

# **SIGRID Format for Gridded Sea Ice Data**

Secretariat of the World Meteorological Organization – Geneva – Switzerland

1989

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## 4. Specification of Symbolic Letters

In this report the symbolic letters are typed in italics: letters used as indicators on the tape record are printed in normal letter style. The following specifications of identifiers and symbolic letters are given in the order in which they appear in the record.

SIGRIDINF - identifier of header file

: - start of a new information group

AA - area or country from which the data originate (See WMO Pub No. 365, Part 11, Attachment 11-6, Table 8)

FcFc - Centre, Service or institution from which the data originate (table to be established)

NN - Catalogue number of grid used (See WMO Pub. No. 9, Volume 3). If the grid specification is not included in this publication, the grid can be defined by the following groups identified by the letters A, B and C. Use in this case NN = 099

( ) - If the grid is specified by means of a WMO catalogue number, groups within parentheses are omitted.

A B C ...R - indicators

QcLaLaLaLaLoLoLoLoLo - latitude and longitude of origin (starting point) of a geographical grid. The grid lines are scanned towards increasing latitudes (south to north in the Northern Hemisphere and north to south in the Southern). The grid points are scanned from west to east along grid lines (applies to the Southern as well as the Northern Hemisphere)

nlnl - maximum number of grid lines (along meridian)

nnpnp - maximum number of grid points (along parallels)

dldldl - mesh width of grid (distance between grid lines along meridians) in degrees and minutes.

NtNt - total number of sea ice parameters occurring on the charts

PtPt...PtPt - identifiers of all sea ice parameters occurring on the charts

SIGRIDNN - identifier of Chart Data File with sequential number (NN)

JJJ - century, decade and year (e.g. 982 = 1982)

MM - month of the year; from 01 to 12

YY - day of the month, from 01 to 31

GG - time of chart in whole hours, GMT

GpGp - period (+/- whole hours) of observations on which chart is based

NsNs - serial number of chart (determined by national center)

NpNp - number of sea ice parameters included in each grid point without being separately identified in these points (see note 1).

PiPi...PiPi - identifiers of sea ice parameters and order in which they are included in each grid point without being separately identified in these points (see note 1).

PIPI - identifier of sea ice parameters defined individually for actual chart

Np - number of parameters defined by PIPI

Nn - number of digits per parameter defined by PIPI

= - sign that identifies the start of grid line record

ll - longitude/latitude mesh width ratio (example: distance between grid lines (N-S) 2 degrees, distance between grid points (E-W) 4 degrees,

ll = mmmppp - coordinates of first grid point of a grid line, expressed as the number of grid points along the meridian (mmm) and along the parallel (ppp) counted from the origo (the origo has the coordinates 001001)

NpNpNp - number of grid points on grid line

: - start of data group indicator, used to separate data groups

GI - grid subdivision indicator

NrNr - number of consecutive grid points for which the identical information is repeated. (The RNrNr should not occur when the information only refers to one point). When, for instance RnrNr = RO2, the actual and the following point contain identical information.

PiPi - identifier of sea ice parameter within a data group. The data group may include one or several sea ice parameters all identified by PiPi, unless all grid points contain the same parameters in which case the parameters are identified in the Header Record (see Note 1).

## 5. Data Groups

A data group consist of one or several sea ice parameters which correspond to a grid point. The parameters in a data group are representative for one mesh rectangle (for instance a geographical rectangle where the length along the parallels is 2 degrees and along the meridians 1 degree). the grid point is in the middle of the rectangle. The parameters are divided into nine main categories which contain one or several sub-elements.

The sea ice parameters are defined according to the new International System of Sea Ice Symbols. Each parameter is identified in the record by two letters, e.g. CT (total concentration of ice). The first letter identifies the category of the parameter while the second identifies parameters within the category. In the following tables the letters B,C,D,E,L,O,R,S,T and W are used as category indicators; the rest of the alphabet is left for future use.

The letters X, Y and Z are however reserved for use by individual services should they wish to include parameters not contained in the internationally agreed list. The X, Y, and Z may be used together with any other letter of the alphabet. The use of X, Y, Z should be clearly explained in the Tape Header File at the beginning of each tape. The number of parameters defined in the following tables is 53.

