1. INTRODUCTION

NEAMTWS-VII during 23-25 November 2010 in Paris-France, established a Task Team on Communication Test and Tsunami Exercises (TT-CT&TE) with the Terms of References detailed in Annex I of this document. The aim of the NEAMTWS-ECTE1 is to refine procedures for testing the communication of tsunami alert messages between National Tsunami Warning Centres and all possible Tsunami Warning Focal Points, including speed and availability within NEAMTWS region. CTEs conducted during the previous intersessional period highlighted the importance of having other communication method like Global Telecommunication System (GTS), and therefore utilization of GTS during the NEAMTWS-ECTE1 is another aim of the Exercise.

NEAMTWS-ECTE1 will address the questions related to the evaluation and issuance of the warning message by tsunami watch/warning centres, as in the previous CTEs, but will also attempt to assess the national and/or local response and warning dissemination mechanisms once emergency authorities receive a warning. NEAMTWS-ECTE1 will involve all possible TWFPs using conventional message dissemination channels that have been previously subject to test between candidate RTWC and NTWCs. Message dissemination using GTS will be only available between TWFPs that have this system available to them at the operational level.

2. RECOMMENDATIONS AND CONCLUSIONS OF TASK TEAM ON THE COMMUNICATION TEST EXERCISE (TT-CTE)

TT-CTE was the responsible Task Team for the CTEs during the previous intersessional period. Recommendations and conclusions of TT-CTE were submitted in the Intersessional Activity Report during NEAMTWS-VII in Paris, November 2010, and are listed below:

i. TT-CTE suggests that other communication systems, like GTS, should be used in future Communication Test Exercises.

ii. TT-CTE recommends the use of multiple phone lines in parallel to speed up the delivery of messages by fax.

iii. TT-CTE recommends that, for future exercises, participants report more accurately the reception time of their fax messages

iv. TT-CTE recommends that the TOR for future exercises should clarify the rules used for the numbering of Tsunami Communication Test Messages.

v. TT-CTE recommends that future exercises will endorse the definition of the reference time as was adopted in CTE2: the time when the decision is taken at the NTWC/RTWC that a tsunami message has to be issued, presumably based on earthquake information.
2. PREPARATION, IMPLEMENTATION, AND EVALUATION OF NEAMTWS-ECTE1

During the TT-EC&TE Meeting in Paris, 11 March 2011, it was agreed that Turkey, while still making preparations to obtain GTS capacity, would most likely be the originator of the NEAMTWS-ECTE1, whereas Portugal offered also to be the next originator towards the end of the year for the possible NEAMTWS-ECTE2. At the time of the TT-EC&TE meeting, France was making necessary preparations, and France and Portugal had already conducted GTS test among themselves. Since all three possible candidates (France, Portugal and Turkey) for the NEAMTWS-ECTE1 were still trying to obtain full GTS capability, a further evaluation needs to be done during the Tsunami and Civil Protection Workshop in ISPRA, Italy, 15-16 June 2011, to decide on the message provider for the first Enlarged CTE. It’s important to emphasize that, as indicated above, message recipients will involve all possible TWFPs, whether they have the GTS capability or not, since NEAMTWS-ECTE1 will also utilize conventional message dissemination channels.

2.1 TIME OF NEAMTWS-ECTE1

During the TT-CT&TE meeting in Paris, 11 March 2011, it was in principal agreed to conduct and evaluate NEAMTWS-ECTE1 well before the 2nd TT-CT&TE meeting, which will be held during the 3rd week of September 2011. The exact time of the NEAMTWS-ECTE1 will be determined during the Tsunami and Civil Protection Workshop in ISPRA, Italy, 15-16 June 2011, based on the evaluation of the readiness of the candidate message originators. Considering the time needed for reporting the questionnaires and evaluation, it is suggested to conduct the exercise no later than mid-August.

