

ACSYS HISTORICAL ICE CHART ARCHIVE

(1553 - 2002)

USER GUIDE

User Guide

The data

All data are provided in Series ArcView shapefile format and are readily viewed using ArcView or ArcGIS software. (More information about this software and data format specification can be found at www.esri.com.) A shapefile consists of 3 files with extensions “.shp”, “.shx”, and “.dbf” and all must be present in the same directory in order to view them. Two additional files “.sbn” and “.sbx” may be present but are not required.

The data are organized by date in appropriate directories on the CD-ROMs. Between 1550 and 1800 directories contain data for the following 50 years. For example, data in the directory “1550” cover the period from 1550 until 1599. From 1800 until 1960 data are archived every decade, i.e., the directory “1800” contains data from 1800 until the end of 1809. From 1966 to the present each directory contains data from the corresponding year. This structure reflects the increasing frequency of ice observations and increasing regularity of ice chart production with time. A brief overview of the directory structure is given in Figure 3.

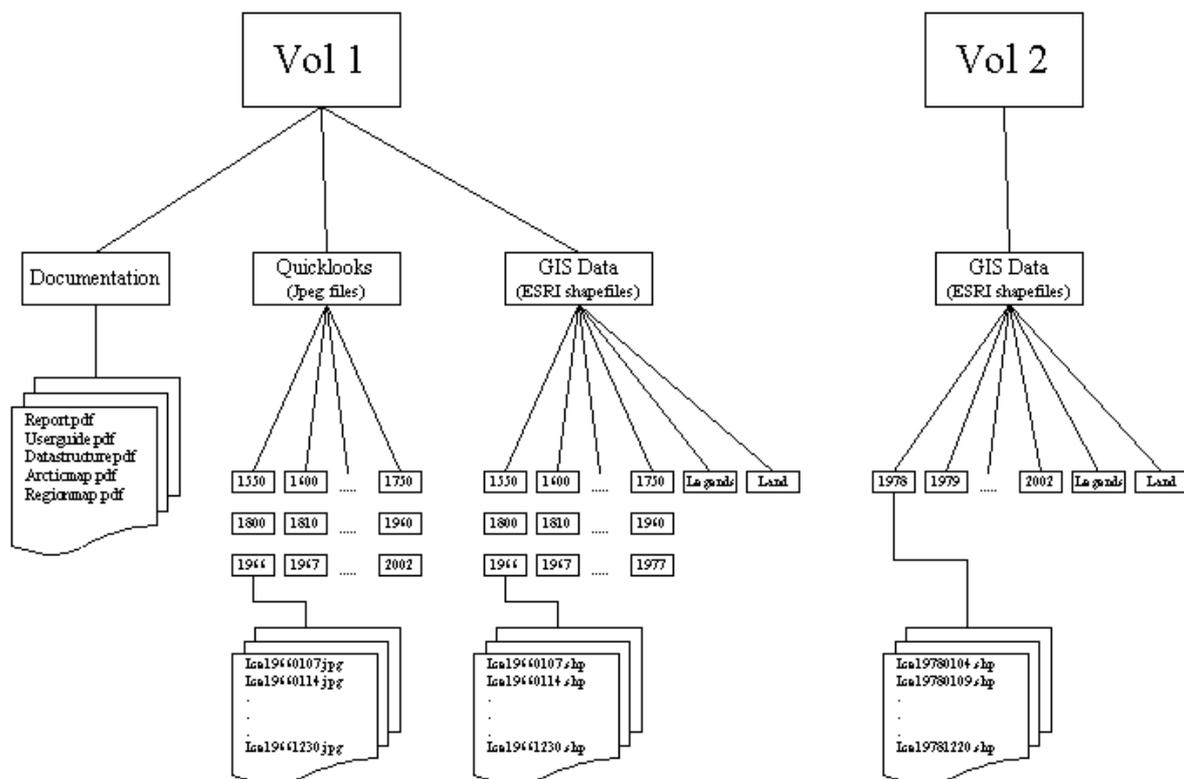


Figure 3. Overview of the directory structure of the archive. Prior to 1966, Quicklook and GIS data filenames are not prefixed by 'Ice'. GIS data also contain files with the extensions “.shx” and “.dbf”, and these must be present to view the files with ESRI software. 'Legend' and 'land' files are also for use with ESRI software, to allow information on ice types to be displayed more clearly, and to allow land to be viewed on shapefiles from July 1997 onwards. (See 'User Guide' text for details.)