The following categories are proposed for general use:

Category Element Indicators:

c - Concentration, stage of development and form of ice (including strips and patches)

D - Dynamic processes

v - Water openings

R - Topography features

E - Thickness of ice

s - Surface features and melting forms

B - Ice bergs or ice of land origin

T - Sea surface temperature

0 - Source of information on which chart is based

L - Land area

## 6. Identification of parameters within a data group

In order to identify unambiguously a parameter within a data group, each parameter is defined by an identifier. The identifier can be used in the header record to define the parameter or parameters and the order in which they appear at each grid point. The identification of parameters in the header record shall be used when they occur at all or most of the grid points. Parameters not occurring at most of the grid points could preferably be identified at each grid point.

It should be noted that the recording of parameters on a tape record is less subject to space restrictions than are their coding for telecommunication reports or plotting in the form of symbols on a sea ice chart. For archiving purposes, there is a greater freedom of choice of the number of digits to be used to record a parameter; this facilitates later processing of the data. Thus, for the recording of for instance, sea ice concentration, two digits are proposed.

The following parameter identifiers are defined:

- Concentration
- Stage of development
- Form of ice

According to the New International System of Sea Ice Symbols, seven cases need to be distinguished. LL identifies grid points over land.

1. CT- Total concentration, CC (code table 1)
2. CA - Partial concentration, stage of development (or thickness) and form of thickest ice  
CaCaSaSaFaFa (code tables 1, 2 and 3)
3. CB - Partial concentration, stage of development, and form of second thickest  
ce,CbCbSbSbFbFb (code tables 1, 2 and 3)
4. CC - Partial concentration, stage of development and form of third thickest ice, cCcScScFcFc  
(code tables 1, 2 and 3)
5. CF - Predominant FpFp and secondaryFsFs form of ice (code table 3)
6. CN - Stage of development of ice thicker than reported by SaSc, but with a concentration less than 1/10, SoSo (code table 2)
7. CD - Stage of development of any remaining class of ice, SdSd, not reported under CA, CB or CC (code table 2); note that no concentration or form of ice is reported for SoSo and SdSd  
Coding: CTCC CACaCaSaSaFaFa CBCbCbSbSbFbFb CCCcCcScScFcFc (CFFpFpFsFs)  
CNSoSo CDSdSd

## 7. The Grid Layout

Provision is only made for one type of grid, the geographical. This in order to facilitate the compilation of data from different centers, which cover over-lapping geographical areas. The following definitions are used in this report:

**Grid Line:** Line connecting all grid points having the same latitude

**Grid Point:** A point in the middle of a square or rectangle where the dimension corresponds to the mesh width along parallels and meridians. The distance between the grid points corresponds to the above mesh width. The ice information for a grid point is representative for the grid square in which the grid point lies.

**Data Group:** Group which contains information on one or several ice parameters relative to one grid point (or several consecutive grid points with identical information on a grid line).

**Mesh Width:** The length of the sides of the rectangles, in the middle of which the grid point lies. The sides of the rectangle will in most cases have different lengths in a geographical grid (e.g. 2 degrees along parallels and 1 degree along meridians).

**Scanning Mode:** the order in which the grid points are scanned. In a geographical grid the grid points are scanned along grid lines from west to east (0 to 360 degrees). The grid lines are scanned towards increasing latitudes (south to north in the Northern Hemisphere and north to south in the Southern).

## 8. Positioning of the Grid

A grid will consist of a number of sequential grid lines along which lie a number of sequential grid points. The grid covers an area from 67 degrees N to 83 degrees N and 33 degrees W to 40 degrees E corresponding a Norwegian ice chart. The grid squares have a mesh width of 2 degrees Long. X 1 degree Lat from 67 degrees N to 75 degrees N and 4 degrees Long. X 1 degree Lat. from 76 degrees N to 83 degrees N. The origin is placed in the lower left corner. The grid lines are numbered and scanned from south to north and the grid points from west to east. When digitizing a chart, the "coordinates" of the first point on each grid line shall be given, e.g. 008007. This would mean that the first point on grid line 008 to be scanned is No. 007.

