
EXPERT TEAM ON SEA ICE – FIFTH SESSION

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STEERING GROUP FOR THE PROJECT
GLOBAL DIGITAL SEA ICE DATA BANK (GDSIDB) –
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PROPOSED UPDATES TO WMO MANUALS AND GUIDES FOR SEA ICE MARITIME SAFETY INFORMATION

Summary and Purpose of Document

This document provides status and suggestions for the specification of sea ice and iceberg information for Marine Safety Information (MSI) METAREA and NAVAREA bulletins.

ACTION PROPOSED

The Expert Team on Sea Ice is invited to:

- (a) Note and comment on the information provided as appropriate;
- (b) Consider these suggestions in developing proposals for inclusion of sea ice and iceberg information specifications in the *Manual on Marine Meteorological Services* (WMO- No. 558), the *Guide to Marine Meteorological Services* (WMO-No. 471) the *Manual on Maritime Safety Information* (MSI) Special Publication No. 53 (July 2009 Edition) and other related manuals and guides; and,
- (c) Develop a list of sea-ice and iceberg informational products for general services for efficiency of maritime activities in the ice-covered waters and as part of Marine safety information

References:

Manual on Marine Meteorological Services (WMO- No. 558), 2012 Edition
Guide to Marine Meteorological Services (WMO-No. 471)
JCOMM 4th session final report, WMO-IOC/JCOMM-4/3, WMO-No. 1093
Manual on Maritime Safety Information (MSI) Special Publication No. 53 (July 2009 Edition)

Appendix:

JCOMM-4 Recommendation 6, Annex 1 - Modifications to the Manual on Marine Meteorological Services – WMO No. 558

DISCUSSION

Background

1. The latest specifications for sea ice information in SafetyNET and NAVTEX bulletins were developed by ETSI in 2010-2012, approved and included into JCOMM 4th session final report, WMO-IOC/JCOMM-4/3, WMO-No. 1093, Annex 1 to Recommendation 6 (see Appendix 1 to current document).
2. In accordance with specifications, information on ice edge (where applicable) is the only information that the Preparation Service shall prepare for SafetyNET bulletins. Coding of ice edge information should follow strict rules included as new paragraphs 2.2.11, 2.2.12 & 2.2.13 (Part I, Vol. I) of the WMO. No.558.
3. Opposite to SafetyNET, content of NAVTEX bulletins in terms of sea ice information is not restricted. Rules for coding including the use of abbreviations were included as a new Appendix I.20 in **Volume I, Part I, Section 6** of the WMO. No.558.

Suggestions to new specification

Manual on Marine Meteorological Services (WMO- No. 558)

4. Amend Section 2.2.4.7 “Warnings for other severe conditions such as poor visibility, severe sea states (swell), ice accretion and other ice conditions shall also be issued, as necessary.” to read:
“Warnings for other severe conditions such as poor visibility, severe sea states (swell), ice accretion, **strong ice pressure or** other sea ice conditions shall also be issued, as necessary.

Strong ice pressure can prevent ships from navigating freely and may cause them to drift into hazardous conditions.

5. Amend Section 2.2.5.1
“The synopses given in Part II of weather and sea bulletins shall have the following content and order of items:
(a) Date and time of reference in UTC;
(b) Synopsis of major features of the surface weather chart;
(c) Direction and speed of movement of significant pressure systems and tropical disturbances;
(d) Ice conditions where applicable.”

to read:

- “The synopses given in Part II of weather and sea bulletins shall have the following content and order of items:
(a) Date and time of reference in UTC;
(b) Synopsis of major features of the surface weather chart;
(c) Direction and speed of movement of significant pressure systems and tropical disturbances;
(d) **Limit of all known ice or iceberg coordinates** where applicable.”

This is the current practice followed by two of the three northern METAREA service providers

6. Amend section 2.2.5.1.1 “Significant characteristics of corresponding wave conditions (sea and swell) should be included in the synopsis whenever this information is available, as well as characteristics of other sea surface conditions (for example, drifting ice and currents).” to read:

“Significant characteristics of corresponding wave conditions (sea and swell) should be included in the synopsis whenever this information is available, as well as characteristics of other sea surface conditions (for example, ~~drifting ice and~~ currents).”

