



European  
Global Navigation  
Satellite Systems  
Agency



## Appendix 3: EGNOS Maritime and IWW Safety Information



Iss. 01-00

Date: 03/12/2018



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Document Life Cycle				
Release	Author	Date	Reason for Change	Sections impacted
00-01	José Manuel Álvarez María Mota EMRF- EGNOS SPWG members	11/07/2018	New document	All
00-02	José Manuel Álvarez María Mota EMRF- EGNOS SPWG members	15/10/2018	Updated with comments from the group	All
01-00	José Manuel Álvarez María Mota EMRF- EGNOS SPWG members	03/12/2018	Consolidated version of the document.  Scheme on the provision of MSI agreed with the support of the EMRF members at the 2018 EMRF-SPWG workshop [RD-21].	Section 2.1

Document Dissemination	
Internal to ESSP-SAS	External
ESSP	GSA
	EMRF members

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# 1 INTRODUCTION

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## 1.1 Purpose and Scope of the Document

IMO SOLAS Convention [RD-7] Chapter IV defines “Maritime Safety Information” as “*navigational and meteorological warnings, meteorological forecasts and other urgent safety related messages broadcast to ships*”.

The purpose of this document is to define the **appropriate schemes for the provision of EGNOS related safety information** to mariners and skippers.

This document is one of the appendices generated in the frame of the EMRF Service Provision Working Group, as depicted in the figure below, gathering the information shared and addressed by the group members for the definition of the EGNOS Service Provision aspects:

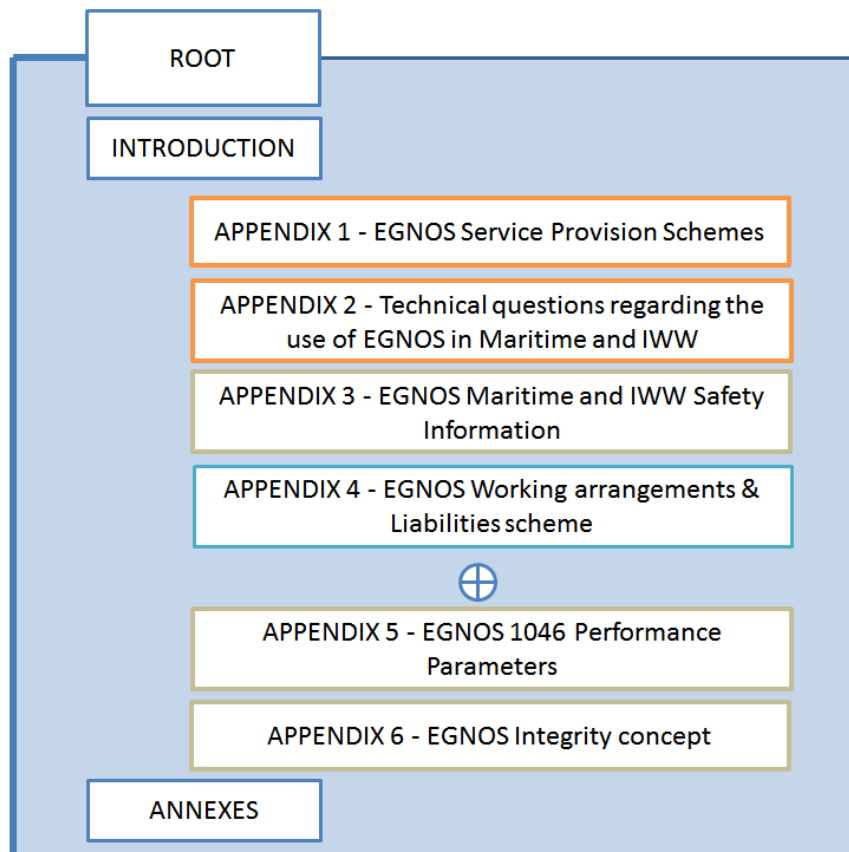


Figure 1: SPWG Technical document new structure

This Appendix 3 on EGNOS Maritime and IWW Safety Information is structured in the following sections:

1. Introduction (this section):

Introduction to the document, including the scope and how this appendix is integrated in the frame of the SPWG documents structure.

## 2. EGNOS Safety Information Provision schemes

### 2.1. Provision of Maritime Safety Information

This section presents the proposed scheme to be followed for the provision of Maritime Safety Information (MSI) regarding EGNOS 1046 service.

### 2.2. Provision of Inland Waterways EGNOS Safety Information

This section presents the proposed scheme to be followed for the provision of IWW Safety Information (SI) regarding EGNOS 1046 service.

## 3. Annex 1. Regulatory framework

This annex includes the reference regulatory framework for the provision of Safety Information in the Maritime and IWW domains.

## 4. Annex 2. Weather forecast areas

This annex includes the predefined geographical sea areas used to identify areas when sending navigational warnings to the vessels.

## 1.2 Reference Documents

RD	Document Title
[RD-1]	EMRF-SPWG-Root_v1.0, March 2018
[RD-2]	EMRF-SPWG-APPENDIX 1 - EGNOS Service Provision Schemes
[RD-3]	EMRF-SPWG-APPENDIX 2 - Technical questions regarding the use of EGNOS in Maritime and IWW
[RD-4]	EMRF-SPWG-APPENDIX 4 - EGNOS Working Arrangements & Liabilities Scheme
[RD-5]	EMRF-SPWG-APPENDIX 5 - EGNOS 1046 performance parameters_v7
[RD-6]	EMRF-SPWG-APPENDIX 6 - EGNOS V2 Integrity for maritime operations_v1.3
[RD-7]	IMO International Convention for the Safety of Life at Sea (SOLAS), 1974
[RD-8]	IMO Resolution A.1046(27) on Worldwide Radionavigation Systems - 30 November 2011
[RD-9]	IALA Recommendation R-121 on the Performance and Monitoring of DGNSS Services in the Frequency Band 283.5 – 325 kHz - Edition 2.0 - May 2015
[RD-10]	IALA Guideline No. 1112 On Performance and Monitoring of DGNSS Services in the Frequency Band 283.5 – 325 kHz - Edition 1 - May 2015
[RD-11]	IALA Guideline G1129 – The Retransmission of SBAS Corrections Using MF RB and AIS. – December 2017
[RD-12]	IMO Resolution A.706(17) on World-Wide Navigational Warning Service (WWNWS) – amended by MSC.1 Circular 1288 (9 December 2018)
[RD-13]	IMO Resolutions A.705(17) on Promulgation of Maritime Safety Information – amended by MSC.1 Circular 1287 Rev.1 (24 June 2013)

[RD-14]	Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005 harmonised river information services (RIS) on inland waterways in the Community
[RD-15]	Joint IMO/IHO/WMO Manual on Maritime Safety Information –2015 Edition
[RD-16]	IMO MSC.1/Circ.1310/Rev.1 – Revised Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI) - 21 November 2014
[RD-17]	Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI) - November 2015
[RD-18]	Commission Regulation (EC) 416/2007 of 22 March 2007
[RD-19]	IHO Publication M-2: The Need for a National Hydrographic Service”, Version 3.0.6, December 2016
[RD-20]	WMO publication No.9, Weather Reporting - Volume D on Information for Shipping - 2014 Edition (with amendments 10 January 2018)
[RD-21]	EMRF-SPWG 2018 Workshop Report_v1.1 (30-31 October 2018)

Table 1: Reference documents

### 1.3 Acronyms

The list of acronyms is provided is included hereafter.

Acronym	Definition
EMRF	European Maritime RadioNavigation Forum
ESSP	European Satellite Services Provider
GSA	European GNSS Agency
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IMO	International Maritime Organization
IWW	Inland Waterways
MSI	Maritime Safety Information
NHO	National Hydrographic Office
NtM	Notice to Mariners
NtS	Notice to Skippers
PoC	Point of Contact
RIS	River Information Services
SBAS	Satellite-Based Augmentation System
SI	Safety Information
SPWG	EGNOS Service Provision Working Group

Acronym	Definition
WMO	World Meteorological Organization
WWNWS	World-Wide Navigational Warning Service

Table 2: Acronyms

## 2 EGNOS SAFETY INFORMATION PROVISION SCHEMES

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The intention of this document is to define the best method of promulgating **EGNOS related Safety Information (SI) to mariners/skipppers** over a wide area, ensuring the right information is provided to the right users in a timely manner.

As established by existing regulations, the Service provider is responsible to:

- Promulgate adequate notices when changes in the transmissions of position-fixing systems could affect the performance of receivers fitted in ships (IMO SOLAS [RD-7] Chapter V, Regulation 13.3)
- Provide users, as soon as practicable by Maritime Safety Information (MSI) systems, with warnings of system malfunction, non-availability or discontinuity (IMO Resolution A.1046 (27) [RD-8]).
- Provide mariners with information about service disruptions (IALA Recommendation R-121 [RD-9]).
- Provide means to inform users using navigational warnings regarding service disruptions or scheduled interruptions (IALA Guideline No.1112 [RD-10]).
- Manage maintenance work or changes to the service in such a way that service disruption is minimized and the users are provided with advance warning (IALA Guideline No.1112 [RD-10]).
- Provide up-to-date information of scheduled maintenance activities (IALA Guideline No.1112 [RD-10]).
- Employ the existing information channels, appropriate to the intended users and to the nature of the information (e.g. Notices-to-Mariners, broadcasting of maritime safety information (MSI) in the GMDSS). The relevant information to be published should include: navigational warnings regarding service disruptions or scheduled interruptions (IALA Guideline No.1112 [RD-10]).
- Provide information related to the SBAS service degradation and maintenance activities (IALA Guideline G.1129 [RD-11]).
- Provide alarms/alerts procedure in relation with service degradations (IALA Guideline G.1129 [RD-11]).

More information on the regulatory framework requiring the provision of Safety Information (SI) can be found in ANNEX 1 to this document.

The sections below address the different types of SI and distribution means and define the schemes to generate and provide EGNOS related SI to the final users, including the different actors involved and their roles and responsibilities.

The approach described in this document presents a first step for the provision of EGNOS SI, based on the mechanisms already in place. In line with the most advanced trends on this field currently under discussion, a future step would be to assess the feasibility to provide safety information directly to the bridge systems for use in aspects such as e-Navigation services. Future MSI approach should also evolve to allow the Multisystem Receivers (MSR) to adapt to the SBAS/EGNOS status.

### 2.1 Provision of Maritime EGNOS Safety Information

This section presents the proposed scheme to be followed for the provision of Maritime Safety Information (MSI) regarding EGNOS 1046 service, which follows the established procedures for the

provision of MSI and which has been agreed in the frame of the SPWG and supported by the Maritime Authorities attending the 2018 EMRF – SPWG Workshop[RD-21].

There are different types of maritime Safety Information, depending on the type of information, the area impacted, the transmission means and the responsible for its distribution, as depicted in the figure below:

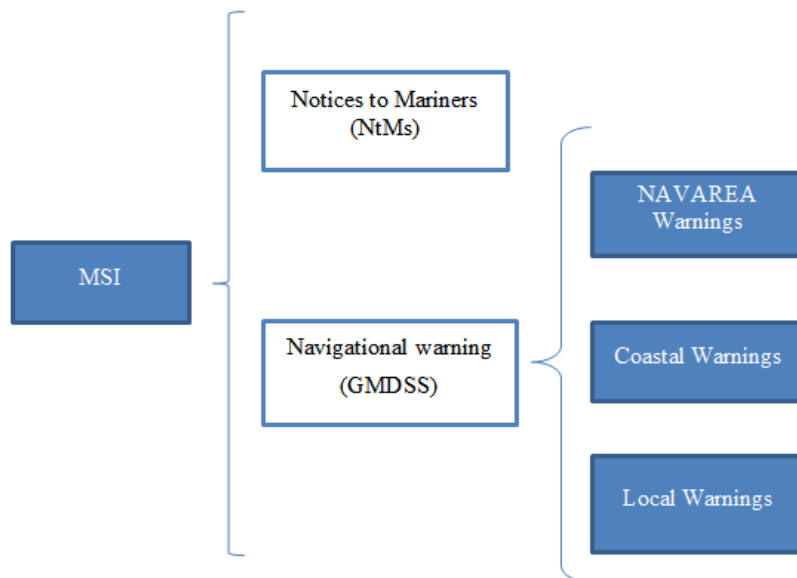


Figure 2: Classification of MSI

The Maritime Safety Information provided to mariners/vessels in open sea and ports could be transmitted in the form of Notices to Mariners (NtM) or Radio Navigational warnings (GMDSS).

The main difference between Notice to Mariners and the Radio Navigational Warnings is the temporality of the information they provide and the method to broadcast the information.

- Notices to Mariners (NtM) mainly provide timely (permanent) information for the correction of navigation charts and publications, and they are consulted by the vessel captain/crew, on a weekly basis, normally in paper or through web-based services.
- The Radio Navigational Warnings provide information of temporary nature, which are sent to the GMDSS equipment onboard the vessels (through NAVTEX SafetyNET or other communication means). If these warnings remain in force for several weeks, they may be superseded by NtM.

Given the temporary and immediate nature of the EGNOS unavailabilities to be reported, this information should be provided to the vessels through Navigational Warnings.

Taking into account that the NtM provide more permanent information (related to corrections to charts) and considering that the EGNOS outages (even planned) are going to be temporary, these events should be communicated through navigational warnings.

However, if there is other EGNOS-related information that affects navigation charts and publications permanently (for instance, areas within the EGNOS Service area, or the deployment of particular AIS

stations/IALA beacon stations providing EGNOS corrections), this should be informed through Notices to Mariners.

Regarding the bodies responsible for the generation and distribution of MSI, SOLAS [RD-7] Chapter V Regulations 9 and 4 require each coastal State to ensure that hydrographic and Maritime Safety Information (MSI) services are provided. This is achieved through the establishment of a **National Hydrographic Service** that provides the following services either directly, or through coordination with other providers:

- **Maritime Safety Information services,**
- Hydrographic Surveys,
- Nautical Charts,
- Other Nautical Documents, such as: **Notices to Mariners**, Sailing Directions, Lists of Lights and Tide Tables.

The contracting governments, through their NHO; are responsible to take all the necessary steps to ensure that the Safety Information (SI) is brought to the knowledge of those concerned and communicated to other interested Governments when necessary.

The World-Wide Navigational Warning Service (WWNWS) [RD-12] was jointly created by the IMO and the IHO for the promulgation of internationally co-ordinated warnings via the NAVTEX and international SafetyNET services. According to the WWNWS the world's oceans are divided into 21 NAVAREAs, each of which is assigned to a Coordinator. This Coordinator is normally the **National Hydrographic Office (NHO)**, which is in charge of the promulgation of NtM on behalf of the state. Additionally they also have responsibilities about the generation and promulgation of navigational warnings.

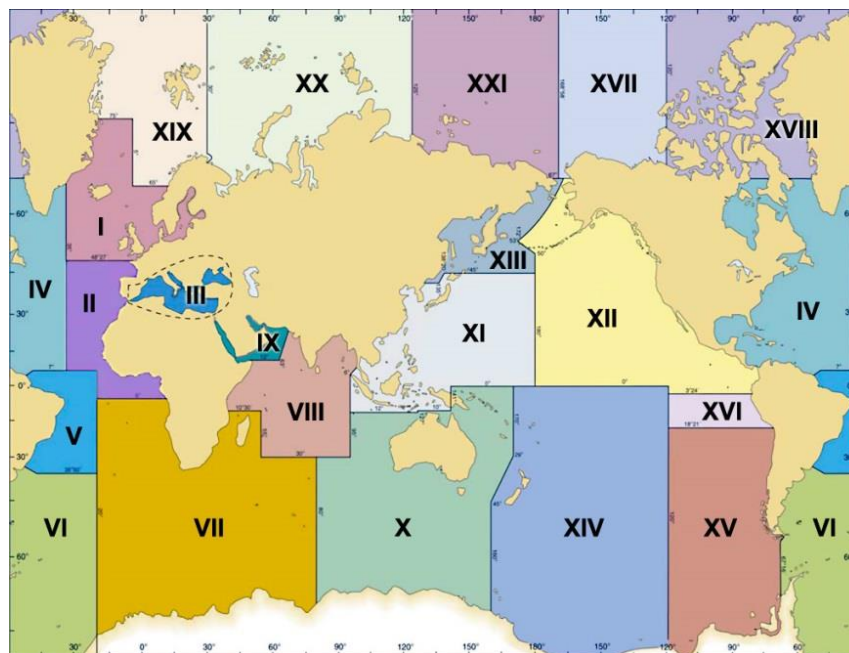


Figure 3: 21 NAVAREAS

Three different types of navigational warnings are defined:

1. NAVAREA warning

2. Sub-AREA<sup>1</sup> warning and
3. Coastal warning

4. Note that Local warnings (which cover inshore waters, often within the limits of jurisdiction of a harbour or port authority [RD-16]) do not fall within the WWNWS and are not broadcast by NAVTEX or SafetyNET, but provided through other means (e.g. VHF).

