



Environmental Working Group Joint U.S.-Russian Arctic Sea Ice Atlas, Version 1

USER GUIDE

How to Cite These Data

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

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National Snow and Ice Data Center

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1 DETAILED DATA DESCRIPTION

1.1 Overview

The Environmental Working Group (EWG) was established in June 1995 under the framework of the U.S.-Russian Joint Commission on Economic and Technological Cooperation. In January 1996, the EWG Arctic Climatology Group took on the task of compiling digital data on arctic regions to expand scientific understanding of the Arctic. This work resulted in a set of three atlases on CD-ROM. The one described here for sea ice plus two others: one for [Arctic oceanography](#) and one for [Arctic meteorology and climate](#). The contents of this CD-ROM are available for digital download from NSIDC FTP. Note: This online user guide is an overview of the Atlas and was prepared by NSIDC based on the complete documentation available as part of the digital download. Please refer to the [User Notes and Frequently Asked Questions](#) for important information on working with the atlas.

U.S. and Russian partners developed the EWG Joint U.S.-Russian Arctic Sea Ice Atlas. The U.S. Navy submarine and Meteorology and Oceanography (METOC) community strongly supported this project. The U.S. Arctic Submarine Laboratory and the National Ice Center (NIC)/Naval Ice Center (NAVICE)--a joint agency supported by the U.S. Navy, NOAA, and the U.S. Coast Guard--prepared the data. The Russian Arctic and Antarctic Research Institute (AARI) in St. Petersburg contributed sea ice data and analyses. The Environmental Research Institute in Michigan designed and compiled the CD-ROM and served as managing editor of the project. The EWG project goals were to use all available data, including previously restricted information, to improve understanding of arctic climatology; to use this information to validate General Circulation Models (GCMs); and to improve predictions of ocean pollution transport at high latitudes. The EWG Subgroup for Arctic Climatology worked to digitize and assemble a significant portion of the Russian hydrographic, sea ice, and meteorological data resources for the Arctic Basin and marginal seas; develop an atlas containing primary data and derived products; and to pursue scientific analysis of climatic forecasting and risk assessment.

The U.S.-Russian Joint Commission on Economic and Technological Cooperation initiated the EWG as part of a commitment in the U.S. and Russia to combine scientific strengths and previously restricted environmental data resources. A team of Russian and U.S. scientists, working together under the EWG, signed a protocol in St. Petersburg on 29 November 1995 to develop the oceanography, sea ice, and meteorology atlases. The EWG released oceanography atlases for winter and summer on 15 March 1997 and 15 March 1998, respectively. The EWG released this sea ice atlas and a meteorology atlas in October 2000 as a joint U.S.-Russian effort. The combined EWG Arctic Ocean data sets allow scientists to investigate many aspects of the Arctic that were previously inaccessible, particularly the heat balance and circulation of the complex arctic climate

system. The sea ice atlas is based on individual observations collected from 1950 to 1994 from Russian satellite data, ice stations, ice breakers, and airborne ice surveys. Developers also used U.S. satellite observations, airborne surveys, and declassified U.S. Navy submarine Upward Looking Sonar (ULS) data in the construction of this atlas. Particular data sources included operational ice charts from the U.S. National Ice Center (NIC) and the Russian Arctic and Antarctic Research Institute (AARI); ice drift products from the International Arctic Buoy Program (IABP); and sea ice draft products from the U.S. Navy Arctic Submarine Laboratory.

1.2 Atlas Contents

Please refer to the [User Notes and Frequently Asked Questions](#) for important information on working with the atlas.

The sea ice atlas provides a historical record of sea ice charts from both Russian and U.S. sources from 1950 to 1994. It provides coverage for all of the Arctic Ocean and adjacent regions poleward from 45 degrees north latitude. U.S. and Russian researchers developed a large database of historic thematic sea ice concentration charts. The Russian charts are based on a ten-day period of observation; the U.S. charts are based upon a seven-day period. The original charts are available in the atlas as both color maps and digital binary files. Monthly ice chart statistics are provided for each five-year period and the entire period of record. The atlas also contains a monthly sea ice climatology of median ice concentration and the number of years of occurrence. The latter climatology was derived from a combined set of unclassified seven-day sea ice charts and classified sea ice data from 1972 through 1990. Both nations digitized historical sea ice charts from paper records as part of the atlas effort. The atlas contains ice chart data in World Meteorological Organization (WMO) SIGRID format with detailed ice code descriptors for individual ice types and stages of ice development. Ice chart data are also available in the NSIDC EASE-Grid format with selected composite ice types and ice concentrations on a standardized grid and graphical chart.