Hazardous drifting ice can be covered by warnings in the warning section and the ice edge in the synopsis section. Other ice information should be in the forecast section.

7. Amend section 2.2.5.4

“Concise descriptions of ice conditions should be included in the synopsis (for example, position of the ice edge, total concentration, stages of ice development).”

To read:

“Descriptions of the limit of all known ice or icebergs shall be given using latitude/longitude coordinates. The location of the ice or the icebergs shall be given relative to the limit.

8. Amend section 2.2.6.1 “The forecasts given in Part III of weather and sea bulletins shall have the following content and order of items:

- (a) The valid period of forecast;
- (b) The name or designation of forecast area or areas within the main MSI area;
- (c) A description of:
 - (i) Wind speed or force, and direction;
 - (ii) Sea state (significant wave height, total sea);
 - (iii) Visibility when forecast is less than 6 nautical miles (10 kilometres);
 - (iv) Ice accretion, where applicable;
 - (v) Ice conditions, where applicable”

To read:

The forecasts given in Part III of weather and sea bulletins shall have the following content and order of items:

- (a) The valid period of forecast;
- (b) The name or designation of forecast area or areas within the main MSI area;
- (c) A description of:
 - (i) Wind speed or force, and direction;
 - (ii) Sea state (significant wave height, total sea);
 - (iii) Visibility when forecast is less than 6 nautical miles (10 kilometres);
 - (iv) Ice accretion, where applicable;
 - (v) Ice conditions (total concentration, stage of development, icebergs, etc), where applicable.

9. Amend section 2.2.10 Issue of sea-ice information

Sea-ice terminology shall be in accordance with *WMO Sea-ice Nomenclature* (WMO-No. 259)

to read:

“Issue of ice information

Sea ice and iceberg terminology shall be in accordance with *WMO Sea-ice Nomenclature* (WMO-No. 259)”

Manual on Maritime Safety Information (MSI) Special Publication No. 53 (July 2009 Edition)

10. Amend section 4.1.8

“Some of the subjects for navigational warnings listed in paragraph **4.2.2** (e.g., drifting ice, tsunami warnings, negative tidal surges) may also be suitable for promulgation as METAREA forecasts or warnings. In this event, appropriate coordination between the relevant NAVAREA coordinator and METAREA Issuing Service must occur.

to read:

“Some of the subjects for navigational warnings listed in paragraph **4.2.2** (e.g., drifting ice, tsunami warnings, negative tidal surges) may also be suitable for promulgation as METAREA forecasts or warnings. In this event, appropriate coordination between the relevant NAVAREA coordinator and METAREA Issuing Service must occur. If the drifting ice information is issued at regular times, then it would be a METAREA bulletin. If drifting ice is reported outside areas that were provided in the METAREA bulletin, then the information about the position of those ice hazards would be issued in a NAVAREA warning. This warning would be cancelled by the broadcast of the next scheduled METAREA bulletin.

Appendix: 1

Appendix

JCOMM 4th session final report, WMO-IOC/JCOMM-4/3, WMO-No. 1093

Recommendation 6 (JCOMM-4)

AMENDMENT TO THE MANUAL ON MARINE METEOROLOGICAL SERVICES (WMO-NO. 558), THE GUIDE TO MARINE METEOROLOGICAL SERVICES (WMO-NO. 471) AND WMO NO. 9, VOLUME D, INFORMATION FOR SHIPPING

Annex 1 to Recommendation 6 (JCOMM-4)

Modifications to the Manual on Marine Meteorological Services – WMO No. 558

[In Volume I, Part I, Section 2]

To add at the end of the introductory paragraph, before 2.1 (Principles):

“To facilitate the work of the METAREA Co-ordinators (see § 2.2 of Part I) and allow the alimentation of the JCOMM GMDSS-Weather website (<http://weather.gmdss.org>), all MSI prepared for the GMDSS (i.e. to be broadcast on SafetyNET or International NAVTEX) should be disseminate on the GTS.