Users may wish to copy all data from the two CD-ROMs to a computer hard disk to ease data access and retrieval.

Filenames

Filenames contain the date for which the ice chart is valid. From 1550 until 1965 the filename only contains the date, and from 1966 onwards the date is preceded by the prefix “ice”. The date format is “yyyymmdd”. For example, the file “18660422.shp” contains the ice chart for the 22nd of April 1866, while “ice20020103.shp” contains the ice chart for the 3rd of January 2002 (Figure 4).

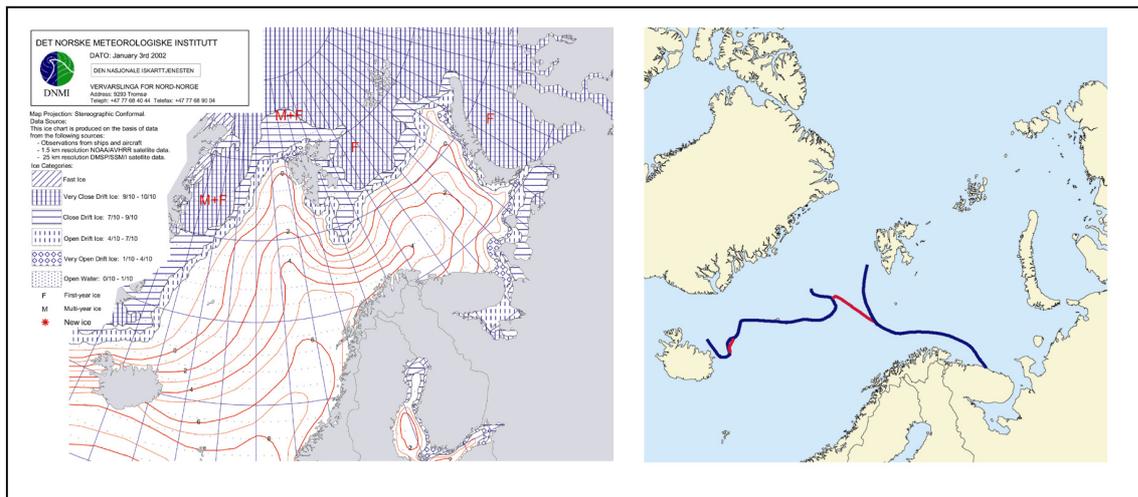


Figure 4. Examples of ice charts from 2002 and 1866. Colour of the ice edge on the 1866 chart (right) indicates different codes (see text ‘Information on the maps – Codes’).

Quicklooks

“Quicklooks” for all ice charts are provided under the “Quicklook” directory and sorted by date as described above. The quicklooks are in “jpeg” format and should be readily viewable in any standard graphics software. File names contain the date in “yyyymmdd” format in the same manner as for the full chart, but with the extension “.jpg”.

Viewing shapefiles

The data set has been compiled using ArcView and it is therefore recommended that the ice charts are viewed using one of the ESRI products: ArcView, ArcInfo or ArcGIS. Many other GIS software products exist and most have import utilities for handling shapefiles. The ability to import and handle shapefiles is obviously a minimum requirement of the GIS software for it to be used with this database.

Ice charts since 1997 do not include land. It is therefore necessary to add a land file to your view to create a mask over land areas. The shapefile “country.shp” supplied with the free data from ESRI is included on the CDrom for this purpose.

A basic understanding of their own software package on the part of the users is assumed and details are not given here. For detailed descriptions of tools and functions in ArcView or other GIS software, the user should refer to the software documentation.