2.2 EXERCISE DESCRIPTION

NEAMTWS-ECTE1 will simulate the dissemination of tsunami messages by one candidate RTWC and its timely reception by the NTWCs and all participating TWFPs. It will try to evaluate the communications delays that may be involved in the international communication systems, and identify possible bottlenecks, by requiring the record of adequate time stamps. To do this properly, all exercise participants must have their equipments synchronized, either to local time or universal time. If possible, each exercise participant should provide the methods and procedures used to ensure the synchronization of equipments, PCs and Fax.

The NEAMTWS-ECTE1 will use email, fax and GTS as means of communication. It will be conducted in such a way to be completed in a timely manner during reasonable work hours across the time zones found in the NEAM region, most likely between 10:00-14:00 UTC.

NEAMTWS-ECTE1 begins by the broadcast of a Tsunami Test Message by one of the candidate RTWC (see the message description in Annex IIa and IIb).

In order to simulate the best way possible the future operation of a RTWC, we should consider as time zero of the evaluation (time stamp zero or TS0) the instant when the message provider is aware that a Tsunami message has to be delivered. The message should already be pre-formatted, missing only the time stamp on the header. The message provider will then take all the actions required to issue this message by e-mail, fax and GTS to all possible message recipients. This means that the preparation latency from the message provider can be also evaluated.

The participant NTWC/TWFP then receives this message. It is required that the operator that receives the message takes note of the time when the message was received by the local equipment (TS1) and the time when the message was read and understood by the operator (TS2). The copies of the documents to be included in the report should have as much detail as possible, regarding time-stamping and routing.

NEAM-RTWC text messages format and content, including information on the rules used for the numbering of Tsunami Communication Test Messages, can be found in Interim Operational Users
2.3 UTILIZATION OF GTS DURING NEAMTWS-ECTE1

2.3.1 General Overview of GTS

WMO’s Global Telecommunication System (GTS) is the communications and data management component that allows the World Weather Watch Programme (WWW) to operate through the collection and distribution of information critical to its processes. GTS is defined as: “The coordinated global system of telecommunication facilities and arrangements for the rapid collection, exchange and distribution of observations and processed information within the framework of the World Weather Watch.” It is implemented and operated by National Meteorological Services (Annex VI) of WMO Members and International Organizations, such as ECMWF and EUMETSAT.

GTS also provides telecommunication support to other WMO programmes, facilitating the flow of data and processed products to meet requirements in a timely, reliable and cost-effective way, ensuring that all Members have access to all meteorological and related data, forecasts and alerts. This secured communication network enables real-time exchange of information, critical for forecasting and warnings of hydrometeorological hazards in accordance with approved procedures.

The GTS has a hierarchical structure on three levels. The Main Telecommunication Network (MTN), linking together three World Meteorological Centres (WMCs) (Melbourne, Moscow and Washington) and 15 Regional Telecommunication Hubs (RTHs) (Algiers, Beijing, Bracknell, Brasilia, Buenos Aires, Cairo, Dakar, Jeddah, Nairobi, New Delhi, Offenbach, Toulouse, Prague, Sofia and Tokyo). This core network has the function of providing an efficient, rapid and reliable communication service between the Meteorological Telecommunication Centres (MTCs).

The Regional Meteorological Telecommunication Networks (RMTNs) is an integrated network of circuits covering the six WMO regions - Africa, Asia, South America, North America, Central America & the Caribbean, South-West Pacific, Europe and Antarctic - and interconnecting the MTCs thus ensuring the collection of observational data and regional selective distribution of meteorological and other related information to Members. Until the integrated network is
completed, HF-radio-broadcasts may be used in order to meet the requirements of the WWW for the dissemination of meteorological information.

The National Meteorological Telecommunication Networks (NMTNs) enable the National Meteorological Centres (NMCs) to collect observational data and receive and distribute meteorological information on a national level.

Satellite-based data collection and/or data distribution systems are also integrated in the GTS as an essential element of the global, regional and national levels of the GTS. Data collection systems operated via geostationary or near-polar orbiting meteorological/environmental satellites, including ARGOS, are widely used for the collection of observational data from Data Collection Platforms. International data distribution systems operated either via meteorological satellites such as the Meteorological Data Distribution (MDD) of METEOSAT, or via telecommunication satellites, such as RETIM or FAX-E via EUTELSAT are efficiently complementing the point-to-point GTS circuits. Several Countries, including Argentina, Canada, China, France, India, Indonesia, Mexico, Saudi Arabia, Thailand and the USA, have implemented satellite-based multi-point telecommunication systems for their national Meteorological Telecommunication Network.