To identify a grid the following information is needed:

- the coordinates of the origin
- the mesh width (grid distance) along meridians which is constant for each chart
- the longitude/latitude ratio for each grid line (this will allow the ratio long/lat to be changed when moving along the meridians)

The following ratio (Long/Lat) is recommended if mesh width along meridians is 60 nm (1° lat):

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|              |                      |
|--------------|----------------------|
| 00° - 50°    | - 1 (60 nm - 39 nm)  |
| 50° - 75°    | - 2 (77 nm - 31 nm)  |
| 75° - 80°    | - 4 (52 nm - 42 nm)  |
| 80° - 85°    | - 6 (63 nm - 31 nm)  |
| 85° - 87°    | - 12 (63 nm - 38 nm) |
| 87° - 89°    | - 20 (63 nm - 21 nm) |
| 89° - 89°30' | - 40 (42 nm - 21 nm) |
| 89°30' - 90° | - 80 (42 nm)         |

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## 9. Variation of Grid Resolution

The information contained in an ice chart will generally not be evenly distributed. Over large areas the conditions may be fairly uniform and a coarse grid may suffice here. In other areas more detailed information may be shown, especially along coast lines and along the ice edges. A more detailed recording of information in such limited areas without having to use a fine grid for the entire chart is made by the insertion of local subdivisions of the grid. The subdivision is then indicated by a "subdivision indicator."

Three levels of subdivisions have been provided for, with a view to dividing the original grid square into four, nine or 16 areas. The basic grid may be defined as "first order" and the following finer meshes as second, third and fourth respectively. The number of sub-areas for each of these orders will be  $2^2 = 4$ ,  $3^2 = 9$  and  $4^2 = 16$ .

Example: a geographical grid has a basic mesh width of 1 latitude by 2 longitude; the second order will have 4 grid squares with a mesh width of 1/2 latitude by 1 longitude, the third order 9 grid squares with a mesh width of 1/3 latitude by 2/3 longitude, and the fourth order 16 grid squares with a mesh width of 1/4 latitude by 1/2 longitude. Expressed in degrees and minutes this would be 1 x 2, 30' x 1, 20' x 40', and 15' x 30'. The grid subdivision is indicated by a subdivision indicator which for the basic grid is set to 1, second order to 2, third order to 3 and fourth order to 4.

## 10. Example Grids

As an example of gridding and digitizing a sea ice chart, the Norwegian ice chart from 1 October 1979 was chosen. The mesh width of the grid is constant 1 degree along the meridians and 2 degrees along the parallels south of 75 degrees N and 4 degrees north of 75 degrees N. The origo of the grid lies at 67 degrees north, 33 degrees west. The sea ice information has only been digitized for two grid lines 009 and 010. In Example 1 each parameter is identified at each grid point, while in Example 2 the parameter CT (total concentration of ice) is defined in the Header Record and identified at each grid point by its position.

### Example 1. Digitized Norwegian Ice Chart of 1 February 1979

SIGRIDINF

:NOMI:099:A7670003300:B018036:C0100:D05CTCAWFWDTT

SIGRID01

:E97902011200:F009

=K02:L009007:M032

:R02CT92CA929908:RO3CT90:407CT80:N2CT80:CT402F6WD3

:CT00:CT60WF6WD7:CT00:TT000:TT010:TT015:N2CT10:TT000:TT005

:CT40WF6WD7:CT50WF6WD7:RO3CT80:N2CT40:CT20WF6WD5:CT80:CT70

:CT30WF6WD1:R02CT20WF6WD2:CT60WF6WD3:CT70:RC2CT90:R02CT80

=K04:L010004:M016

:CT92CA929908:R02CT90:CT90:CT80:CT60WF6WD3:CT0CTT005

:CT01TT005:N2CT0155005:CT40WF6WD4:CT60WF6WD7:CT00

:CT70WF6WD3:R02CT80:CT90:R04CT90

=k04:L011004:M016

:99:99:99

### Example 2. Digitized Norwegian Ice Chart of 1 February 1979

SIGRIDINF

:NOMI:099:A7670003300:B018036:C0100:D05CTCAWFWDTT

SIGRID01

:E97902011200:F0009:G01CT

=K02:L009007:M032

:R0292CA929908:R0390:R0780:N280:40WF6WD3:00:60WF6WD7:00

:00TT000:00TT01000TT015:N210:00TT000:00TT005:40WF6WD7

:50WF6WD7:R0380:N240:20WF6WD5:80:70:30WF6WD1:R0220WF6WD2

:60WF6WD2:70:R0290:R0280

=k04:L010004:M016

:92CA929908:R0290:90:80:60WF6WD3:00TT005:01TT005:N201TT005

:40WF6WD4:60WF6WD7:00:70WF6WD3:R0280:90:R0490

=K04:L011004:M016

:99:99:99

## 11. Explanation of the Code Figures

NO = Norway

MI = Meteorological Institute

099 = Geographical Grid with definitions

A7670003300 = Coordinates of origo (67 00' N, 3300' W)