Member States wishing to provide maritime safety information services should nominate a national coordinator for each type of information concerned [RD-13], informing IMO of such nominations as they are made. IMO MSC maintains and publishes a list of the nominated coordinators.

Navigational Warning	Coordinator	Transmission means
<b>NAVAREA warning</b>	NAVAREA coordinator	Inmarsat C
<b>Coastal warning</b>	NAVTEX Coordinator <sup>2</sup> /National Coordinator	NAVTEX
<b>Local warnings</b>	NATIONAL COORDINATOR through CRS(Coastal Radio Station) or LOCAL AUTHORITY	VHF

Table 3: Classification of Navigational Warnings, transmission means and coordinators

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<sup>1</sup> Some NAVAREAS have a Sub-Area with its designated a Sub-Area Coordinator

<sup>2</sup> NAVTEX Coordinator is the authority charged with operating and managing one or more NAVTEX stations broadcasting maritime safety information as part of the International NAVTEX service

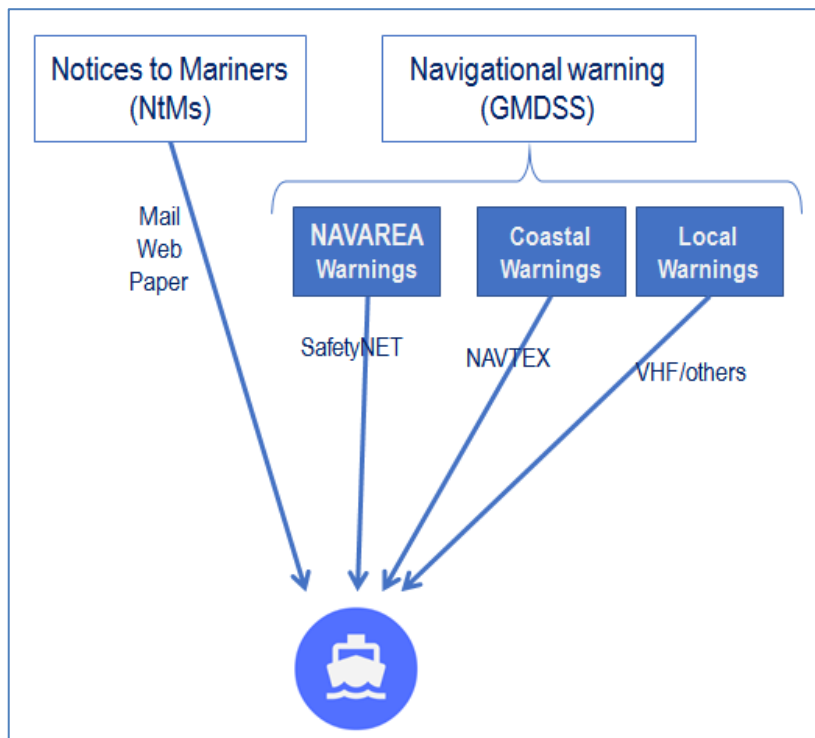


Table 4: SI transmission means

The Safety Information concerning a NAVAREA is transmitted to the users through SafetyNET. If the NAVAREA coordinator receives SI affecting a Coastal or a local Area within its NAVAREA, this information is forwarded to the NAVTEX Coordinator responsible for the provision of Coastal warnings through NAVTEX, or to the corresponding National Coordinator or Local Authority responsible for the communication of local warnings through VHF. Thus, the NAVAREA Coordinator maintains updated PoC of the coordinators at lower levels (NAVTEX and Local) so as to guarantee that the SI is properly communicated on time to the affected users.

Four NAVAREAS (among the complete list of 21 NAVAREAS) are included within the EGNOS Service area footprint:

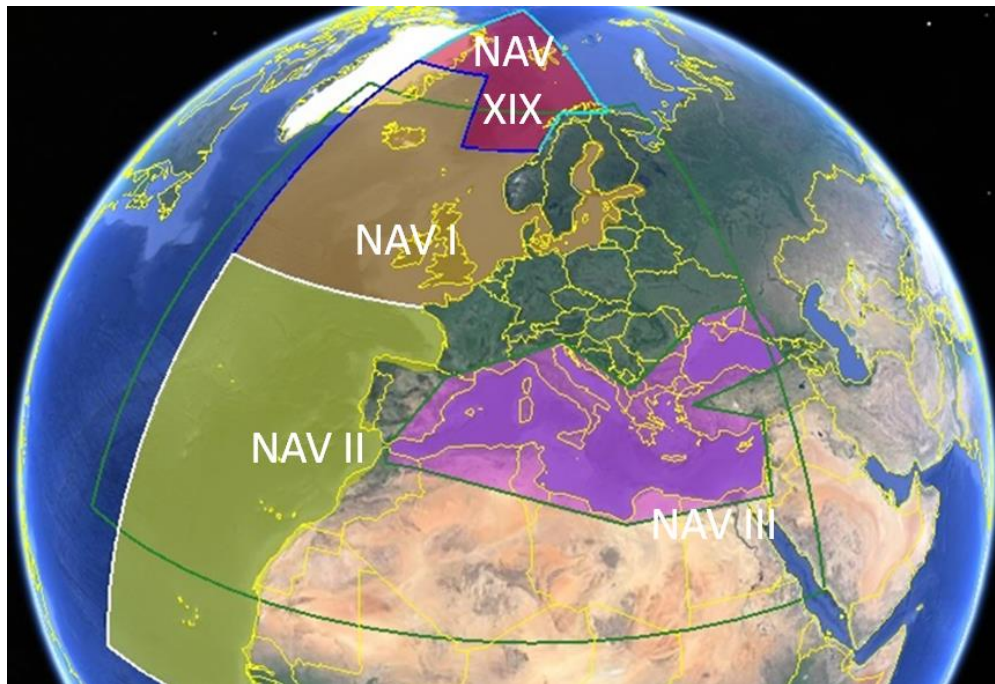


Figure 4 Navareas & EGNOS service area

These 4 NAVAREAS are coordinated by the countries/hydrographic offices indicated below:

1. **NAVAREA I (UK)**  
NAVAREA Coordinator: United Kingdom Hydrographic Office
2. **NAVAREA II (France)**  
NAVAREA Coordinator: Service Hydrographique et Océanographique de la Marine
3. **NAVAREA III (Spain)**  
NAVAREA Coordinator: Instituto Hidrográfico de la Marina
4. **NAVAREA XIX (Norway)**  
NAVAREA Coordinator: Norwegian Hydrographic Service

Consequently, the corresponding 4 NHOs coordinating these NAVAREAS are proposed to be the ESP PoC for the provision of EGNOS Maritime Safety Information as explained in the scheme below:

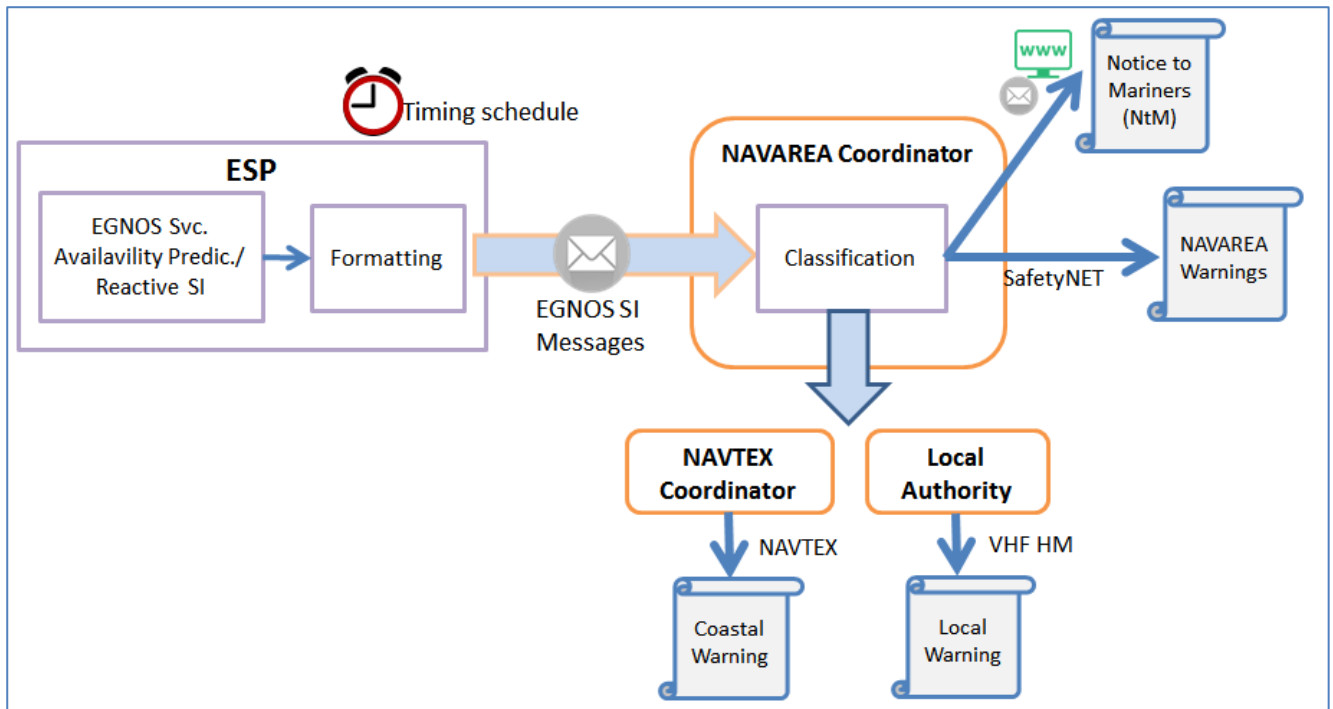


Figure 5: Example – Scheme for the provision of Maritime EGNOS Safety Information

The following actors/bodies are expected to be involved in the generation and provision of EGNOS SI to the mariners.

1. EGNOS Service Provider
2. NAVAREA Coordinator (NAV I, NAV II, NAV III and NAV XIX)
3. The corresponding NAVTEX Coordinators within these four NAVAREAS
4. The corresponding Local Authorities within these four NAVAREAS

Additionally, the Maritime Authorities may be involved in the MSI process, according to the common existing practices<sup>3</sup>.

Note that this document proposes a high level approach based on the procedures already in place. The low level details with respect to the EGNOS performance prediction logic/concept will need to be further addressed in a future dedicated activity/project.

Regarding the formatting, a proposal is included in section 2.1.1.2 that to be confirmed with the different NAVAREA coordinators.

The tasks and responsibilities of each of these actors are detailed next:

<sup>3</sup>Some states may also monitor the MSI at point of delivery to the mariner.

## 1 EGNOS Service Provider tasks and responsibilities w.r.t EGNOS MSI

ESP will be responsible to monitor EGNOS Service real time performance and will also predict future performance over a grid of points (2x2 degrees) within the EGNOS Service area<sup>4</sup> and will interpolate the resulting performance so as to get the maps from this grid of points.

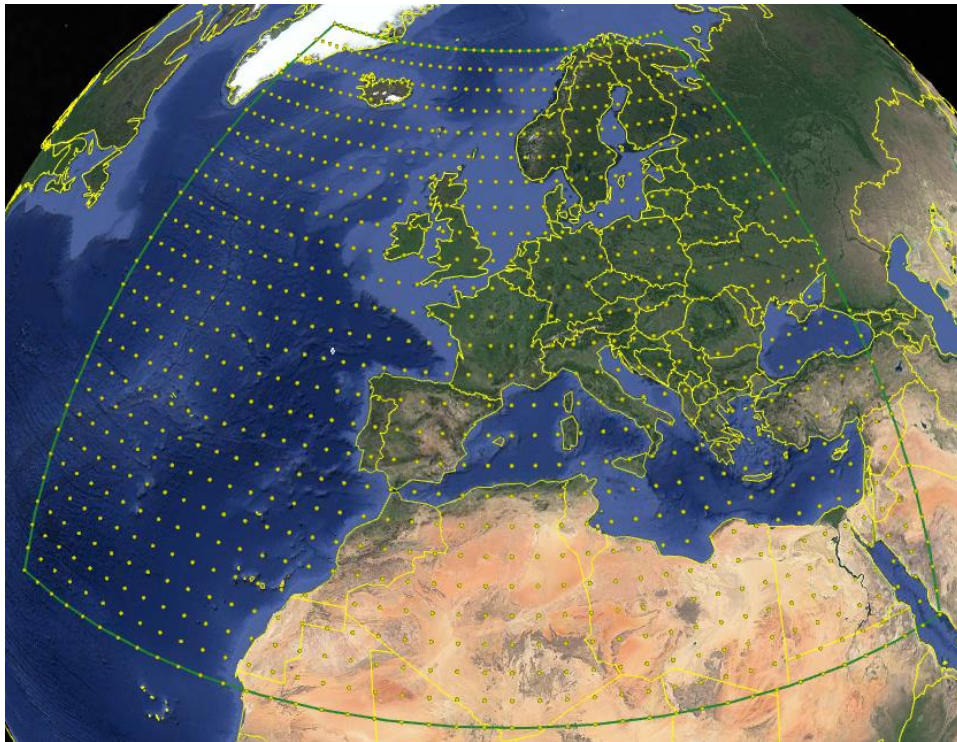


Figure 6: Grid of points (2x2 degrees) within the EGNOS Service Area

If a degradation w.r.t the committed performance<sup>5</sup> is identified, the ESP will inform the coordinator of the affected NAVAREA through an email to be acknowledged by the nominated PoC.

Please note that additional security and authentication mechanism could be considered and are to be agreed with the NAVAREA coordinators so as to guarantee and secure the communication of EGNOS safety related information between the ESP and the NAVAREA coordinators.

- An **unscheduled (real time)** degradation of the Service Performance will be communicated to the NAVAREA Coordinator immediately (according to the revised Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI) [RD-16], the navigational warnings should be broadcast as soon as possible or as dictated by the nature and timing of the event).
- A **scheduled (predicted or planned)** degradation of the EGNOS Service Performance will be communicated whenever possible **5 days in advance**<sup>6</sup> to the identified event [RD-6] (according

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<sup>4</sup> The definition of EGNOS Service Area can be found in [RD-5].

<sup>5</sup> The committed performance can be checked in [RD-4].

to the revised Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI) [RD-16], whenever possible the navigational warnings should be originated not less than five days in advance of the scheduled event).

- The NAVAREA Coordinator PoC will acknowledge the reception of the e-mail with the EGNOS SI in 30 min.

## 2 NAVAREA Coordinator tasks and responsibilities w.r.t EGNOS MSI

The NAVAREA Coordinator will be responsible for acknowledging the reception of the EGNOS SI messages. Then the information received (the notified event) will be classified as:

- Permanent information → Notice to Mariner
- NAVAREA related → to be broadcast as NAVAREA warning
- Coastal related → to be broadcast as Coastal warning
- Local event → to be broadcast as Local warning

If the information is classified as permanent or NAVAREA related, the NAVAREA Coordinator will be responsible for the generation and distribution of the corresponding NtM or NAVAREA Warning using the established communication channels.

If required, the NAVAREA Coordinators will also forward these EGNOS NAVAREA warnings for wider promulgation directly to adjacent NAVAREA Coordinators and/or others as appropriate, using the quickest possible means.

If the information is classified as a Coastal related, the affected NAVTEX coordinators will be informed to generate and broadcast the corresponding Coastal warnings.

If the EGNOS event is local, the affected Local Authorities will be informed so as to generate and broadcast the corresponding local warning to the vessels.

## 3 NAVTEX Coordinators tasks and responsibilities w.r.t EGNOS MSI

The NAVTEX Coordinators will receive the EGNOS MSI forwarded by the NAVAREA Coordinator and will generate the corresponding Coastal warning to be broadcast to the vessels following the established procedures and mechanisms.

