

## ICG/NEAMTWS working group 4

### “Public Awareness, Preparedness and Mitigation”: 2021 activity report

This document describes the activities in 2021 by Working Group 4 “Public Awareness, Preparedness and Mitigation” in the NEAM region with respect to the objectives outlined in the WG4 plan of action for 2021 (Appendix I).

According to what had been agreed at the online session of ICG/NEAMTWS Working Groups and Task Teams (24–26 November 2020) and according to [the IOC Circular Letter No2821](#) , a dedicated Group on Community Tsunami Ready (TR) was formed within WG4. The activities of the Group will be also included in this report, according to the WG4 plan of action for 2021.

**OBJECTIVE: Promote community preparedness and initiatives at national level and in the framework of international projects, fostering synergies whenever possible and appropriate.**

#### ACTIVITIES PERFORMED:

##### Tsunami Ready

Interaction with the Tsunami Ready (TR) Group, which has been formed within WG4. In this context:

- Two online meetings have taken place. A summary report of these meetings can be found in Appendix II.
- The first meeting was held on 6th April 2021 (25 attendees). The objectives of the meeting were:
  - To introduce the team members
  - To make an overview in TR implementation or TR “elements” in NEAM region
  - To define the role of the team
  - To plan the actions for 2021
- Following the discussions during the first TR Group online meeting, **a first draft of a Terms of Reference and a draft plan of actions** were compiled and were shared with the members of the Group in a Google Doc (email sent on 26<sup>th</sup> May 2021). The members of the Group contributed to this document and provided their feedback.
- The second meeting was held on 30<sup>th</sup> June 2021 (21 attendees) and the main objective of the meeting was to discuss the draft Terms of Reference for the Group and the plan of action.
- A proposal Terms of Reference for the Tsunami Ready Group (Appendix III) plan has been drafted after the discussions.
- A proposal regarding membership of the TR group was sent to the Steering Committee on 6<sup>th</sup> May by email and the Tsunami Ready Group members list was finalized after the SC approval.
- An email was sent to TR Group members on 9<sup>th</sup> November asking for a brief outline of TR activities in the NEAM region. A report including these activities was compiled, according to these inputs. In addition, the updates regarding TR developments in each country, as provided during the 2<sup>nd</sup> TR Group online meeting, were included. (Appendix IV).

**OBJECTIVE:**

**Encourage and support the development of the downstream (Preparedness and Response) component of the ICG/NEAMTWS programme.**

**ACTIVITIES PERFORMED:**

Perform an assessment of the legal implications of piloting Tsunami Ready-like initiatives in some test Countries of the NEAM region.

-Study on the impact of TR guidelines on the responsibilities of scientists, public administrators and civil protection. (ongoing)

-Study on the responsibilities of the members of the local and the national TR board as well as the evaluation of the role of UNESCO in the recognition of a municipality as TR (ongoing).

**OBJECTIVE:**

**Information and experience exchange regarding tsunami risk and disaster management within NEAM region.**

**ACTIVITIES PERFORMED:**

An email was sent to the TSPs on 15th June asking for their contribution to keeping the NEAMTIC website updated and to enriching its content with reference to tsunami events, recurrence of past tsunamis, exercises carried out, scientific publications, conferences or seminars organised.

**OBJECTIVE:**

**Enhancing interdisciplinarity in tsunami risk and disaster management.**

**ACTIVITIES PERFORMED:**

A research by social scientists regarding threat levels (by Andrea Cerase) is ongoing. The road map of the research will be presented at the ICG.

**OBJECTIVE: Represent WG4 in ICG/NEAMTWS and in INTER-ICG TOWS TASK TEAM on DMP (Disaster Management and Preparedness).**

**ACTIVITIES PERFORMED:**

WG4 was represented at the meeting of the inter-ICG Task Team on “Disaster management and preparedness”, 22-23 February 2021, by Cecilia Valbonesi (Italy) and Amir Yahav (Israel), nominated representatives of the ICG/NEAMTWS region in the task team. The meeting’s report was shared with the WG4 members.

