemisphere (gsfc.bootstrap.daily.area.1978-2015.n)

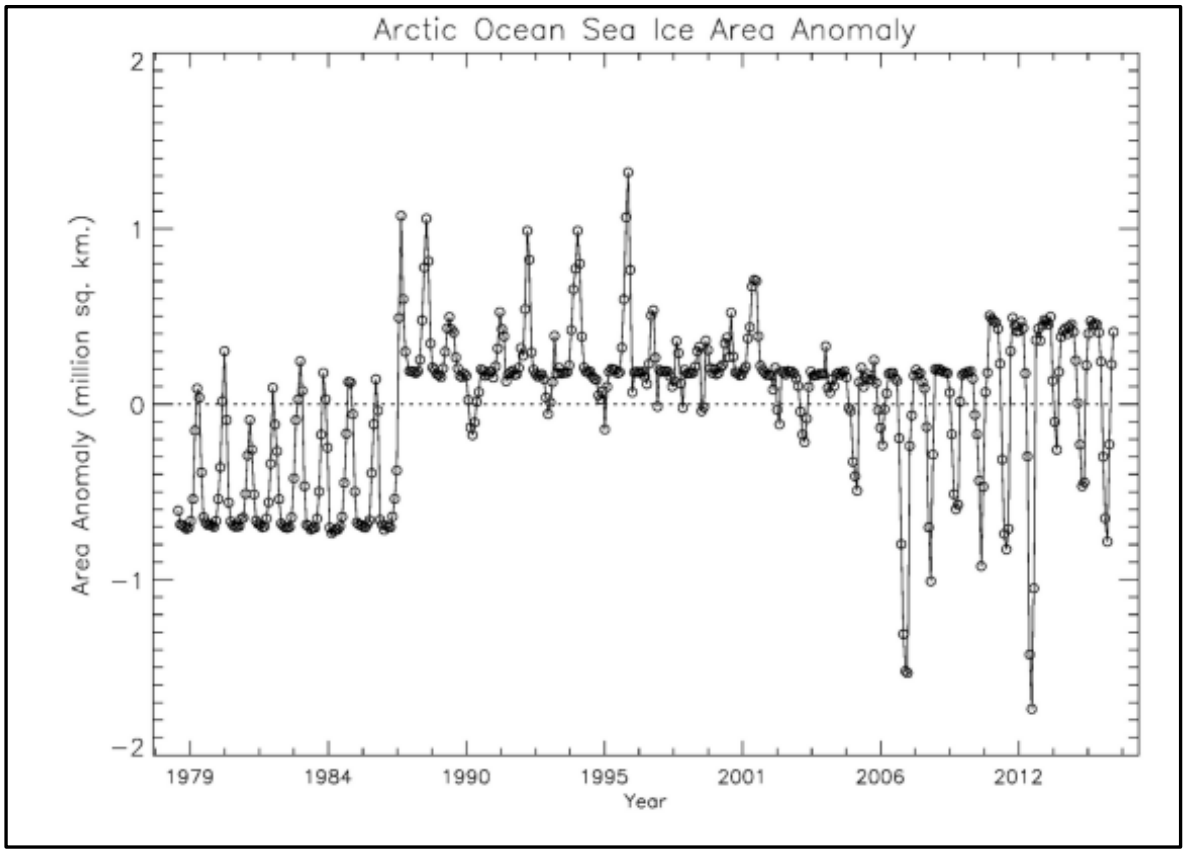

Figure 2. Total Ice-Covered Areas and Sea Ice Extent PNG Bootstrap Sample Data File for the Northern Hemisphere (gsfc.bootstrap.anomaly.area.Arctic-Ocean.1978-2015.n.png)

Refer to the following figures for Nasateam sample data images for the Total Ice-Covered Areas and Sea Ice Extent data files.

Year	Mon	Day	DOY	Ver	TotalAnt	Weddell	Indian	Pacific	Ross	BellAm
1978	10	26	299	v1.	13399033	4597097	2500219	1512812	2842652	1946251
1978	10	28	301	v1.	13460477	4652336	2472720	1507421	2857296	1970703
1978	10	30	303	v1.	13317781	4617049	2420854	1422710	2892206	1964959
1978	11	1	305	v1.	13134660	4491628	2400621	1390944	2846293	2005172
1978	11	3	307	v1.	13075505	4509183	2407130	1383612	2879340	1896238
1978	11	5	309	v1.	12840995	4516443	2404125	1308427	2781423	1830575
1978	11	7	311	v1.	12909917	4537097	2466660	1245990	2828219	1831949
1978	11	9	313	v1.	12796243	4610731	2393771	1152650	2853333	1785756
1978	11	11	315	v1.	12365925	4581102	2154145	1058240	2868564	1703873
1978	11	13	317	v1.	12048933	4518020	2041946	998647	2829181	1661138
1978	11	15	319	v1.	11908206	4541636	1989854	1010500	2675589	1690626
1978	11	17	321	v1.	11547705	4495555	1915322	909007	2609579	1618239
1978	11	19	323	v1.	11225740	4385814	1813098	832964	2557290	1636572

Figure 3. Total Ice-Covered Areas and Sea Ice Extent ASCII Text NASATEAM Sample Data File for the Southern Hemisphere (gsfc.nasateam.daily.area.1978-2015.s)