The MTCs function is to accommodate the volume of meteorological information and its transmission within the required time limits for global and interregional exchange of observational data, processed information and any other data required by its Members. Regional Telecommunication Hubs (RTHs) on the MTN perform an interface function between the RMTNs and the MTN.

The GTS is an integrated network of surface-based and satellite-based telecommunication links of point-to-point circuits, and multi-point circuits, interconnecting meteorological telecommunication centres operated by countries for round-the-clock reliable and near-real-time collection and distribution of all meteorological and related data, forecasts and alerts. This secured communication network enables real-time exchange of information, critical for forecasting and warning of hydrometeorological hazards.

WMO GTS is the backbone system for global exchange of data and information in support of multi-hazard, multipurpose early warning systems, including all meteorological and related data; weather, water and climate analyses and forecasts; tsunami related information and warnings, and seismic parametric data. WMO is building on its GTS to achieve an overarching WMO Information System (WIS), enabling systematic access, retrieval, and dissemination and exchange of data and information of all WMO and related international Programmes.

2.3.2 GTS Header Format for Tsunami Warning Messages and Bulletins

Detailed information for the GTS format can be found at Manual on the Global Telecommunication System, Volume I. The abbreviated GTS header has the following format in general:

\[ T_1T_2A_1A_2ii CCCC YYGGgg BBB \]

where

\[ T_1T_2 \] : data type and/or form designators.
\[ T_1=W \text{ (Warning)} \]
\[ T_2=E \text{ (Tsunami, when } T_1=W) \]

\[ A_1A_2 \] : geographical and/or data type and/or time designators. \( A_1A_2 \) is one of the following:

- ME Eastern Mediterranean area
- MM Mediterranean area
- MP Central Mediterranean area
- MQ Western Mediterranean area
- NT North Atlantic area
ii: a number with two digits. When an originator or compiler of bulletins issues two or more bulletins with the same T1T2A1A2 and CCCC the ii shall be used to differentiate the bulletins and will be unique to each bulletin.

CCCC: International four-letter location indicator of the station or centre originating or compiling the bulletin, as agreed internationally, and published in WMO-No. 9, Volume C1, Catalogue of Meteorological Bulletins. Examples are:

- LFPW  Toulouse (Centre Régional de Télécommunications)
- LPMG  Lisboa (MET COM Centre)
- LTAA  Ankara (Turkish State Meteorological Service)

YYGGgg: International date-time group, where

YY Day of the month.
GGgg UTC time of the compilation of the message.

BBB: An abbreviated heading defined by T1T2A1A2 ii CCCC YYGGgg shall be used only once. Consequently, if this abbreviated heading has to be used again for an addition, a correction or an amendment, it shall be mandatory to add an appropriate BBB indicator, identified by a three-letter indicator which shall be added after the date-time group. The BBB indicator shall have the following forms:

- RRx for additional or subsequent issuance of bulletins;
- CCx for corrections to previously relayed bulletins;
- AAx for amendments to previously relayed bulletins; where x is an alphabetic character of A through X.

For example,

- WEME40 LTAA YYGGgg CCA; for the same hour, when the warning message is updated for the first time
- WEME40 LTAA YYGGgg CCB; for the same hour, when the warning message is updated for the second time

Example Headers for France, Portugal and Turkey are the following:

<table>
<thead>
<tr>
<th>Tsunami Warning, Advisory and Tests</th>
<th>Tsunami Information Bulletin</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>WEMQ40 LFPW</td>
</tr>
<tr>
<td>Portugal</td>
<td>WENT40 LPMG</td>
</tr>
<tr>
<td>Turkey</td>
<td>WEME40 LTAA</td>
</tr>
<tr>
<td>WEMQ42 LFPW</td>
<td>WENT42 LPMG</td>
</tr>
<tr>
<td>WEME42 LTAA</td>
<td></td>
</tr>
</tbody>
</table>

Sample GTS message for NEAMTWS-ECTE1 is given in Annex IIb.