WG4 plan of action for 2021 was shared with the NEAMTWS members during the Steering Committee meeting, in April 2021.

## APPENDIX I

### Working Group 4 : Public Awareness, Preparedness and Mitigation-Draft Plan of Action for the period December 2020 – November 2021

Co-chairs: **Cecilia Valbonesi** (University of Florence, Italy) & **Areti Plessa** (Civil Protection Directorate, Region of Attica, Greece)

Strategic Area	Objectives	Activity	Target / Result Indicators	Time Frame	Responsible Per/ Inst
Working Group 4: Public Awareness, Preparedness and Mitigation	Promote community preparedness and initiatives at national level and in the framework of international projects, fostering synergies whenever possible and appropriate	Interact with the TR group, which has been formed within WG4 and foster its activities.	<ul style="list-style-type: none"> <li>-Online meetings of the TR group (at least 3)</li> <li>- Report to the ICG on the activities of TR Team among them a draft of ToR.</li> <li>-Webinar to enhance the development of TR in NEAM region and gain experience by interacting with experts from other ICGs, who will be invited.</li> </ul>	-All intersessional period	Cecilia Valbonesi/Areti Plessa / TR group/Secretariat
		Put forward the issue of membership regarding TR group	-Official list of active TR group members	-Until June 2021	Secretariat with the support of WG4 co-chairs
		Monitoring of TR pilot projects in NEAM area and sharing with WG4 members	-Report to ICG on TR initiative	-All intersessional period	Cecilia Valbonesi/Areti Plessa / TR Team

Strategic Area	Objectives	Activity	Target / Result Indicators	Time Frame	Responsible Per/ Inst
	Encourage and support the development of the downstream (Preparedness and Response) component of the ICG/NEAMTWS programme	Perform an assessment of the legal implications of piloting Tsunami Ready-like initiatives in some test Countries of the NEAM region	-Study on the impact of TR guidelines on the responsibilities of scientists, public administrators and civil protection.  -Study on the responsibilities of the members of the local and the national TR board as well as the evaluation of the role of UNESCO in the recognition of a municipality as TR.	-All intersessional period	Cecilia Valbonesi
	Information and experience exchange regarding tsunami risk and disaster management within NEAM region	Attempt to collaborate with the TSPs to obtain inputs (e.g. reports) in order to contribute to keeping the NEAMTIC website updated and to enriching its content	Contacts with all TSPs	-All intersessional period	Cecilia Valbonesi/Areti Plessa with the support of the Secretariat
	Enhancing interdisciplinarity in tsunami risk and disaster management	To explore contributions and views of social scientists on tsunami threat levels.	- A first step analysis (short report) that will focus on the review of research literature and operational reports to	-All intersessional period	Andrea Cerase (University of Rome "La Sapienza") and

Strategic Area	Objectives	Activity	Target / Result Indicators	Time Frame	Responsible Per/ Inst
			address strength, weakness, opportunities and threats of threat level based EWS systems within the NEAMTWS context, as a base for further empirical research.		Lorenzo Cugliari (INGV)
	Represent WG4 in ICG/NEAMTWS and in INTER-ICG TOWS TASK TEAM on DMP (Disaster Management and Preparedness)	<ul style="list-style-type: none"> <li>-Represent WG4 at the online meeting of the inter-ICG Task Team on “Disaster management and preparedness”, February 2021</li> <li>-Share the WG4 plan of action for 2021 with the NEAMTWS members during the Steering Committee meeting April 2021</li> <li>-Report progress to Steering Committee and to ICG</li> </ul>	<ul style="list-style-type: none"> <li>-Report to the ICG</li> <li>-Participation to the SC meeting/WG4 presentation</li> <li>-Draft PoA for WG4</li> </ul>	-All intersessional period	Cecilia Valbonesi/Areti Plessa
	Cooperation with other Working Groups and Task Teams as needed and requested	Support when needed and provide feedbacks	Participation to online meetings, input/provide feedbacks to reference documents upon request	-All intersessional period	Cecilia Valbonesi/Areti Plessa