B0018036 = number of grid lines (18) and number of grid points (36)

C0100 = Grid mesh (1 degree along meridians)

D05CTCAWFWDTT = Total number of parameters (5) and identifiers

E97902011200 = Date of chart (1 February 1979 12 GMT)

F009 = Serial number of chart (no 9/1979)

G01CT (example 2) = Number of parameters (1) and parameter in each grid point

K02 = Ratio between longitude and latitude (2 long/1 lat)

L009007 = coordinates of starting point of grid line

M032 = number of grid points along grid line

R02 = number of grid points for which the same data apply (two grid points)

CT92 (example 1) = total concentration = 10/10

92 (example 2) = total concentration = 10/10

CA92 = Partial concentration of thickest ice = 10/10

99 = stage of development of ice unknown

08 = form of ice = fast ice

R03 = number of grid points for which the same data apply (three grid points)

CT90 (example 1) = total concentration = 9/10

90 (example 2) = total concentration = 9/10

R07 = seven consecutive grid points are identical

CT80 (example 1) = total concentration = 8/10

80 (example 2) = total concentration = 8/10

N2 = grid square subdivided into four subsquares

CT80 (example 1) = total concentration in first subsquare = 8/10

80 (example 2) = total concentration in first subsquare = 8/10

CT40 (example 1) = total concentration = 4/10

40 (example 2) = total concentration = 4/10

WF6 = form of water opening = ice edge (6)

WD3 = orientation of ice edge = SE - NE (3)

CT00 (example 1) = open water

00 (example 2) = open water

CT60 (example 1) = total concentration = 6/10

60 (example 2) = total concentration = 6/10

WF6 = form of water opening = ice edge (6)

WD7 = orientation of ice edge = NW - SE (7)

CT00 (example 1) = open water

00 (example 2) = open water

TT000 = sea surface temperature = 00.0 c

## 12. List of Parameter Identifiers and Parameters

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| Parameter(s) | Identifier   |
|--------------|--------------|
| CT           | CC           |
| CA           | CaCaSaSaFaFa |
| CB           | CbCbSbSbFbFb |
| CC           | CcCcScScFcFc |
| CF           | FpFpFsFs     |
| CN           | SoSo         |
| CD           | SdSd         |
| DP           | dp           |
| DD           | D            |
| DR           | ViVi         |
| DO           | Op           |
| WF           | Wf           |
| WN           | No           |
| WD           | D            |
| WW           | WwWw         |
| WO           | Op           |
| RN           | Rn           |
| RA           | Ra           |
| RD           | D            |
| RC           | CrCr         |
| RF           | RfRf         |
| RH           | RhRh         |
| RO           | Op           |
| RX           | RIRI         |
| EM           | tEtEtE       |
| EX           | txtxtx       |
| EI           | tntntxtxtx   |
| EO           | Op           |
| SC           | CsCs         |
| SN           | s            |
| SD           | D            |
| SM           | ms           |
| SA           | mama         |
| SO           | Op           |
| BL           | BiBs         |
| BD           | D            |
| BR           | ViVi         |
| BN           | nBnB         |
| BY           | YY           |
| BO           | Op           |
| TT           | TwTwTw       |
| TO           | Op           |
| OP           | Op           |
| OS           | Os           |
| OT           | Ot           |
| LL           |              |

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Total: 46

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## List of Sea Ice Parameters

BiBs - type and size of iceberg

CC - total concentration of all ice in the area, reported in tenths (code table 1)

CaCa, CbCb and CcCc- Partial concentration of respectively thickest, second thickest and third thickest ice, reported in tenths (code table 1)

CrCr - concentration of topography features, in tenths (code table 1)

CsCs - concentration of snow coverage in tenths (code table 1)

D -1) Direction of dynamic processes, 2) Orientation of water openings, 3) Orientation of sastrugies, 4) Orientation of topography feature

Note: compacting of ice in for instance NE-SW, direction is recorded either as 1 or 5

dp -dynamic processes

FaFa, FbFb and FcFc -form of ice corresponding to SaSa, SbSb, and ScSc respectively (code table 2)

FpFp - predominant (FpFp) and secondary (FsFs) form FsFs (code table 2)

