

EDUCATION AND AWARENESS

Effectiveness and Sustainability of NEAMTWS

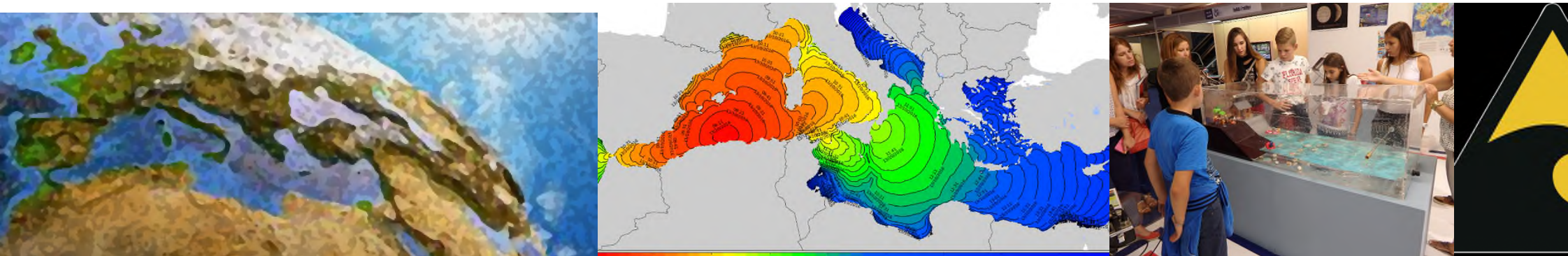
Information Workshop on NEAMTWS:

Reducing Tsunami Risk through EWS, Preparedness and Awareness

25 - 26 September 2017, Madrid, Spain

Denis Chang Seng

IOC / UNESCO
ICG/NEAMTWS Technical Secretary



Outline

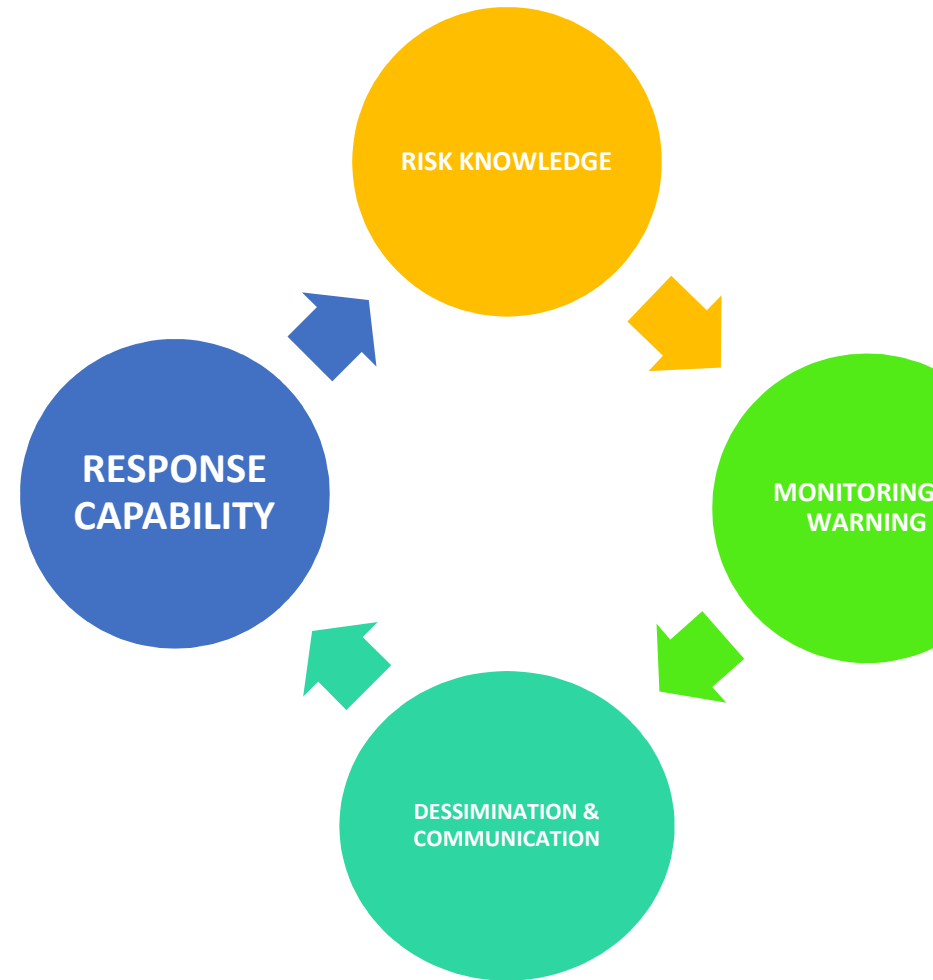
- End to End EWS
- Governance-ICG/NEAMTWS Technical Working Group on Education and Preparedness
- National Education and Awareness Activities in NEAM region

