

Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas

Sixth Communication Test Exercise (CTE6)

29 July 2015

Volume 1

Exercise Manual

Advanced copy, June 2015

**Tsunami Early Warning and Mitigation
System in the North-Eastern Atlantic, the
Mediterranean and Connected Seas**

**Sixth Communication
Test Exercise (CTE6)**

29 July 2015

Volume 1

Exercise Manual

UNESCO 2015

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariats of UNESCO and IOC concerning the legal status of any country or territory, or its authorities, or concerning the delimitation of the frontiers of any country or territory.

For bibliographic purposes, this document should be cited as follows:

Intergovernmental Oceanographic Commission. 2015. Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas. Sixth Communication Test Exercise (CTE6), 29 July 2015. Volume 1: Exercise Manual. Paris, UNESCO, IOC, Technical Series 122 Vol.1 (English only)

Published in 2015
by United Nations Educational, Scientific
and Cultural Organization
7, Place de Fontenoy, 75352 Paris 07 SP

© UNESCO 2015

TABLE OF CONTENTS

page

1.	INTRODUCTION	1
2.	PREPARATION OF NEAMTWS-CTE	2
3.	DESCRIPTION OF NEAMTWS-CTE	2
4.	REQUIREMENTS AND GUIDELINES FOR THE COMMUNICATON TECHNOLOGIES TO BE USED IN NEAMTWS-CTE.....	3
4.1.	General Requirements.....	3
4.2.	Requirements for E-mail	4
4.3.	Requirements for Fax	4
4.4.	Requirements for GTS.....	4
4.5.	Requirements for SMS.....	5
5.	MESSAGE SECURITY	6
6.	EXERCISE PARTICIPANTS.....	6
7.	EVALUATION OF NEAMTWS-CTE	7
8.	SMALL SCALE COMMUNICATION TEST EXERCISE (SSCT).....	8
9.	REFERENCES.....	8

ANNEXES

ANNEX I.A - SAMPLE TEST MESSAGES FOR E-MAIL AND FAX	10
ANNEX I.B - SAMPLE TEST MESSAGES FOR GTS.....	11
ANNEX I.C - SAMPLE TEST MESSAGES FOR SMS.....	12
ANNEX II.A - INFORMATION ON MESSAGE PROVIDER.....	13
ANNEX II.B - INFORMATION ON MESSAGE RECEIVER	14
ANNEX III.A - EVALUATION QUESTIONNAIRE FOR MESSAGE PROVIDER	15
ANNEX III.B - EVALUATION QUESTIONNAIRE TO MESSAGE RECEIVER.....	16
ANNEX IV - GENERAL OVERVIEW OF GTS.....	17
ANNEX V - GTS HEADER FORMAT FOR TSUNAMI MESSAGES.....	19
ANNEX VI - LIST OF NATIONAL METEOROLOGICAL SERVICES IN NEAM REGION	21
ANNEX VII - EXAMPLE OF MESSAGE DETAILS AVAILABLE IN THE SERVER MAILBOX	22
ANNEX VIII - EXAMPLE OF TIME STAMPS ON A FAX MESSAGE	23
ANNEX IX - CTE FIRST ANNOUNCEMENT MESSAGE TEMPLATE	24
ANNEX X - CTE SECOND ANNOUNCEMENT MESSAGE TEMPLATE	25
ANNEX XI - CTE TIMELINE FLOWCHART	26
ANNEX XII - CTE CHECKLIST.....	27

1. INTRODUCTION

The Tsunami Watch Providers (TWP), National Tsunami Warning Centres (NTWC) and Tsunami Warning Focal Points (TWFP) must keep a high level of readiness so as to be able to act efficiently and effectively to provide for the public's safety during fast-onset and rapidly-evolving natural disasters like the tsunamis. To maintain this high state of operational readiness and especially for infrequent events such as tsunamis, TWP/NTWC and emergency agencies must regularly practice their response procedures to ensure that vital communication links work seamlessly, and that agencies and response personnel know the roles that they will need to play during an actual event. For this purpose, Tsunami Communication Test Exercises (CTEs) must be conducted regularly, ideally every 1 to 3 months on a fully operating system.

General objectives of a CTE are:

- (i) Evaluate and validate the Tsunami Watch Providers' dissemination process of issuing tsunami messages to the NEAM (North-Eastern Atlantic, Mediterranean and Connected Seas) region.
- (ii) Evaluate and validate the process for countries to receive and confirm tsunami messages.
- (iii) Develop and implement mechanisms for the regular update of NTWC and TWFP contacts.
- (iv) Help the establishment and updating of Standard Operational Procedures (SOP) as regards the communications used to disseminate and receive tsunami messages in the NEAM region.

TWFPs are the key players in terms of translating the warning message into essential information for Civil Protection and Disaster Management Authorities (CP-DMA), especially if they are not CP- DMA by themselves. The CTEs are important tools in terms of seeking the involvement of CP- DMAs. Therefore, the NEAMTWS CTE will address not only the questions related to the evaluation and issuance of the warning message by (candidate) Tsunami Watch Providers, but will also attempt to assess the national and/or local response and warning dissemination mechanisms once emergency authorities receive a warning. The CTE will involve all possible TWFPs using conventional message dissemination channels, like e-mail, fax and SMS. Message dissemination using GTS will be only available between TWFPs that have that system available to them at the operational level. It is also desirable that relevant organizations not belonging to the ICG/NEAMTWS, like the European Union Monitoring and Information Centre (MIC) and the Caribbean Tsunami Warning Center, participate in the NEAMTWS-CTE as observers and they are encouraged to fill also the questionnaires related to the exercise.

Tsunami Communication Test Exercises are planned, conducted and evaluated by dedicated Task Teams established by the ICG/NEAMTWS. This manual together with the report of previously conducted CTEs are available through the IOC website. This manual provides detailed information and guidance on the preparation, conduct and evaluation of a CTE. A CTE Timeline Flowchart has been provided in [Annex XI](#) to use as a quick-guide for the CTE covering the most essential issues and a CTE Checklist is provided in [Annex XII](#) as a process control mechanism for all parties involved in the CTE. While these two annexes could be considered as a chart summary of the manual, parties involved in a CTE are strongly encouraged to read this manual thoroughly to have a better understanding of all the requirements in detail.

2. PREPARATION OF NEAMTWS-CTE

The Message Provider is chosen among the candidate TWPs and agreed upon within the ICG/NEAMTWS appropriate Task Team. The identification of the Message Provider will be clearly identified in the CTE announcement. When in operation, the TWPs will define in their SOP the periodicity for conducting CTEs. Message recipients will involve all possible TWFPs and NTWCs belonging to the NEAMTWS.

The CTE period begins by issuing a first announcement from official IOC channels to all TWFPs registered in the NEAMTWS, at least four weeks in advance of the planned exercise date. This CTE Manual should also be sent at the first announcement as an attachment and the announcement should clearly indicate from where this Manual could be downloaded.

In the announcement, CTE participants should be strongly invited to read this manual in detail and report any inconsistencies to the IOC Secretariat. Then the TWFPs from Member States (MS) will have the time to correct and/or update all the contact information, which should be reported to IOC at **least 10 days before the exercise**.

The CTE is preceded, one week before, by a second announcement sent by the Message Provider via e-mail 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. This will also allow the Message Provide to check any limitation in the number of email recipients. The text of these two announcements should be very clear on the actions that are required by the message recipients in order to participate in the exercise and in its evaluation. Evaluation Questionnaire to Message Receiver (Annex III.B) should also be distributed as a word file to the Message Receivers during this second announcement.

Three days before the second announcement, the IOC Secretariat will send the most up-to-date list of TWFP / TNC contact information in the following format to the Message Provider, copied to the Task team chair/co-chairs. It should be reminded that it's the Member States' responsibility to nominate their Tsunami National Contacts (TNCs) and Tsunami Warning Focal Points (TWFPs) and to ensure the actuality of these information.

		TWFP CONTACT INFO				TSUNAMI MESSAGES					
						Fax Message		E-mail Message		Voice/SMS Message	
		Name	Address	E-mail	Fax	Primary	Alternate	Primary	Alternate	Primary	Alternate
Country 1	Institute 1										
	Institute 2										
Country 2	Institute 1										
	Institute 2										

3. DESCRIPTION OF NEAMTWS-CTE

NEAMTWS Tsunami Communication Test exercises will simulate the dissemination of tsunami messages by one RTWC Tsunami Watch Provider 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, it is desirable that all exercise participants 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 CTEs will use email, fax, GTS and SMS 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. It is important to note that, while being an old generation of communication technology, the well-proven reliability of GTS in case of emergency situations makes its use indispensable.

The NEAMTWS CTE begins by the broadcast of a Tsunami Test Message by one of the candidate TWP. (See the message description in [Annex-I.A](#) and [Annex-I.B](#)). In order to simulate in the best way possible the operation of a TWP, the instant when the message provider is aware that a Tsunami message has to be delivered should be considered as time zero of the evaluation (time stamp zero or TS0). 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, GTS and SMS 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). It is important that these time stamps are well taken and reported in the evaluation questionnaire. Some guidelines on the cares to be taken to report TS1 accurately are presented [in annexes VII](#) and [VIII](#).