## 4 Local Authorities tasks and responsibilities w.r.t EGNOS MSI

The Local Authorities will receive the EGNOS MSI forwarded by the NAVAREA Coordinator and will generate the corresponding Local warning to be broadcast to the vessels following the established procedures and mechanisms.

**Note that this proposal has been confirmed as a good approach by NAVAREA III Coordinator**

<sup>6</sup> IMO MSI Manual [RD-16] in section 2.4.1.4 and 4.2.3, states that “whenever possible such warnings should be originated not less than five days in advance”. Three days is proposed to also comply with the current EGNOS operations planning scheme.

**and also by the Spanish NAVTEX Coordinator.**  
**The next step would be to crosscheck the proposed approach with other NHO at IMO Level at the next SafetyNET Coordinating Panel.**

### 2.1.1 EGNOS Safety Information messages

First of all, it is important to recall the difference between the EGNOS related SI provided by the ESP to the NAVAREA Coordinator and the SI warnings actually received by the vessels.

The EGNOS SI messages are information on EGNOS availability for navigation (including scheduled or unscheduled performance degradations) provided by the ESP to the NAVAREA Coordinators. The NAVAREA Coordinator, will evaluate the EGNOS SI messages received and, if need be, according to their criteria, use them to build the actual warning (NAVAREA, Coastal or Local) to be finally sent to the mariners through the current regular mechanism.

This section addresses the format to be used for the EGNOS SI messages to be provided by the ESP to the NAVAREA Coordinators. The selected format is similar to that used for the official warnings, so as to facilitate the process and guarantee minimum manipulation and reformatting of the SI to be reported to the final users (vessels).

#### 2.1.1.1 *Language*

The EGNOS SI will be provided in English, as IMO (resolution A.706(17), as amended [RD-12]) requires all NAVAREA, Sub-area and coastal warnings to be broadcast only in English in the International NAVTEX and SafetyNET services.

#### 2.1.1.2 *Format*

Given the importance of the MSI, IMO states that it is essential to follow common standards when editing and disseminating of this type of information [RD-16] so as to assure that the mariner receives the information they need, in a form which they understand, at the earliest possible time. Therefore, the ESP will use the established message format (with minor modifications) for the communication of SI to the NAVAREA coordinators to avoid reformatting and changes in the messages.

The minimum information in a navigational warning which a mariner requires is hazard and position. However, it is recommended to include also amplifying remarks in order to provide sufficient extra details to clearly identify the significance of the hazard and to assist mariners in recognizing and assessing its effect upon their navigation. Moreover, the time, date and duration of the event should be included if known [RD-16].

Taking the above recommendation into consideration, the following table details the EGNOS SI messages structure:

MESSAGE ELEMENTS	
Preamble	EGNOS SI Message Identifier
	General area
	Locality
Warning	Key subject
	Geographical position
	Amplifying remarks
Postscript	Cancellations details

Figure 7: Navigation warnings message elements

### 1. EGNOS SI Message Identifier

In order to register and track the messages issued, an internal numbering will be used for the communications between the ESP and the NAVAREA coordinator (different from the official numbering assigned to the actual navigational warning for its broadcast to the users).

The messages will be consecutively numbered throughout the calendar year using the following format:

**EGNOSMSG NAVAREA N S/YY**

Where:

N- affected NAVAREA

S - consecutive number

YY – year

e.g: *EGNOSMSG NAVAREA III 5/21* (5<sup>th</sup> EGNOS SI message in 2021 affecting NAVAREA III)

### 2. General Area

According to the Revised Manual on MSI [RD-16], the general area field identifies the broad geographic region affected by the warning/message. However, for events as failure of satellite or terrestrial positioning systems, the Manual states that a navaid identification acronym "GPS", "LORAN", etc. should be used instead of a general area. Thus, “**EGNOS**” will be used in this field for the EGNOS SI messages.

### 3. Locality

This field gives information to the mariners to help them identify the warnings which affect their passage without having to plot them. The geographical name which is selected as locality should be one that can be found on charts and in nautical publications.

The Manual on MSI suggest using the established meteorological forecast areas as defined in WMO publication No.9, Volume D [RD-20] (included in ANNEX 2 in this document).

#### 4. Key Subject

The key subject is the event the mariner/skipper needs to be warned of.

The Manual on MSI in paragraph 4.2.3 suggests a list of events considered suitable to be broadcast as NAVAREA, SUB-AREA, or COASTAL Warnings. Among the list of subjects, in this case, EGNOS Maritime Service degraded performance or unavailability fits into two of them:

- 12. significant malfunctioning of radio-navigation services and shore-based maritime safety information radio or satellite services;
- 13. information concerning events which might affect the safety of shipping, sometimes over wide areas, e.g. naval exercises, missile firings, space missions, nuclear tests, ordnance dumping zones, etc;

Thus, an event of EGNOS performance degradation is considered suitable to be broadcast as navigational warning, and the key subject will indicate so. The phrase to be included in this field will be: “EGNOS degraded performance” or “EGNOS not available” in a particular area.

#### 5. Geographical position

Following the indication in the Revised Manual on MSI [RD-16], the Geographical position locating the EGNOS unavailability will be given in WGS84 in degrees and minutes or in degrees, minutes and decimal minutes in the form indicated below:

Latitude: DD-MMN or DD-MMS

Longitude: DDD-MME or DDD-MMW

or

Latitude: DD-MM.mmN or DD-MM.mmS

Longitude: DDD-MM.mmE or DDD-MM.mmW

e.g. 07-08N 039-17W 32-18.65S 165-02.81E

Remarks:

- Leading zeros should always be included
- Three digits are used for reporting degrees of longitude
- Positions should only be quoted to the accuracy required. Even if the known accuracy of the position is better.
- The same level of accuracy should always be quoted for both latitude and longitude

Note that the word **LOCATED** should only be used when the position of the hazard has been confirmed by a hydrographic survey. In all other cases the word **REPORTED** should be used.

In order to communicate a geographical area, so as to report an area affected by EGNOS degraded performance communicated in the warning, the following premises should be considered:

- For polygons, positions should be listed in a clockwise direction starting from the North West corner.
- Circular areas should be defined by a radius in nautical miles from a single point.

#### 6. Amplifying remarks

This field will be used to provide extra details to clearly identify the significance of the EGNOS hazard and to assist mariners in recognizing and assessing its effect upon their navigation, considering that:

- Distances should be quoted in nautical miles and decimals.
- The time, date and duration of the event should be included if known. The time standard for Navigational Warnings should always be UTC.
- The accepted format for a Date Time Group (DTG) in the text of a message is as follows:

DDHHMM UTC MoMoMo YY;  
e.g. 231642 UTC JUN 14

#### 7. Cancellation details

According to the Revised MSI Manual [RD-16], the cancellation details should be provided in a message that includes a definitive time frame. The reason for the cancellation should only be included if it is of benefit to the mariner and can be stated concisely.

When cancellation details relating to the subject of the message are included, it is recommended that paragraph numbers are used in order to clearly distinguish between the subject of the message and the cancellation details, for example:

1. *MESSAGE TEXT – EVENT OF KNOWN DURATION.*
2. **CANCEL THIS MSG DDHHMM UTC MoMoMo YY.**

These are called “self-cancelling messages”. In these cases, according to the Manual, if the cancellation time is not accurately known, a cancellation time should be chosen: one hour after the event completes or one day later.

“Stand alone” cancellation messages may be used when the intention is to cancel a previous EGNOS SI message. These messages only concern the cancellation of a previous message and will only include the cancellation field, as in the example below:



European  
Global Navigation  
Satellite Systems  
Agency



**CANCEL EGNOSMSG NAVAREA III 7/22 AND THIS MSG.**

## 2.2 Provision of Inland Waterways EGNOS Safety Information

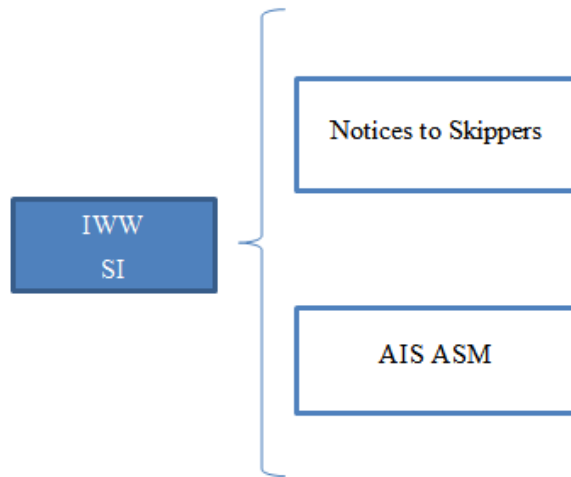


Figure 8: Classification of IWW SI

- Maritime Safety Information provided to mariners/vessels in Inland Waterways:
  - o Notices to Skippers
  - o Application Specific Messages provided over AIS
  - o Other VHF/voice communications

The Notices to Skippers (NtS) provide more timely (permanent) information and are not provided in real time to the vessels/skippers (they are accessed by the skippers when needed through different available web services provided by the existing European RIS providers).

So, in order to communicate immediate EGNOS unavailabilities to the skippers, other communication means should be used: AIS Application Specific messages or VHF dedicated communication.

This section presents the potential scheme to be followed for the generation and distribution of IWW Safety Information regarding EGNOS v2 1046 service.

It should be noted that this scheme is a preliminary proposal that needs to be further developed and validated with the feedback from IWW community.

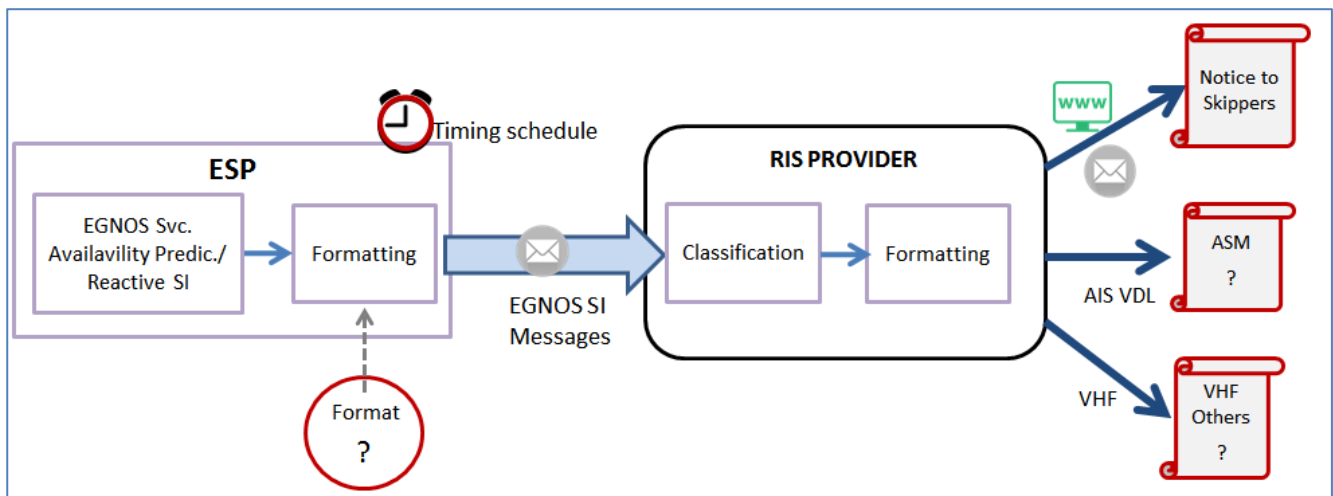


Figure 9: Example – Scheme for the provision of IWW EGNOS Safety Information

The following actors/bodies are expected to be involved in the generation and provision of EGNOS SI to the skippers.

1. EGNOS Service Provider
2. European RIS Providers

The tasks and responsibilities of each of these actors are detailed next:

#### 1 EGNOS Service Provider tasks and responsibilities w.r.t EGNOS SI

ESP will be responsible to monitor EGNOS Service real time performance and will also predict future performance over a grid of points (2x2 degrees, see Figure 6) within the EGNOS Service area<sup>7</sup> and will interpolate the resulting performance so as to get the maps from this grid of points.

If a degradation w.r.t the committed performance<sup>8</sup> is identified, the ESP will inform the RIS provider(s) responsible for the provision of River Information Services over the affected areas through an email to be acknowledged by the nominated PoC.

- An **unscheduled** degradation of the Service Performance will be communicated immediately.
- A **scheduled** degradation of the EGNOS Service Performance will be communicated **5 days in advance** to the identified event.
- The RIS Provider PoC will acknowledge the reception of the e-mail with the EGNOS SI in 30 min.

In order to comply with these tasks a complete/exhaustive list of Points of Contac for the European RIS Providers should be maintained. This list of PoC will be validated twice a year e.g. at each VTT (Vessel Tracking and Tracing) Experts Group meeting.

<sup>7</sup> The definition of EGNOS Service Area can be found in [RD-5].

<sup>8</sup> The committed performance can be checked in [RD-4].

## 2 RIS Provider tasks and responsibilities w.r.t EGNOS SI

The RIS Provider will be responsible for acknowledging the reception of the EGNOS SI messages. Then the information received (the notified event) will be classified as:

- Permanent information → Notice to Skipper
- Temporal information → to be broadcast as AIS ASM or through other means (e.g. voice communications).

Once the EGNOS SI has been classified, the RIS provider will apply the corresponding format (e.g.: xml for Notices to Skippers) and will broadcast the messages to the vessels.

## ANNEX 1. REGULATORY FRAMEWORK AND KEY STAKEHOLDERS

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This section aims to provide an overview of the main regulations, standards and guidance material to be considered for the provision of Maritime/IWW Safety information to vessels.

The paragraphs below highlight the main regulations on the Service Providers requiring the generation and provision of Safety information to be forwarded to the final users so as to guarantee the safety of navigation:

- **IMO SOLAS Chapter V [RD-7] Regulations 13.3** states that any change in the service affecting the performance of receivers fitted in ships shall only be affected after an adequate notice has been promulgated:

*“Contracting Governments undertake to arrange for information relating to aids to navigation to be made available to all concerned. Changes in the transmissions of position-fixing systems which could adversely affect the performance of receivers fitted in ships shall be avoided as far as possible and only be effected after timely and adequate notice has been promulgated.”*

- **IMO Resolution A.1046(27) on Worldwide Radionavigation Systems (WWRNS) [RD-8]** establishes the operational requirements that a system shall fulfil to be recognized by IMO as a component of the WWRNS. The summary of requirements can be found in the appendix "Operational Requirements" of the resolution.

For Ocean Waters the document states that *an integrity warning of system malfunction, non-availability or discontinuity should be provided to users as soon as practicable by Maritime Safety Information (MSI) systems.*

- **IALA Recommendation R-121 [RD-9]**(applicable to maritime radio beacon DGNSS services). This IALA document recommends to Members and other Authorities providing DGNSS services in the MF band to adopt the following principles: *Provide mariners with information about the service, for example service disruptions.*
- **IALA Guideline No.1112 – Performance and monitoring of DGNSS services in the MF band [RD-10].** This Guideline provides the design and implementation principles of IALA Recommendation R-121 on Performance and Monitoring of DGNSS Services in the MF Band. According to this document, the set of tasks to be performed by the Service provider include:
  - **Operation and Maintenance:** *The DGNSS service provider should continuously monitor the DGNSS transmissions to detect service disruptions and anomalies.*

To monitor the quality of the service, the Service provider should provide means to:

- *to monitor the service using local or remote integrity monitors to detect service disruptions and anomalies;*
- *inform users using navigational warnings regarding service disruptions or scheduled interruptions;*
- *manage any service disruptions;*
- *manage maintenance work or changes to the service in such a way that service disruption is minimized and the users are provided with advance warning.*

- **Publication of information:** *The DGPS service provider should provide a description of the DGNSS service and provide up to date information of scheduled maintenance activities.*

The service provider should publish sufficient information about the service to enable users to use the service safely at all times. This IALA Guideline proposes to employ the existing information channels, appropriate to the intended users and to the nature of the information (e.g. Notices-to-Mariners, broadcasting of maritime safety information (MSI) in the GMDSS).

The relevant information to be published should include: navigational warnings regarding service disruptions or scheduled interruptions.