## Appendix II

### 1<sup>st</sup> Tsunami Ready (TR) Team meeting (Online)

6<sup>th</sup> April 2021-11-12:30 (CET)

## Attendees

	Name	Organization	Country	Membership
1	Amato Alessandro	National Institute of Geophysics and Volcanology-INGV	Italy	Nominated Expert
2	Brax Marleine	National Centre for Geophysical Research	Lebanon	Nominated Expert
3	Cambaz Didem	Bogazici University Kandilli Observatory and Earthquake Research Institute	Turkey	Steering Committee
4	Chang Seng Denis	IOC Secretariat		
5	Crochet Emilie	Ministry of interior	France	WG member
6	Cugliari Lorenzo	National Institute of Geophysics and Volcanology - INGV.	Italy	Nominated Expert
7	Dandoulaki Miranda	Senior Engineer, Independent Civil Protection Directorate, Region of Attica	Greece	Nominated Expert
8	Daskalaki Elena	Scientific Staff, Institute of Geodynamics, National Observatory of Athens	Greece	Nominated Expert
9	Di Manna Pio	Italian Institute for Environmental Protection and Research, ISPRA	Italy	Nominated Expert
10	Ghika Faidra	Scientific Staff, Institute of Geodynamics, National Observatory of Athens	Greece	Nominated Expert
11	González Mauricio	University of Cantabria, Spain	Spain	Steering Committee
12	Graziani Laura	National Institute of Geophysics and Volcanology-INGV.	Italy	Nominated Expert
13	Kalligeris Nikos	Tsunami National Contact, Operational head of the Hellenic National Tsunami Warning Center ,Institute of Geodynamics, National Observatory of Athens	Greece	Steering Committee
14	Ktenidou Olga-Joan	Researcher, Institute of Geodynamics, National Observatory of Athens	Greece	Nominated Expert

	Name	Organization	Country	Membership
15	Necmioglu Öcal	Assistant Manager (Tsunami), Regional Earthquake and Tsunami Monitoring Center, Kandilli Observatory and Earthquake Research Institute	Turkey	Nominated Expert
16	Paniccia Chiara	Italian Civil Protection Department	Italy	Nominated Expert
17	Papageorgiou Antonia	Scientific Staff, Institute of Geodynamics, National Observatory of Athens	Greece	Nominated Expert
18	Péroche Mathieu	maître de conférences en géographie à l'université de Montpellier 3 en France	France	Nominated Expert
19	Plessa Areti	Civil Protection Directorate, Region of Attica	Greece	WG4 co-chair
20	Rojas Alejandro	IOC Secretariat		
21	Romano Fabrizio	National Institute of Geophysics and Volcanology-INGV.	Italy	Nominated Expert
22	Scalzo Antonella	Italian Civil Protection Department	Italy	Nominated Expert
23	Schmid Fiona	IOC Secretariat		
24	Valbonesi Cecilia	University of Florence	Italy	WG4 co-chair
25	Yahav Amir	Director of Israel's National Steering Committee for Earthquake Preparedness, NEMA	Israel	Nominated Expert

## Objective of the meeting

- To introduce the team members
- To make an overview in TR implementation or TR “elements” in NEAM region
- To define the role of the team
- To plan the actions for 2021

## Summary of the presentations and discussion

### Current status in TR implementation or TR “elements” in NEAM region

**France** (Mathieu Péroche): The city of Cannes is a pilot city for TR and is the most advanced city in France in terms of tsunami risk prevention.

**Greece** (Nikos Kaliggeris): The seven member national TR team, which is also part of the UNESCO TR team aims to promote and set the foundation of the TR program implementation in Greece. TR elements have been achieved in some locations in Greece. For example, in the city of Kos where the Tsunami Last Mile project has been implemented, the estimation of a tsunami hazard zone and an evacuation map have been developed. The Tsunami last Mile included also tsunami awareness activities and a tsunami exercise. There are also other locations in Greece, where tsunami hazard maps have been developed due to research projects. Evacuation map has been developed also for Plomari (Lesvos Island). There is an ongoing process for defining suitable candidate locations for the TR implementation and webinars will be organized in the near future to inform national and local civil protection agencies.