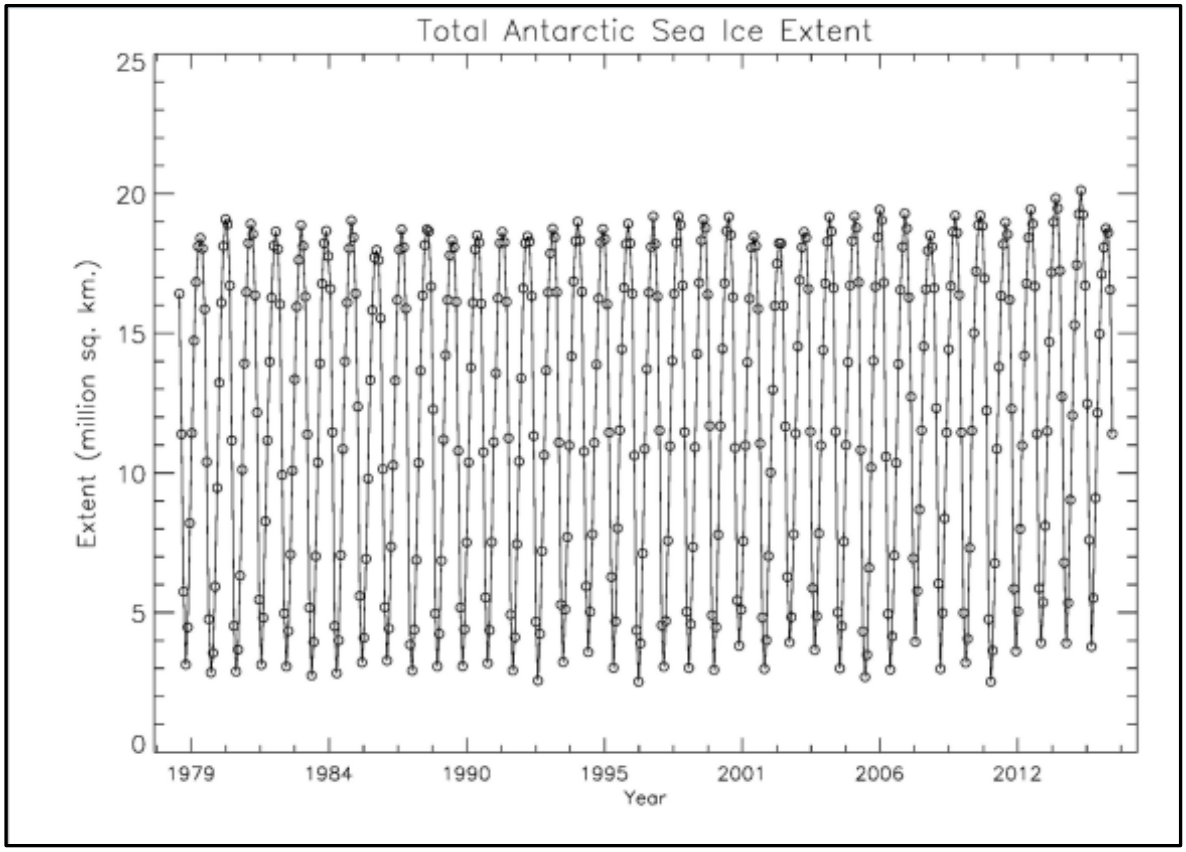

Figure 4. Total Ice-Covered Areas and Sea Ice Extent PNG NASATEAM Sample Data File for the Southern Hemisphere

Sea Ice Persistence

The next several images represent data images of the Sea Ice Persistence data files for both the Northern and Southern Hemispheres.

The coastal values in the binary files are outlined in red. The browse images in .png format include a color bar indicating the scale used for the persistence frequency.

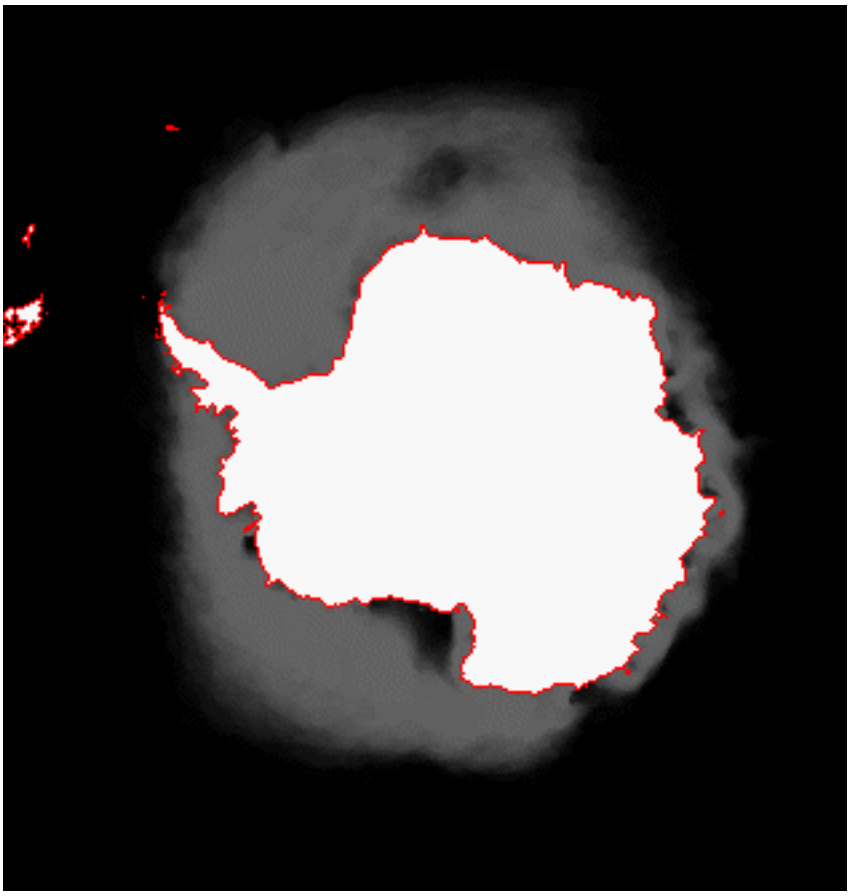

Figure 5. Sea Ice Persistence Binary Sample Data File of the Southern Hemisphere (persistence.dec.1979-2015.s)