The NEAM-TWP tsunami text messages, format and content, including information on the rules used for the numbering of Tsunami Communication Test Messages, can be found in the Interim Operational Users Guide (I-OUG) for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS) , also given at the NEAMTWS website. The names of countries/institutions and corresponding abbreviations to be used in the test should also be taken from the I-OUG.

[<http://neamtic.ioc-unesco.org/images/documents/neamtws-opug-version%202%200%20final.pdf>]

4. REQUIREMENTS AND GUIDELINES FOR THE COMMUNICATON TECHNOLOGIES TO BE USED IN NEAMTWS-CTE

4.1. General Requirements

ASCII character set should be used in the message templates used in all communication technologies. All times in the evaluation questionnaires should be reported in HH:MM:SS UTC format.

Message providers are encouraged to make use of an interface especially created for message dissemination by accessing pre-formatted messages and updating the time information and channeling the messages to e-mail, fax, GTS and SMS dissemination to avoid human errors.

No country/institution other than the Message Provider is entitled to broadcast the CTE message. Participating institutions are free to make use of CTE message in any way they like as long as the they assure that that communication test messages should not cause concern among the public and/or relevant institutions. All deviations from this guideline need to be reported in the Evaluation Questionnaire.

4.2. Requirements for E-mail

The number of e-mail message recipients would be restricted to two e-mail addresses per agency and four e-mail addresses per Member State.

In addition to TS0, TS1E (time stamp of e-mail message) should be reported by the Message Provider. Message Recipients are recommended to develop codes to automatically detect e-mail messages and send the subject line to the designated mobile phone number of TWFP via sms.

4.3. Requirements for Fax

The number of fax message recipients would be restricted to 2 per member state; thus 1 per agency if two agencies are designated. If a single agency has been designated, both primary and alternate fax numbers would be utilized.

At least an 8-channel fax server for should be used for the fax message dissemination.

The Message Provider should set up the fax server in such a way so that each recipient fax number will be subject to at least three attempts to send the fax message, where in each attempt the fax recipient will be ringed at. In addition to TS0, TS1F (time stamp of fax message) should be reported by the Message Provider and ASCII character set should be used in the fax message templates.

For the easier evaluation of fax message dissemination, the sequencing of the fax numbers should be done in such a way so that in each group, the last two digits of the three digit fax sequence code would always correspond to the same country, sorted in alphabetical order. An example is given below:

101_COUNTRY-1	INSTNO-1	FAXNO-PRIM
1XX_COUNTRY-N	INSTNO-1	FAXNO-PRIM
201_COUNTRY-1	INSTNO-2	FAXNO-PRIM
1XX_COUNTRY-N	INSTNO-2	FAXNO-PRIM
201_COUNTRY-1	INSTNO-1	FAXNO-ALT

As described above, it is recommended to limit the fax numbers to 2 per institute, where the number of institutes per countries should be limited to 2, also. If required, messages could be distributed by the primary or alternate TWFPs to other national organizations. Any arrangement for this should be within the discretion of the respective country. Member States are encouraged to provide alternate fax numbers.

Message Recipients are recommended to develop codes to automatically detect fax messages and send them as internal email.

4.4. Requirements for GTS

In addition to TS0, TS1G (time stamp of GTS message) should be reported and ASCII character set should be used in the GTS message templates. **In coordination with the WMO-NR, detailed GTS logs should be acquired both by the Message Provider and Message Recipient, where applicable.** Message Recipients are recommended to develop codes to automatically detect GTS messages and send them as internal email. Similar

mechanism could be implemented to automatically detect the header of the message and inform the TWFP via sms.

GTS connects meteorological and other centres throughout the world. Its primary purpose is to distribute meteorological, hydrological, and other data, products, alerts, and warnings to the global **meteorological** community, composed of member nations of the World Meteorological Organization (WMO). The structure of the GTS makes use of terrestrial communications circuits to disseminate data, products, and messages over a tiered network. The three tiers of the GTS are the World Meteorological Centres (WMC), the Regional Telecommunications Hubs (RTH), and the National Meteorological Centres (NMC).

NTWCs and TWPs should employ backup communications for data and information collection required to detect a tsunami. Alternative communication paths within a centre should be employed by tsunami warning centres. In the event of the failure of one of a centre's primary communication links, such as e-mail or fax, information can be re-routed through a secondary connection. Currently, SMS is not considered as one of the primary communication mechanisms by the NEAMTWS. GTS is among the robust communications methods that are used for the transmission of tsunami warnings. A general overview of GTS can be found in [Annex IV](#).

4.4.1. GTS Capacity Building

TWFPs should contact their national representative for WMO (WMO-NR; see [Annex VI](#)) to establish the necessary infrastructure for GTS including hardware and software. TWFPs can receive the GTS messages through e-mail, ftp, VPN 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.

To establish a link between the WMO-NR and the TWFP, the TWFP has to contact its WMO-NR requesting:

- Type of transmission mode existing in the WMO-NR (email, ftp, VPN...)
- The establishment of a MoU or other type of agreement to receive the messages.

The TWFP has to provide the list of messages header he would like to receive (see [Annex V](#)).

TWPs are invited and encouraged to cooperate with other TWPs to validate the successful establishment of GTS links. Such cooperation took place between CENALT (France), IM (Portugal) and KOERI (Turkey) in 2011 before the First Enlarged Communication Test Exercise (NEAMTWS-ECTE1), which led to the successful utilization of GTS.

The Tsunami Communication Test Exercise will also validate the first part of the transmission path, namely the latency between the TWP and the WMO-NR.

4.5. Requirements for SMS

At the Fourth Meeting of the Task Team on the Communication Test and Tsunami Exercise of the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS) in Paris, France on 24 April 2013, it was decided to utilize Short Message Service (SMS). Short messages can be encoded using a variety of alphabets: the default GSM 7-bit alphabet, the 8-bit data alphabet, and the 16-bit UCS-2 alphabet. Depending on which alphabet the subscriber has configured in the

handset, this leads to the maximum individual short message sizes of 160 7-bit characters, 140 8-bit characters, or 70 16-bit characters. GSM 7-bit alphabet support is mandatory for GSM handsets and network elements, but characters in languages such as Arabic, Chinese, Korean, Japanese, or Cyrillic alphabet languages (e.g., Russian, Serbian, Bulgarian, etc.) must be encoded using the 16-bit UCS-2 character encoding (http://en.wikipedia.org/wiki/Short_Message_Service). Any other language with special characters should require some kind of a limitation in the number of characters. However, the 7-bit encoding allows the transport of texts encoded in the Basic Latin subset of ASCII, as well as some characters of the ISO Latin 1 character set and it also allows the encoding of texts written in the Greek script, but only capitals; for such use in Greek, the Latin capital letters that look like the Greek letters are reused with the same code, so that the above character set is complete only for modern monotonic Greek restricted to capital letters. (http://en.wikipedia.org/wiki/GSM_03.38). For the purposes of CTE, it was decided to set the character limit to 160 7-bit characters using English alphabet with capital letters.

5. MESSAGE SECURITY

Message security is a major concern in any Tsunami Communication Test Exercise. In NEAMTWS-CTE, the message authorship will be ensured by validating the fax number, and/or fax-id code, email address, telephone number (for SMS) and message headers that the Message Provider will use for the exercise and that are known beforehand. The CTE will provide a true evaluation of the communication channels used for the message dissemination, but **it is recommended that message recipients ensure that the anti-spam and firewall software operating in their networks do not block the Communication Test Exercise message.**

6. EXERCISE PARTICIPANTS

There are two types of exercise participants: The message provider and the message receivers. The Message Provider is the candidate Tsunami Watch Provider that offered to participate. The basic requirement for a provider is to be able to disseminate messages to multiple recipients using email, fax, GTS and SMS.

Only Member States with designated TWFP/TNC can participate in the CTE. TNCs communication details would be used in the CTE **only if the respective Member State has no TWFP designated**. In case of a designated TWFP, TNCs communication details would not be used during the CTE.

The NEAMTWS-CTE messages will be delivered to the TWFP/TNC operational addresses as provided by the Member States to the IOC secretariat. Member States are invited to verify that these addresses are accurate and up-to-date. **Any changes, corrections or amendments should be sent to the IOC secretariat through the official channels described in UNESCO IOC TWFP and TNC nomination forms.** They will be used in the NEAMTWS-CTE **if received at least ten days before the exercise.**

The information that is required from each exercise participant is presented in [Annex II.A](#) for the Message Provider and [Annex II.B](#) for the message recipients.

Since the information from the Message Provider is needed to verify the authoritative source of the CTE messages, it has to be given beforehand by the two exercise announcement messages.

The basic information of the Message Recipients (TWFPs and candidate TWPs) is the one that is officially collected by the IOC following information by the Member States. [Annex II.B](#) forms will be utilized to verify the Message Recipient Information provided via official channels.