- Tsunami Information Centers (TICS)
 - NEAM Tsunami Information Center
 - Education Products/Resources

- Challenges and Opportunities /Sustainability of NEAMTWS

End to End EWS

- People need to know what to do in presence of natural signs of a tsunami, with or without a warning.
- The effectiveness of any early-warning system ultimately depends upon an educated and trained population
- Community at risk should:
 1. **Aware of the risks**
 2. Understand the likely **impacts**
 3. Able to adopt the appropriate safety and risk reduction responses



Governance

ICG/NEAMTWS

Technical Working Groups

There are four technical Working Groups (WGs):

- **Working Group 1** - Hazard Assessment and Modelling - Co-chairs: Mauricio González (University of Cantabria, Spain) and Jörn Behrens (University of Hamburg, Germany)
- **Working Group 2** - Seismic and Geophysical Measurements - Co-chairs: Marinos Charalampakis (Institute of Geodynamics, National Observatory of Athens, Greece) and Alberto Michelini (National Institute of Geophysics and Volcanology, Italy)
- **Working Group 3** - Sea Level Data Collection and Exchange, Including Offshore Tsunami Detection and Instruments - Chair: Dov S. Rosen (NEMA, Israel)
- **Working Group 4** - Public Awareness, Preparedness and Mitigation - Co-chairs: Areti Plessa (Institute of Geodynamics, National Observatory of Athens) and Marzia Santini (Department for Civil Protection, Italy)

National Education and Awareness Raising

- **Turkey:** Education activities for school children



- **Israel:** End to End Tsunami Exercise 4 April 2016



National Education and Awareness Raising (Con't)

Italy: Activities during the “I don’t take risks – Tsunami” campaign

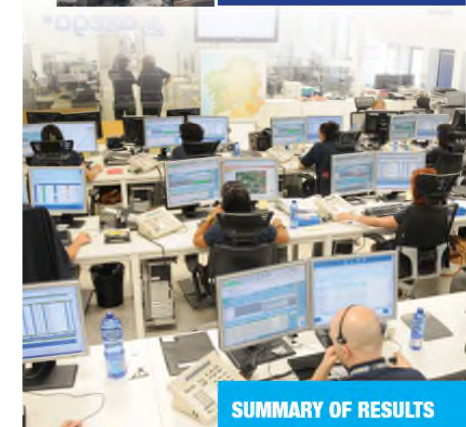


Greece: Tsunami education for school children organized by HL-NTWC during the Athens Festival for Science and Technology, Athens, 3-8 April 2016. The tsunami education tank attracted great interest and caused enthusiasm among the kids. The tsunami education tank produced by HL-NTWC within the frame of EU-FP7 ASTARTE Project with the aim to educate in a funny way school children as regards tsunami generation and impact



Tsunami Exercises in the NEAM Region (NEAMWave)

- **Exercise NEAMWave12 (2012)**: A tsunami warning and communication exercise for the North-eastern Atlantic, the Mediterranean, and Connected Seas Region
- **Exercise NEAMWave14 (2014)**: A tsunami warning and communication exercise for the North-eastern Atlantic, the Mediterranean, and Connected Seas Region, 28-30 October 2014
- **Exercise NEAMWave17 (2017)**: 30 October-3 November 2017
- **WTAD 5 November 2017 (next presentation)**
 - NEAM Tsunami Exercises contributes to education and awareness raising on tsunami