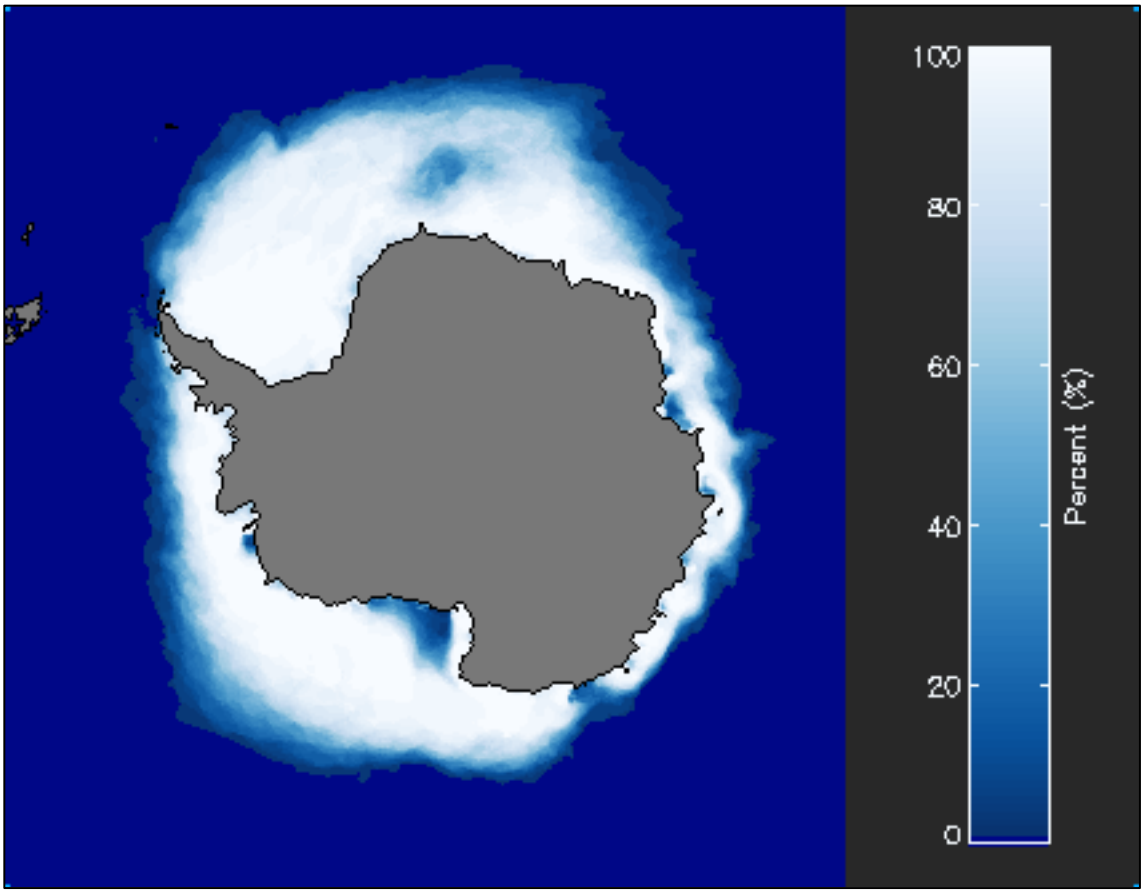

Figure 6. Sea Ice Persistence PNG Sample Data File of the Southern Hemisphere (persistence.dec.1979-2015.s.png)

Figure 7. Sea Ice Persistence Binary Sample Data File of the Northern Hemisphere (persistence.dec.1979-2015.n)