Participants are especially encouraged to read the Exercise Reports of previously conducted CTEs, which can be found at the UNESCO publications website [<http://www.unesco.org/new/en/unesco/resources/publications/unesdoc-database/>]

7. EVALUATION OF NEAMTWS-CTE

The evaluation will be conducted by filling a questionnaire (see the proposed questionnaires in [Annex III.A](#) and [Annex III.B](#), one for the message provider and one for each message receivers). Each agency that participates in the CTE is requested to deliver one report encompassing all messages received. **These questionnaires should be answered shortly after the end of the exercise, and they must be sent via email to the Message Provider within one week of the CTE. The complete address is provided in [Annex II.A](#).**

After reception of all the questionnaires, the Message Provider is responsible to prepare the Exercise Report within 4 weeks after the conduct of the CTE and circulate TT-CTTE co-chairs. The Exercise Report should include a story book of the CTE starting from TS0 (as the instant when the message provider is aware that a Tsunami message has to be delivered) to TSE (as the instant when the message dissemination activities are finalized). The Exercise Report should also make use of system logs (including GTS logs obtained from the WMO-NR) of the Message Provider and include statistical information on message dissemination concerning each communication technology utilized. Following parameters should be included: number of recipients, number of successful message delivery, min time of message delivery, max time of message delivery, median time of message delivery and mean time of message delivery. The Exercise Report should include also an evaluation of the TWFP response. The main responsibility of the Message Provider is to prepare a technical report on the exercise based on the logs-questionnaires, of course underlining important issues, which then could be considered by the TT-CTTE co-chairs as recommendations for the CTE manual after a TT-CTTE meeting. Hence, CTE report should provide a section at the end of the report with a title as “Issues to be considered by the TT-CTTE”, where each “problem” could be listed as an item, from which the TT-CTTE could pick up and formulate a recommendation.

The Message Provider should also provide all the information required to update the “CTE Performance Indicators” document, distributed in the initial announcement of the CTE together with this manual. These performance indicators are grouped into two major sets, the first one characterizing the universe of the exercise participants and the second one summarizing the technical details of the exercise results. The “CTE Performance Indicators” document is closely linked and cross-referenced to the CTE Manual and will be updated by the TT-CTTE co-chairs after each CTE.

TT-CTTE co-chairs are responsible to provide their comments to the Message Provider within the following 2 weeks. If necessary, the Message Provider will update/modify the CTE report accordingly and send it back to the TT-CTTE co-chairs within the following two weeks. The Task Team chair/co-chairs will send the report IOC Secretariat asking for their comments on the report’s content and editorial changes required. The IOC Secretariat will provide these comments within the following two weeks. If necessary, the CTWP and/or TT-CTTE co-chairs will update the report and the approved version of the report will be sent to the IOC Secretariat by the TT-CTTE co- chairs within the following two weeks. The IOC Secretariat

should then ensure that the CTE Report is electronically published within the following one month. Lessons learned will be applied on consecutive exercises and relevant documentation updated if necessary.

In the Evaluation Report, message provider will also indicate which Member States TWFP/TNC contact information differences are observed between the information they have received from IOC Secretariat and from the [Annex II.B](#). After this, a standard message could be sent by the secretariat to the respective Member State stating this fact and informing the Member State on the urgent need of updating TWFP/TNC via official channels, indicating that when NEAMTWS is in place, [Annex II.B](#) will be removed from the CTE Manual and CTEs will rely only to the information provided to the IOC Secretariat via official channels.

8. SMALL SCALE COMMUNICATION TEST EXERCISE (SSCT)

A SSCT could be conducted after the initial evaluation of the CTE focusing on the problem areas of the CTE and to consolidate the lessons learnt from it. The decision on this would be taken by Task Team responsible for the CTE. The main differences of a SSCT from a CTE are the following:

1. A SSCT is limited only to a subset of communication technologies and subset of TWFPs. In case of a need to utilize all communication technologies involving all participants of CTE, a new CTE has to be conducted.
2. The requirements and guidelines for the communication technology(ies) provided in this manual will be also applicable to SSCT.
3. The announcement of the SSCT will be made by the TWP and should be sent to the participants of the CTE it follows, 10 days before the SSCT clearly defining which States/Centres will be involved.
4. The reporting of SSCT will not be subject to same requirements and guidelines as the CTE provided in this document. The Message Provider will be responsible to prepare an exercise report within 15 days and submit it to the Task Team chair/co-chairs who will be responsible for the approval of the SSCT report within the next 15 days. The SSCT report will be added to the CTE report as an annex.

9. REFERENCES

NOAA. *NECP Central Operations*

<http://www.nco.ncep.noaa.gov/sib/decoders/CREXLIB/toc/tidedcod/>

UNESCO/IOC. 2011. *Tsunami Early Warning And Mitigation System In The North-Eastern Atlantic, The Mediterranean And Connected Seas-First Enlarged Communication Test Exercise (ECTE1) - Exercise Manual & Evaluation Report*; Necmioglu, O., Rudloff, A. (IOC Technical Series 98)

UNESCO/IOC. 2010. *Interim Operational Users Guide for the Tsunami Early Warning and Mitigation System in the North-eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS), version 1.1g*. Paris, UNESCO.

UNESCO/IOC. 2010. *NEAMTWS Task Team on Communication Test Exercises (TT-CTE). Intersessional Activity Report*, Version 1. Paris, UNESCO.

UNESCO/IOC. 2010. *Second NEAMTWS Tsunami Communication Test Exercise (Manual)*. Version. 1. Paris, UNESCO.

- UNESCO/IOC. 2010. *Second NEAMTWS Tsunami Communication Test Exercise (NEAMTWS-CTE2) Preliminary Post Exercise Report*, Version 1. Paris, UNESCO.
- U.S. Indian Ocean Tsunami Warning System Program (US IOTWS). 2007. *Tsunami Warning Center Reference Guide*. Bangkok. (U.S. IOTWS Document No.26-IOTWS-07)
- World Meteorological Organization. 2006. Commission for Basic Systems, On Information Systems & Services. *Joint implementation-coordination meeting on the GTS-WIS MTN and meeting of the CBS Expert Team on GTS-WIS operations and implementation*. Geneva. [ISS/ICM- MTN & ET-OI 2005/Doc.4.3 (11.V.2006)]
- World Meteorological Organization. 2007. *Manual on the Global Telecommunication System*, Vol. 1. No. 386. Geneva. (ISBN 978-92-63-10386-4)
- World Meteorological Organization. 2007. *Meeting of Expert Team on Data Representation and Codes*. Geneva. WMO. [ET/DR&C/Doc. 3.1.3(1) (12.IV.2007)]
- World Meteorological Organization. 2011. *The Global Telecommunication System*
http://www.wmo.int/pages/prog/www/TEM/GTS/index_en.html

ANNEX I.A - SAMPLE TEST MESSAGES FOR E-MAIL AND FAX

Subject: TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001

Body:

TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001
NEAM KOERI CANDIDATE TSUNAMI WATCH PROVIDER
ISSUED AT 1430Z 10 AUG 2011

... TSUNAMI COMMUNICATION TEST ...
THIS TEST APPLIES TO ... CGCCR(BELGIUM)... BAS(BULGARIA)... INMG(CAPE VERDE)...
NPRD(CROATIA)... OC(CYPRUS)... DMI(DENMARK)... NRIAG(EGYPT)... EMI(ESTONIA)...
FMI(FINLAND)... GSC(FINLAND)... CENALT(FRANCE)... BSH(GERMANY)...
DWD(GERMANY)... NOA(GREECE)... GSI(ISRAEL)... DPC (ITALY) ... NCGR(LEBANON)...
CPD(MALTA)... SPMC(MONACO)... KNMI(NETHERLANDS)... DSB(NORWAY)... NHQ
SFS(POLAND)... IM (PORTUGAL)... NIEP(ROMANIA)... NPO "Typhoon"(RUSSIAN
FEDERATION)... DGPCE(SPAIN)... SMHI(SWEDEN)... SWO(SYRIA)... AFAD(TURKEY)...
DFID(UNITED KINGDOM)

FROM – KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE (KOERI)

TO – TWFP PARTICIPANTS IN THE NEAMTWS COMMUNICATION TEST EXERCISE
SUBJECT –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 CANDIDATE TSUNAMI WATCH PROVIDER TO OTHER
CANDIDATE TSUNAMI WATCH PROVIDERS, NATIONAL TSUNAMI WARNING CENTERS AND
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-CTE INSTRUCTIONS

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

TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001

ANNEX I.B - SAMPLE TEST MESSAGES FOR GTS

Body:

WEME40 LTAA YYGGgg

TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001
NEAM KOERI CANDIDATE TSUNAMI WATCH PROVIDER
ISSUED AT 1430Z 10 AUG 2011

... TSUNAMI COMMUNICATION TEST ...