**Israel** (Amir Yahav): Two international exercises have already been conducted with the TSPs. Tsunami signage has been implemented to coastal cities in Israel (to be finalized). A mapping project is about to start regarding signage and signs will be used as focal points for talking to the public.

**Italy** (Alessandro Amato): The Italian TR Group consists of 6 persons (DPC, INGV and ISPRA). Italy started with 3 pilot municipalities in 3 different regions of Italy:

**1) Minturno (Latium, Tyrrhenian Sea)**

Started in spring 2020 - Resolution by Municipality (2020) - Local Board deliberated (March 6, 2021)- Several of the 12 indicators are completed. Minturno municipality has rolled out some field activity during NEAMWAVE 21 (vertical evacuation in a school) a video is also available (in Italian).

Composition of the Local Board (involves all the community): Mayor/Representatives from Disaster risk management, local responsible CP and Volunteers, health assistance, harbour and local police, association for the beaches, association for the hotels, commercial, camping)

**2) Palmi (Calabria, Tyrrhenian Sea)**

Started in Fall 2020 - Resolution by Municipality (December 30, 2020) - Local Board approval ongoing - many of the 12 indicators completed

**3) Marzamemi/Pachino (Sicily, Ionian Sea)**

Started end 2020- Resolution by Municipality & Local Board approval pending

*Key issues:*

- Importance of continuous dialogue between authorities and experts
- Importance of bureaucracy part (all levels from National to Local)
- Involvement of all the components of the local society
- Creation of specific web pages on CAT-INGV website
- Survey on tsunami risk perception of local authorities (presentation by Lorenzo Cugliari). The survey was conducted by telephone in 9 regions (including the TR pilot sites). The data analysis under preparation.
- Thinking of a “template” for other communities
- Importance of international exchange
- National Board Nomination soon available (nomination by DPC-NTC)

**Lebanon** (Marleine Brax): Interested to learn about TR

**Spain** (Mauricio Gonzalez Rodriguez): Chipiona city is a test site for the TR initiative. At the moment there is a complication and political clearances are needed. Evacuation maps and the emergency plan are under preparation and posters for local public awareness have been developed to provide information to the local community.



**Turkey** (Öcal Necmioglu): The Last Mile project that was implemented in Bodrum contributed to the development of some TR indicators/ TR “elements” (preparation of high resolution tsunami inundation and evacuation maps, awareness and preparation activities, such as seminars and workshops, a tsunami exercise in Bodrum). Hence, Bodrum has a great potential to be identified as a possible Tsunami Ready location in Turkey and is given a priority. In addition, progress has been made in Istanbul (tsunami modelling, vulnerability and hazard analysis), where the Marmara coasts can be considered as potential Tsunami Ready communities in the near future.

**IOC Secretariat** (Denis Chang Seng): There is no one single pathway to TR. For example: 1) Building on existing experience, such as the experience of the Tsunami Last Mile Project or other experience (e.g preparedness activities) 2) The Tsunami Evacuation Map Plans and procedures (TEMPP<sup>1</sup>) of IOC/UNESCO, common in other ICGs 3) Direct to TR implementation without a previous experience.

At the TOWS final meeting in February it was recommended that the Draft 10-year Research, Development and implementation plan for the UN Decade Tsunami program contribute to achieving the societal outcome of a Safe Ocean with the aim of making 100% of communities at risk of tsunami prepared for and resilient to tsunamis by 2030 through the implementation of the UNESCO/IOC Tsunami Ready Programme and other initiatives.

### **Role of the Team**

WG4 co-chairs stressed the need to define the role of the team and provided some initial reflections. The team:

- Will encourage Member states (MS) to initiate Tsunami Ready (TR).
- Will advise on the procedures to achieve a TR recognition.
- Will guide local and national authorities in nominating the local board and the national board.
- Will review existing practices in TR implementation and promote best practices among (MS).
- Will coordinate the discussion and dissemination of the most relevant issues that may emerge from the new version of the TR Guidelines
- Will set the standards according to the TR Guidelines.
- Will draft the Terms of Reference (ToR) for the team.
- Will continuously relate with WG4 for the coordination of the different national realities and for the search of common solutions.
- Will encourage the involvement of more Countries in the team.