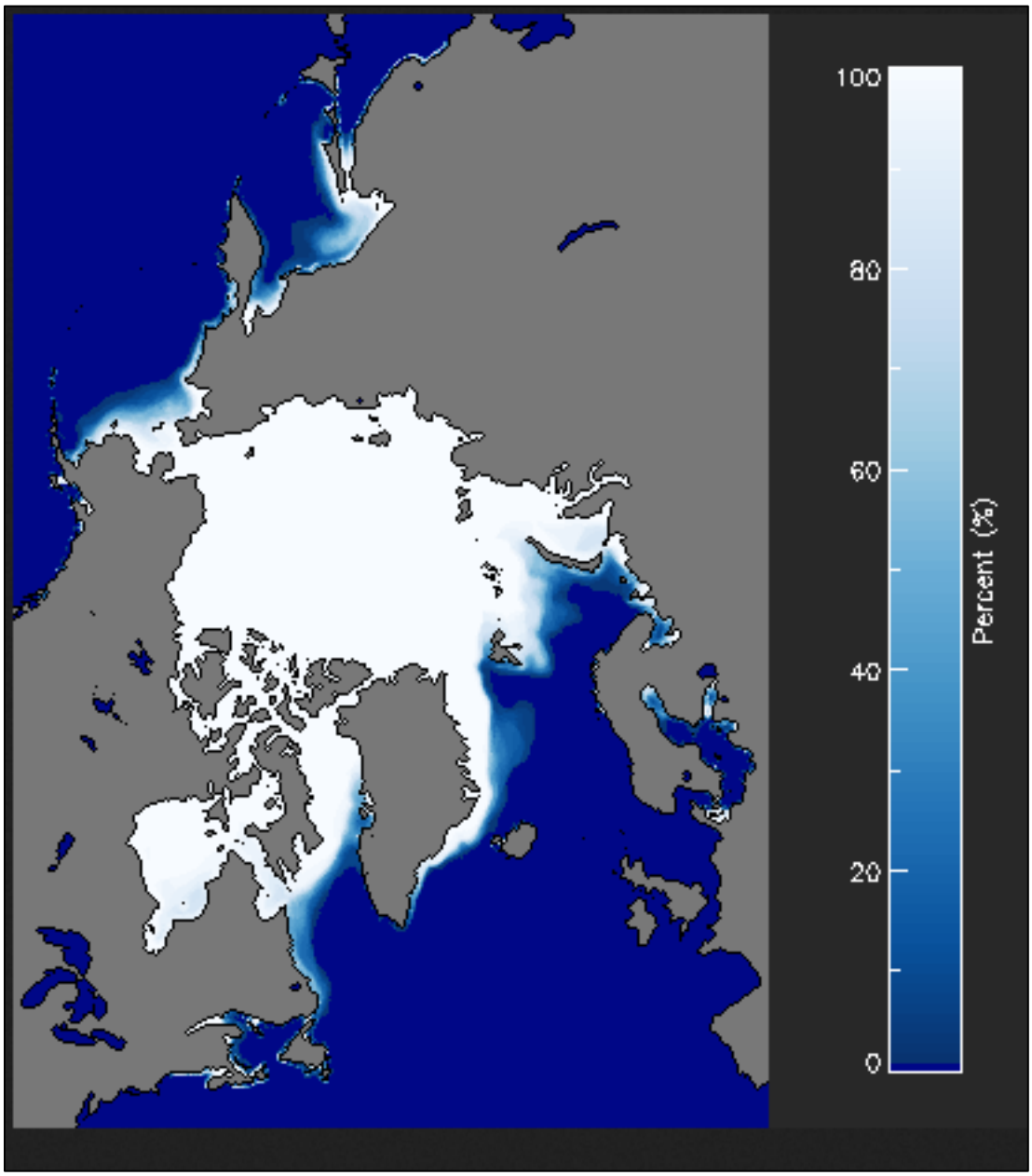

Figure 8. Sea Ice Persistence PNG Sample Data File of the Northern Hemisphere (persistence.dec.1979-2015.n.png)

Monthly Climatology of Sea Ice Concentration

The following images provide examples of sample data of the Monthly Climatology of Sea Ice Concentration data files for both the Northern and Southern Hemispheres.

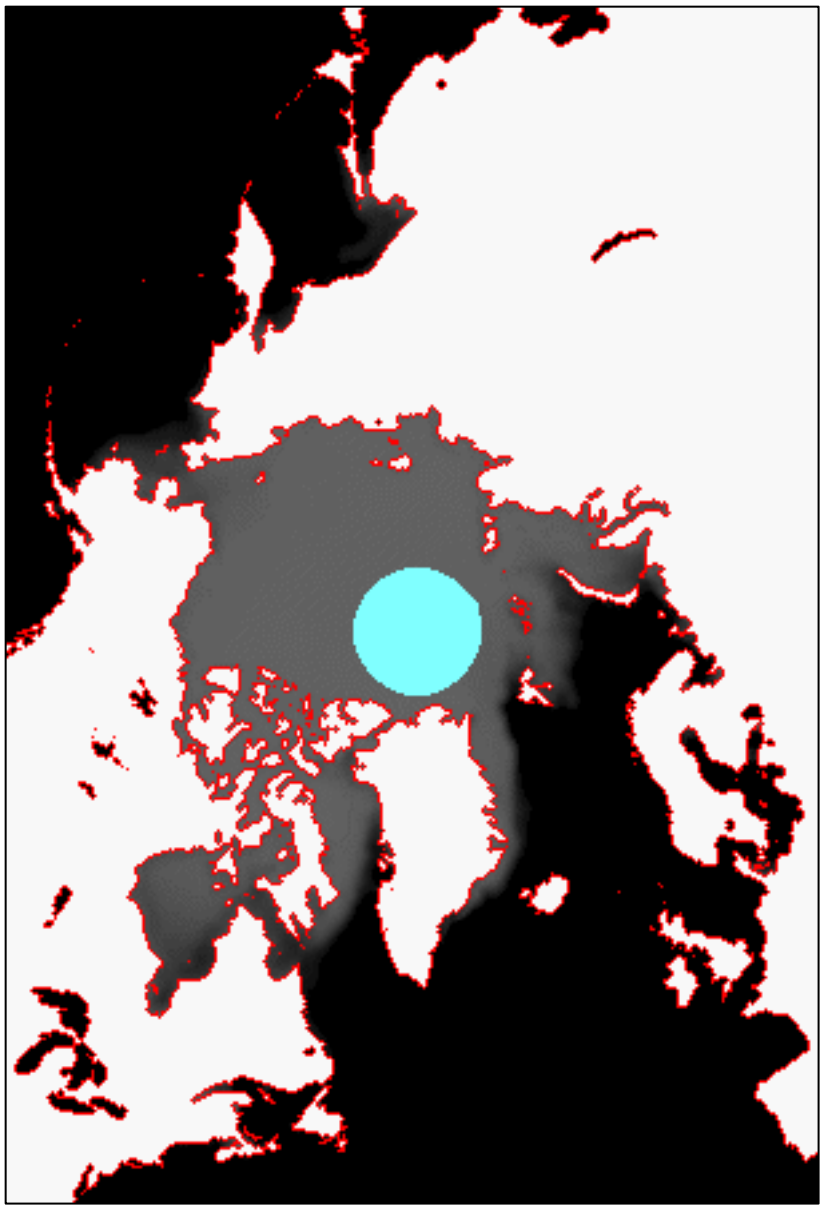

Figure 9. Monthly Climatology of Sea Ice Concentration Binary Sample Data File of the Northern Hemisphere