MaMa - area coverage of melt water in tenths

Ms - melting forms

No - number of water openings

BnBn - number of icebergs

Op - Observational method for individual parameters

Op - primary (Op), secondary (Os) and tertiary (Ot)

Os source of observation on which the ice chart is based Ot

Ea - age of topography feature

RfRf - frequency of topography feature, in number per nautical mile

EhEh - mean height of topography feature, in tenths of meters

RxRx - maximum height of topography feature, in tenths of meters

Rn - nature of topography feature

SaSa, SbSb and ScSc - stage of development of respectively thickest, second thickest and third thickest ice, of which the concentration is reported by CaCa, CbCb and CcCc

SdSd - stage of development of any remaining class of ice not reported by SaSa , SbSb , ScSc or SoSo

SoSo - stage of development of ice thicker than SaSa but with a concentration less than 1/10

s -snow depth

TwTwTwTw -sea surface temperature, in tenths of degrees

tetete - mean thickness of ice in centimeters

tntntn - minimum thickness in thickness interval

txtxtx - maximum thickness of ice, in centimeters

ViVi - rate of ice drift, in tenths of knots

Wf - form of water openings

WwWw - width of water openings, in hundreds of meters

YY - day of month when icebergs were sighted

**Sea ice variable identifiers**

| Identifier                         | Description                                                 |
|------------------------------------|-------------------------------------------------------------|
| Dynamic Processes                  |                                                             |
| DP                                 | Dynamic processes                                           |
| DD                                 | Direction of dynamic processes                              |
| DR                                 | Rate of ice drift in tenths of knots                        |
| DO                                 | Source of information                                       |
|                                    |                                                             |
| Water Openings                     |                                                             |
| WF                                 | Form of water openings                                      |
| WN                                 | Number of water openings                                    |
| WD                                 | Orientation (direction) of water openings                   |
| WW                                 | Width of water openings                                     |
| WO                                 | Source of information                                       |
|                                    |                                                             |
| Topography Features                |                                                             |
| RN                                 | Nature of topography feature                                |
| RA                                 | Age of topography feature                                   |
| RD                                 | Orientation of topography feature                           |
| RC                                 | Concentration of topography feature                         |
| RF                                 | Frequency of topography feature                             |
| RH                                 | Height (mean) of topography feature                         |
| RO                                 | Source of information                                       |
| RX                                 | Maximum height of topography feature                        |
|                                    |                                                             |
| Thickness of Ice                   |                                                             |
| EM                                 | Mean thickness of level ice in cm                           |
| EX                                 | Maximum thickness of level ice in cm                        |
| EI                                 | Thickness interval                                          |
| EO                                 | Source of information                                       |
|                                    |                                                             |
| Surface features and melting forms |                                                             |
| SC                                 | Concentration of snow                                       |
| SN                                 | Snow depth                                                  |
| SD                                 | Orientation (direction) of sastrugies                       |
| SM                                 | Melting forms                                               |
| SA                                 | Area coverage of water on ice in tenths                     |
| SO                                 | Source of information                                       |
|                                    |                                                             |
| Icebergs or ice of land origin     |                                                             |
| BL                                 | Type of iceberg                                             |
| BD                                 | Direction of drift of iceberg                               |
| BE                                 | Rate of drift in tenths of knots                            |
| BN                                 | Number of icebergs                                          |
| BY                                 | Day of month                                                |
| BO                                 | Source of information                                       |
|                                    |                                                             |
| Sea surface temperature            |                                                             |
| TT                                 | Sea surface temperature in tenths of degrees                |
| TO                                 | Source of information                                       |
|                                    |                                                             |
| Source of information              |                                                             |
| OP                                 | Primary source of information on which the chart is based   |
| OS                                 | Secondary source of information on which the chart is based |
| OT                                 | Tertiary source of information on which the chart is based  |