All internationally co-ordinated met-ocean MSI which does not apply to purely national services (including all MSI prepared for the GMDSS) are part of the World-Wide Met-Ocean Information and Warning Service (WWMIWS) The promulgation of those MSI is regulated by the IMO Resolution A1051.(27) on the IMO/WMO Worldwide Met-Ocean Information and Warning Service (WWMIWS) – Guidance Document.“

To add as a new paragraph 2.2.1.3

“*METAREA Co-ordinator* is the NMS charged with co-ordinating Marine Meteorological Information broadcasts by one or more National Meteorological Services acting as Preparation or Issuing Services within the METAREA.

The METAREA co-ordinator shall:

- act as the central point of contact on matters relating to meteorological information and warnings within the METAREA;
- promote and oversee the use of established international standards and practices in the promulgation of meteorological information and warnings throughout the METAREA;

- co-ordinate preliminary discussions between neighbouring Members, seeking to establish and operate NAVTEX services, prior to formal application;
- contribute to the development of international standards and practices through attendance and participation in the JCOMM Expert Team on Maritime Safety Services meetings, and also attend and participate in relevant IMO, IHO and WMO meetings as appropriate and required.

The METAREA co-ordinator shall also ensure that within its METAREA, National Meteorological Services which act as Issuing Services have the capability to:

- select meteorological information and warnings for broadcast in accordance with the guidance given in the Manual;
- monitor the SafetyNET transmission of their bulletins, broadcast by the Issuing Service.

The METAREA co-ordinator shall also ensure that within its METAREA, National Meteorological Services which act as Preparation Services have the capability to:

- endeavour to be informed of all meteorological events that could significantly affect the safety of navigation within their area of responsibility;
- assess all meteorological information immediately upon receipt in the light of expert knowledge for relevance to navigation within their area of responsibility;
- forward marine meteorological information that may require wider promulgation directly to adjacent METAREA co-ordinators and/or others as appropriate, using the quickest possible means;
- ensure that information concerning all meteorological warning subject areas that may not require a METAREA warning within their own area of responsibility is forwarded immediately to the appropriate National Meteorological Services and METAREA co-ordinators affected by the meteorological event;
- maintain records of source data relating to meteorological events.”

To be inserted as new paragraphs 2.2.11, 2.2.12 & 2.2.13 (Part I, Vol. I)

“Information on ice edge (where applicable) shall be provided in MSI prepared for the GMDSS.

Following practices should be used for the ice edge information prepared for SafetyNET bulletins:

- no more than 10 lat/long points for each Sub-Area;

- latitude 4 digits; longitude 5 digits (add preceding 0 if needed);
- N/W/E must be added for areas bordering the E/W divide;
- lat/long pairs separated by comma;
- period at the end of the lat/long string to define end of information;
- no local names used (exception – reference chart is to be prepared with acceptable well-known place names which are allowed in addition to Sub-Area names);
- location of sea ice relative to ice edge must be given before lat/long string;
- additional information on ice edge form state may be added – diffuse, compact, movement, growth;
- can cut across small islands as if they weren't there;
- for bulletins prepared for SafetyNET, extend into neighbouring METAREA by 150 nm (use issuing office ice boundaries as reference recognizing that, with different issue times, the boundaries may have moved);
- when describing neighbouring METAREA ice, use Sub-Area names from that METAREA;
- cannot create ice free “holes” in the ice pack unless they are significant as noted below; ice-free “inlets” in the ice pack will be ignored if the entrance is less than 30 nm wide:
 - o Significant open water within the main ice edge may be described with an ice edge if shipping is active within that area (significant means that an entire marine sub-area is open water);
- Include all sea ice within the ice edge – fast ice, strips and patches; ice edge is boundary between any sea ice and sea ice free (icebergs may be outside of the ice edge provided there is no sea ice);
- idea is to be conservative and not endanger shipping.
- in winter, when ice edge is outside of Sub-Area due to complete ice cover, bulletin to say “Ice covered”;
- in summer, when ice edge is outside of region due to lack of sea ice, bulletin to say “ice free” or “bergy water”.

Sharing and operational exchange of information on ice edge position is essential to ensure its contiguity across the METAREA boundaries.”