Marlene Brax expressed a question if a country that has not any experience yet regarding TR implementation has a role in this team. It was agreed that the team will support Members States that have no experience and that experience will be exchanged in order to learn from each other.

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<sup>1</sup> [http://itic.ioc-unesco.org/index.php?option=com\\_content&view=category&layout=blog&id=2166&Itemid=2640](http://itic.ioc-unesco.org/index.php?option=com_content&view=category&layout=blog&id=2166&Itemid=2640)

Öcal Necmioglu expressed the need to clarify at this initial stage if the TR implementation at the NEAMTWS aims to be a capacity building/development program or a capacity recognition program.

### **Actions for 2021**

WG4 co-chairs suggested to organize a webinar with the support of the Secretariat , inviting experts from other ICGs to share their experience with us. <sup>2</sup>

WG4 co-chairs suggested to develop a first legal study on the impact of TR guidelines on the responsibilities of scientists, public administrators and civil protection and a second legal study on the responsibilities of the members of the local and the national TR board as well as the evaluation of the role of UNESCO in the recognition of a municipality as TR.

Öcal Necmioglu asked if a similar study has already been developed in other Countries and suggests to not go too deep in specific issues. The goal could be preparing operative guidelines that can be shared in all Countries.

Miranda Dandoulaki emphasized on the need to build bridges with all stakeholders, especially in public administration at this initial stage.

### **Next steps**

WG4 co-chairs will share a Google Doc with suggestions for the Terms of Reference and for the actions that can be planned in this year according to what has been discussed during the meeting.

The next meeting was scheduled for June 2021.

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<sup>2</sup> Useful indications can also be obtained by the IOC-ICG series of lectures that were held between in 2020 and are available at <https://iopic.ioc-unesco.org/news/online-lecture-series-on-ioc-unesco-tsunami-ready-for-indian-ocean/>

**TSUNAMI READY SECOND MEETING (ONLINE)**  
**30 JUNE 2021 11:00-12:30 (CET)**

**Participants**

	<b>Name</b>	<b>Organization</b>	<b>Country</b>
1	Aguirre Ayerbe Ignacio	Environmental Hydraulics Institute	Spain
2	Amato Alessandro	National Institute of Geophysics and Volcanology-INGV	Italy
3	Brax Marleine	National Centre for Geophysical Research	Lebanon
4	Cambaz Didem	Bogazici University Kandilli Observatory and Earthquake Research Institute	Turkey
5	Chang Seng Denis	IOC Secretariat	
6	Charalampakis Marinos	Scientific Staff, Institute of Geodynamics, National Observatory of Athens	Greece
7	Cugliari Lorenzo	National Institute of Geophysics and Volcanology - INGV.	Italy
8	Dandoulaki Miranda	Senior Engineer, Independent Civil Protection Directorate, Region of Attica	Greece
9	Daskalaki Elena	Scientific Staff, Institute of Geodynamics, National Observatory of Athens	Greece
10	González Mauricio	University of Cantabria, Spain	Spain
11	Graziani Laura	National Institute of Geophysics and Volcanology-INGV.	Italy
12	Kalligeris Nikos	Tsunami National Contact, Operational head of the Hellenic National Tsunami Warning Center, Institute of Geodynamics, National Observatory of Athens	Greece
13	Macias Jorge	Facultad de Ciencias-Universidad de Malaga	Spain
14	Necmioglu Öcal	Assistant Manager (Tsunami), Regional Earthquake and Tsunami Monitoring Center, Kandilli Observatory and Earthquake Research Institute	Turkey
15	Paniccia Chiara	Italian Civil Protection Department	Italy
16	Papageorgiou Antonia	Scientific Staff, Institute of Geodynamics, National Observatory of Athens	Greece
17	Péroche Mathieu	maître de conférences en géographie à l'université de Montpellier 3 en France	France
18	Plessa Areti	Civil Protection Directorate, Region of Attica	Greece
19	Rojas Alejandro	IOC Secretariat	
20	Valbonesi Cecilia	University of Florence	Italy
21	Yahav Amir	Director of Israel's National Steering Committee for Earthquake Preparedness, NEMA	Israel