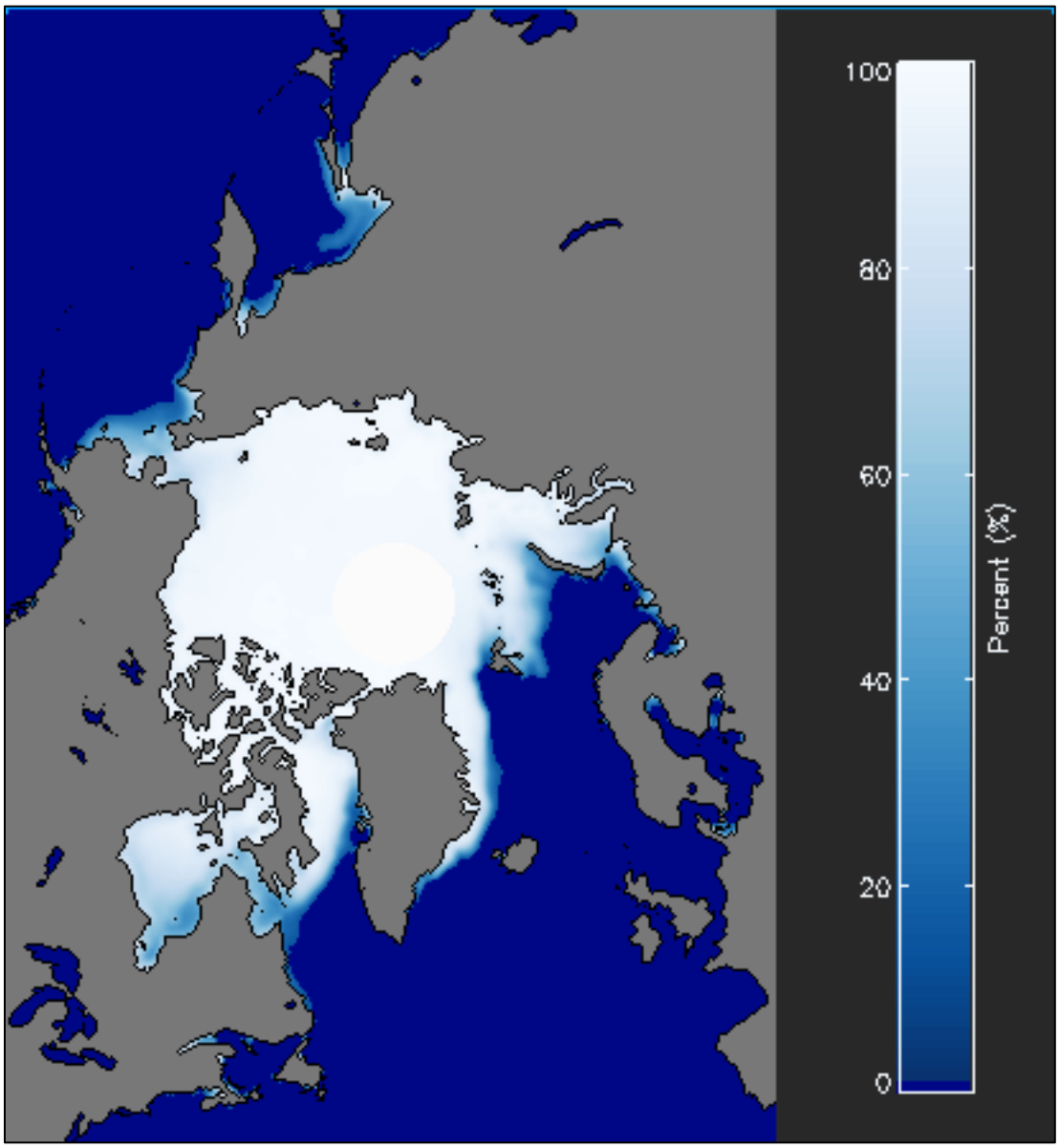

Figure 10. Monthly Climatology of Sea Ice Concentration PNG Sample Data File of the Northern Hemisphere

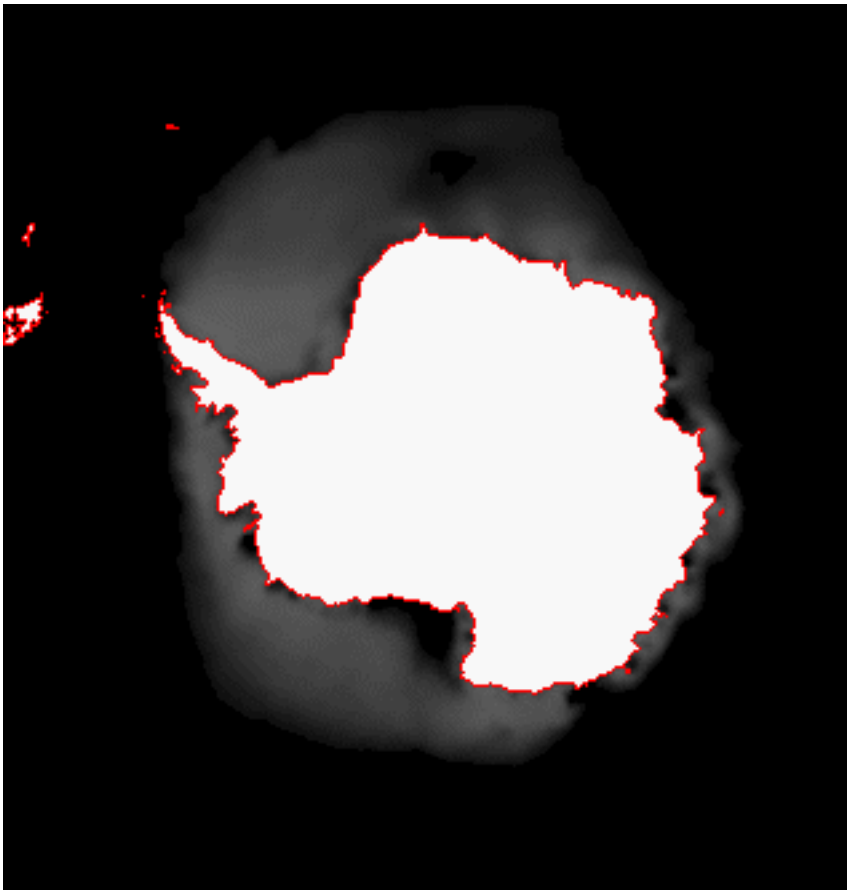

Figure 11. Monthly Climatology of Sea Ice Concentration Binary Sample Data File of the Southern Hemisphere (mean.dec.1979-2015.s)