**WORLD
TSUNAMI
AWARENESS
DAY**
5 NOVEMBER
2017



Tsunami Information Centers (TICs)

- 4 Tsunami Information Centers (TICs)

1. Indian Ocean Tsunami Information Center (IOTIC)



2. International Tsunami Information Center (ITIC)



3. NEAM Tsunami Information Center (NEAMTIC)



4. Caribbean Tsunami Information Center (CTIC)



NEAM Tsunami Information Centre (NEAMTIC)

- **NEAM Tsunami Information Centre (NEAMTIC)** was established to provide information on **warning systems**, **risks** and **good practices** in respect of tsunamis and other sea-level related hazards
- Users include:
 - CPAs
 - disaster management organizations,
 - decision makers
 - schools
 - industries in the coastal zone
 - general public.
- NEAMTIC supports the development of the NEAMTWS.

The screenshot displays the NEAMTIC website interface. At the top, there is a navigation bar with a home icon and several menu items: Tsunami Info, Technical Info, NEAMTWS, Resources, Training & Exercises, and About NEAMTIC. Above the navigation bar is a row of flags representing member states. The main content area features a large image of a tsunami evacuation exercise in Israel, April 2016, with the caption 'Evacuation of Ashdod sea port'. To the right of the main image is a 'Tsunami Information' section with a dropdown menu for 'NEAMTWS Tsunami Service Providers (TSPs) Links' and a list of providers: NQA (Greece), CENALT (France), INGV (Italy), and KOERI (Turkey). Below the main image is a 'Recent News' section with a link to a booklet titled 'Booklet - 10 Years of the North-Eastern Atlantic, the Mediterranean and Connected Seas Tsunami Warning and Mitigation System (NEAMTWS): Accomplishments...'. To the right of the news section is an 'Upcoming Events' section with a link to 'NEAMWave17 planned for the 4th Quarter of 2017'. At the bottom right, there is an 'Earthquakes Update' section with a link to 'Through the following website, you can find updated earthquake information :'. The website also includes a footer with contact information for the Centro Nazionale Terremoti, Istituto Nazionale di Geofisica e Vulcanologia, and the Institute of Geodynamics, National Observatory of Athens.

NEAMTIC Core Web Structure

➤ TSUNAMI INFORMATION-Tsunami, Risk and What to DO?