2.3.3 GTS Capacity Building

TWFPs should contact their national representative for WMO (WMO-NR; see Annex 6) to establish the necessary infrastructure for GTS including hardware and software. TWFPs can receive he messages through e-mail, ftp and/or in-situ satellite system, which are connected to the GTS system hosted by WMO-NR. TWFP contact info should be registered at GTS also through the WMO-NR. For all types of communication systems, tests should be conducted.

2.4 MESSAGE SECURITY

Message security is a major concern raised during many NEAMTWS meetings. In NEAMTWS-ECTE1, the message authorship will be ensured by validating the fax number, email address and message headers that the Message Provider will use for the exercise and that are known beforehand. It is suggested that the final announcement of the NEAMTWS-ECTE1 be sent from
the message provider address, with a copy to the message recipient addresses in order to ensure that the anti-spam and firewall software operating in the Message Receivers networks do not block the Communication Test Exercise message.

2.5 EXERCISE PARTICIPANTS

There are two types of exercise participants: the message provider and the message receivers. The provider is the RTWC candidate in the NEAM region that wishes to participate. The basic requirements for a provider is to be able to disseminate messages to multiple recipients using email, fax and GTS.

The NEAMTWS-ECTE1 provider must give the following information:

- Name of Agency;
- Contact name;
- Communication contacts (email, fax, phone, …);
- Mailing address.
- Email used to broadcast the communication test message
- Fax number used to broadcast the communication test message (all lines available)
- GTS message header information

For each Message Receiver Agency it is required to give the following information:

- Name of Agency;
- Contact name;
- Communication contacts (email, fax, phone,…);
- Mailing address.
- Email used to receive the communication test message
- Fax number used to receive the communication test message

The forms to be filled by the Message Provider and Message Receivers for the NEAMTWS-ECTE1 are given in Annex IIIa and IIIb.

2.6 EVALUATION OF NEAMTWS-ECTE1

The evaluation will be conducted by filling a questionnaire (see the proposed questionnaires in Annexes IVa and IVb, one for the message provider and the other for the message receivers). These questionnaires should be answered shortly after the end of the exercise and they must be sent to the responsible co-chairperson of TT-CT&TE:

Mr. Ocal Necmioglu
Boğaziçi University
Kandilli Observatory and Earthquake Research Institute (KOERI)
Cengelkoy Uskudar
34684 Istanbul
Turkey
Tel: +90 216 516 32 60
Fax: +90 216 332 26 81
Cel: +90 532 638 54 19
E-mail: ocal.necmioglu@boun.edu.tr

After reception of all the questionnaires, the responsible co-chairperson of TT-CT&TE will prepare the Exercise Report that will be circulated among participants before further distribution to the Architecture Task Team and NEAMTWS ICG. The decision on NEAMTWS-ECTE2 will be made based on the discussions among with reference to this evaluation report.
ANNEX-I

Terms of Reference of the Task Team on the Communication Test and Tsunami Exercises

Mandate

As part of the preparations phase for the NEAMTWS the Task Team on Communication Test and Tsunami Exercises will:

1. Refine procedures for testing the communication of tsunami alert messages between National Tsunami Warning Centres and Tsunami Warning Focal Points, including speed and availability within NEAMTWS region

2. Conduct a Workshop ahead of the enlarged Communication Test to inform about the procedures and discuss the practical means of the Tsunami Exercise in 2012. Participants: NTWC, TWFPs, TNCs, Civil Protection authorities, IT experts, representatives of relevant organizations working in the NEAMTWS region

3. Prepare and conduct the test and organize its assessment

4. Contribute to reviewing and proposing amendments to the relevant parts of the Operational Users Guide in the light of experience with the tests

5. Based on experience gained, set-up procedures for the first NEAM Tsunami exercise to be conducted in 2012

6. Report to ICG/NEAMTWS-VIII

Modus operandi

The Task Team will mainly work by correspondence, but hold a first meeting at the beginning of 2011 and a final one, in preparation for the next ICG meeting. Other meetings will be held as needed.