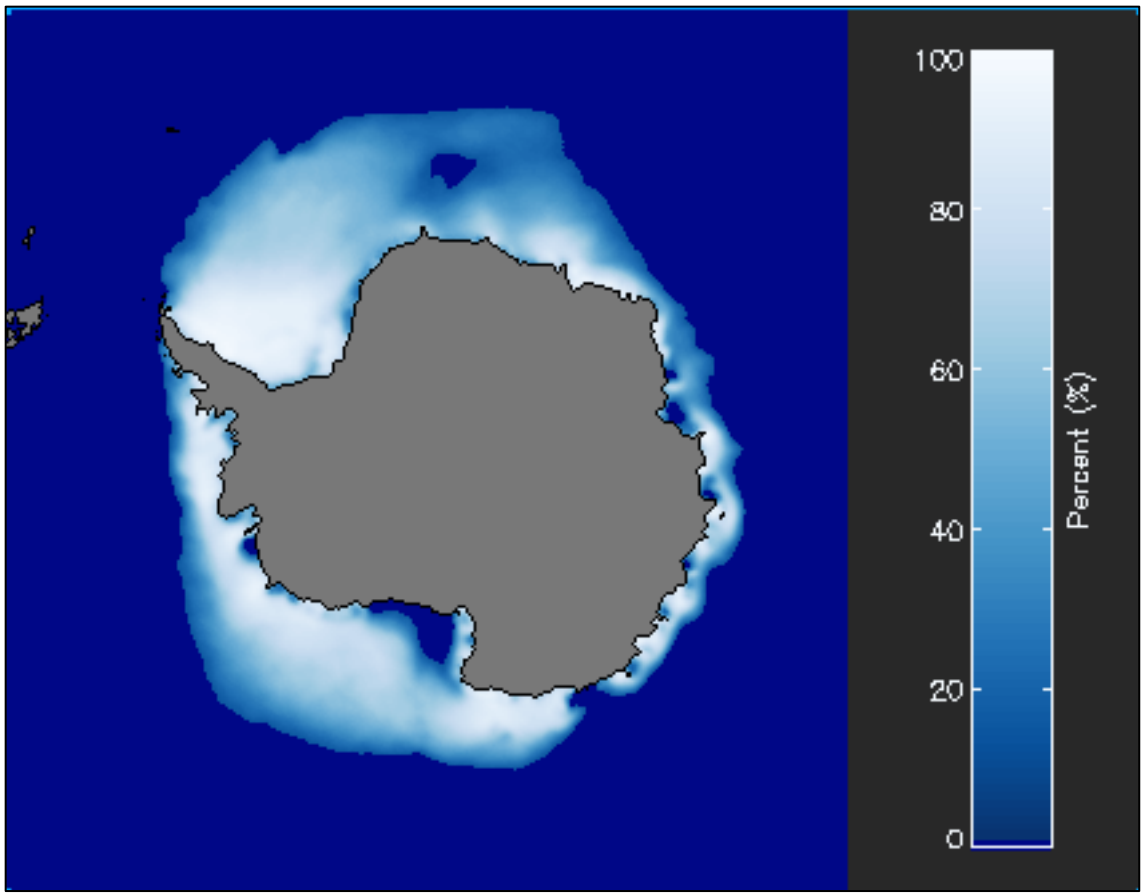

Figure 12. Monthly Climatology of Sea Ice Concentration PNG Sample Data File of the Southern Hemisphere

The files sizes may change slightly, but generally they are:

- 136,192 bytes for Northern Hemisphere data files
- 104,912 bytes for Southern Hemisphere data files
- 25-40k bytes for .png browse images

1.2.3 Directory Structure

This version of the data have been retired. Please access the most current data here: http://nsidc.org/data/nsidc-0192

Data are available on the HTTPS site in the https://daacdata.apps.nsidc.org/pub/DATASETS/nsidc0192_seaice_trends_climo_v2/ directory. Within this directory there are three folders:

ice-persistence/ - contains monthly climatologies of ice persistence binary data files and a browse/ folder with corresponding .png images of ice persistence

monthly-climatology/ - contains monthly sea ice concentration climatology binary data files and a browse/ folder with corresponding .png images of monthly climatologies

total-ice-area-extent/ - contains three sub folders:

bootsrap/ - this folder contains ASCII text data files and a browse/ folder with .png files of regional graphs showing monthly time-series plots of ice-covered area, area anomalies, ice extent, and extent anomalies (departures from the long-term averages)

esmr-smmr-ssmi-merged/ - this folder contains ASCII text data files of daily and monthly sea ice extent summaries from 01 January 1972 to 31 December 2002 for the Northern Hemisphere and 01 January 1973 to 31 December 2002 for the Southern Hemisphere

nasateam/ - this folder contains ASCII text data files and a browse/ folder with .png files of regional graphs showing monthly time-series plots of ice-covered area, area anomalies, ice extent, and extent anomalies (departures from the long-term averages)

1.2.4 Naming Convention

The following sections explain the file naming convention used for these data files with an example.

Ice Persistence Data Files

File Naming Convention: `persistence.mmm.1979-yyyy.h`

Example File Name: `persistence.apr.1979-2015.n`

Where:

Table 3. File Naming Convention for Ice Persistence Data Files

Variable	Description
persistence	Identifies this as an ice persistence data file
mmm	3-character month abbreviation
1979	First year for which data is available
yyyy	4-digit year of the last year for which data is available
h	Hemisphere (n: Northern, s: Southern)

Monthly Climatology of Sea Ice Concentration Data Files

File Naming Convention: `mean.mmm.1979-yyyy.h`
Example File Name: `mean.apr.1979-2015.n`

Where:

Table 4. File Naming Convention for Monthly Climatology of Sea Ice Concentration Data Files

Variable	Description
mean	Identifies this as a mean ice concentration percentage data file
mmm	3-digit month abbreviation
1979	First year for which data is available
yyyy	4-digit year of the last year for which data is available
h	Hemisphere (n: Northern, s: Southern)

Total Ice Area Extent Data Files

Bootstrap and Nasateam Files

This section explains the file naming convention used for these files with an example. The following file naming conventions pertain to both the NASA Team and Bootstrap algorithm data files. Data are provided in two different temporal resolutions: daily and monthly.