THIS TEST APPLIES TO ... CGCCR(BELGIUM)... BAS(BULGARIA)... INMG(CAPE VERDE)...
NPRD(CROATIA)... OC(CYPRUS)... DMI(DENMARK)... NRIAG(EGYPT)... EMI(ESTONIA)...
FMI(FINLAND)... GSC(FINLAND)... CENALT(FRANCE)... BSH(GERMANY)...
DWD(GERMANY)... NOA(GREECE)... GSI(ISRAEL)... DPC (ITALY) ... NCGR(LEBANON)...
CPD(MALTA)... SPMC(MONACO)... KNMI(NETHERLANDS)... DSB(NORWAY)... NHQ
SFS(POLAND)... IM (PORTUGAL)... NIEP(ROMANIA)... NPO "Typhoon"(RUSSIAN
FEDERATION)... DGPCE(SPAIN)... SMHI(SWEDEN)... SWO(SYRIA)... AFAD(TURKEY)...
DFID(UNITED KINGDOM)

FROM – KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE (KOERI)

TO – TWFP PARTICIPANTS IN THE NEAMTWS COMMUNICATION TEST EXERCISE
SUBJECT –NEAMTWS 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 CANDIDATE TSUNAMI WATCH PROVIDER TO OTHER
CANDIDATE TSUNAMI WATCH PROVIDERS, NATIONAL TSUNAMI WARNING CENTERS AND
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-CTE INSTRUCTIONS

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

TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001

ANNEX I.C - SAMPLE TEST MESSAGES FOR SMS

- a) TSUNAMI COMMUNICATION TEST MESSAGE NEAM CENALT CTWP 1049Z 06 JUN 2013 TO TWFP OF NEAM REGION FILL AND SEND EVALUATION QUESTIONNAIRE ACCORDING TO CTE MANUAL
- b) TSUNAMI COMMUNICATION TEST MESSAGE NEAM KOERI CTWP 1049Z 06 JUN 2013 TO TWFP OF NEAM REGION FILL AND SEND EVALUATION QUESTIONNAIRE ACCORDING TO CTE MANUAL
- c) TSUNAMI COMMUNICATION TEST MESSAGE NEAM NOA-HLNTWC CTWP 1049Z 06 JUN 2013 TO TWFP OF NEAM REGION FILL AND SEND EVALUATION QUESTIONNAIRE ACCORDING TO CTE MANUAL

ANNEX II.A - INFORMATION ON MESSAGE PROVIDER

Name of the Country:
Name of the Institution:
Email address to broadcast the communication test message:
Fax number(s) to broadcast the communication test message ^{1*} :
Fax ID code(s):
GTS Message Header:
Telephone number to broadcast the communication test message*:
TWFP Information ²
Name:
E-mail address:
Telephone*:
Fax*:
Mailing address:

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

² Please note that this information is only to identify the person responsible for sending the message, and also responding to the technical questions concerning the CTE.

* All fax/telephone numbers reported here should include international phone codes

ANNEX II.B - INFORMATION ON MESSAGE RECEIVER

COUNTRY:
INSTITUTION:
Email addresses to receive the test message:
Primary e-mail address:
Alternate e-mail address (if any):
Fax numbers to receive the test message:
Primary fax number*:
Alternate fax number*:
Telephone numbers to receive the SMS test message:
Primary telephone number*:
Is your institute connected to GTS?
Contact Info:
Name:
E-mail:
Telephone*:
Fax*:
Mailing Address:

* All fax/telephone numbers reported here should include international phone codes.

ANNEX III.A - EVALUATION QUESTIONNAIRE FOR MESSAGE PROVIDER

Please note that all times should be provided in Universal Time in HH:MM:SS format. Please copy and paste confirmation sheets from the fax machine (if available), and a copy of the messages distributed by email, fax, GTS and SMS. Please verify that the time-stamp information is visible on the documents, if applicable. Preferably the e-mail message text appended to this report should be copied directly from the mail-box server in order to provide all the details on timing and routing. All fax/telephone numbers reported here should include international phone codes.

COUNTRY:				
INSTITUTION:				
Provide T0 Time:				
Provide times of message delivery for each communication technology below:				
	E-MAIL	FAX	GTS	SMS
time stamp:				
Provide a detailed story of all activities starting from T0 and TN (end of the exercise). Did you receive any error messages or observed any problems? If yes, describe them for all dissemination technologies and addresses concerned.				
Describe the operational service to deliver the e-mail messages.				
Describe the operational service to deliver the fax messages.				
Describe the operational service to deliver the GTS messages.				
Describe the operational service to deliver the SMS messages.				
Describe briefly the preparation made in your agency for the Communication Test Exercise				
Describe briefly the procedures taken during the exercise, before time zero, and after time zero.				
Did you synchronize the PC before distributing the email messages? If yes, describe briefly the procedure used.				
Did you synchronize the fax machine before sending the messages? If yes, describe briefly the procedure used.				
Did you find the exercise useful in assessing the readiness of your agency to distribute tsunami related messages?				
Do you have any comments on the exercise, including the exercise manual and/or information received related to the exercise?				
Have you and/or your institution been contacted by media concerning the exercise before/during/after the exercise? Please provide brief information if applicable.				

ANNEX III.B - EVALUATION QUESTIONNAIRE TO MESSAGE RECEIVER

Please note that all times should be provided in Universal Time in HH:MM:SS format, where applicable. Please copy and paste into this questionnaire e-mail, fax, GTS and SMS messages received for each delivery. All fax/telephone numbers reported here should include international phone codes.

COUNTRY:					
INSTITUTION:					
Provide the time stamps of the messages received through each communication technology:					
Is your institution connected to GTS?					
Please mark below the technologies used by your institute during the CTE.					
E-MAIL	FAX	GTS	SMS		
Provide times of message delivery for each communication technology:					
Primary E-MAIL	Alternate E-MAIL	Primary FAX	Alternate FAX	GTS	SMS
[type e-mail address]	[type e-mail address]	[type fax number]	[type fax number]		[type telephone number]
[type time in UTC HH:MM:SS format]	[type time in UTC HH:MM:SS format]	[type time in UTC HH:MM:SS format]	[type time in UTC HH:MM:SS format]	[type time in UTC HH:MM:SS format]	[type time in UTC HH:MM:SS format]
Provide times for each communication technology when the message is read and understood by the operator:					
Primary E-MAIL	Alternate E-MAIL	Primary FAX	Alternate FAX	GTS	SMS
[type e-mail address]	[type e-mail address]	[type fax number]	[type fax number]		[type telephone number]
[type time in UTC HH:MM:SS format]	[type time in UTC HH:MM:SS format]	[type time in UTC HH:MM:SS format]	[type time in UTC HH:MM:SS format]	[type time in UTC HH:MM:SS format]	[type time in UTC HH:MM:SS format]
Was the provider e-mail address as expected?					
Was the e-mail message complete as expected? If not, report the differences.					
Was the provider fax number as expected?					
Was the fax message complete as expected? If not, report the differences.					
Was the GTS message complete as expected? If not, report the differences.					
Was the provider telephone number (SMS) as expected?					
Was the SMS complete as expected? If not, report the differences.					
Did the operator that received the messages understood its content and knew how to respond to it?					
Describe briefly the preparation made in your agency for the Communication Test Exercise.					
Did you synchronize the PC before distributing the email messages? If yes, describe briefly the procedure used.					
Did you synchronize the fax machine before receiving the messages? If yes, describe briefly the procedure used.					
Did you find the exercise useful in confirmation communication contacts and delays?					
Do you have any comments on the exercise, including the exercise manual and/or information received related to the exercise?					
Do you have any suggestions for the next exercises?					
Have you and/or your institution been contacted by media concerning the exercise before/during/after the exercise? Please provide brief information if applicable.					

ANNEX IV - 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 co-ordinated 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 (see Annex VI) of WMO Members and International Organizations, such as ECMWF and EUMETSAT.

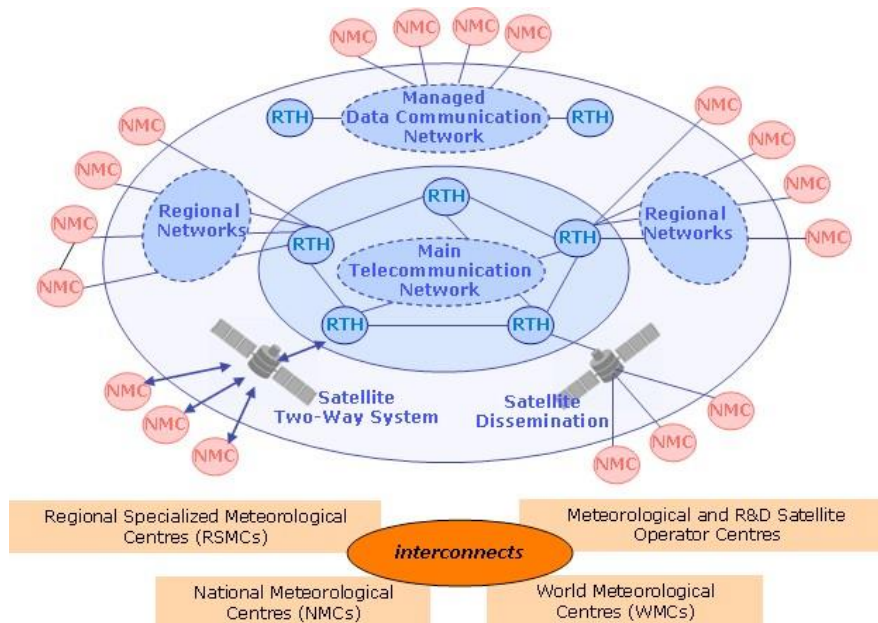


Figure VI-1. Structure of GTS

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 3 World Meteorological Centres (Melbourne, Moscow and Washington) and 15 Regional Telecommunication Hubs (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.