The offer of JRC to host the workshop is acknowledged.
ANNEX-Ila
Sample Message Test for E-mail and Fax

Subject: TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001

Body:
TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001
KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE (KOERI)
ISSUED AT 1430Z 15 AUG 2011

... TSUNAMI COMMUNICATION TEST ...
THIS TEST APPLIES TO ... CGCC(BELGIUM)... BAS(BULGARIA)... INMG(CAPE VERDE)... NPRD(CROATIA)... COC(CYPRUS)... DMI(DENMARK)... NRIAG(EGYPT)... EMI(ESTONIA)... MCND(FINLAND)... GSC(FINLAND)... CEA/DASE (FRANCE) ... NOA(GREECE) ... DPC (ITALY)... GNC(LEBANON)... MFA(MALTA)... CSPM(MONACO)... KNMW(NETHERLANDS)... DCPEP(NORWAY)... NCCROPP(Poland)... IM (PORTUGAL)... NIEP(ROMANIA)... SIRPAT(RUSSIA)... DGPCE(SPAIN)... SMHI(SWEDEN)... SWO(SYRIA)... DEMP(TURKEY)... HO/DFID(UNITED KINGDOM)

FROM – KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE (KOERI)

TO – TWFP PARTICIPANTS IN THE FIRST NEAMTWS ENLARGED COMMUNICATION TEST EXERCISE
SUBJECT – FIRST NEAMTWS ENLARGED TSUNAMI COMMUNICATION TEST

THIS IS A TEST TO VERIFY COMMUNICATION LINKS AND DETERMINE TRANSMISSION TIMES INVOLVED IN THE DISSEMINATION OF OPERATIONAL TSUNAMI MESSAGES FROM THE CANDIDATES TO REGIONAL TSUNAMI WATCH CENTERS AND TO TSUNAMI WARNING FOCAL POINTS OF THE NEAM TSUNAMI WARNING SYSTEM

RECIPIENTS ARE REQUESTED TO FILL THE EVALUATION QUESTIONNAIRE AND SEND IT ACCORDING TO THE NEAMTWS-ECTE1 INSTRUCTIONS

THANK YOU FOR YOUR PARTICIPATION IN THIS COMMUNICATION TEST
THIS WILL BE THE FINAL MESSAGE ISSUED

TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001
ANNEX-IIb

Sample Message Test for GTS

Body:

WEME40 LTAA
TSUWCT
TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001
KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE (KOERI)
ISSUED AT 1430Z 15 AUG 2011

... TSUNAMI COMMUNICATION TEST ...
THIS TEST APPLIES TO ... CGCC(BELGIUM)... BAS(BULGARIA)... INMG(CAPE VERDE)... NPRD(CROATIA)... COC(CYPRUS)... DMI(DENMARK)... NRIAG(EGYPT)... EMI(ESTONIA)... MCND(FINLAND)... GSC(FINLAND)... CEA/DASE (FRANCE) ... NOAA(GREECE) ... DPC (ITALY) ... GNC(LEBANON)... MFA(MALTA)... CSPM(MONACO)... KNMW(NETHERLANDS)... DCPEP(NORWAY)... NCCROP(Poland)... IM (PORTUGAL)... NIEP(ROMANIA)... SIRPAT(RUSSIA)... DGPCE(Spain)... SMHI(SWEDEN)... SWO(SYRIA)... DEMP(TURKEY)... HO/DFID(UNITED KINGDOM)

FROM – KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE (KOERI)

TO – TWFP PARTICIPANTS IN THE FIRST NEAMTWS ENLARGED COMMUNICATION TEST EXERCISE
SUBJECT – FIRST NEAMTWS ENLARGED TSUNAMI COMMUNICATION TEST

THIS IS A TEST TO VERIFY COMMUNICATION LINKS AND DETERMINE TRANSMISSION TIMES INVOLVED IN THE DISSEMINATION OF OPERATIONAL TSUNAMI MESSAGES FROM THE CANDIDATES TO REGIONAL TSUNAMI WATCH CENTERS AND TO TSUNAMI WARNING FOCAL POINTS OF THE NEAM TSUNAMI WARNING SYSTEM