There are two different types of daily files: ice covered area files and sea ice extent files.

There are six different types of monthly files: ice covered area files, sea ice extent files, ice covered area anomaly files, sea ice extent anomaly files, monthly mean ice covered area files, and monthly mean sea ice extent files.

Monthly anomalies of ice-covered area and ice extent are calculated from monthly mean ice concentrations throughout the period of study. These anomalies show the deviations from the mean monthly values averaged over the entire time series.

File Naming Conventions

```
gsfc.algorithm.xxxx.area.1978-yyyy.h

gsfc.algorithm.xxxx.extent.1978-yyyy.h

gsfc.algorithm.xxxx.anomaly.area.1978-yyyy.h

gsfc.algorithm.xxxx.anomaly.extent.1978-yyyy.h

gsfc.algorithm.xxxx.mean.area.1978-yyyy.h

gsfc.algorithm.xxxx.mean.extent.1978-yyyy.h
```

Where:

Table 5. File Naming Convention for Total Ice Area Extent Files

Variable	Description
gsfc	Indicates that this is GSFC data
algorithm	Algorithm used to process the data (nasateam or bootstrap)
xxxx	Indicates that this file is either daily or monthly
anomaly	Indicates that this file contains the difference between the monthly data (area or extent) and the total monthly mean for the entire temporal coverage
area	Indicates that this file contains ice covered area measurements
extent	Indicates that this file contains sea ice extent measurements
1978	First year for which data is available
yyyy	4-digit year of the last year for which data was available
h	Hemisphere (n: Northern, s: Southern)

ESMR-SMMR-SSM/I-SSMIS-Merged Sea Ice Extent Files

Data are provided in two different temporal resolutions: daily and monthly.

Example File Names

gsfc.nasateam.extent.1972-2002.n
gsfc.nasateam.month.extent.1972-2002.n

File Naming Convention

gsfc.nasateam.extent.1972-yyyy.h
gsfc.nasateam.month.extent.1972-yyyy.h

Where:

Table 6. File Naming Convention for ESMR-SMMR-SSM/I-SSMIS-Merged Sea Ice Extent Files

Variable	Description
gsfc.nasateam	Indicates this is GSFC data processed with the NASA Team algorithm
extent	Indicates that this file contains sea ice extent measurements
month	Indicates that this file contains monthly averaged data (otherwise daily)
1972	First year for which data is available
yyyy	4-digit year (most recent year of processing)
h	Hemisphere (n: Northern, s: Southern)

Column Header Naming Conventions Used for ASCII Text Files

Total Ice Area Extent ASCII Text File Column Header Names

Data are in ASCII text format arranged in columns as described here:

Table 7. Column Header Descriptions for Total Ice Area Extent ASCII Text Files

Column	Description
Year	4-digit year
Mon	1-digit and 2-digit month
Day	1-digit and 2-digit day of month
DOY	3-digit day of year
Ver	Version number (pre: preliminary, v01: version 01, v02: version 02)
Region	The remaining columns of the Arctic and Antarctic daily area and daily extent files list the total ice-covered area (km^2) and total sea ice extent (km^2), respectively. The columns are labeled by region. Refer additional tables for abbreviations for the column names for the Arctic and Antarctic regions.

Table 8 lists the Arctic regions covered by this data set along with their abbreviations found in the data files. Table 9 lists the Antarctic regions covered by this data set along with their abbreviations found in the data files.

Table 8. Arctic Regions and Abbreviations

Arctic Region	Abbreviation in Data Files
Total Arctic	TotalArc
Seas of Okhotsk & Japan	Okhotsk
Bering Sea	Bering
Hudson Bay	Hudson
Baffin Bay	Baffin
Greenland Sea	Grnland
Kara and Barents Seas	BarKara
Arctic Ocean	ArctOcn
Canadian Archipelago	CanArch
Gulf of St. Lawrence	StLawr

Table 9. Antarctic Regions and Abbreviations

Antarctic Region	Abbreviation in Data Files
Total Antarctic	TotalAnt
Weddell Sea	Weddell
Indian Ocean	Indian
Pacific Ocean	Pacific

Ross Sea	Ross
Bellingshausen and Amundsen Seas	BellAm

Merged ESMR-SMMR-SSMI Sea Ice Extent ASCII Text File Column Header Names

Data are in ASCII text format arranged in columns as described in the following tables for daily and monthly data.

Table 10. Column Descriptions for Merged Daily Data Files

Column No.	Description
1	4-digit year
2	1-digit and 2-digit month
3	1-digit and 2-digit day of month
4	1-digit to 3-digit day of year
5	Observed/interpolated sea ice extent (10^6 km^2)

Table 11. Column Descriptions for Merged Monthly Data Files

Column	Description
Year	4-digit year
Months (remaining 12 columns)	3-character month abbreviation

1.3 Spatial Information

1.3.1 Coverage

N: -39.23, S: -90, E: 180, W: -180

N: 90, S: 30.98, E: 180, W: -180

1.3.2 Resolution

25 km x 25 km

1.3.3 Geolocation

Projection Description

Polar Stereo

Grid Description

For the Northern Hemisphere, the grid size is 304 x 448 pixels.

For the Southern Hemisphere, the grid size is 316 x 332 pixels.

1.4 Temporal Information

1.4.1 Coverage

26 October 1978 to 31 December 2015

2 DATA ACQUISITION AND PROCESSING

2.1 Background

There is a circular section over the Northern Hemisphere pole known as the pole hole, which is never measured due to orbit inclination. For the purposes of ice extent, pixels under the pole hole are always considered to be at least 15 percent. For total ice-covered area, the pixels under the pole hole are not used. The Southern Hemisphere also has a pole hole, but it does not affect this sea ice data set because there is only land under this hole. For SMMR, the hole is 611 km in radius and is located poleward of 84.5 degrees North. For SSM/I and SSMIS, the hole is 311 km in radius and is located poleward of 87.2 degrees North.