# **Code Tables**

**Table 1.** Concentration codes for variable identifiers CT, CA, CB, and CC.

| Definition                                                                                               | Code Figure |
|----------------------------------------------------------------------------------------------------------|-------------|
| Ice Free                                                                                                 | 00          |
| Less than 1/10 (open water)                                                                              | 01          |
| Bergy Water                                                                                              | 02          |
| 1/10                                                                                                     | 10          |
| 2/10                                                                                                     | 20          |
| 3/10                                                                                                     | 30          |
| 4/10                                                                                                     | 40          |
| 5/10                                                                                                     | 50          |
| 6/10                                                                                                     | 60          |
| 7/10                                                                                                     | 70          |
| 8/10                                                                                                     | 80          |
| 9/10                                                                                                     | 90          |
| 10/10                                                                                                    | 92          |
| Concentration intervals (lowest concentration in interval followed by highest concentration in interval) |             |
| 9/10 – 10/10                                                                                             | 91          |
| 8/10 – 9/10                                                                                              | 89          |
| 8/10 – 10/10                                                                                             | 81          |
| 7/10 – 9/10                                                                                              | 79          |
| 7/10 – 8 /10                                                                                             | 78          |
| 6/10 – 8/10                                                                                              | 68          |
| 6/10 – 7/10                                                                                              | 67          |
| 5/10 – 7/10                                                                                              | 57          |
| 5/10 – 6/10                                                                                              | 56          |
| 4/10 – 6/10                                                                                              | 46          |
| 4/10 – 5/10                                                                                              | 45          |
| 3/10 – 5/10                                                                                              | 35          |
| 3/10 – 4/10                                                                                              | 34          |
| 2/10 – 4/10                                                                                              | 24          |
| 2/10 – 3/10                                                                                              | 23          |
| 1/10 – 3/10                                                                                              | 13          |
| 1/10 – 2/10                                                                                              | 12          |
| Unknown                                                                                                  | 99          |

**Table 2.** Thickness of ice or stage of development codes for variable identifiers SA, SB, SC, CN, and CD.

| Stage of Development    | Thickness   | Code Figure |
|-------------------------|-------------|-------------|
| Ice Free                |             | 00          |
| No Stage of Development |             | 80          |
| New Ice                 |             | 81          |
| Nilas, Ice Rind         | < 10 cm     | 82          |
| Young Ice               | 10 - 30 cm  | 83          |
| Grey Ice                | 10 - 15 cm  | 84          |
| Grey - White Ice        | 15 - 30 cm  | 85          |
| First Year Ice          | 30 - 200 cm | 86          |
| Thin First Year Ice     | 30 - 70 cm  | 87          |
| Thin First Year Stage 1 | 30 - 50 cm  | 88          |
| Thin First Year Stage 2 | 50 - 70 cm  | 89          |
| For Later Use           |             | 90          |
| Medium First Year Ice   | 70 - 120 cm | 91          |
| For Later Use           |             | 92          |
| Thick First Year Ice    | > 120 cm    | 93          |
| For Later Use           |             | 94          |
| Old Ice                 |             | 95          |
| Second Year Ice         |             | 96          |
| Multi-Year Ice          |             | 97          |
| Glacier Ice             |             | 98          |
| Undetermined/Unknown    |             | 99          |

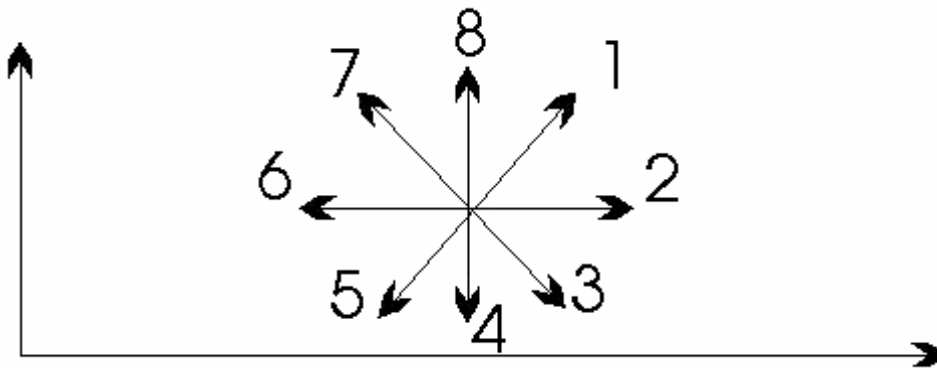
**Table 3.** Form of ice codes for variable identifiers FA, FB, FC, and CF.