[In Volume I, Part I, Section 5]

In whole Section and its appendices, replace “responsible Members” by “Responsible Members”, “responsible Member” by “Responsible Member”, and “global collecting centres” by “Global Collecting Centres”, “global collecting centre” by “Global Collecting Centre”.

Add at the end of the note: “, Recommendation 8 (JCOMM-I), Recommendation 9 (JCOMM-II), Recommendation 9 (JCOMM-III), Recommendation 12 (JCOMM-III)”

In paragraph 5.1:

Principle 1, replace “the marine climatological” by “marine climatological”

Principle 2, replace “shall prepare” by “should optionally prepare”; add the word “historical” before “fixed ship stations”

Principle 3, replace “Members operating fixed ship stations” by “Members once operating (historical) fixed ship stations”

Principle 5, delete “on magnetic tape”

In paragraph 5.2: Replace “shall prepare” by “should optionally prepare”; add “(historical)” in front of the first occurrence of “fixed ship stations”, and add “once” after the second occurrence.

In paragraph 5.2.1.2: Replace “Commission for Marine Meteorology (CMM)” by “Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM)”

In paragraph 5.2.3.2: Replace “President of CMM” by “Co-President of JCOMM”

In paragraph 5.2.3.5: Replace “shall” by “should”

In paragraph 5.3.3.2: Replace “shall” by “should optionally”, add “,1991-2000, 2011-2010” at the end of the sentence; and add new sentence : “The routine production of decadal summaries ceased in 2012. However, such summaries may continue to be published by Responsible Members on an optional basis.”

In paragraph 5.5.1: replace “Fixed ship stations” by “Fixed stations” in the title of the paragraph, and in the paragraph itself.

In paragraph 5.5.3: replace “shall” by “should”.

In paragraph 5.6.1.1: Add “(historical)” in front of “fixed ship stations”; add “(or other alternative modern media)” after “magnetic tape”.

In paragraph 5.6.1.3: Replace “tapes” by “data”; replace “Any alternative format” by “Use of this or any other alternative format”

In paragraph 5.6.1.4: Replace paragraph by “Members should ensure that magnetic tapes (or other modernized computer media) are readable at the global collecting centres.”

In paragraph 5.6.4.1: Replace “The Historical” by “While the Historical”; replace “project provide for” by “project provided in the past for”; add “this responsibility in the future will be transitioned to modernized international archives (CMOCs — ICOADS)” after “1960”. Add “past” in front of “participants”; replace “have agreed” by “agreed”.

In paragraph 5.6.4.2: add “previous” in from of “HSSTD”; add “(or modern day CMOC)”

[In Volume I, Part I, Section 6]

In paragraph 6.1, principle 2, replace “World Data Centres for Oceanography” by “WMO-IOC Centres for Marine-meteorological and Oceanographic Climate Data (CMOCs), and the ICSU World Data System”

[In Appendix I.2]

METAREA Co-ordinators to be inserted in the appropriate table

[In Appendix I.8]

Under the GCC United Kingdom, replace “Meteorological Office, S9” by “Met Office”; and replace website link by:

“Website: http://www.metoffice.gov.uk/weather/marine/observations/gathering_data/gcc.html ”

[In appendix I.11]

Under note (2), replace definition of Steadiness by the following:

Steadiness = ratio of speed of the monthly mean vector wind to the speed of the monthly mean scalar wind.

Under note (3), replace the whole note by the following:

“(3) A resultant vector mean direction with each wind speed or wave height set equal to 1”

[In Appendix I.12]

In the title, add “(HISTORICAL)” in front of “FIXED SHIP STATIONS”.

[In Appendix I.15]

In the title, replace IMMT-IV by IMMT-5, and “(Version 4)” by “(Version 5)”

In note (b), replace IMMT-II by IMMT-2; replace “(FM 13-XIV)” by “(e.g. FM 13)”

In the table, in the last column “Coding Procedure”:

For element 15, replace “Tens and units of knots” by “Units of knots”.