➤ TECHNICAL INFORMATION

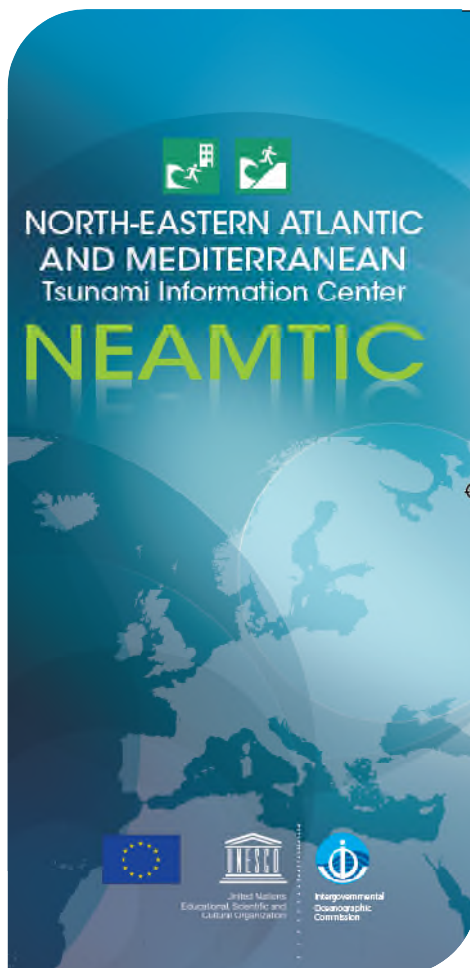
➤ NEAMTWS


➤ RESOURCES




➤ TRAINING & EXERCISES

The screenshot displays the NEAMTIC website interface. At the top, there is a navigation bar with flags and menu items: Tsunami Info, Technical Info, NEAMTWS, Resources, Training & Exercises, and About NEAMTIC. The main content area features a large photo of children interacting with a tsunami education tank, captioned 'Tsunami education tank for children during the Athens/Dreeca Festival for Science and Technology, 3-8 April 2016.' Below this, there are sections for 'Recent News' (including a report on the NEAMTWS-UN Forum in New York) and 'Upcoming Events' (announcing NEAMWave17). To the right, the 'Tsunami Information' section lists TSPs: IIDA (Greece), CENALT (France), IIGI (Italy), and KODER (Turkey). The 'Earthquakes Update' section provides a link to find updated earthquake information. At the bottom, the 'NEAMTIC Resources' section includes links for Awareness and Education, Publications, and the Tsunami Catalogue.

NEAMTIC LEAFLET




NORTH-EASTERN ATLANTIC AND MEDITERRANEAN Tsunami Information Center
NEAMTIC

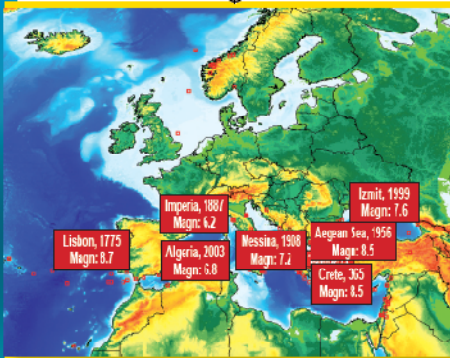




United Nations Educational, Scientific and Cultural Organization
 Intergovernmental Oceanographic Commission

OBJECTIVES OF THE NEAMTIC

- Providing information** to civil protection authorities and the general public on warning systems for tsunamis and other sea-level related hazards, and on the activities of IOC and European Union (EU) in the field of tsunami preparedness
- Building capacity** through one training workshop on tsunami early warning systems, standard operating procedures, numerical models to determine tsunami travel time, and ISO signage
- Making citizens, especially youth, aware of risks** of floods from the sea in coastal areas, such as tsunamis, storm surges and strong swells, providing them with knowledge on the phenomena and practices of safe behaviour
- Identifying, sharing and disseminating** good practices in plans, methods and procedures to strengthen preparedness for sea level related hazards
- Fostering linkages between the EU and IOC** on intergovernmental and transnational actions to develop NEAMTIC


The Tsunami Information Centre for the North eastern Atlantic and the Mediterranean and Connected Seas (NEAMTIC) is part of the activities coordinated by the Intergovernmental Oceanographic Commission (IOC) of UNESCO and carried out by Member States to develop the Tsunami Early Warning and Mitigation System for the NEAM region (NEAMTWS).



Lisbon, 1775 Magn: 8.7
 Imperia, 1887 Magn: 6.2
 Algeria, 2003 Magn: 6.0
 Messina, 1908 Magn: 7.2
 Aegean Sea, 1956 Magn: 8.5
 Crete, 365 Magn: 8.5
 Izmit, 1999 Magn: 7.6

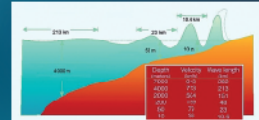
© Steiano Tinti

Although less frequent than in the Pacific and Indian Ocean, tsunamis can hit the Mediterranean and North East Atlantic coastal areas causing extensive loss of lives and properties. Major tsunamis with thousands of casualties and severe damage to coastal cities happened for example in 365 (Crete), in 1775 (Lisbon), in 1908 (Messina), in 1956 (Aegean Sea), and affected the coastline extensively following the 1999 Izmit earthquake. At some locality the inundation distance ranged up to 35 m. Furthermore, tsunamis have been generated in 2032 in Stromboli and in 2003 in Algeria though fortunately not very damaging. The Mediterranean area represents the collision between the European and the African plates, and comprises a number of geodynamically affected by different seismic activity extended from West to East. Furthermore volcanic and geomorphological processes could be at the origin of tsunamis in the area



TSUNAMI PROPAGATION

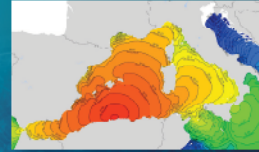
A tsunami is a series of very long waves created by an underwater disturbance usually associated with earthquakes occurring below or near the ocean. The tsunami propagation **speed is reduced** in shallow water while the **height of its waves rapidly increases**.