ANNEX V - GTS HEADER FORMAT FOR TSUNAMI MESSAGES

GTS Header Format for Tsunami Messages

Detailed information for the GTS format can be found at Manual on the Global Telecommunication System, Volume I (WMO-No. 386). In general, the abbreviated GTS header has the following format:

T₁T₂A₁A₂ii CCCC YYGGgg BBB

Where:

T₁T₂ data type and/or form designators

T₁=W (Warning)*

T₂=E (Tsunami, when T₁=W)

**In the case of NEAMTWS, this WMO terminology applies to all levels of NEAMTWS Tsunami messages.*

A₁A₂ geographical and/or data type and/or time designators

A₁A₂ 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 messages issues two or more messages with the same T₁T₂A₁A₂ and CCCC the ii shall be used to differentiate the messages and will be unique to each message.

CCCC International four-letter location indicator of the station or centre originating or compiling the message, as agreed internationally, and published in WMO-No. 9, Volume C1, Catalogue of Meteorological Messages. 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 messages;
- CCx for corrections to previously relayed messages;
- AAx for amendments to previously relayed messages; 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:

	<i>France</i>	<i>Portugal</i>	<i>Turkey</i>
<i>Tsunami Watch, Advisory and Tests</i>	<i>WEMQ40 LFPW</i>	<i>WENT40 LPMG</i>	<i>WEME40 LTAA</i>
<i>Tsunami Information Message</i>	<i>WEMQ42 LFPW</i>	<i>WENT42 LPMG</i>	<i>WEME42 LTAA</i>

The first type of message with the header format xxxx40 request an action from the recipient (Watch-Advisory or respond to the communication test); hence these messages are the highest priority. The second type of message with the header format xxxx42 do not request action; it is only an information.

Sample GTS message for NEAMTWS-CTE is given in Annex-I.B. Any candidate Tsunami Watch Provider has to inform WMO, via an official letter from IOC/NEAMTWS Secretariat and from its national weather service, on the GTS headers used and requesting the prioritization and re-routing of all tsunami messages.

ANNEX VI - LIST OF NATIONAL METEOROLOGICAL SERVICES IN NEAM REGION

Albania	The Hydrometeorological Institute
Algeria	Ministère des Transports
Belgium	Institut Royal Météorologique
Bosnia and Herzegovina	Meteorological Institute
Bulgaria	National Institute of Meteorology and Hydrology
Croatia	Meteorological and Hydrological Service
Cyprus	Meteorological Service
Denmark	Danish Meteorological Institute
Egypt	The Egyptian Meteorological Authority
Estonia	Estonian Meteorological and Hydrological Institute
Finland	Finnish Meteorological Institute
France	Météo-France
Georgia	Department of Hydrometeorology
Germany	Deutscher Wetterdienst
Greece	Hellenic National Meteorological Service
Iceland	Icelandic Meteorological Office
Ireland	The Irish Meteorological Service
Israel	Israel Meteorological Service
Italy	Servizio Meteorologico
Latvia	Latvian Environment, Geology and Meteorology Agency
Lebanon	Service Météorologique
Lithuania	Lithuanian Hydrometeorological Service
Libyan Arab Jamahiriya	Libyan National Meteorological Centre Malta Meteorological Office
Monaco	Mission Permanente de la Principauté de Monaco
Montenegro	Hydrometeorological Institute of Montenegro
Morocco	Direction de la Météorologie Nationale
Netherlands (the)	Royal Netherlands Meteorological Institute
Norway	Norwegian Meteorological Institute
Poland	Institute of Meteorology and Water Management
Portugal	Instituto Português do Mar e da Atmosfera
Romania	National Meteorological Administration
Russian Federation	Russian Federal Service for Hydrometeorology and Environmental Monitoring
Serbia	Republic Hydrometeorological Service of Serbia
Slovenia	Meteorological Office
Spain	Agencia Estatal de Meteorología
Sweden	Swedish Meteorological and Hydrological Institute
Arab Republic	Syrian Ministry of Defence Meteorological Department
Tunisia	National Institute of Meteorology
Turkey	Turkish State Meteorological Service
Ukraine	Ukrainian Hydrometeorological Center
United Kingdom	Met Office

ANNEX VII - EXAMPLE OF MESSAGE DETAILS AVAILABLE IN THE SERVER MAILBOX

```

From ???@??? Thu Jun 24 10:05:46 2010
Return-Path: <hl_ntwc@gein.noa.gr>
Delivered-To: pt.ntwc@meteo.pt
Received: from eris.meteo.pt (eris1.meteo.pt [193.137.20.2])
    by afrodite.meteo.pt (Postfix) with ESMTP id B35684546A9
    for <pt.ntwc@meteo.pt>; Thu, 24 Jun 2010 10:05:47 +0100 (WEST)
Received: from ste.anubis.internal (unknown [80.67.98.165])
    (using TLSv1 with cipher ADH-AES256-SHA (256/256 bits))
    (No client certificate requested)
    by eris.meteo.pt (Postfix) with ESMTPS id 840886A204F
    for <pt.ntwc@meteo.pt>; Thu, 24 Jun 2010 10:04:20 +0100 (WEST)
Received: from mx.anubis.local (ste [10.1.2.2])
    by ste.anubis.internal (Postfix) with ESMTP id 2012A7D815C
    for <pt.ntwc@meteo.pt>; Thu, 24 Jun 2010 10:05:19 +0100 (WEST)
Received: from egelados.gein.noa.gr (egelados.gein.noa.gr [194.177.194.10])
    by mx.anubis.local (Postfix) with ESMTP id D92B17D8159;
    Thu, 24 Jun 2010 10:05:18 +0100 (WEST)
Received: from unknown (localhost [127.0.0.1])
    by egelados.gein.noa.gr (8.12.10+Sun/8.12.10) with ESMTP id o5C956nI005048;
    Thu, 24 Jun 2010 12:05:06 +0300 (EEST)
Date: Thu, 24 Jun 2010 12:04:55 +0300
From: hl_ntwc <hl_ntwc@gein.noa.gr>
To: Nicolas.alabrunes@cea.fr, pt.ntwc@meteo.pt, twfp_tr@boun.edu.tr
Subject: TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001
Message-ID: <20100624120455.0000538a@unknown>
Organization: Geodynamics Institute
X-Mailer: Claws Mail 3.7.6 (GTK+ 2.16.0; i586-pc-mingw32msvc)
Mime-Version: 1.0
Content-Type: text/plain; charset=UTF-8
X-Esetid: 4DE50F2977A9B96C52E30F7D7FFEF9

TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001
NATIONAL OBSERVATORY OF ATHENS (NOA)
ISSUED AT 0900 UTC 24 JUN 2010

```

In this example (from CTE1, June 2010) the sequence of message routing is as follows:

Delivery	Reception	Time UTC
hl_ntwc	NOA-local machine	09:04:55
NOA-local machine	egelados.gein.noa.gr	09:05:06
egelados.gein.noa.gr	mx.anubis.local	09:05:18
mx.anubis.local	ste.anubis.internal	09:05:19
ste.anubis.internal	eris.meteo.pt	09:04:20*
eris.meteo.pt	afrodite.meteo.pt	09:05:47
afrodite.meteo.pt	<pc operacional>	09:05:46

It should be noted that the time stamp that the mail servers usually report is the first one in the table which represents indeed the delivery time by the Message Provider, not the reception time. The reception time is the last one in the table and that is the one that it is requested to provide in the Evaluation Questionnaire as TS1. If all computers are synchronized, a time delay in the delivery of the message of 51 seconds could be measured. Also remark that many servers do intervene in the message routing and not all are synchronized.

ANNEX VIII - EXAMPLE OF TIME STAMPS ON A FAX MESSAGE

Only the bottom line provides the reception time.

9/30/2010 9:39 AM FROM: IM-L1 TO: 0033169267085 PAGE: 001 OF 001		
TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001 INSTITUTO DE METEOROLOGIA, I.P. (IM) ISSUED AT 0935Z 30 SEP 2010		
... TSUNAMI COMMUNICATION TEST ... THIS TEST APPLIES TO ... CEA/DASE (FRANCE) ... PROTEZIONE CIVILE (ITALY) ... NOA (GREECE) ... KOERI (TURKEY)		
FROM - INSTITUTO DE METEOROLOGIA, I.P. (IM) TO - TWFP PARTICIPANTS IN THE SECOND NEAMTWS COMMUNICATION TEST EXERCISE SUBJECT - SECOND NEAMTWS 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 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 SECOND NEATWS-CTE INSTRUCTIONS		
THANK YOU FOR YOUR PARTICIPATION IN THIS COMMUNICATION TEST THIS WILL BE THE FINAL MESSAGE ISSUED		
TSUNAMI COMMUNICATION TEST MESSAGE NUMBER 001		
1	30/09/10 11:41	Pg: 1

In this example, taken from CTE1 June 2010, the time stamp shown on the top of the page is indeed the delivery time of the message and the reception time is found at the bottom of the message. It is this second time that has to be reported in the Evaluation Questionnaire as TS1.

ANNEX IX - CTE FIRST ANNOUNCEMENT MESSAGE TEMPLATE

We have the pleasure to announce the next NEAMTWS Communication Test Exercise (NEAMTWS-CTE), which will be conducted on [DD/MM/YYYY]. The NEAMTWS-CTE will involve the National Tsunami Warning Centres (NTWC), the Tsunami Warning Focal Point (TWFP) and the Tsunami National Contacts (TNC) for Member States (MS) without a designated TWFP.