For element No. 64, add the following code values at the end: “B- FM 13-XIII” and “C- FM 13-XIV Ext.”; delete (more version needed here)

For element No. 65, replace IMMT-I by IMMT-1, IMMT-II by IMMT-2, and IMMT-III by IMMT-3; replace “4 – IMMT-IV (this version)” by “IMMT-4 (in effect from Jan. 2011)”, and add the following code value at the end: “5 – IMMT-5 (in effect from June 2012)”.

For element 86, replace MQCS-I by MQCS-1, MQCS-II by MQCS-2, MQCS-III by MQCS-3, MQCS-IV by MQCS-4, and MQCS-V by MQCS-5; replace “6 = MQCS-VI (this version, to be agreed)” by “6 = MQCS-6 (Version 6, November 2009) JCOMM-III”, and add a new line: “7 = MQCS-7 (Version 7, in effect from June 2012)”

For element No. 87, replace “(000-360); e.g.” by “(001-360); e.g.”, and remove the line “000 – No Movement”

For element 104, add the following line at the beginning "0 – No Automated Weather Station (AWS)"

[In Appendix I.17]

In the title, replace "MQCS-VI (Version 6)" by "MQCS-7 (Version 7)"

In the table,

For element 64, column Error, replace "version \neq 0-9, A, Δ " by "version \neq 0-9, A-C, Δ "

For element 86, column Action, replace MQCS-I by MQCS-1, MQCS-II by MQCS-2, MQCS-III by

MQCS-3, MQCS-IV by MQCS-4, and MQCS-V by MQCS-5; replace "6 = MQCS-VI (this version, to be agreed)" by "6 = MQCS-6 (Version 6, November 2009) JCOMM-III", and add a new line: "7 = MQCS-7 (Version 7, in effect from June 2012) JCOMM-IV"

For element 87, column Error, replace "HDG \neq 000-360" by "HDG \neq 001-360"

[As new Appendix I.20]

To include NAVTEX Ice Abbreviations, as finalized in November 2011 by the Expert Team on Sea Ice (ETSI), as following:

NAVTEX ICE ABBREVIATIONS

0. Background

Ice (sea and lake ice) abbreviations for NAVTEX bulletin were developed in 2007-2011 by JCOMM Expert Team on Sea Ice (ETSI) in cooperation with the International Ice Charting Working Group (IICWG) and are based on a number national sea ice practices (in particular Canadian and German Ice Services). The rules were discussed and generally agreed by ETSI 4th session (March 2010, JCOMM Meeting Report No. 74), tested during the JCOMM 3rd Ice Analysts Workshop (June 2011, JCOMM Technical Report No. 56), discussed and agreed during the IICWG 12th Meeting (October 2011, <http://nsidc.org/noaa/iicwg/>).

According to JCOMM ETSI recommendation ice abbreviations in NAVTEX bulletins should be used by Preparation Services only in cases of reliable HF connections to vessels in particular area, otherwise plain text description of ice in NAVTEX bulletin should be used.

1. General rules

Abbreviations concerning ice type always have two parts: the first part indicates the ice concentration, the second part the ice thickness or stage of development.

2. Concentration

The concentration abbreviations are given in tenths **or** in amount of ice. A 2-symbol abbreviation exists for all concentrations.

Table 1 – Concentration

Abbr.	Description	Abbr.	Description
1T	1 tenth	BW	bergy water
2T	2 tenths	OW	open water (less then 1/10)
3T	3 tenths	VO	very open ice
4T	4 tenths	OP	open ice
5T	5 tenths	CL	close ice
6T	6 tenths	VC	very close ice
7T	7 tenths	CO	compact or consolidated ice
8T	8 tenths	FI	fast ice
9T	9 tenths		
+T ; 9+	9+Tenths		
XT	10 Tenths (X is roman 10)		

3. *Ice thickness and stages of ice development*

The ice thickness can be given as a range in cm or as a stage of development. When given as a range, a single thickness should have at least 2 digits (e.g. 05-10 cm, 30-50 cm), It is also possible to use the abbreviation GT (greater than) and LT (less than) as in GT80 cm. All stages of sea ice development are characterized by a 2-symbol abbreviation, but for lake ice 3-symbol abbreviations are used.