The difference in pole hole areas between SMMR and SSM/I-SSMIS results in a discontinuity in the Northern Hemisphere ice-covered area time series across the instrument transitions.

2.2 Processing

All data are derived from the Bootstrap Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS data set and/or the NASA Team Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data data set. Polar Stereographic Valid Ice Masks Derived from National Ice Center Monthly Sea Ice Climatologies are also used in the processing to remove spurious ice caused by residual weather effects and land spillover in passive microwave data. Processing Steps:

2.2.1 Total Ice-Covered Areas and Sea Ice Extent Data

In computing the total ice-covered area and ice extent data with both the NASA Team and Bootstrap Algorithms, pixels must have an ice concentration of 15 percent or greater to be

included. Total ice-covered area is defined as the area of each pixel with at least 15 percent ice concentration multiplied by the ice fraction in the pixel (0.15 to 1.00). Total ice extent is computed by summing the number of pixels with at least 15 percent ice concentration multiplied by the area per pixel; thus, the entire area of any pixel with at least 15 percent ice concentration is considered to contribute to the total ice extent. Anomalies are the difference between the current time period's average value and the long-term average. A positive anomaly indicates that the current period has greater extent or area than the average

2.2.2 Ice Persistence Data

Individual ocean pixels containing a minimum of 15 percent ice cover are summed throughout the time series. The maximum ice persistence value is 100 percent. Each pixel represents the percentage of years for which ice was present during that month. Only the NASA Team Algorithm is used to compute these data.

2.2.3 Monthly Climatology of Sea Ice Concentration

A threshold of 15 percent concentration is applied to the monthly climatology fields. Only the NASA Team Algorithm is used to compute these data.

2.2.4 Processing History

Table 12. Processing History Information

Version No.	Date	Description

2	January 2017	• Extended the temporal coverage of the data to December 2015.
		• Updated the data with input data from Version 1.1 of the Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data data set. An examination of the differences between the previous version of 0192 and the current version was performed.
		  • In the northern hemisphere, very small differences in sea ice extent were found: less than 0.2 percent for the NASA Team algorithm and less than 0.05 percent for the bootstrap algorithm.
		  • Differences in northern hemisphere sea ice area were also small. Most years had less than 0.05 percent. Differences in the Bootstrap sea ice area were generally less than 0.01 percent.
		  • For both the Bootstrap and NASA Team algorithms, the differences in the southern hemisphere were negligible.
		  • These small differences are found in the persistence and monthly climatology data also. The northern hemisphere monthly fields showed no difference in 95-98 percent of the sea ice values, and fewer than 0.02 percent of pixels had differences in ice concentration of greater than 2 percent.
		• Updated the data with input data from the Polar Stereographic Valid Ice Masks Derived from National Ice Center Monthly Sea Ice Climatologies data set.
		• Made improvements to the browse images.

1	28 July 2014	Reprocessing is complete and updated data are now available through 31 December 2013 for all *Sea Ice Trends and Sea Ice Trends and Climatologies from SMMR and SSM/I-SSMIS* data sets.

Version No.	Date	Description
1	04 September 2013	Reprocessing is complete and updated data are now available through 31 December 2012 for all Sea Ice Trends and Sea Ice Trends and Climatologies from SMMR and SSM/I-SSMIS data sets. With this update, the following changes have been implemented: Total Ice-Covered Area and Extent • The cutoff value which defines a region as ice-covered or not ice-covered has been adjusted from 14.8 percent to 15 percent to more closely match the methodology used to calculate other sea ice extent and area products at NSIDC. Ice Persistence and Monthly Climatology of Sea Ice Concentration (Monthly Means) • Includes the new 15 percent cutoff value described above. • To prevent inconsistencies between different algorithms, these parameters are now calculated exclusively using the NASA team algorithm. Monthly Ocean Masks and Maximum Extent Masks The ocean mask files and maximum extent mask files were removed as they are not the masks used in the production of these data sets. This most recent reprocessing also rectifies two previous releases of these data sets that contained erroneous data. In January/February of 2012, and May of 2013, the products were to have contained data from 2007 to 2010 and from 2010 to 2011, respectively. However, the climatology products contained data only through 2007. We recommend replacing previously downloaded 2010 and 2011 climatology data files with the climatology files that now extend through 2012. The Total Ice-Covered Area and Extent data set did contain post-2007 data, but reprocessed data utilizing the new methodology are available in the 2012 release.

2.3 Quality, Errors, and Limitations

2.3.1 Missing Data and Monthly Anomalies

Periods for which there are no available data are described in Table 13.

Monthly anomalies of ice-covered area and ice extent are calculated from monthly mean ice concentrations throughout the period of study. These anomalies show the deviations from the mean monthly values averaged over the entire time series.

Table 13. Missing Data

Time Periods	Data Type	Description
October 1978, December 1987	Sea ice	Sea ice data are missing for most days, so monthly values are not calculated for these months.
January 1988	Sea ice	January 1988 is missing data for the first half of the month. A value is given for this month, but the value may not represent true monthly mean since the sea ice data are incomplete.

2.4 Instrumentation

2.4.1 Description

For information regarding the sensors used for this product, refer to the SMMR, SSM/I, and SSMIS Sensors Summary.

3 SOFTWARE AND TOOLS

The gridded data files for the regions are on the Polar Stereographic Tools page.

4 RELATED DATA SETS

- Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data
- Bootstrap Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS
- Polar Stereographic Valid Ice Masks Derived from National Ice Center Monthly Sea Ice Climatologie

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7 DOCUMENT INFORMATION

7.1 Publication Date

July 2017

7.2 Date Last Updated

16 February 2021