| Form                             | Size/Concentration   | Code Figure |
|----------------------------------|----------------------|-------------|
| Pancake Ice                      | 30 cm - 3 m          | 00          |
| Shuga/Small Ice Cake, Brash Ice  | < 2 m across         | 01          |
| Ice Cake                         | < 20 m across        | 02          |
| Small Floe                       | 20 m - 100 m across  | 03          |
| Medium Floe                      | 100 m - 500 m across | 04          |
| Big Floe                         | 500 m - 2 km across  | 05          |
| Vast Floe                        | 2 km - 10 km across  | 06          |
| Giant Floe                       | > 10 km across       | 07          |
| Fast Ice                         |                      | 08          |
| Growlers, Floebergs or Floebiits |                      | 09          |
| Icebergs                         |                      | 10          |
| Strips and Patches               | concentrations 1/10  | 11          |
| Strips and Patches               | concentrations 2/10  | 12          |
| Strips and Patches               | concentrations 3/10  | 13          |
| Strips and Patches               | concentrations 4/10  | 14          |
| Strips and Patches               | concentrations 5/10  | 15          |
| Strips and Patches               | concentrations 6/10  | 16          |
| Strips and Patches               | concentrations 7/10  | 17          |
| Strips and Patches               | concentrations 8/10  | 18          |
| Strips and Patches               | concentrations 9/10  | 19          |
| Strips and Patches               | concentrations 10/10 | 20          |
| Level Ice                        |                      | 21          |
| Undetermined/Unknown             |                      | 99          |

**Table 4.** Dynamic processes

|                                    |   |
|------------------------------------|---|
| Compacting ice, no intensity given | 0 |
| Compacting ice, slight             | 1 |
| Compacting ice, considerable       | 2 |
| Compacting ice, strong             | 3 |
| Diverging ice                      | 4 |
| Shearing ice                       | 5 |
| Ice drift, rate 0,1 - 0,9 knots    | 6 |
| Ice drift, rate 1,0 - 1,9 knots    | 7 |
| Ice drift, rate 2,0 - 2,9 knots    | 7 |
| Ice drift, rate 3,0 knots or more  | 9 |

**Table 5.** Direction indicator



**Table 6.** Form of water opening

|                            |   |
|----------------------------|---|
| Cracks                     | 1 |
| Crack at specific location | 2 |
| Lead                       | 3 |
| Frozen lead                | 4 |
| Polynia                    | 5 |
| Ice edge                   | 6 |

**Table 7.** Number of water openings

|      |   |
|------|---|
| 1    | 1 |
| 2    | 2 |
| 3-5  | 3 |
| 5-10 | 4 |
| > 10 | 5 |

**Table 8.** Nature of topographic feature (deformation)

|                      |   |
|----------------------|---|
| Rafting              | 1 |
| Hummocks             | 2 |
| Ridges               | 3 |
| Jammed brash barrier | 4 |

**Table 9.** Age of topographic feature

|                |   |
|----------------|---|
| New            | 1 |
| Weathered      | 2 |
| very weathered | 3 |
| Aged           | 4 |
| Consolidated   | 5 |

**Table 10.** Melting forms

|                    |   |
|--------------------|---|
| No melt            | 0 |
| Few puddles        | 1 |
| Flooded ice        | 3 |
| Few thaw holes     | 4 |
| Many thaw holes    | 5 |
| Dried ice          | 6 |
| Rotten ice         | 7 |
| Few frozen puddles | 8 |
| All frozen puddles | 9 |

**Table 11.** Snow depth

|          |
|----------|
| WMO code |
|----------|

**Table 12.** Ice of land origin (type of iceberg)

| Form                     |   | Size        |   |
|--------------------------|---|-------------|---|
| Growler and or bergy bit | 1 | unspecified | 0 |
| Iceberg, unspecified     | 2 | small       | 1 |
| Iceberg, glacier berg    | 3 | medium      | 2 |
| Iceberg, dome            | 4 | large       | 3 |
| Iceberg, pinnacled       | 5 | very large  | 4 |
| Iceberg, tabular         | 6 |             |   |
| Ice island               | 7 |             |   |
| Floeberg                 | 8 |             |   |
| Radar target             | 9 |             |   |

**Table 13.** Number of icebergs

|               |
|---------------|
| WMO code 2877 |
|---------------|

**Table 14.** Observational method

|                                                 |   |
|-------------------------------------------------|---|
| Visual surface observation                      | 1 |
| Visual aircraft observation                     | 2 |
| Visual and infrared satellite observation       | 3 |
| Passive microwave satellite observation         | 4 |
| Radar satellite surface or airborne observation | 5 |
| Radar satellite observation (SAR)               | 6 |
| Laser/scatterometer/sonar                       | 7 |
| Data buoys                                      | 8 |
| Estimated (temporal and/or spatial)             | 9 |
| Unknown                                         | 0 |