If thickness is not known (or not applicable as in bergy water) it is recommended to use ??. Then the abbreviated sea ice type, using stages of development, always consists of 4 symbols. For example: 5TGR (5 tenths gray ice), +TNI (9+ Tenths new ice), FIGW (gray-white fast ice). This makes it clear, that with only 3 symbols there was a transmission problem. For lake ice most ice types would consist of 5 symbols. Clearly more symbols are needed if a thickness range is given (e.g. CL10-20 cm).

Table 2 – Stages of ice development

Abbr.	Description	Abbr.	Description
NI	New ice	FY	first year ice
NL	Nilas	F1; W1	thin first year stage 1 (Baltic white ice stage 1)
DN	dark Nilas	F2; W2	thin first year stage 2 (Baltic white ice stage 2)
LN	light Nilas	FM	medium first year
GR	gray ice	FT	Thick first year
GW	gray-white ice	OI	old ice
YG	young ice	MY	multi year ice
		THN	thin ice (main use for lake ice)
		MED	medium ice (main use for lake ice)
		THK	thick ice (main use for lake ice)
		VTK	very thick ice (main use for lake ice)
		??	undetermined

4. Ice surface topography

The ice type abbreviation can be followed by an abbreviation giving the topography of the ice. The topography should be separated with a ":". There can be none, one or several of these abbreviations. For example XTGW:HRDG:ROTN (10 tenths gray-white ice which is heavily ridged and rotten).

5. Egg-code

There is also the possibility to use an Egg-code. In this case the ice definition start with the total concentration (in tenths, using just the first letter of the ice concentration abbreviations) followed by EGG. The partial ice type then follow separated with "-". For example: 9EGG-5TGW:RDG-4TNI (total concentration 9 tenths, with 5 tenths of ridged gray-white ice and 4 tenths new ice).

Table 3 - Ice surface topography

Abbr.	Description
LVL	level ice
RFT	rafted ice
HRFT	heavily rafted
RDG	ridged ice (hummocked)
HRDG	heavily ridged
ROTN	rotten ice

6. Other abbreviations to be used in the text

Table 4 – Miscellaneous abbreviations

Abbr.	Description
PRESS	ice pressure
LGT	Light
MOD	Moderate
STRG	Strong
FI-LEAD	lead along the fast ice
CSTL-LEAD	coastal lead
GT	greater than
LT	less than

7. Example coding

Made up example in the Baltic

Abbreviated form:

Bay of Bothnia N-part FI50-70cm; E-part FI30-50cm, 9EGG-6TW1:RFT:HRDG-3TLN MOD PRESS; W-part FI30-50cm, FI-lead, CLGW; S-part VCNI.
Gulf of Finland E-part FI20-30cm, CL10-20cm; NE-part FI15-20cm:ROTN, OPGR:RFT:ROTN.

Clear text:

In the Bay of Bothnia there is 50-70 cm thick fast ice in the north. In the eastern part there is 30-50 cm thick fast ice, further out there is 9 tenths of ice, with 6 tenths of 30-50 cm thick ice which is rafted and heavily ridged and 3 tenths of light nilas. There is moderate pressure in the ice field. In the western part the fast ice is 30-50 cm thick, there is a lead along the fast ice, followed by close gray-white ice. In the southern part there is very close new ice.
In the Gulf of Finland there is 20-30 cm thick fast ice in the east and farther out there is 10-20cm thick close ice. In the northeastern part there is 15-20 cm thick rotten fast ice and farther out rafted and rotten, open gray ice.

[In Volume I, Part II, Section 2]

To replace the paragraph 2.2.3.2

“2.2.3.2 Warnings shall be given for:

- (a) Tropical cyclones and associated phenomena;
- (b) Gales and storms;
- (c) Ice accretion;

2.2.3.2.1 In addition, warnings should be given for the following phenomena, as necessary. Warnings for phenomena (e) and (f) may be the responsibility of more than one national agency or authority:

- (d) Restricted visibility (one nautical mile or less);
- (e) Unusual and hazardous sea-ice conditions;

(f) Storm-induced water-level changes”

to be inserted as a new paragraph after 2.2.5.3

“Information on ice edge (where applicable) shall be provided in MSI prepared for the GMDSS.”