The Candidate Tsunami Watch Providers (CTWP), National Tsunami Warning Centres (NTWC) and Tsunami Warning Focal Points (TWFP) must keep a high level of readiness so as to be able to act efficiently and effectively to provide for the public's safety during fast-onset and rapidly-evolving natural disasters like the tsunamis. To maintain this high state of operational readiness, and especially for infrequent events such as tsunamis, tsunami watch/warning centres and emergency agencies must regularly practice their response procedures to ensure that vital communication links work seamlessly, and that agencies and response personnel know the roles that they will need to play during an actual event.

This NEAMTWS-CTE will consist of the broadcast of a Tsunami Communication Test Message by [MESSAGE PROVIDER] that will act as the Message Provider. This message will be distributed by e-mail, fax, GTS and SMS. The details of the Message Provider are given in Annex II.A so that each CTE participant can recognize the authority and validity of the messages received. It is suggested that the exercise participants check beforehand that their communication systems do not block the messages originated by the Message Provider. For GTS users, the exercise participants should verify that they are able to receive the appropriate message header identifiers.

The NEAMTWS-CTE messages will be delivered to the TWFP (TNC in the absence of a designated TWFP) operational addresses as provided by MS to the IOC secretariat. MS are invited to verify that these addresses are accurate and up-to-date. Any changes, corrections or amendments should be sent to the IOC secretariat through the official channels described in UNESCO IOC TWFP and TNC nomination forms. They will be used in the NEAMTWS-CTE if received one week before the exercise.

All agencies participating in the NEAMTWS-CTE (TWFPs and optionally TNCs) are requested to fill in the evaluation questionnaire sent as [Annex III.B](#), one questionnaire for each agency. The questionnaires should be sent to the Message Provider address, given in [Annex II.A](#) within one week after the exercise. It is the responsibility of the Message Provider to collect all evaluation questionnaires and produce the first version of the NEAMTWS-CTE Evaluation Report to be distributed to all exercise participants. The Message Provider will fill a similar questionnaire that will be part of the Evaluation Report.

More information on the nature of exercise together with technical details concerning the conduct and evaluation of the exercise can be found in the NEAMTWS-CTE Manual, attached to this Circular Letter. NEAMTIC website has also a dedicated section on CTE where all relevant information and documentation can be accessed <http://neamtic.ioc-unesco.org/>.

ANNEX X - CTE SECOND ANNOUNCEMENT MESSAGE TEMPLATE

To whom it may concern;

This e-mail message is sent to you from the CTE message provider [MESSAGE PROVIDER] e-mail address [\[e-mail address\]](#) in order to ensure that the anti-spam and firewall software operating at the message recipient side do not block the CTE message on the day of the exercise, [DD/MM/YYYY].

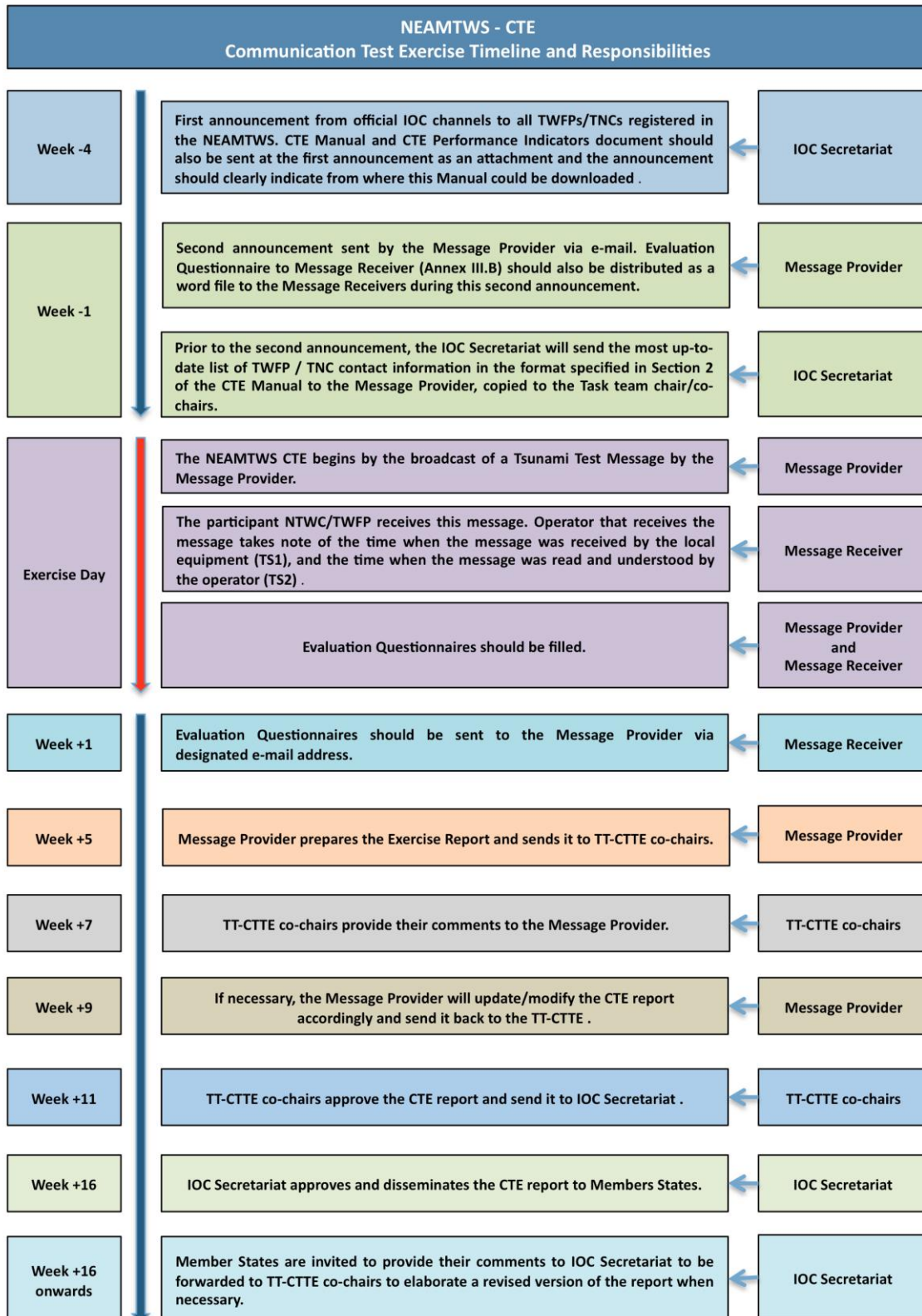
You have received this e-mail because either you have provided your e-mail address in AnnexII.B of the NEAMTWS-CTE Manual or your e-mail address was provided in TWFP/TNC forms submitted by your State/Government to UNESCO/IOC.

Please be so kind to confirm the receipt of this message.

Best regards,

[MESSAGE PROVIDER NAME]

ANNEX XI - CTE TIMELINE FLOWCHART



ANNEX XII - CTE CHECKLIST

Time-line Week referred to Exercise Day	Action	Tick Boxes		
		MP	MR	IOC
-4	The CTE period begins by issuing a first announcement from official IOC channels to all TWFPs and TNCs registered in the NEAMTWS, at least 4 weeks in advance of the planned exercise date. This CTE Manual and CTE Performance Indicators Document should also be sent at the first announcement as an attachment and the announcement should clearly indicate from where this Manual could be downloaded.			
between -4 and -1	During the following 3 weeks period TWFPs from Member States (MS) will have the time to correct and or update all the contact information. Updates are collected by the IOC Secretariat.			
between -4 and -1	During the following 3 weeks period the Message Provider defines the contacts that will be used to broadcast the Tsunami Test Message. This information is collected by the IOC Secretariat			
-1 and 1/2 days	Prior the CTE second announcement, the IOC Secretariat will send the most up-to-date list of TWFP / TNC contact information in the agreed format (provided in the CTE Manual) to the Message Provider, copied to the Task team chair/co-chairs			
-1	The CTE is preceded, one week before, by a second announcement sent by the Message Provider via e-mail 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. Evaluation Questionnaire to Message Receiver (Annex III.B) should also be distributed as a word file to the Message Receivers during this second announcement.			
before 0	ASCII character set should be used in the message templates used in all communication technologies. All times in the evaluation questionnaires should be reported in HH:MM:SS UTC format.			
before 0	All communication technology systems should be synchronized.			
before 0	The number of e-mail message recipients would be restricted to 2 e-mail addresses per agency and 4 e-mail addresses per member state.			
before 0	The number of fax message recipients would be restricted to 2 per member state; thus 1 per agency if two agencies are designated. If a single agency has been designated, both primary and alternate fax numbers would be utilized.			
before 0	At least an 8-channel fax server for should be used for the fax message dissemination			
before 0	The Message Provider should set up the fax server in such a way so that each recipient fax number will be subject to at least three attempts to send the fax message, where in each attempt the fax recipient will be ringed at.			
before 0	Message Recipients are recommended to develop codes to automatically detect fax messages and send them as internal email.			
before 0	Message Recipients are recommended to develop codes to automatically detect GTS messages and send them as internal email.			
0	The Message Provider broadcasts the Tsunami Test Message			
0	In addition to TS0, TS1E (time stamp of e-mail message) should be reported by the Message Provider			
0	In addition to TS0, TS1F (time stamp of fax message) should be reported by the Message Provider and ASCII character set should be used in the fax message templates.			
0	In addition to TS0, TS1G (time stamp of GTS message) should be reported and ASCII character set should be used in the GTS message templates.			
0	In coordination with the WMO-National Representatives, detailed GTS logs should be acquired both by the Message Provider and Message Recipient, where applicable.			
0	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) .			
0	Evaluation Questionnaires should be filled on the day of CTE.			
1	Evaluation Questionnaires should be sent to the Message Provider via designated e-mail address.			