RECIPIENTS ARE REQUESTED TO FILL THE EVALUATION QUESTIONNAIRE AND SEND IT ACCORDING TO THE NEAMTWS-ECTE1 INSTRUCTIONS

THANK YOU FOR YOUR PARTICIPATION IN THIS COMMUNICATION TEST THIS WILL BE THE FINAL MESSAGE ISSUED

TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001
ANNEX-IIIa

INFORMATION ON MESSAGE PROVIDER

Email used to broadcast the communication test message:

Fax number used to broadcast the communication test message:

Name of Agency:

Contact name:

Contacts:
Phone:
Fax¹:
E-mail:
Mailing address:

¹ Include all the lines used by the Fax machine in case of parallel broadcasting.
ANNEX-IIIb

INFORMATION ON MESSAGE RECEIVER

Email used to receive the communication test message:

Fax number used to receive the communication test message:

Name of Agency:

Contact name:

Contacts:
Phone:
Fax:
E-mail:
Mailing address:
Evaluation Questionnaire to Message Provider

1- Provide the time\(^1\) of delivery of each message by email.
2- Provide the time\(^1\) of delivery of each message by fax.
3- Provide the time\(^1\) of delivery of each message by GTS and explain the procedure used.
4- Did you receive any error messages? If yes, describe the errors observed for all dissemination technologies and addresses concerned.
5- Did you use an operational service to deliver the email messages or prepared a special one?
6- Describe briefly the service used for email distribution.
7- Did you use an operational service to deliver the fax messages or prepared a special one?
8- Did you use an operational service to deliver the GTS messages or prepared a special one?
9- Describe briefly the preparation made in your agency for the Communication Test Exercise.
10- Describe briefly the procedures taken during the exercise, before time zero, and after time zero.
11- Describe briefly the service used for fax distribution.
12- Did you synchronize the PC before distributing the email messages? If yes, describe briefly the procedure used.
13- Did you synchronize the fax machine before sending the messages? If yes, describe briefly the procedure used.
14- Describe in detail the procedure of sending the GTS message and report any problems observed.
15- Did you find the exercise useful in assessing the readiness of your agency to distribute tsunami related messages?
16- Do you have any comments on the exercise?
17- Do you have any suggestions for the next exercises?
18- Please annex to this report the confirmation sheets from the fax\(^2\) machine (if available) and a copy of the messages distributed by email\(^3\) and GTS.

\(^1\) All times should be provided in Universal Time.
\(^2\) Please verify that the time-stamp information is visible on the document.
\(^3\) Preferably the message text appended to this report should be copied from directly from the mailbox server, in order to provide all the details on timing and routing.
ANNEX-IVb

Evaluation Questionnaire to Message Receiver

1-Did you receive the communication test message by email?
2-Provide the time\(^1\) stamp of the email message
3-Provide the time\(^1\) when the email message was received and understood by the operator.
4-Was the provider e-mail address as expected?
5-Was the e-mail message complete as expected? If not, report the differences.
6-Did you receive the communication test message by fax?
7-Provide the time\(^1\) stamp of the fax message
8-Provide the time\(^1\) when the fax message was received and understood by the operator
9-Was the provider fax number as expected?
10-Was the fax message complete as expected? If not, report the differences.
11-Did you receive the communication test message by GTS?
12-Provide the time\(^1\) stamp of the GTS message.
13-Provide the time\(^1\) when the GTS message was received and understood by the operator.
14-Was the GTS message complete as expected? If not, report the differences.
15-Did the operator that received the message understand its content and knew how to respond to it?
16-Describe briefly the preparation made in your agency for the Communication Test Exercise.
17-Did you synchronize the PC before distributing the email messages? If yes, describe briefly the procedure used
18-Did you synchronize the fax machine before sending the messages? If yes, describe briefly the procedure used.
19-Did you find the exercise useful in confirmation communication contacts and delays?
20-Do you have any comments on the exercise?
21-Do you have any suggestions for the next exercises?
22-Please annex to this report a copy of the fax\(^2\) message received and a copy of the messages received by email\(^3\) and GTS.