For ArcView users a number of legend files are included on the CD-ROM in the “Legend” directory. These files have the extension “.avl”. For ice charts from before 1967 “leg_1550_1966.avl” should be used as these charts are simply lines displaying the position of the ice edge, as described in ships logbooks. From 1967 until July 1997 the charts use a format digitized at the Norwegian Polar Institute,

and “leg_1967_1997.avl” should be used. From July 1997 to present, use “leg_1997_2002.avl” since these files adopted a new format when the Norwegian Meteorological Institute began producing daily, digital ice charts. For these more recent charts (1967 onwards) sea ice is denoted by closed polygons and attributed an ice concentration.

To make use of the legend files on the CD-ROM:

- 1) Open a view in ArcView and add the ice chart shapefiles you wish to display.
- 2) In the table of contents on the left hand side of the view, double click on an ice chart to open the legend editor.
- 3) Click on the button “Load” and then navigate to the directory containing the legend files and select the appropriate file corresponding to the chart’s date, as described above.

For users of other software packages it will be necessary to create a legend within their own package to obtain the best view of the data.

Information on the maps - Codes

For all charts, codes are associated with each digitized line characterizing the ice conditions inward from this line. It is important to note that this coded attribute data associated with the ice charts varies for different periods.

From 1553-1965 two attributes are associated with each chart. The first attribute, “ice_cond”, assigns a code to the ice concentration, which can be found in Table 1 below. The second attribute, “source”, assigns a code to the ice line describing the origin of the data, as shown in Table 2 below.

Data from 1966 contains the single attribute, “ice_cond”, as described above.

Data from 1967 to June 1997 contains the two attributes, “ice_cond” and “source”, as described above, and a third attribute called “Ice_type”. This third attribute is an attempt to assign the equivalent attribute used in current Norwegian Meteorological Institute ice charts to the corresponding “ice_cond”.

From July 1997 a single attribute, “Ice_type”, is used to describe the ice concentration. These values are described in Table 3 below.

To retrieve attribute information about either ice lines or areas:

- 1) Click on the ice chart in the table of contents in the view to select it.
- 2) Select the “identify” tool (the leftmost tool in the ArcView View menu).
- 3) Click on the line or area for which you wish to see information.

Table 1: Ice concentration codes for ice charts from 1550-1997, given by the first two numbers attached to each line.

Number	Concentration	Description
01	10/10	Fast ice
02	9/10-10/10	
03	7/10-8/10	
04	4/10-6/10	
05	1/10-3/10	
06	> 6/10	Young ice
07	> 6/10	Grease ice
08	< 6/10	Young ice
09	< 6/10	Grease ice
10	< 1/10	Open water

Table 2: Data source used for compilation of ice charts.

0 or 1	Satellite pictures (after 1966).
2	US ice maps (Birds Eye aircraft 1960-1971 and Joint Ice Center from 1972).
3	Other second hand sources, e.g. notes/collections from earlier reviews, such as 'Detailed information on ice conditions in the seas near Spitsbergen and Bjørnøya, 1899-1923' probably by Adolf Hoel.
4	Probable line based on a general description or observations before and after the date.
5	Assumed line, not digitized (Appears only on the maps used for digitization).
6	Radar aircraft observations. Russian 1950-1970. American 1960-1970. Norwegian 1963 onwards
7	Visual aircraft observation.
8	Ship observation, original or documented. 274 ice maps were drawn by Adolf Hoel on the basis of observations from sealers 1853-1922 (originals in the collection of hand written material at the Norwegian University Library in Oslo, copies at the Norwegian Polar Institute). 170 meteorological observation books from sealers and merchant ships in the European Arctic 1864-1922 (originals at the Norwegian Meteorological Institute, copies at Norwegian Polar Institute).
9	Observations from land stations (Bjørnøya, Hopen, Isfjord Radio, and Jan Mayen since 1963, or from earlier wintering stations in the Svalbard Archipelago).

Table 3: Ice concentration codes for ice charts from 1997-2002

Ice Type	Concentration
Fast ice	100% land fast ice
Very Close Drift Ice	90% - 100%
Close Drift Ice	70% - 90%
Open Drift Ice	40% - 70%
Very Open Drift Ice	10% - 40%
Open Water	0% - 10%