- **IALA Guideline G.1129 – The Retransmission of SBAS Corrections using MF Radiobeacon and AIS [RD-11]**, states that the working arrangements to be established with the SBAS Service Provider should include:
  - Provision of Information related to the SBAS service degradation and maintenance activities
  - Provision of alarms/alerts procedure in relation with service degradations

### Annex 1.1. Regulatory framework: Maritime Safety Information provided to mariners/vessels in open sea and ports

The **Notices to Mariners (NtM)** provide timely information for the correction of navigation charts and publications: any information the mariner should know prior to the next edition of the nautical chart currently in use. Consequently, NtM are associated to a particular Nautical Chart and publications.

**SOLAS Chapter V regulation [RD-7]** requires the promulgation of notices NtM in order to keep the nautical charts up-to-date.

- SOLAS chapter V regulation 2 states: “*Nautical chart or nautical publication is a special-purpose map or book, or a specially compiled database from which such a map or book is derived, that is issued officially by or on the authority of a Government, authorized Hydrographic Office or other relevant government institution and is designed to meet the requirements of marine navigation*<sup>9</sup>.”
- SOLAS Chapter V regulation 9 requires contracting governments to “*promulgate notices to mariners in order that nautical charts and publications are kept, as far as possible, up to date*”.

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<sup>9</sup> Refer to appropriate resolutions and recommendations of the International Hydrographic Organization concerning the authority and responsibilities of coastal States in the provision of charting in accordance with regulation 9

*“Contracting Governments undertake to ensure the greatest possible uniformity in charts and nautical publications and to take into account, whenever possible, relevant international resolutions and recommendations”.*

*“Contracting Governments undertake to co-ordinate their activities to the greatest possible degree in order to ensure that hydrographic and nautical information is made available on a world-wide scale as timely, reliably, and unambiguously as possible”.*

- SOLAS Chapter V regulation 27 states that *“Nautical charts and nautical publications, such as sailing directions, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage, shall be adequate and up to date”.*
- SOLAS Chapter V Regulation 4 places an obligation on Contracting Governments to ensure that appropriate navigational warnings are issued: *“Each Contracting Government shall take all steps necessary to ensure that, when intelligence of any dangers is received from whatever reliable source, it shall be promptly brought to the knowledge of those concerned and communicated to other interested Governments”.*

Regarding **navigational warnings, the Global Maritime Distress and Safety System (GMDSS)** needs to be introduced. The GMDSS is an integrated communication system using satellite and terrestrial radio-communications to ensure that the aid required by a ship in distress will be dispatched. This System ensures also the provision of Maritime Safety Information (MSI), both meteorological and navigational information, on a global basis at sea.

The GMDSS was developed by the International Maritime Organization (IMO), in close co-operation with the International Telecommunication Union (ITU) and other international organizations, as the World Meteorological Organization (WMO), the International Hydrographic Organization (IHO) and the COSPAS-SARSAT partners.

The GMDSS requirements are contained in **Chapter IV of SOLAS [RD-7]** on Radiocommunications and were adopted in 1988.

**SOLAS regulation IV/12.2** states that *“Every ship, while at sea, shall maintain a radio watch for broadcasts of maritime safety information on the appropriate frequency or frequencies on which such information is broadcast for the area in which the ship is navigating”.*

According to GMDSS requirements, every GMDSS equipped ship shall be capable of:

- transmitting ship-to-shore Distress Alerts by at least two separate and independent means, each using a different radio communication service;
- receiving shore-to-ship Distress Alerts;
- transmitting and receiving ship-to-ship Distress Alerts;
- transmitting and receiving search and rescue co-ordinating communications;

- transmitting and receiving on-scene communications;
- transmitting and receiving locating signals;
- **receiving maritime safety information;**
- transmitting and receiving general radiocommunications relating to the management and operation of the vessel; and
- transmitting and receiving bridge-to-bridge communications.

The GMDSS became mandatory for SOLAS vessels (commercial vessels of 300 Gross Registered Tons (GRT) and above, engaged on international voyages) in February 1, 1999. Some Flag States have also incorporated GMDSS requirements into their domestic marine radio legislation.

The SOLAS GMDSS regulations are structured such that all GMDSS ships are required to carry a minimum set of equipment, with basically more equipment being required the further the ship travels from land.

The following paragraphs detail the IMO and IHO regulatory material addressing the GMDSS and MSI:

- **IMO Resolutions A.705(17) on Promulgation of Maritime Safety Information [RD-13]** – amended by MSC.1 Circular 1287 Rev.1 (24 June 2013)

The purpose of this Recommendation is to set out the organization, standards and methods which should be used for the promulgation and reception of maritime safety information.

According to the IMO document, “*the MSI Service (MSIS) of the GMDSS is the international and national coordinated network of broadcasts containing information which is necessary for safe navigation, received on ships by equipment which automatically monitors the appropriate transmissions, displays information which is relevant to the ship and provides a print capability.*”

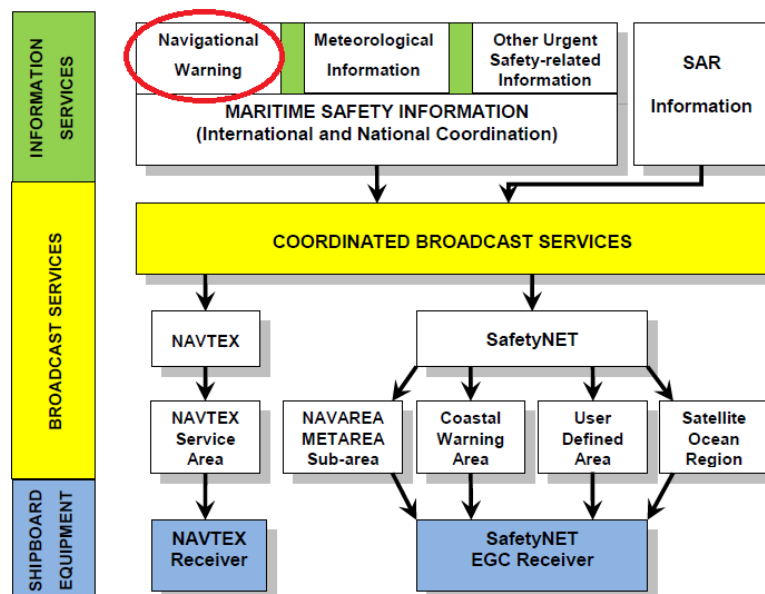


Figure 10: The MSIS of the GMDSS. Source: MSC.1/Circ.1287

The resolution provides information on the following topics:

- Broadcast methods: Two principal methods are used for broadcasting maritime safety information
  - NAVTEX: broadcasts to coastal waters (standards and procedures set out in the NAVTEX Manual).
  - SafetyNET: broadcasts which cover all the waters of the globe within Inmarsat coverage (standards and procedures set out in the International SafetyNET Manual).
  - High Frequency Narrow Band Direct Printing (HF NBDP) may be used to promulgate maritime safety information in areas outside Inmarsat coverage (SOLAS regulation IV/7.1.5).
  - In addition, Administrations may also provide maritime safety information by other means (e.g. VHF)

The majority of warnings will be broadcast either on NAVTEX or SafetyNET.

- Shipboard equipment: technical details of NAVTEX receivers, SafetyNET receivers and the HF NBDP receivers.
- Provision of information:
  - *“Navigational warnings should be provided in accordance with the standards, organization and procedures of the WWNWS under the functional guidance of the International Hydrographic Organization (IHO) through its World-Wide Navigational Warning Service Sub-Committee (WWNWS)”*
  - Additionally, it states that *“Relevant national or international authorities should take into account the need for contingency planning”*
- Coordination procedures:

Coordination is required in order to ensure that the mariners receive the information necessary for safe navigation.

According to the Resolution, this coordination is regulated by the standard operational procedures of the Organization, IHO, WMO, International Telecommunication Union (ITU) and the International Mobile Satellite Organization (IMSO).

The administrations broadcasting MSI should provide details of services to the Organization, which will maintain and publish this as part of the GMDSS Master Plan.

#### - **IMO Resolution A.706(17) on World-Wide Navigational Warning Service (WWNWS) [RD-12]** – amended by MSC.1 Circular 1288 (9 December 2018)

The purpose of this document is to provide specific guidance for the promulgation of internationally coordinated NAVAREA and coastal warnings.

This resolution provides information on the following points:

- Navigational warning broadcasts **methods** (same information as in A. A.705(17))
- Navigational warning broadcasts **scheduling**:

Navigational warnings shall be broadcast as soon as possible or as dictated by the nature and timing of the event. Normally, the initial broadcast should be made as follows:

- for NAVTEX, at the next scheduled broadcast, unless circumstances indicate the use of procedures for VITAL or IMPORTANT warnings;

Broadcast times for NAVTEX are defined by the coordinating Panel on NAVTEX Services of the Sub-Committee on Radiocommunications and Search and Rescue.

- for SafetyNET, within 30 min of receipt of original information, or at the next scheduled broadcast.

Times of scheduled broadcasts under the international SafetyNET service are coordinated through the International SafetyNET coordinating Panel.

Navigational warnings shall be repeated in scheduled broadcasts in accordance with the guidelines promulgated in the NAVTEX Manual and International SafetyNET Manual as appropriate.

At least two scheduled daily broadcast times are necessary to provide adequate promulgation of NAVAREA warnings.

- The resolution also describes the different **types of navigational warnings**:
  - NAVAREA warnings, concerned with the information which ocean-going mariners require for their safe navigation. This includes, in particular, new navigational hazards and failures of important aids to navigation as well as information which may require changes to planned navigational routes.
  - Sub-Area warnings broadcast information which is necessary for safe navigation within a Sub-Area.
  - Coastal warnings broadcast information which is necessary for safe navigation within areas seaward of the fairway buoy or pilot station, and should not be restricted to main shipping lanes.
  - Local warnings broadcast information which covers inshore waters, often within the limits of jurisdiction of a harbour or port authority. They are broadcast by means other than NAVTEX or SafetyNET, and supplement coastal warnings by giving detailed information within inshore waters.
- Message requirements, in terms of numbering and language
- Finally the Resolution details the coordinator resources and responsibilities:
  - NAVAREA coordinator resources and responsibilities
  - Sub-Area coordinator resources and responsibilities
  - National coordinator resources and responsibilities

## - **Manual on Maritime Safety Information:**

A Working Group of the IHO World-Wide Navigational Warning Service Sub-Committee revised the Resolutions indicated above (A.705(17) and A.706(17)) and prepared the revised Joint IMO/IHO/WMO **Manual on Maritime Safety Information [RD-15]**, approved by MSC 86 in May/June 2009 and updated in 2015. This manual gathers the information of revised IMO resolutions and provides a practical guide for the provision navigational warnings or meteorological forecasts under the Global Maritime Distress and Safety System (GMDSS). According to this document:

*“Maritime Safety Information (MSI) is promulgated in accordance with the requirements of IMO resolution A.705(17), as amended. Navigational warnings are issued under the auspices of the IMO/International Hydrographic Organization (IHO) World-Wide Navigational Warning Service (WWNWS) in accordance with the requirements of IMO resolution A.706(17), as amended.”*

*“In order to achieve the necessary impact on the mariner it is essential to present timely and relevant information in a consistent format that is clear, unambiguous and brief. Within this manual, it is particularly intended to provide the best form of words for use in all types of navigational warnings and meteorological forecasts and warnings that are required to be broadcast in the English language<sup>2</sup>. Note has been taken of the IMO Standard Marine Communication Phrases (resolution A.918(22)), where appropriate.”*

## Annex 1.2. Regulatory framework: Safety Information provided to skippers/vessels in Inland Waterways

National and local fairway authorities have the obligation to inform users about issues regarding the waterway that might influence safety and accessibility. Notices to skippers are among the most common means of information in inland navigation.

**Notices to Skippers** communicate for example the status of the inland waterway infrastructure, failures of aids to navigation, temporarily blockages of waterway sections or other types of infrastructure, works, water level and water depth information ice information and weather messages.

The international standard for the distribution of Notices to skippers on inland shipping routes is established by the Central Commission for the Navigation of the Rhine (CCNR) and by the Commission Regulation (EC) 416/2007 of 22 March 2007. This standard establishes the technical specifications for Notices to Skippers as referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community with the objective to support the safety of navigation and voyage planning.

**The international standard for Notices to Skippers** provides a standardized data format, which can be used both for publishing Notices on the internet (pull-services) or for distribution by e-mail (push services).

Traditionally Notices to Skippers have been distributed by VHF, in writing, on notice boards or by fax. Web services have been installed in most countries in the last years. But these services are providing the information only in the national language of each country, which causes a lot of problems on a European level. A standard, which provides automatic translation of the most important safety relevant information, was urgently needed therefore.

Due to the enormous variety of notices to skippers and the big differences in the grammar of the languages it was not possible to provide grammatically correct translations of sentences, but only translation of standardized pieces of information (i.e. code format, exemplary for the limitation: “overtaking prohibited”). Information on restrictions and delays is not only read by skippers, but is also used in voyage planning applications. A second goal of standardization was the possibility to provide machine readable files, which can be used directly by these applications.

**The Expert Group Notices to Skippers Expert (NtS)** ensures a harmonized development of the Notices to Skippers standard in the different international organisations. The NtS Expert Group adapts periodically the standard to technical developments and users requirements and submits proposals to the European Commission, the Central Commission for Navigation on the Rhine, the Danube Commission, the Mosel Commission, the Sava Commission, the UN/ECE and other interested international organisations for formalisation.

Moreover, the NtS Expert Group (with more than 80 members) supports, advises and gives input to the European RIS platform and the CCNR working group regarding a harmonized implementation of Notices to Skippers when requested and on its own initiative.

Since 20 December 2010 the newly approved Terms of Reference are available for the Notices to Skippers Expert Group. The community portal for Notices to Skippers is available for the members of the EC with username and password under <http://eg.ris.eu/nts/>. Various information is published at the RIS Portal under [http://www.ris.eu/expert\\_groups/nts](http://www.ris.eu/expert_groups/nts), where the available RIS indexes can also be downloaded.

- The **Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005 [RD-14]** on harmonised river information services (RIS) on the EU’s inland waterways establishes rules on the use of harmonised river information services (RIS). These rules are designed to ensure the safety, efficiency and environmental friendliness of inland waterways in the EU. They apply to canals, rivers, lakes and ports able to take vessels between 1,000 and 1,500 tonnes. The key points included in this directive are summarized below:
  - River information services include:
    - geographical, hydrological and administrative data on waterways (‘fairway information’);
    - data relevant to navigation in the short, medium and long term (‘tactical and strategic traffic information’);
    - action in the event of an accident (‘calamity abatement support’);
    - statistics, customs services, waterway charges and port dues.
  - EU countries must:
    - ensure their RIS are efficient, allow for expansion and can coordinate with other systems;
    - supply all RIS users with the relevant data on navigational and voyage planning;
    - establish RIS centres according to regional needs;
    - designate authorities to oversee RIS application and the exchange of international data.

- The European Commission is responsible for setting out the technical guidelines and requirements for the planning, implementation and operational use of RIS, including:
  - an electronic chart display and information system;
  - electronic ship reporting;
  - **notices to skippers;**
  - vessel tracking and tracing systems;
  - compatibility of RIS equipment.

The Directive adds that *“These guidelines and specifications shall be based on the technical principles set out in Annex II and shall take account of work carried out in this field by relevant international organisations”*

Annex II establishes that the **technical specifications for notices to skippers**, in particular regarding fairway information, traffic information and management as well as voyage planning, shall respect the following principles:

- (a) a standardised data structure using predefined text modules and encoded to a high extent in order to enable automatic translation of the most important content into other languages and to facilitate the integration of notices to skippers into voyage planning systems;
  - (b) the compatibility of the standardised data structure with the data structure of inland ECDIS to facilitate integration of notices to skippers in inland ECDIS.
- The Article 6 in the directive should be mentioned as it recommends the use of satellite positioning technologies.
  - Regarding roles and responsibilities, the regulation establishes in Article 8 that Member States shall designate **competent authorities for the RIS application** and for the international exchange of data, which then shall be notified to the Commission.
- The **Commission Regulation (EC) 416/2007 of 22 March 2007 [RD-18]** lays down the technical specifications for Notices to Skippers based on the technical principles set out in Annex II to 2005/44/EC Directive.
  - According to this regulation, the standardisation of Notices to Skippers will:
    - provide automatic translation of the most important content of notices in all the languages of the participating countries,
    - provide a standardised structure of data-sets in all the participating countries to facilitate the integration of notices in voyage-planning systems,
    - provide a standard for water level information,
    - be compatible with the data-structure of Inland ECDIS to facilitate integration of Notices to Skippers into Inland ECDIS,
    - facilitate data-exchange between different countries,
    - use standard vocabulary in combination with code lists.
  - As it is not possible to standardise all the information, part will be provided as ‘free text’ without automatic translation. The standardised part should cover the following information:
    - important for the safety of Inland Navigation,



- needed for voyage planning (for example: closure of locks, reduction of vertical clearance, ...).
- These technical specifications for Notices to Skippers include the following content:
  - Data standard
  - Water level information
  - Way of distribution:
    - *Member States shall ensure that Notices to Skippers are provided according to these technical specifications in XML-format downloadable in the Internet*
    - *Data exchange between the authorities is recommended. All the authorities using this standard can integrate Notices to Skippers of other authorities and countries in their own services. The participating parties (authorities) can agree the procedure of transmitting the XML messages by push or pull services directly.*
  - Procedure for changes in the reference tables and the XML scheme of Notices to Skippers
  - Structure of the messages and coding in XML-format

## ANNEX 2. WEATHER FORECAST AREAS

Different METAREAS (geographical sea areas) have been defined for the purpose of coordinating and promulgating marine meteorological information (meteorological warnings and forecasts) within the GMDSS, as depicted in the figure below.