IOC Technical Series

No.	Title	Languages
1	Manual on International Oceanographic Data Exchange. 1965	(out of stock)
2	Intergovernmental Oceanographic Commission (Five years of work). 1966	(out of stock)
3	Radio Communication Requirements of Oceanography. 1967	(out of stock)
4	Manual on International Oceanographic Data Exchange - Second revised edition. 1967	(out of stock)
5	Legal Problems Associated with Ocean Data Acquisition Systems (ODAS). 1969	(out of stock)
6	Perspectives in Oceanography, 1968	(out of stock)
7	Comprehensive Outline of the Scope of the Long-term and Expanded Programme of Oceanic Exploration and Research. 1970	(out of stock)
8	IGOSS (Integrated Global Ocean Station System) - General Plan Implementation Programme for Phase I. 1971	(out of stock)
9	Manual on International Oceanographic Data Exchange - Third Revised Edition. 1973	(out of stock)
10	Bruun Memorial Lectures, 1971	E, F, S, R
11	Bruun Memorial Lectures, 1973	(out of stock)
12	Oceanographic Products and Methods of Analysis and Prediction. 1977	E only
13	International Decade of Ocean Exploration (IDOE), 1971-1980. 1974	(out of stock)
14	A Comprehensive Plan for the Global Investigation of Pollution in the Marine Environment and Baseline Study Guidelines. 1976	E, F, S, R
15	Bruun Memorial Lectures, 1975 - Co-operative Study of the Kuroshio and Adjacent Regions. 1976	(out of stock)
16	Integrated Ocean Global Station System (IGOSS) General Plan and Implementation Programme 1977-1982. 1977	E, F, S, R
17	Oceanographic Components of the Global Atmospheric Research Programme (GARP) . 1977	(out of stock)
18	Global Ocean Pollution: An Overview. 1977	(out of stock)
19	Bruun Memorial Lectures - The Importance and Application of Satellite and Remotely Sensed Data to Oceanography. 1977	(out of stock)
20	A Focus for Ocean Research: The Intergovernmental Oceanographic Commission - History, Functions, Achievements. 1979	(out of stock)
21	Bruun Memorial Lectures, 1979: Marine Environment and Ocean Resources. 1986	E, F, S, R
22	Scientific Report of the Interecalibration Exercise of the IOC-WMO-UNEP Pilot Project on Monitoring Background Levels of Selected Pollutants in Open Ocean Waters. 1982	(out of stock)
23	Operational Sea-Level Stations. 1983	E, F, S, R
24	Time-Series of Ocean Measurements. Vol.1. 1983	E, F, S, R
25	A Framework for the Implementation of the Comprehensive Plan for the Global Investigation of Pollution in the Marine Environment. 1984	(out of stock)
26	The Determination of Polychlorinated Biphenyls in Open-ocean Waters. 1984	E only
27	Ocean Observing System Development Programme. 1984	E, F, S, R
28	Bruun Memorial Lectures, 1982: Ocean Science for the Year 2000. 1984	E, F, S, R
29	Catalogue of Tide Gauges in the Pacific. 1985	E only
30	Time-Series of Ocean Measurements. Vol. 2. 1984	E only
31	Time-Series of Ocean Measurements. Vol. 3. 1986	E only
32	Summary of Radiometric Ages from the Pacific. 1987	E only
33	Time-Series of Ocean Measurements. Vol. 4. 1988	E only
34	Bruun Memorial Lectures, 1987: Recent Advances in Selected Areas of Ocean Sciences in the Regions of the Caribbean, Indian Ocean and the Western Pacific. 1988	Composite E, F, S
35	Global Sea-Level Observing System (GLOSS) Implementation Plan. 1990	E only

(continued)

36	Bruun Memorial Lectures 1989: Impact of New Technology on Marine Scientific Research. 1991	Composite E, F, S
37	Tsunami Glossary - A Glossary of Terms and Acronyms Used in the Tsunami Literature. 1991	E only
38	The Oceans and Climate: A Guide to Present Needs. 1991	E only
39	Bruun Memorial Lectures, 1991: Modelling and Prediction in Marine Science. 1992	E only
40	Oceanic Interdecadal Climate Variability. 1992	E only
41	Marine Debris: Solid Waste Management Action for the Wider Caribbean. 1994	E only
42	Calculation of New Depth Equations for Expendable Bathymetographs Using a Temperature-Error-Free Method (Application to Sippican/TSK T-7, T-6 and T-4 XBTS. 1994	E only
43	IGOSS Plan and Implementation Programme 1996-2003. 1996	E, F, S, R
44	Design and Implementation of some Harmful Algal Monitoring Systems. 1996	E only
45	Use of Standards and Reference Materials in the Measurement of Chlorinated Hydrocarbon Residues. 1996	E only
46	Equatorial Segment of the Mid-Atlantic Ridge. 1996	E only
47	Peace in the Oceans: Ocean Governance and the Agenda for Peace; the Proceedings of <i>Pacem in Maribus</i> XXIII, Costa Rica, 1995. 1997	E only
48	Neotectonics and fluid flow through seafloor sediments in the Eastern Mediterranean and Black Seas - Parts I and II. 1997	E only
49	Global Temperature Salinity Profile Programme: Overview and Future. 1998	E only
50	Global Sea-Level Observing System (GLOSS) Implementation Plan-1997. 1997	E only
51	L'état actuel de l'exploitation des pêcheries maritimes au Cameroun et leur gestion intégrée dans la sous-région du Golfe de Guinée (<i>cancelled</i>)	F only
52	Cold water carbonate mounds and sediment transport on the Northeast Atlantic Margin. 1998	E only
53	The Baltic Floating University: Training Through Research in the Baltic, Barents and White Seas - 1997. 1998	E only
54	Geological Processes on the Northeast Atlantic Margin (8 th training-through-research cruise, June-August 1998). 1999	E only
55	Bruun Memorial Lectures, 1999: Ocean Predictability. 2000	E only
56	Multidisciplinary Study of Geological Processes on the North East Atlantic and Western Mediterranean Margins (9 th training-through-research cruise, June-July 1999). 2000	E only
57	Ad hoc Benthic Indicator Group - Results of Initial Planning Meeting, Paris, France, 6-9 December 1999. 2000	E only
58	Bruun Memorial Lectures, 2001: Operational Oceanography – a perspective from the private sector. 2001	E only
59	Monitoring and Management Strategies for Harmful Algal Blooms in Coastal Waters. 2001	E only
60	Interdisciplinary Approaches to Geoscience on the North East Atlantic Margin and Mid-Atlantic Ridge (10 th training-through-research cruise, July-August 2000). 2001	E only
61	Forecasting Ocean Science? Pros and Cons, Potsdam Lecture, 1999. 2002	E only
62	Geological Processes in the Mediterranean and Black Seas and North East Atlantic (11 th training-through-research cruise, July- September 2001). 2002	E only
63	Improved Global Bathymetry – Final Report of SCOR Working Group 107. 2002	E only
64	R. Revelle Memorial Lecture, 2006: Global Sea Levels, Past, Present and Future. 2007	E only
65	Bruun Memorial Lectures, 2003: Gas Hydrates – a potential source of energy from the oceans. 2003	E only
66	Bruun Memorial Lectures, 2003: Energy from the Sea: the potential and realities of Ocean Thermal Energy Conversion (OTEC). 2003	E only