© International Tsunami Information Centre

TSUNAMI TRAVEL TIME

Tsunamis propagate through the Mediterranean and North East Atlantic region in a very short time. In the **Mediterranean basins** a large area of the coast near the tsunami source is hit in fifteen minutes and within **an hour** the tsunami **has crossed the basin** and arrived on the opposite coast.



© Commission de l'énergie atomique et des énergies alternatives

TSUNAMI CHARACTERISTICS


- Tsunamis travel at jet airliner speeds in the deep ocean, where the waves are only tens of centimetres high. Tsunamis slow down and grow in height tremendously upon entering shallow water.
- Tsunami waves can crest to 10-m high heights, strike with devastating force and quickly flood all low-lying coastal areas.
- An earthquake is one of nature's tsunami warning signs. If you're at the beach and you feel the ground shaking, a tsunami may have been generated.
- Tsunamis may be started by a rapid fall in sea level.
- The first wave may not be the largest.

NEAMTIC Educational Products

WHAT IS A TSUNAMI?

This poster draws public-safety lessons from previous experiences with fast-arriving tsunamis. Tsunamis can be detected using our human senses. Recognize a tsunami's natural warning signs. Be aware of tsunami facts. This knowledge could save your life! Share this knowledge with family and friends. It could save their lives!

- 1 Not all earthquakes cause tsunamis. Only those that occur under the ocean floor can cause a tsunami.
- 2 No tsunami is ever silent. One day in the 1990s, a strong earthquake had been felt.
- 3 Tsunamis are sometimes produced by a landslide that slides off a mountain into the ocean.
- 4 A tsunami is not a single wave, but a series of waves carrying a massive amount of water back and forth. The first wave may not be the largest.
- 5 Small tsunamis can cause damage on the shore.
- 6/7 Remember: In the public, most are silent. If you are at a beach, you may see people running away from the water.
- 8 When you hear the news, you can see the waves. When you can see the waves, you can see the people running away from the water.
- 9 If you are in a coastal area, be prepared and aware of the natural warning signs.
- 10 Sharing is the name of the game. Share this knowledge with your family and friends. It could save their lives.




A tsunami is a series of **enormous** waves created by an underwater disturbance usually associated to earthquakes occurring below or near the ocean. A tsunami propagation velocity is reduced in shallow water while the height of its waves rapidly increases. On the coastline the speed of tsunami waves is like a running horse.










THE HAPPY END

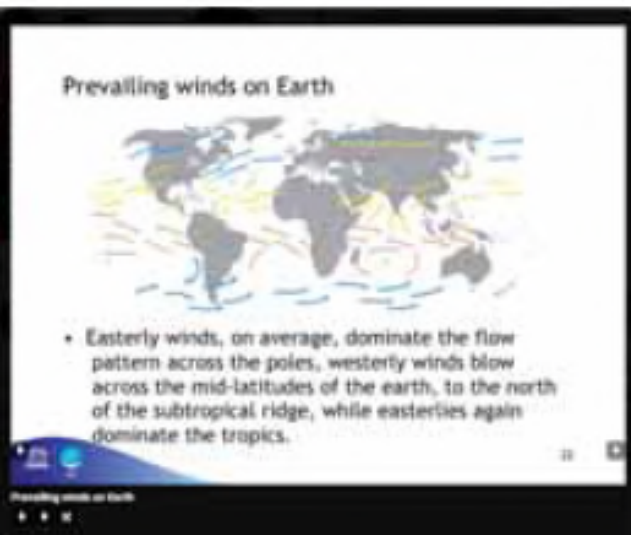
Although the tsunami that hit the Pacific and Indian Ocean, tsunamis can hit the Mediterranean and North Sea. Always coastal areas.

Make tsunamis happen for a second in the Pacific, Indian Ocean, and Mediterranean Sea.