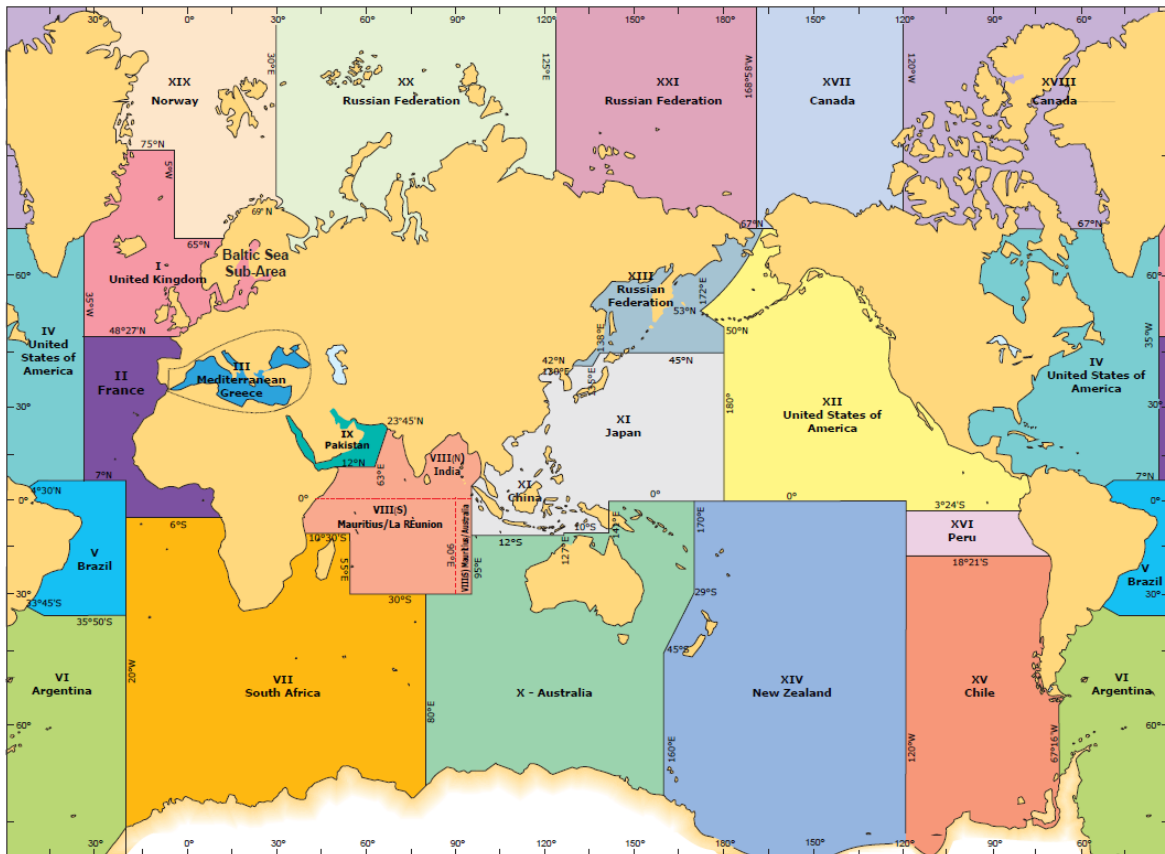


Figure 11: METAREAS

Within the 21 defined METAREAS, four of them fall within the EGNOS Service Area:

- METAREA I – United Kingdom + Baltic Sea Subarea
- METAREA II – France
- METAREA III – Mediterranean – Greece
- METAREA XIX – Norway

The figures below present the weather forecast areas, for these four METAREAS, defined by WMO in its publication No.9, Volume D [RD-20].



## Annex 2.1. METAREA I - Weather forecast areas

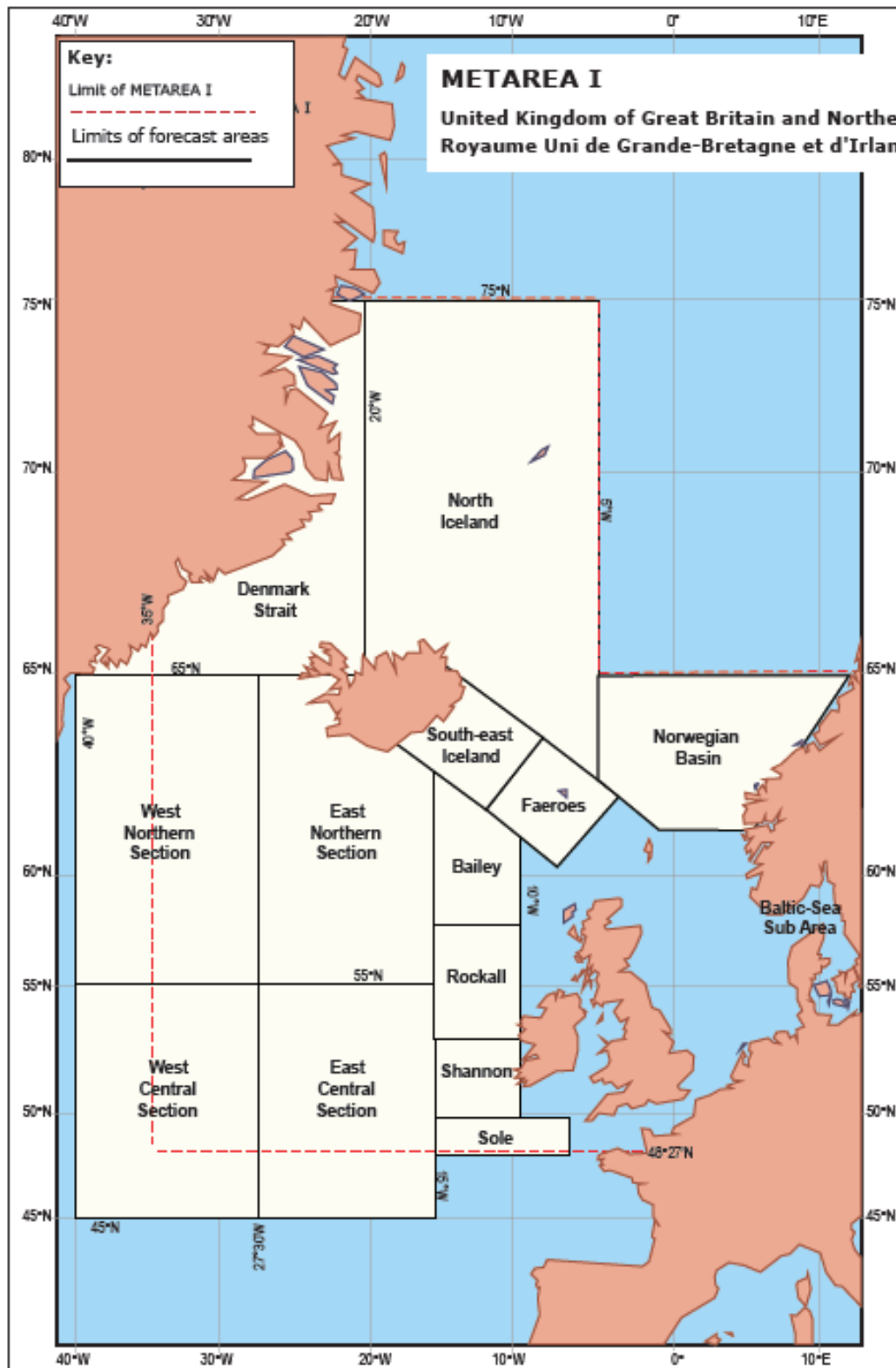


Figure 12: METAREA I – Forecast Areas – United Kingdom of Great Britain and Northern Ireland