\(^1\) All times should be provided in Universal Time
\(^2\) Please verify that the time-stamp information is visible on the document.
\(^3\) Preferably the message text appended to this report should be copied from directly from the mailbox server, in order to provide all the details on timing and routing.
<table>
<thead>
<tr>
<th>Member State</th>
<th>TNC</th>
<th>TWFP</th>
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</thead>
<tbody>
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<td>Centre Gouvernementale de Coordination et de Crise</td>
<td>Centre Gouvernementale de Coordination et de Crise</td>
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<td>BULGARIA</td>
<td>Bulgarian Institute of Oceanology (BAS)</td>
<td>Bulgarian Institute of Oceanology (BAS)</td>
</tr>
<tr>
<td>CAPE VERDE</td>
<td>Instituto Nacional de Meteorología e Geofísica</td>
<td>Instituto Nacional de Meteorología e Geofísica</td>
</tr>
<tr>
<td>CROATIA</td>
<td>Institute of Oceanography and Fisheries*†</td>
<td>National Protection and Rescue Directorate – National Center 112</td>
</tr>
<tr>
<td>CYPRUS</td>
<td>Cyprus Oceanography Centre, University of Cyprus*</td>
<td>Cyprus Oceanography Centre, University of Cyprus*</td>
</tr>
<tr>
<td>DENMARK</td>
<td>Danish Meteorological Institute</td>
<td>Danish Meteorological Institute</td>
</tr>
<tr>
<td>EGYPT</td>
<td>National Institute of Oceanography and Fisheries (NIOF)</td>
<td>National Research Institute of Astronomy and Geophysics (NRIAG)</td>
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<td>ESTONIA</td>
<td>Estonian Marine Institute, University of Tartu*</td>
<td>Estonian Marine Institute, University of Tartu*</td>
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<tr>
<td>FINLAND</td>
<td>Finnish Institute of Marine Research</td>
<td>Monitoring Center for Natural Disasters, Finnish Meteorological Institute</td>
</tr>
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<td>Government Situation Center, Prime Minister’s Office</td>
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<td>Laboratoire de Géophysique, Commissariat à l’Energie Atomique (CEA)</td>
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<tr>
<td>GERMANY</td>
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<td>1) Federal Maritime and Hydrographic Agency (BSH)</td>
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<td></td>
<td></td>
<td>2) Deutscher Wetterdienst</td>
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<td>Ministry of Foreign Affairs*</td>
<td>Ministry of Foreign Affairs*</td>
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<td>Centre Scientifique de Monaco</td>
<td>Compagnie des Sapeurs-Pompiers de Monaco</td>
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<td>NETHERLANDS</td>
<td></td>
<td>KNMW Royal Netherlands Meteorological Institute</td>
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<td>Directororate for Civil Protection and Emergency Planning (DSB)</td>
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<tr>
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<td>Centre for Coordination of Rescue Operations and Protection of Population, National Headquarters of the State Fire Service</td>
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<tr>
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<td>Instituto de Meteorologia</td>
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<td>National Institute for Earth Physics</td>
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<td>Dirección General de Protección Civil y Emergencias</td>
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<td>Office of Prime Ministry, disaster and emergency management Directorate</td>
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<td>UKRAINE</td>
<td>Marine Hydrophysical Institute, National Academy of Sciences of Ukraine*†</td>
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<td>UNITED KINGDOM</td>
<td>National Oceanographic Centre (NOC)</td>
<td>Humanitarian Operations, Department for International Development (DFID)</td>
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**Bold:** all information provided

* Official form not provided

† Validation required either through the PermDel, Head of the UNESCO NatCom or the Minister of Foreign Affairs
**ANNEX-VI**

**List of National Meteorological Services in NEAM Region**

<table>
<thead>
<tr>
<th>Country</th>
<th>Service Name</th>
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<tr>
<td>Albania</td>
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<td>Mission Permanente de la Principauté de Monaco</td>
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</table>
ANNEX-VII

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