Even recently a tsunami has been reported in 2002 near the Turkish coast. It was a small tsunami.

NEAMTIC Educational Products

Online course on tsunami and other sea-level related hazards (for middle school students)



Video on tsunami risk in the NEAM region and on NEAMTWS (for the general public)



This short video of 5 minutes is thought to inform the general public tsunami risk in the NEAM region, and about the NEAMTWS.

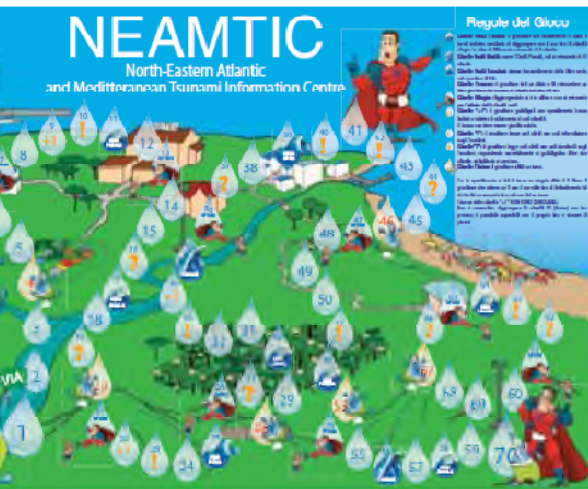
It also contains information about tsunami generation and tsunami characteristics as well as information about tsunamis happened in the NEAM region in the past.

Guidelines and poster for evacuation (for hotel managers)



NEAMTIC Educational Products

Interactive educational
game (for elementary school)



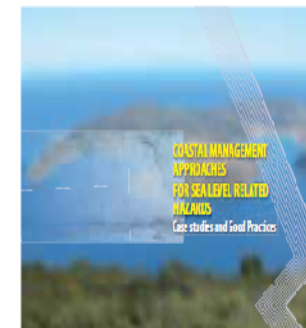
Identification and exchange
of good practices



Courtesy of Presidenza del Consiglio dei Ministri - Dipartimento della Protezione Civile

The aim of this activity was to provide civil protection authorities, coastal managers and planners with reference materials on preparedness for tsunamis and other coastal inundation, as a platform to strengthen cooperation and coordination.

Case studies and good practices for coastal management approaches for sea level related hazards



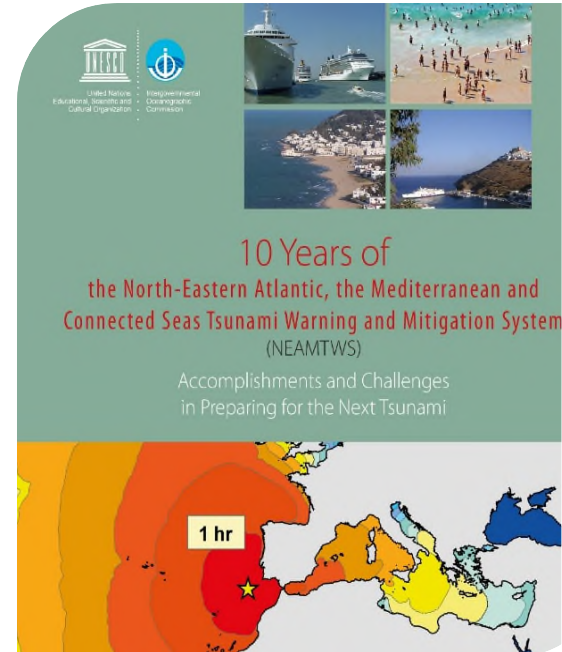
Coastal Management Approaches for Sea Level
Related Hazards
Case Studies and Good Practices

zones relies upon effective management of the risk of inundation both now and in the context of increasing impacts of climate change. Improving risk management and mitigation by providing the tools to better inform planning policy is now a consensus view in light of the disastrous impacts on already pressurized coastal zones. The concept of risk management embodies prevention, preparedness, mitigation, and recovery. The report provides case studies and good practices, highlighting innovative elements, approaches, etc., that could be replicated in similar conditions, or to inform the development of more appropriate policies. The report aims to stimulate new ideas and further action for main coastal hazard preparedness and response in ICAM, in the hope of reducing coastal risks in the future. The report is available in Italian, English, and Spanish.