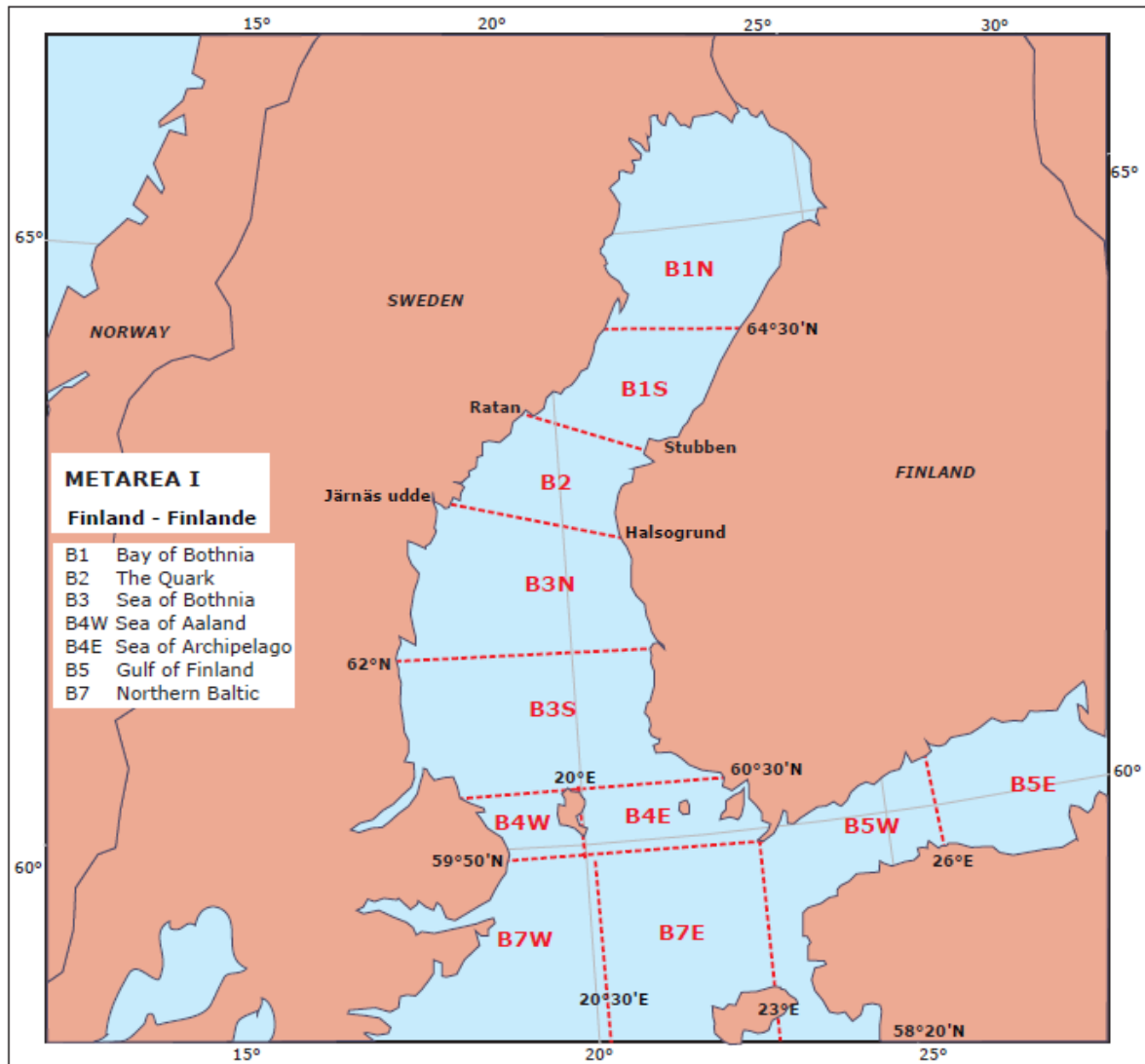


Figure 13: METAREA I – Forecast Areas – Finland



Figure 14: METAREA I – Forecast Areas – France

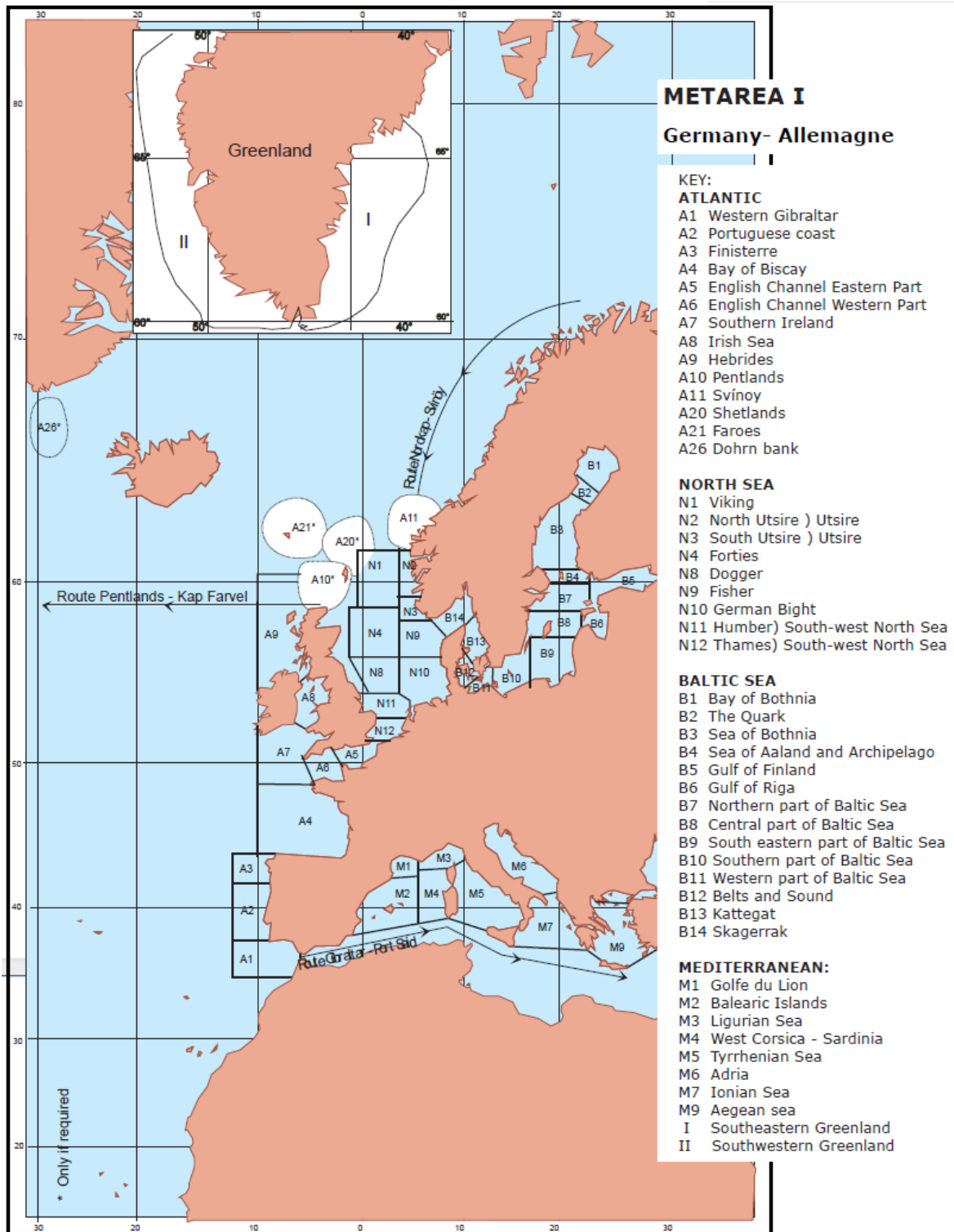


Figure 15: METAREA I – Forecast Areas – Germany

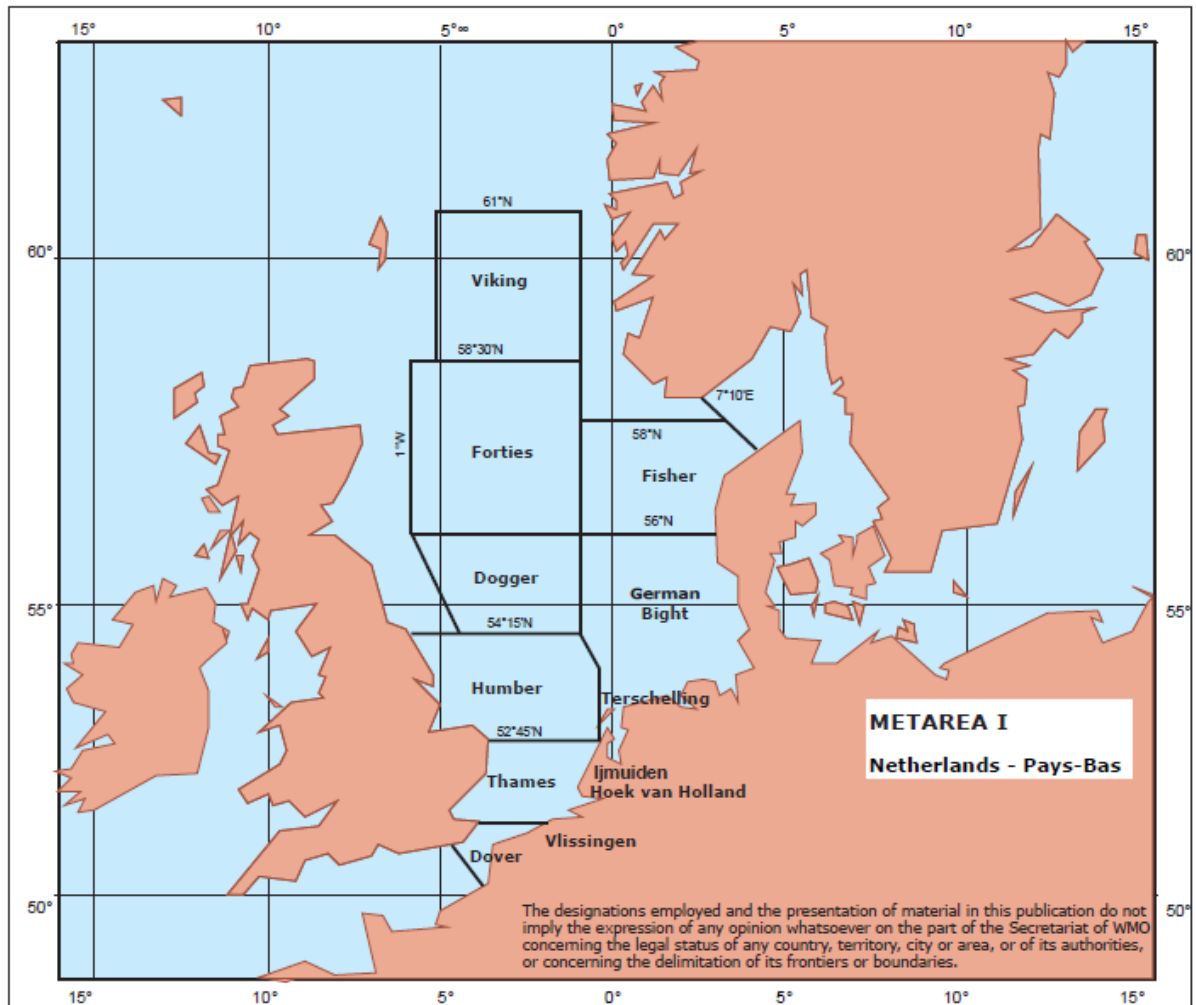


Figure 16: METAREA I – Forecast Areas – Netherlands

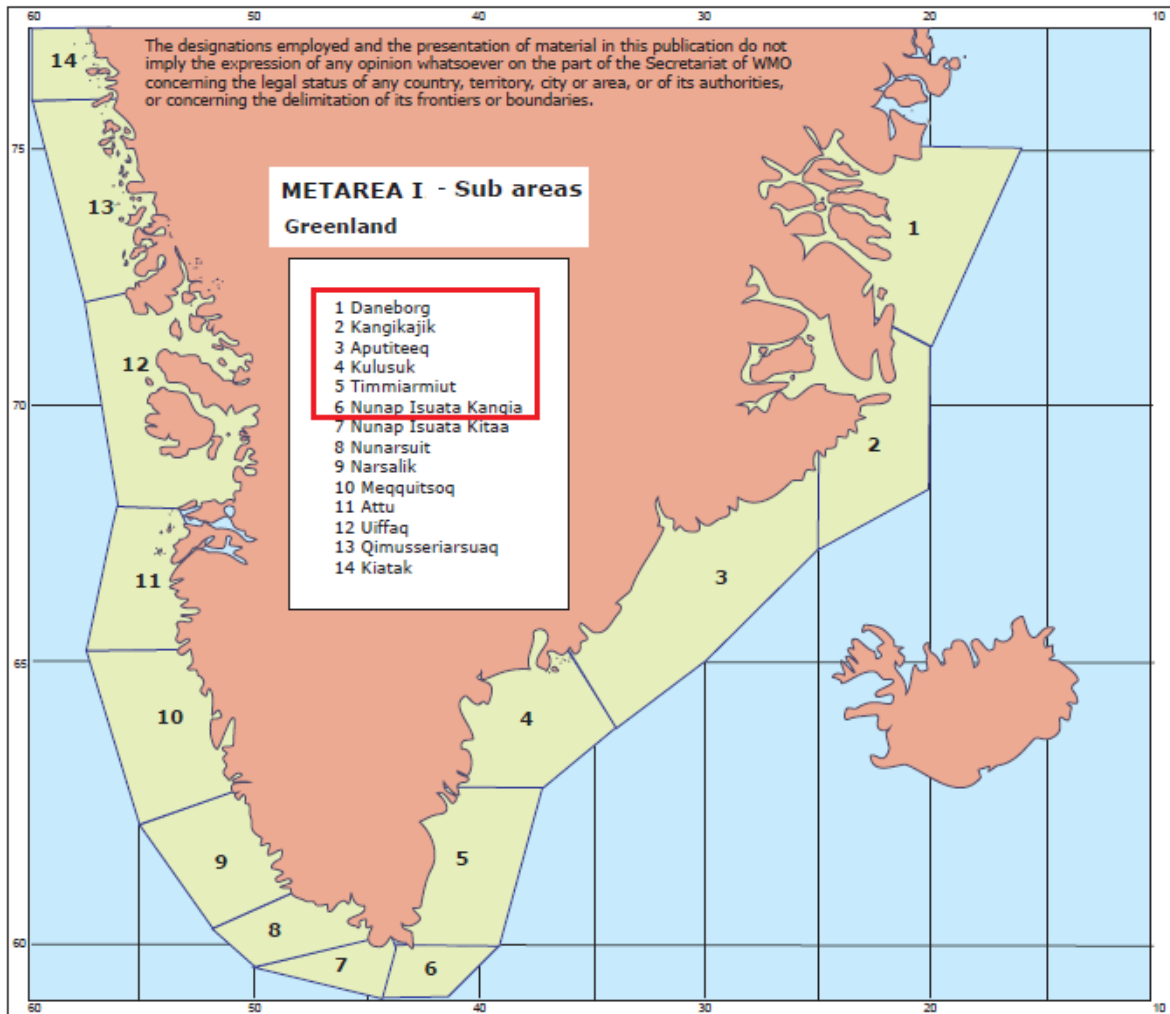


Figure 17: METAREA I – Forecast Areas – Greenland

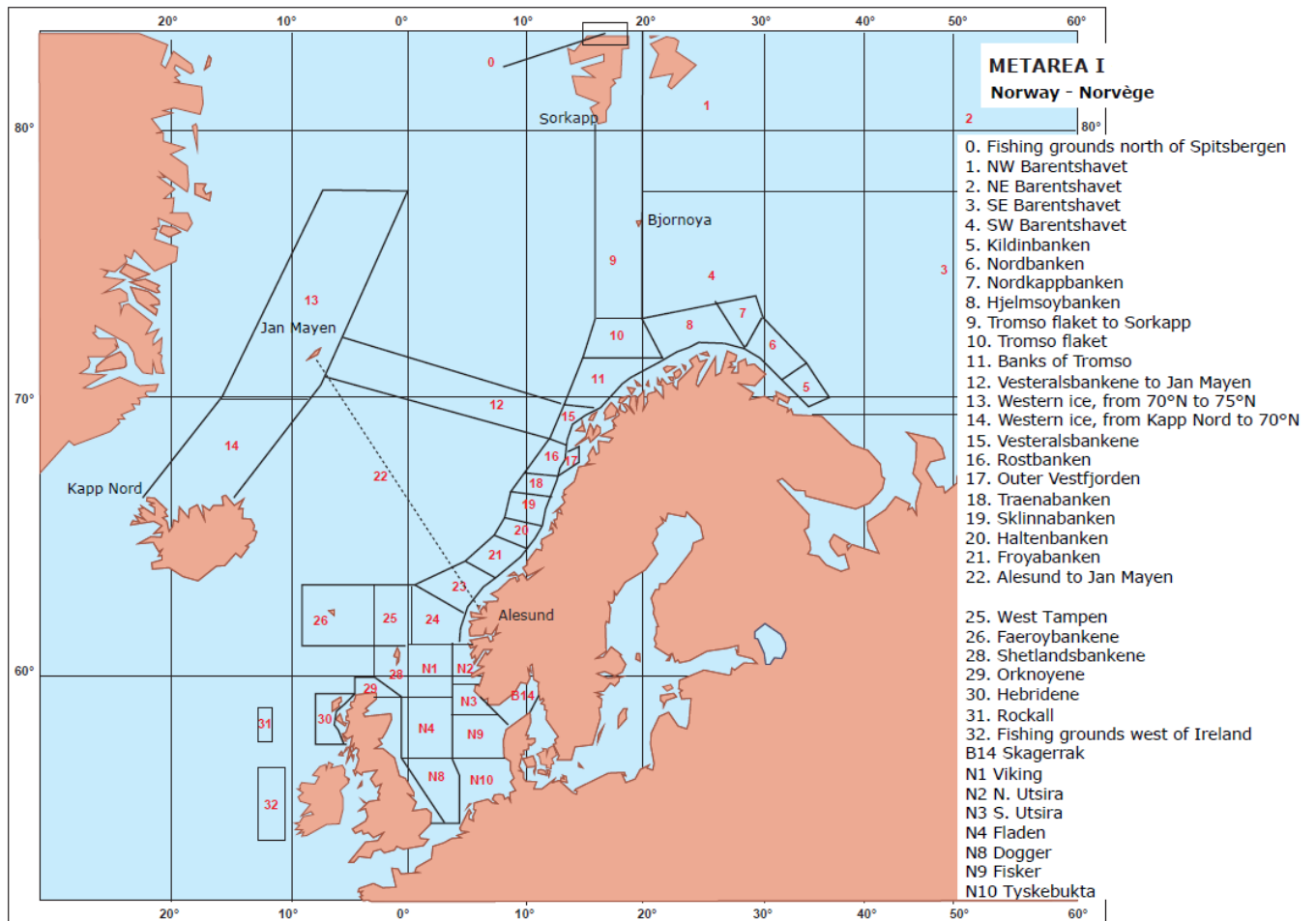


Figure 18: METAREA I – Forecast Areas – Norway



## Annex 2.1. METAREA II - Weather forecast areas

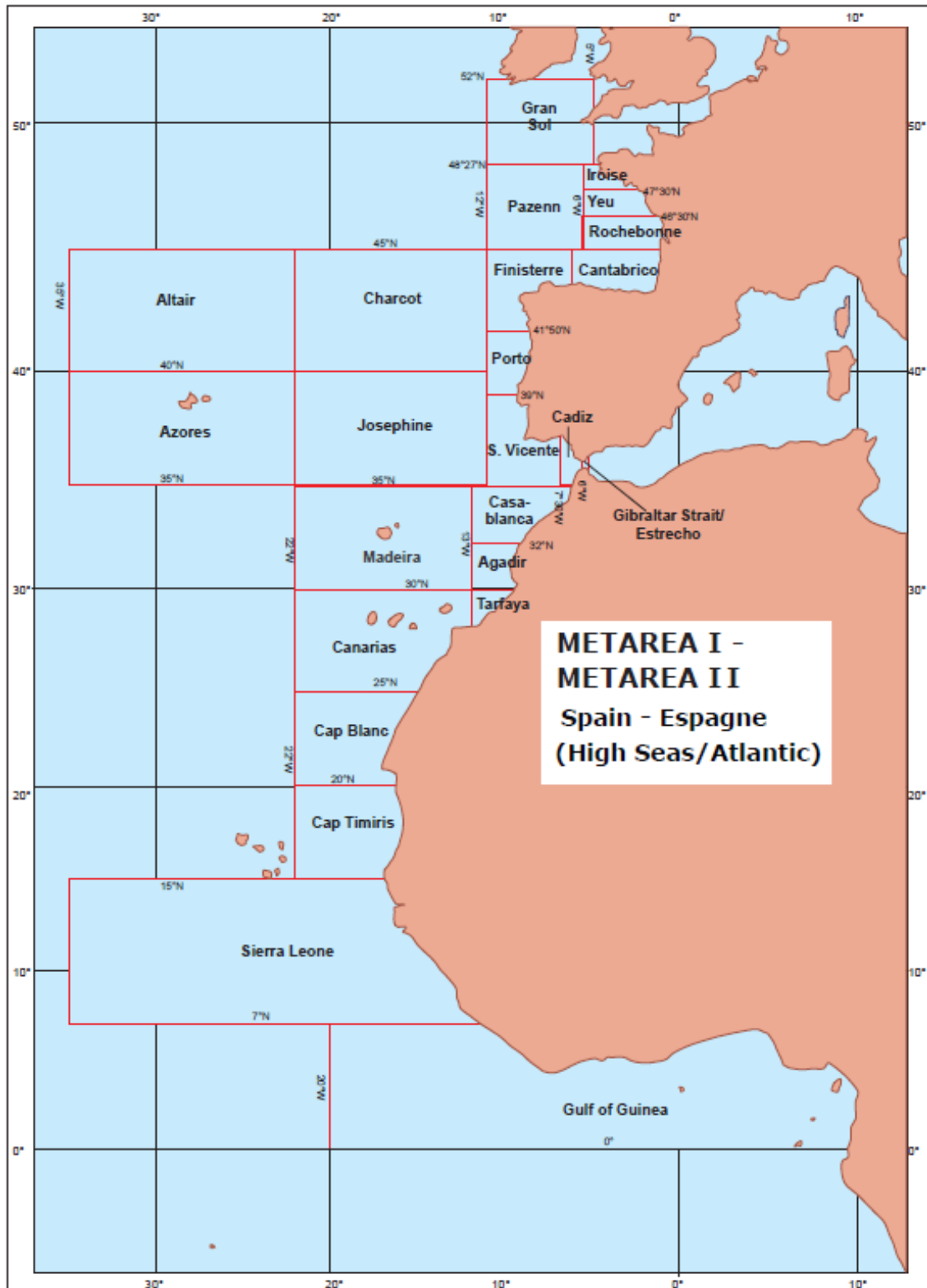