67	Interdisciplinary Geoscience Research on the North East Atlantic Margin, Mediterranean Sea and Mid-Atlantic Ridge (12 th training-through-research cruise, June-August 2002). 2003	E only
68	Interdisciplinary Studies of North Atlantic and Labrador Sea Margin Architecture and Sedimentary Processes (13 th training-through-research cruise, July-September 2003). 2004	E only
69	Biodiversity and Distribution of the Megafauna / Biodiversité et distribution de la mégafaune. 2006 Vol.1 The polymetallic nodule ecosystem of the Eastern Equatorial Pacific Ocean / Ecosystème de nodules polymétalliques de l'océan Pacifique Est équatorial Vol.2 Annotated photographic Atlas of the echinoderms of the Clarion-Clipperton fracture zone / Atlas photographique annoté des échinodermes de la zone de fractures de Clarion et de Clipperton Vol.3 Options for the management and conservation of the biodiversity — The nodule ecosystem in the Clarion Clipperton fracture zone: scientific, legal and institutional aspects	E F
70	Interdisciplinary geoscience studies of the Gulf of Cadiz and Western Mediterranean Basin (14 th training-through-research cruise, July-September 2004). 2006	E only
71	Indian Ocean Tsunami Warning and Mitigation System, IOTWS. Implementation Plan, 7–9 April 2009 (2 nd Revision). 2009	E only
72	Deep-water Cold Seeps, Sedimentary Environments and Ecosystems of the Black and Tyrrhenian Seas and the Gulf of Cadiz (15 th training-through-research cruise, June–August 2005). 2007	E only
73	Implementation Plan for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS), 2007–2011. 2007 (<i>electronic only</i>)	E only
74	Bruun Memorial Lectures, 2005: The Ecology and Oceanography of Harmful Algal Blooms – Multidisciplinary approaches to research and management. 2007	E only
75	National Ocean Policy. The Basic Texts from: Australia, Brazil, Canada, China, Colombia, Japan, Norway, Portugal, Russian Federation, United States of America. (Also Law of Sea Dossier 1). 2008	E only
76	Deep-water Depositional Systems and Cold Seeps of the Western Mediterranean, Gulf of Cadiz and Norwegian Continental margins (16 th training-through-research cruise, May–July 2006). 2008	E only
77	Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – 12 September 2007 Indian Ocean Tsunami Event. Post-Event Assessment of IOTWS Performance. 2008	E only
78	Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE EWS) – Implementation Plan 2013–2017 (Version 2.0). 2013	E only
79	Filling Gaps in Large Marine Ecosystem Nitrogen Loadings Forecast for 64 LMEs – GEF/LME global project Promoting Ecosystem-based Approaches to Fisheries Conservation and Large Marine Ecosystems. 2008	E only
80	Models of the World's Large Marine Ecosystems. GEF/LME Global Project Promoting Ecosystem-based Approaches to Fisheries Conservation and Large Marine Ecosystems. 2008	E only
81	Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – Implementation Plan for Regional Tsunami Watch Providers (RTWP). 2008	E only
82	Exercise Pacific Wave 08 – A Pacific-wide Tsunami Warning and Communication Exercise, 28–30 October 2008. 2008	E only
83.	<i>Cancelled</i>	
84.	Global Open Oceans and Deep Seabed (GOODS) Bio-geographic Classification. 2009	E only
85.	Tsunami Glossary	E, F, S
86	Pacific Tsunami Warning System (PTWS) Implementation Plan (<i>under preparation</i>)	

(continued)

87.	Operational Users Guide for the Pacific Tsunami Warning and Mitigation System (PTWS) – Second Edition. 2011	E only
88.	Exercise Indian Ocean Wave 2009 (IOWave09) – An Indian Ocean-wide Tsunami Warning and Communication Exercise – 14 October 2009. 2009	E only
89.	Ship-based Repeat Hydrography: A Strategy for a Sustained Global Programme. 2009	E only
90.	12 January 2010 Haiti Earthquake and Tsunami Event Post-Event Assessment of CARIBE EWS Performance. 2010	E only
91.	Compendium of Definitions and Terminology on Hazards, Disasters, Vulnerability and Risks in a coastal context	<i>Under preparation</i>
92.	27 February 2010 Chile Earthquake and Tsunami Event – Post-Event Assessment of PTWS Performance (Pacific Tsunami Warning System). 2010	E only
93.	Exercise CARIBE WAVE 11 / LANTEX 11—A Caribbean Tsunami Warning Exercise, 23 March 2011	
	Vol. 1 Participant Handbook / Exercice CARIBE WAVE 11 —Exercice d'alerte au tsunami dans les Caraïbes, 23 mars 2011. Manuel du participant / Ejercicio Caribe Wave 11. Un ejercicio de alerta de tsunami en el Caribe, 23 de marzo de 2011. Manual del participante. 2010	E/F/S
	Vol. 2 Report. 2011	E only
	Vol. 3 Supplement: Media Reports. 2011	E/F/S
94.	Cold seeps, coral mounds and deep-water depositional systems of the Alboran Sea, Gulf of Cadiz and Norwegian continental margin (17th training-through-research cruise, June–July 2008)	<i>Under preparation</i>
95.	International Post-Tsunami Survey for the 25 October 2010 Mentawai, Indonesia Tsunami	<i>Under preparation</i>
96.	Pacific Tsunami Warning System (PTWS) 11 March 2011 Off Pacific coast of Tohoku, Japan, Earthquake and Tsunami Event. Post-Event Assessment of PTWS Performance	<i>Under preparation</i>
97.	Exercise PACIFIC WAVE 11: A Pacific-wide Tsunami Warning and Communication Exercise, 9–10 November 2011	
	Vol. 1 Exercise Manual. 2011	E only
	Vol. 2 Report. 2013	E only
98.	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and connected seas. First Enlarged Communication Test Exercise (ECTE1). Exercise Manual and Evaluation Report. 2011	E only
99.	Exercise INDIAN OCEAN WAVE 2011 – An Indian Ocean-wide Tsunami Warning and Communication Exercise, 12 October 2011	E only
	Vol. 1 Exercise Manual. 2011	
	Supplement: Bulletins from the Regional Tsunami Service Providers	
	Vol. 2 Exercise Report. 2013	
100.	Global Sea Level Observing System (GLOSS) Implementation Plan – 2012. 2012	E only
101.	Exercise Caribe Wave/Lantex 13. A Caribbean Tsunami Warning Exercise, 20 March 2013. Volume 1: Participant Handbook. 2012	E only
102.	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas — Second Enlarged Communication Test Exercise (CTE2), 22 May 2012.	E only
	Vol. 1 Exercise Manual. 2012	
	Vol. 2 Evaluation Report. 2014	
103.	Exercise NEAMWAVE 12. A Tsunami Warning and Communication Exercise for the North-eastern Atlantic, the Mediterranean, and Connected Seas Region, 27–28 November 2012.	E only
	Vol. 1: Exercise Manual. 2012	
	Vol. 2: Evaluation Report. 2013	
104.	Seísmo y tsunami del 27 de agosto de 2012 en la costa del Pacífico frente a El Salvador, y seísmo del 5 de septiembre de 2012 en la costa del Pacífico frente a Costa Rica. Evaluación subsiguiente sobre el funcionamiento del Sistema de Alerta contra los Tsunamis y Atenuación de sus Efectos en el Pacífico. 2012	Español solamente (resumen en inglés y francés)
105.	Users Guide for the Pacific Tsunami Warning Center Enhanced Products for the Pacific Tsunami Warning System, August 2014. Revised Edition. 2014	E, S

106.	Exercise Pacific Wave 13. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, 1–14 May 2013. Vol. 1 Exercise Manual. 2013 Vol. 2 Summary Report. 2013	E only
107.	Tsunami Public Awareness and Education Strategy for the Caribbean and Adjacent Regions. 2013	E only
108.	Pacific Tsunami Warning and Mitigation System (PTWS) Medium-Term Strategy, 2014–2021. 2013	E only
109.	Exercise Caribe Wave/Lantex 14. A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 26 March 2014. Vol. 1 Participant Handbook. 2014	E/S
110.	Directory of atmospheric, hydrographic and biological datasets for the Canary Current Large Marine Ecosystem. 2014	E only
111.	Integrated Regional Assessments in support of ICZM in the Mediterranean and Black Sea Basins. 2014	E only
112.	<i>11 April 2012 West of North Sumatra Earthquake and Tsunami Event - Post-event Assessment of IOTWS Performance</i>	<i>In preparation</i>
113.	<i>Exercise Indian Ocean Wave 2014: An Indian Ocean-wide Tsunami Warning and Communication Exercise.</i>	<i>In preparation</i>
114.	Exercise NEAMWAVE 14. A Tsunami Warning and Communication Exercise for the North-Eastern Atlantic, the Mediterranean, and Connected Seas Region, 28–30 October 2014 Vol. 1 Manual Vol. 2 Evaluation Report – Supplement: Evaluation by Message Providers and Civil Protection Authorities	E only
115.	Oceanographic and Biological Features in the Canary Current Large Marine Ecosystem. 2015	E only
116.	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas. Third Enlarged Communication Test Exercise (CTE3), 1st October 2013. Vol. 1 Exercise Manual Vol. 2 Evaluation Report	E only
117.	Exercise Pacific Wave 15. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, 2–6 February 2015 Vol. 1: Exercise Manual; Vol. 2: Summary Report	E only
118.	Exercise Caribe Wave/Lantex 15. A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 25 March 2015 (SW Caribbean Scenario) Vol. 1: Participant Handbook	E only
119.	Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean Vol 1: Transboundary Large Marine Ecosystems Vol 2: Areas Beyond National Jurisdiction	<i>In preparation</i>
120.	Status and Trends in Primary Productivity and Chlorophyll from 1996 to 2014 in Large Marine Ecosystems and the Western Pacific Warm Pool, Based on Data from Satellite Ocean Colour Sensors	<i>In preparation</i>
121.	Exercise Indian Ocean Wave 14, an Indian Ocean wide Tsunami Warning and Communications Exercise, 9–10 September 2014	<i>In preparation</i>
122.	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas. Sixth Communication Test Exercise (CTE6), 29 July 2015. Vol. 1: Exercise Manual Vol. 2: Evaluation Report	E only