Challenges and Opportunities

Response capability

- Education and preparedness is a fundamental challenge to be addressed in the NEAM region.
- Challenges in Preparing for the Next Tsunami depends on Education and Awareness in NEAM region (IOC/UNESCO 2017)



Challenges and Opportunities (Con't)

- NEAMTWS Strategic Roadmap is composed of 7 phases (building blocks), as described below.
- **Phase 7** focuses on the sustainability and improvements in the downstream components

| NEAMTWS Strategic Phases | Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 | Phase 6 | Phase 7 |
|---|---------|---------|---------|---------|---------|---------|---------|
| <i>Implementation</i> | | | | | | | |
| <i>Development</i> | | | | | | | |
| <i>Testing</i> | | | | | | | |
| <i>Validation</i> | | | | | | | |
| <i>Accreditation</i> | | | | | | | |
| <i>Performance Monitoring of NEAMTWS Upstream Components</i> | | | | | | | |
| <i>Sustainability and Improvements in the Downstream Components</i> | | | | | | | |

Challenges and Opportunities

NEAMTWS Sustainability

- The sustainability of the NEAMTWS strongly depends how it is successfully rooted within the communities at risk, and the level of participation of all Member States, relevant actors and stakeholders in the region.

• But How?

- Reducing Risk and Building Resilience through Community Preparedness:

• Tsunami Ready Programme?

- Recommendation from TOWS-X, Paris, March 2017. Encourage regional TEWS to pilot Tsunami Ready guideline

TsunamiReady, Tsunami Ready

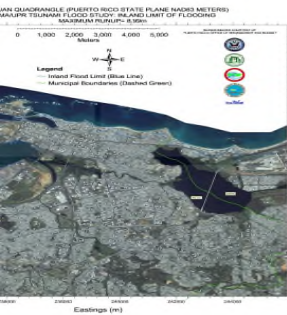


- **US ‘ TsunamiReady® ’** *(2001, US NWS, NTHMP)*
 - Guidelines for standard level of capability to **mitigate**, **prepare for**, and **respond to** tsunamis.
 - Promote community preparedness – minimize risk through better risk assessment, planning, education, warning communications
 - 16 states, territories, 195 recognized Communities *(29 Mar 2016)*. Local, tribal govt, or facility with authority to implement
- **Intl ‘ Tsunami Ready ’** *(UNESCO IOC TOWS–IX, Feb 2016)*
 - Modelled after US TsunamiReady
 - Tsunami Ready Programme Guidelines (community performance-based recognition) available for use / adaption by other ICG regions (e.g., Pacific) *(adopted by ICG/CARIBE-EWS-X, May 2015)*
 - ICG/IOTEWS
 - Agenda item for discussion at next ICG/NEAMTWS, Lisbon, Portugal, 21-23 Nov 2017

Performance-based Tsunami Community Recognition Programs



International Tsunami Ready (I-TR)



MITIGATION

- **MIT-1** Have designated mapped tsunami hazard zones
- **MIT-2** Have a public display of tsunami information



RESPONSE

- **REP-1** Address tsunami hazards in the community operations plan
- **REP-2** Commit to supporting the Emergency Operations Center if activated
- **REP-3** Have a redundant and reliable means of 24-hour warning point to receive/ disseminate tsunami warning threats

PREPAREDNESS

- **PREP-1** Produce easily understood tsunami evacuation maps determined to be appropriate by local authorities in collaboration with communities
- **PREP-2** Develop & distribute outreach & public education
- **PREP-3** Hold at least three outreach or educational activities annually
- **PREP-4** Conduct annual community exercises





End

Tsunamis are rare, but are high consequence and impact hazards

Education

The probability/chance/likelihood of a tsunami wave exceeding 1 m somewhere in the Mediterranean in the next 30 years is close to 100 % (IOC, UNESCO 2017, p22)

TO BE UPDATED (TSUMAP-NEAM Project)