Figure 19: METAREA II – Forecast Areas – Spain



Figure 20: METAREA II – Forecast Areas – France

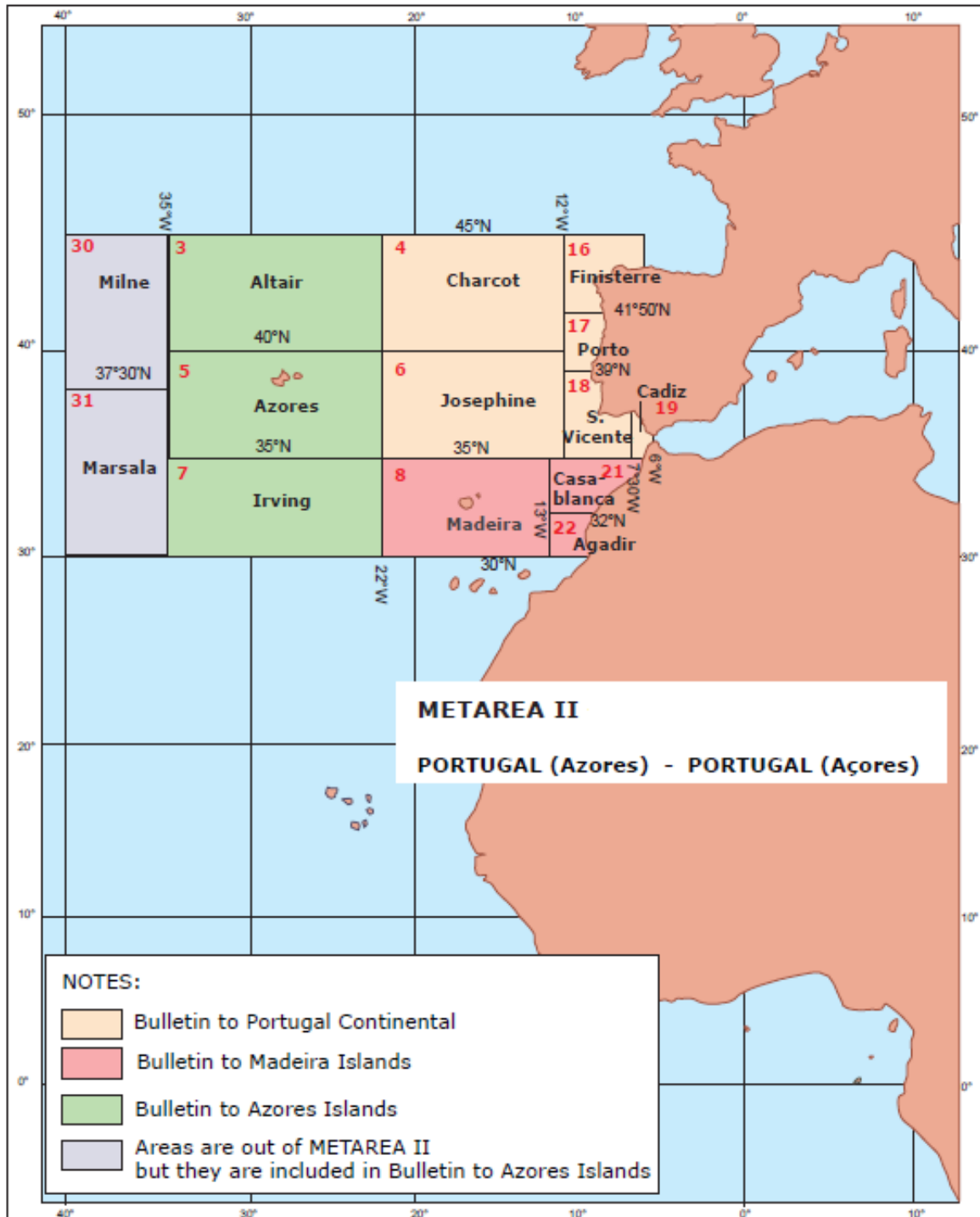


Figure 21: METAREA II – Forecast Areas – Portugal



## Annex 2.1. METAREA III - Weather forecast areas

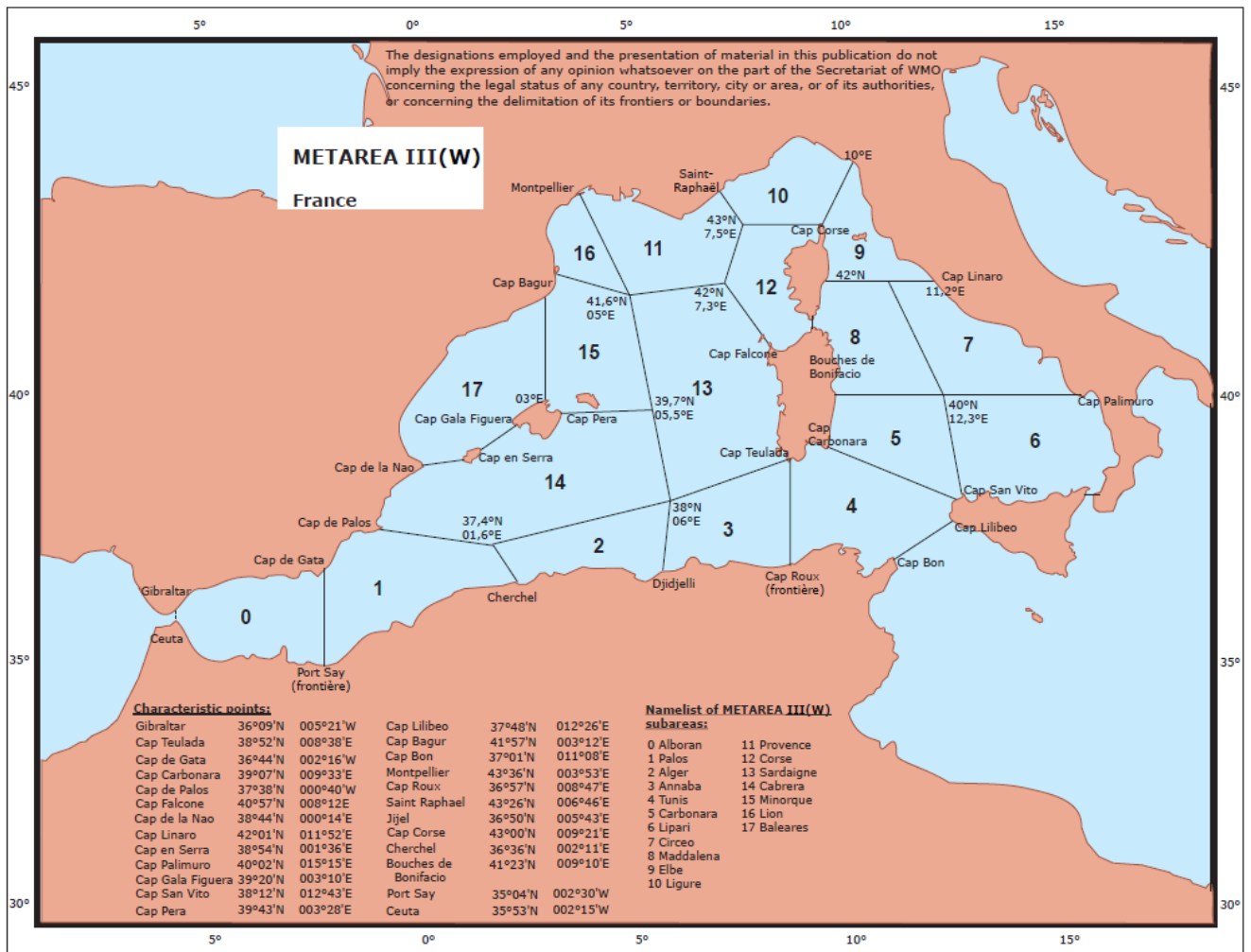


Figure 22: METAREA III – Forecast Areas – France

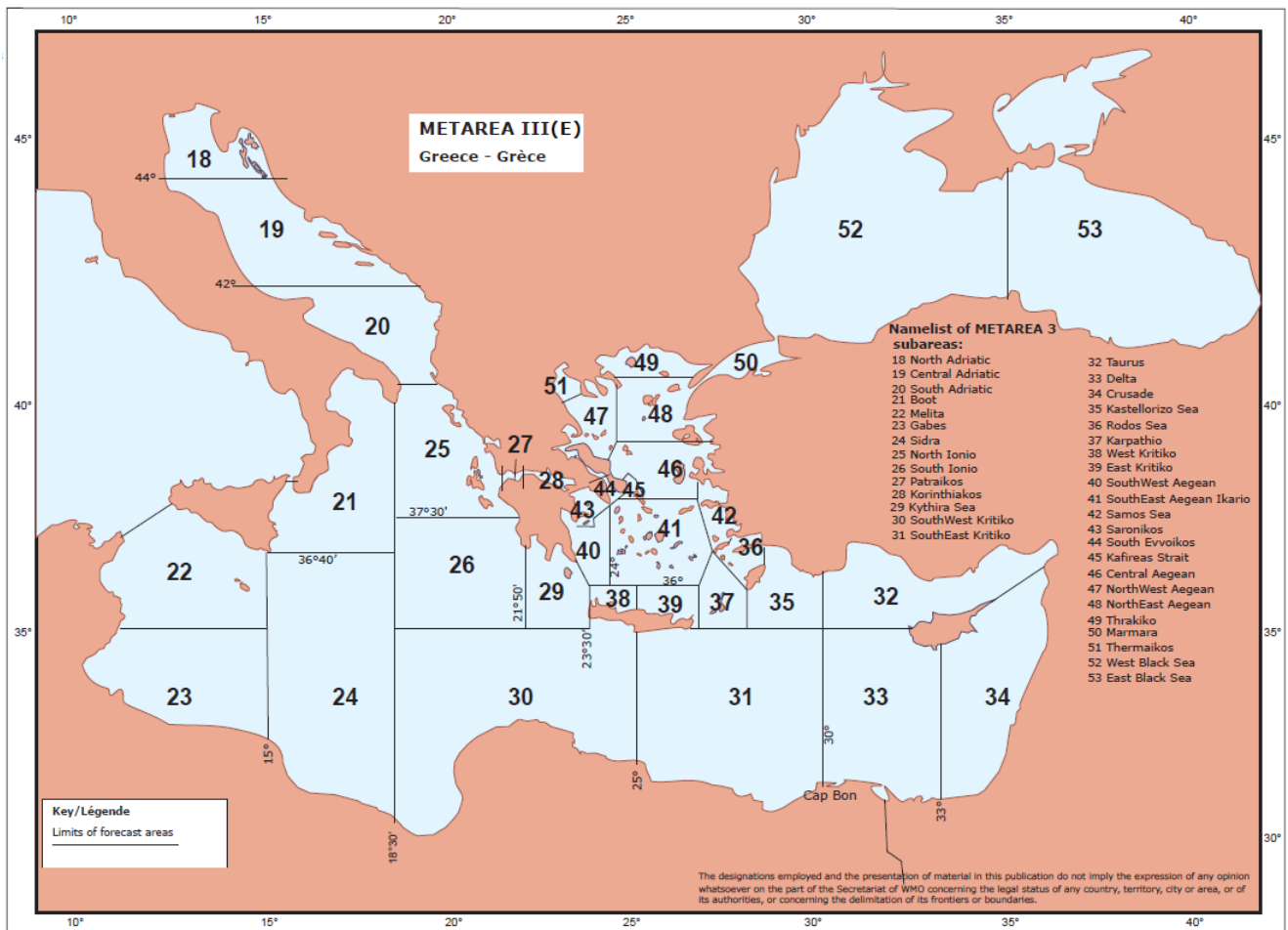


Figure 23: METAREA III – Forecast Areas – Greece

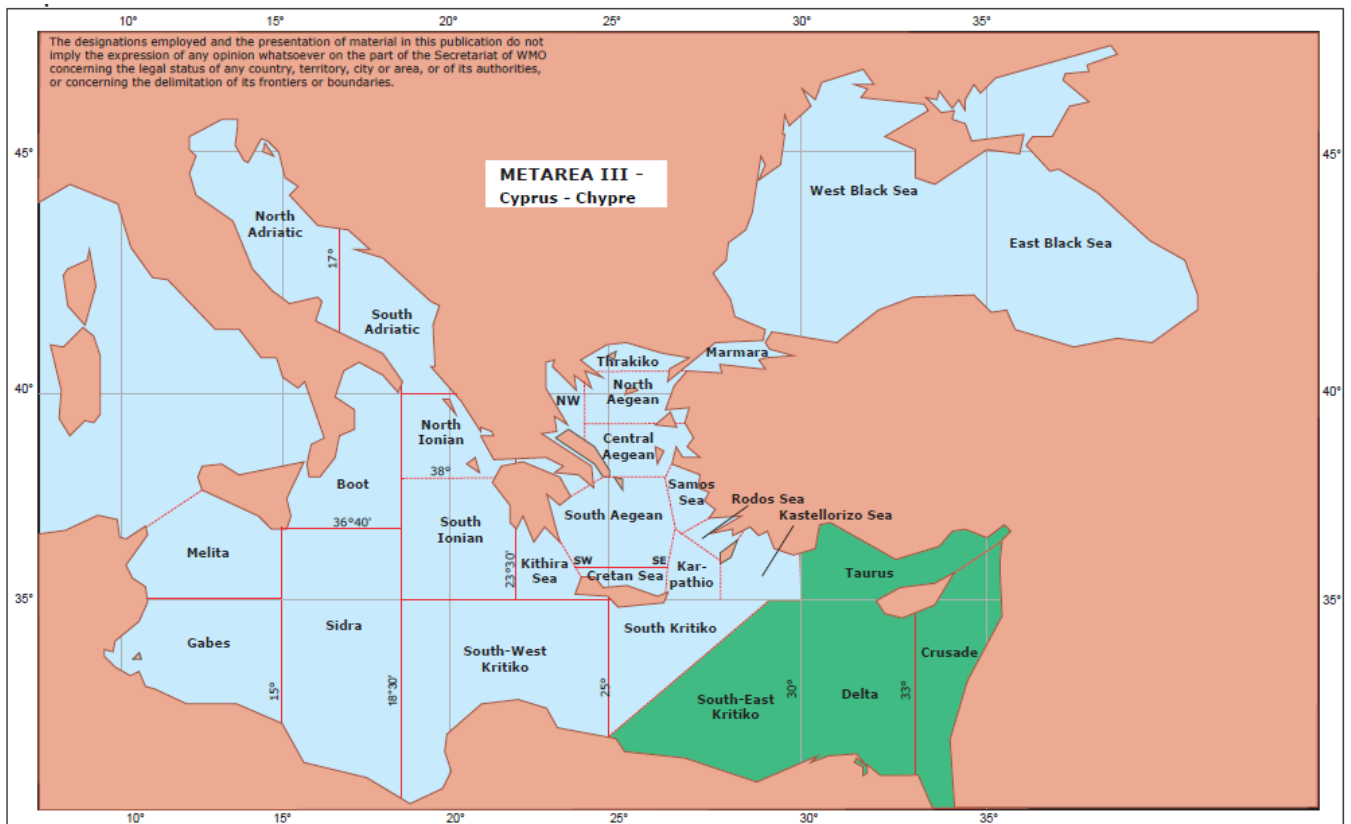


Figure 24: METAREA III – Forecast Areas – Cyprus

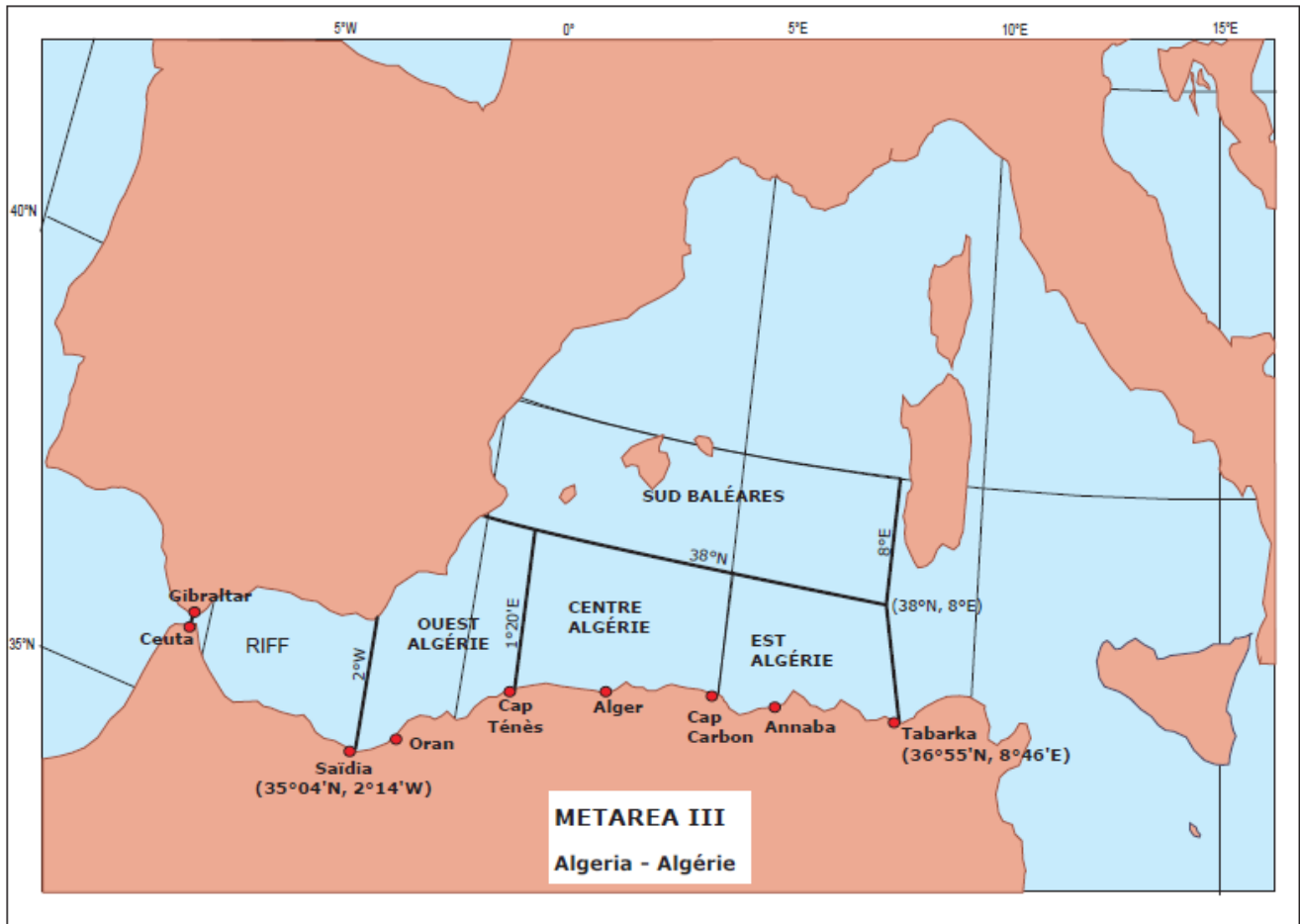