The atlas also contains formerly classified ULS ice draft profile data collected by U.S. Navy submarines from 1977 to 1993. Developers processed these data to provide both track segments of detailed ice draft profiles and statistics, including probability density and cumulative distribution functions. The atlas provides over 200 individual track segments. See also the NSIDC data set, [Submarine Upward Looking Sonar Ice Draft Profile Data and Statistics](#). Note that ice draft statistics on the EWG Atlas may differ from those in the aforementioned data set, due to differences in processing methods. See [User Notes](#) for more information.

Finally, the atlas contains monthly ice motion fields for a 45-year period from a combined Russian and U.S. ice drift data set assembled from ice station, ice buoy, and ice breaker data.

1.2.1 Atlas Sections

The first three sections are on Disc 1 of the CD-ROM set (or the Disc 1 directory on the FTP site). Section 4, "Sea Ice Data Sets," is divided between Disc 1 and Disc 2. See the "Atlas Site Map" for an overview of the directory structure on both CD-ROMs. See the help file and [Frequently Asked Questions](#) for important information on working with the atlas.

Section 1. Introduction:

- Description of the EWG arctic climatology activity
- Description of the sea ice climate system
- Survey of arctic sea ice data. See [NSIDC Special Report 15: Data on the Geographical Distribution of Sea Ice](#) by R. Barry (PDF, 440 KB).
- Summary of sea ice characteristics based upon the Birdseye airborne reconnaissance data
- History of Russian sea ice investigations. See [NSIDC Special Report 16: Sea Ice In the Climate System: A Russian View](#) by V. F. Zakharov (PDF, 5.8 MB).
- Applications of submarine ULS data
- Snow on the arctic ice pack from drifting stations
- Abbreviated sea ice glossary based upon WMO definitions
- Extensive glossary of Russian sea ice terminology

Section 2. Descriptions of primary sea ice data sets and analysis methods:

- NIC seven-day sea ice charts, 1972-1994
- AARI ten-day sea ice charts, 1950-1992
- Explanation of the SIGRID data format
- Conversion from SIGRID to the EASE-Grid format
- NIC special sea ice climatology, 1972-1990
- Sea ice climatological statistics, 1972-1994
- Ice motion data and analysis methods
- U.S. Navy Submarine ULS data and analyses
- Arctic snow data from drifting stations

Section 3. Graphical atlas section containing two-dimensional color-coded ice charts and graphical products:

- NIC seven-day sea ice charts, 1972-1994
- AARI ten-day sea ice charts, 1950-1992
- NIC sea ice special climatology, 1972-1990
- Sea ice monthly statistics, 1972-1994
- Monthly ice motion maps, 1950-1994
- U.S. Navy submarine ULS statistical data and profiles

Section 4. "Sea Ice Data Sets" section (divided between Discs 1 and 2):

- EASE-Grid binary grids and SIGRID text grids for NIC seven-day sea ice charts, 1972-1994
- EASE-Grid binary grids and SIGRID text grids for AARI ten-day sea ice charts, 1950-1992
- EASE-Grid binary grids for NIC special sea ice climatology, 1972-1990
- Two-dimensional EASE-Grid binary grids for sea ice climatological statistics
- Original NIC seven-day sea ice charts, 1972-1994, in ArcInfo format
- Monthly ice motion binary grid, 1950-1997
- U.S. Navy submarine ULS metadata, ice draft profiles, and statistical data products
- Russian North Pole drifting station snow data

1.3 Spatial Coverage

The bounding coordinates of these data are the following:

Southernmost Latitude: 45° N

Northernmost Latitude: 90° N

Westernmost Longitude: 180° W

Easternmost Longitude: 180° E

1.4 Temporal Information

1 January 1950 to 31 December 1994

1.5 Parameter or Variable

The parameters of this data are the following:

- Ice Deformation
- Ice Depth/Thickness
- Ice Extent
- Ice Types
- Ocean Currents
- Sea Ice Age
- Sea Ice Concentration

2 DATA ACQUISITION AND PROCESSING

2.1 Data Acquisition Methods

Data sources for this product include the following:

- Operational ice charts from the [U.S. National Ice Center](#) and the Russian [Arctic and Antarctic Research Institute \(AARI\)](#)
- Ice drift products from the [International Arctic Buoy Program \(IABP\)](#)
- Draft products from the [U.S. Navy Arctic Submarine Laboratory](#)

3 RELATED PUBLICATIONS

3.1 Related Data Collections

- [Environmental Working Group Arctic Meteorology and Climate Atlas](#)
- [Environmental Working Group Joint U.S.-Russian Atlas of the Arctic Ocean](#)
- [Historical Sea Ice Atlas](#)
- [Global Digital Sea Ice Data Bank](#)

4 CONTACTS AND ACKNOWLEDGMENTS

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5 DOCUMENT INFORMATION

5.1 Publication Date

10 May 2001

5.2 Date Last Updated

December 2020