Figure 25: METAREA III – Forecast Areas – Algeria

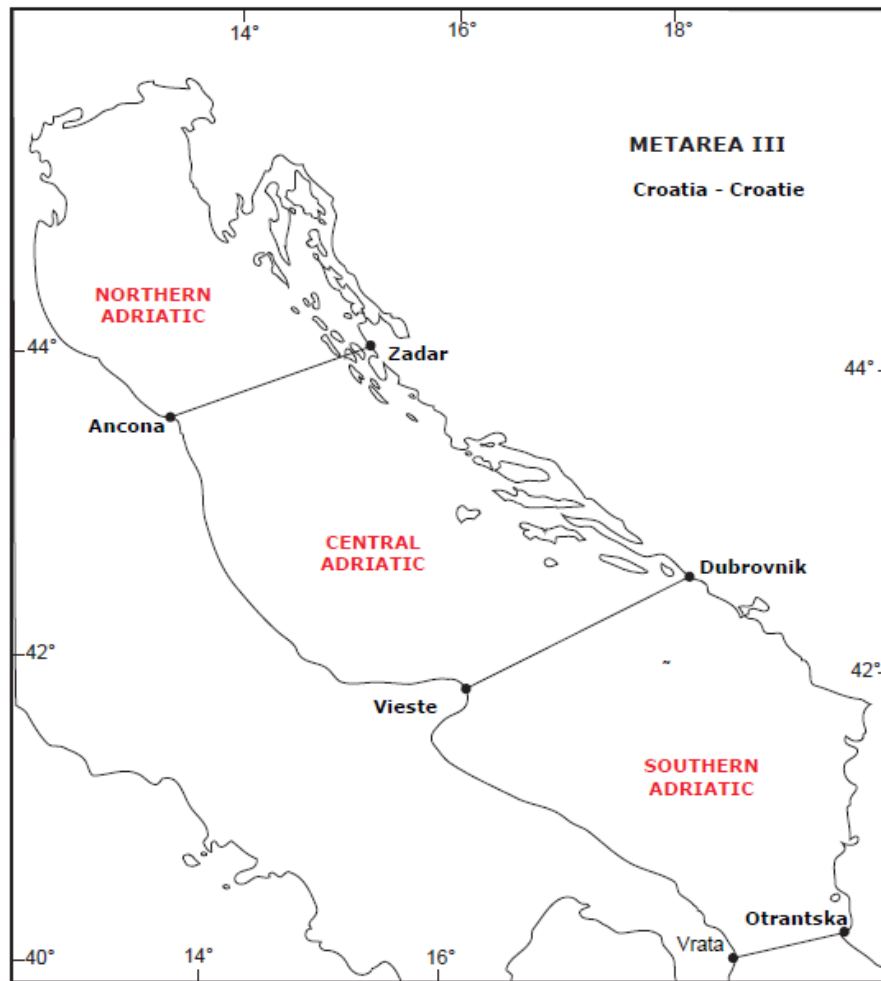


Figure 26: METAREA III – Forecast Areas – Croatia

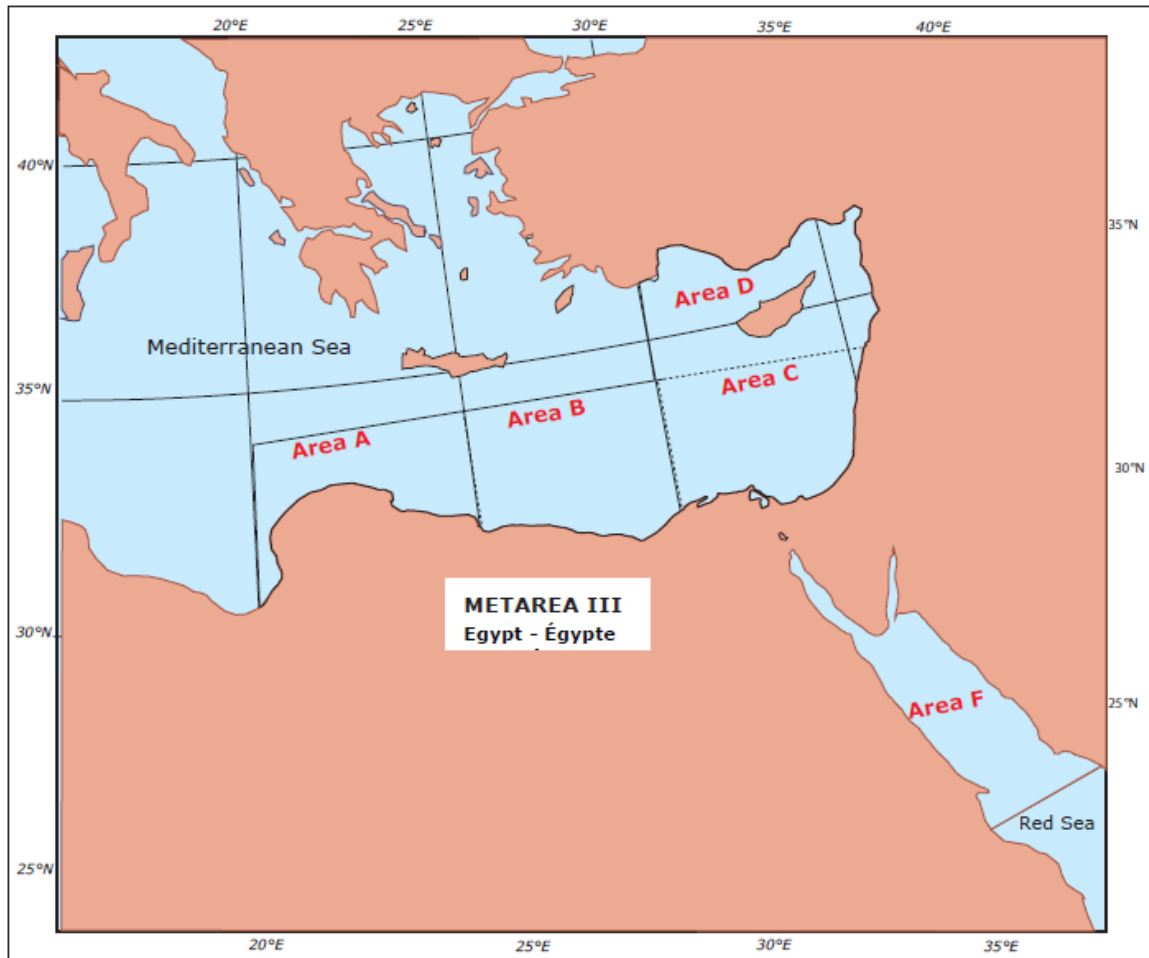


Figure 27: METAREA III – Forecast Areas – Egypt



## METAREA III

### Italy

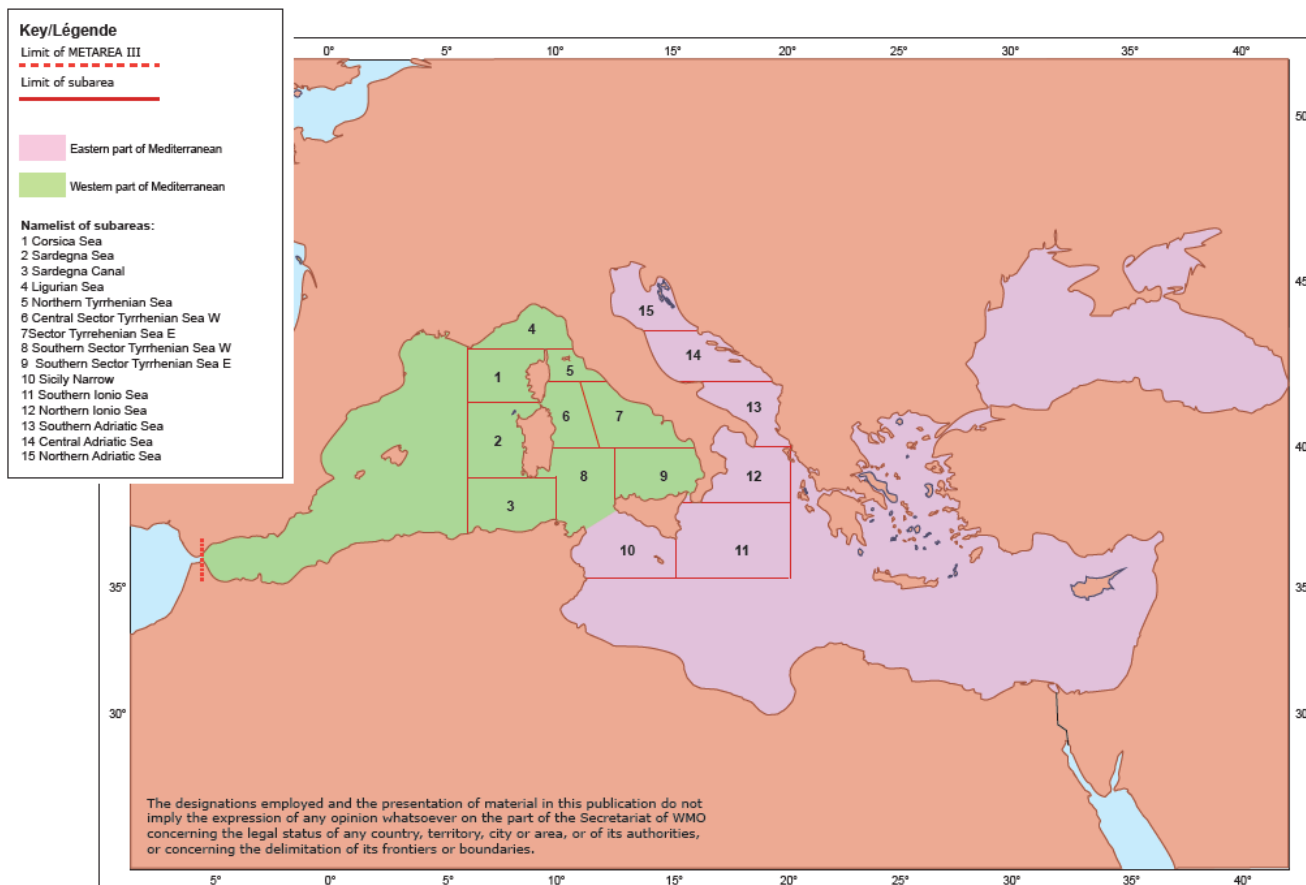


Figure 28: METAREA III – Forecast Areas – Italy



## Annex 2.1. METAREA XIX - Weather forecast areas

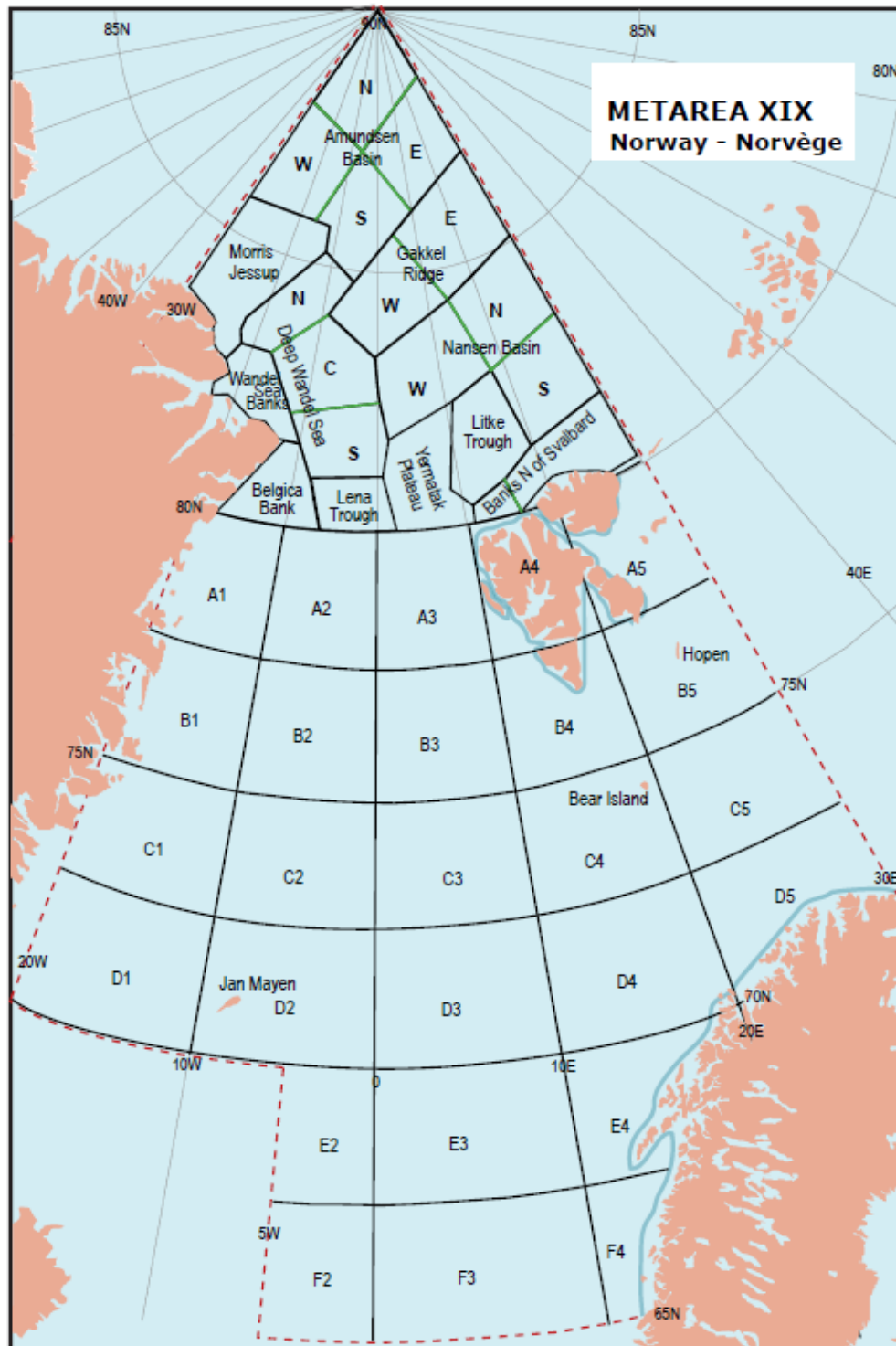


Figure 29: METAREA XIX – Forecast Areas – Norway



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