## **INTRODUCTION**

The Secretariat informed the Group about the IOC Assembly 31 Session, 14-25 June 2021, which has approved:

- The establishment of the Ocean Decade Tsunami Programme and a Scientific Committee to prepare the draft 10 year Research, Development and Implementation Plan with the aim of making 100% of communities at risk prepared and resilient to tsunamis by 2030. TOWS-WG will act as the Steering Committee for the Ocean Decade Tsunami Programme
- Establishment of a special coalition for TR with participation of critical stakeholders

## **UPDATES ON TSUNAMI READY IMPLEMENTATION IN NEAM REGION**

- Greece: Nikos Kalligeris laid out the plan of Greece for the implementation of the TR program at a national level. The plan includes i) examining the integration of the TR guidelines in the regional and national SOPs, as well as examining the legal framework in general, ii) working on the establishment of the National Tsunami Ready Board/Committee; the Board will not only have the mandate to recognize communities as TR, but also to approve elements of the TR program, such as the production of tsunami hazard and evacuation maps, iii) launching a campaign to inform national, regional and local CPAs and administrations on the TR program; in that front, a TR flyer of NOAA has already been translated in Greek and adapted to the NEAM region by the Greek members of the TR subgroup. It was also proposed to make a NEAM-specific TR flyer that would be translated to all the languages of the Member States and be uploaded on the NEAMTIC website.
- France: Matthieu Péroche, presented progress in the elaboration of evacuation maps in the French coast and expressed his interest in sharing the hypotheses and methodologies of making these maps within the Tsunami Ready Group as a way to stimulate collaboration and knowledge dissemination among NEAM member states.
- Turkey (Öcal Necmioglu): Currently focusing on the interaction with the Istanbul municipality. An example of a municipality action plan was presented for one district of Istanbul metropolitan municipality demonstrating the inundation danger zones and a detailed report including an evacuation analysis and associated risk analysis. The work was provided by a deep interaction with the Middle East Technical University. The report was published in 2020 and implied the installation of tsunami signs, the development of local tsunami warning system that would be applicable for the whole Marmara Region, exercises and various other elements already included in Tsunami Ready guidelines. Öcal Necmioglu underlined that they don't have concrete results yet but the work is in progress and hopefully a Memorandum of Understanding will be signed with the Istanbul metropolitan municipality by the end of this summer.
- Portugal (Luis Matias): In Portugal initiatives that promote a bottom up approach are being developed. There is not a specific update for the moment and more details will be illustrated in the next meeting.

- Spain (Mauricio González): An important meeting with the Andalusian community has been organized. The emergency plan for the Andalusian coast, included in the national directive for Tsunami is under development. Different aspects regarding the warning and emergency plans are included. The local government is preparing a public information space, some posters and different information for the public about tsunami risk.
- Lebanon (Marleine Brax): The work was focused on the relationship between the geophysics national centre (tsunami focal point in Lebanon), and the civil defence. In particular, the general director of the civil defence was contacted and a direct link between the operations department in the civil defence and the national centre for geophysics was established. In the future they will establish a monthly exercise, such as transferring messages between the geophysical centre and the civil defence. As a first step they decided to work on the type and the contents of the message. It was agreed that training programs will be conducted for the people involved in the civil defence, which relies mainly on volunteers.
- Israel (Amir Yahav): The tsunami signage implementation has been completed in all coastal local authorities so this project will be finished within two months. A new project has started and specific technology is investigated to provide to the public, the information needed according to their location, in case of tsunami alert. Two main technologies are possible: 1) use of the signage already in place. The public will have scan a sign mainly in the assembly zones to get the emergency information they need. 2) pushing the information specific to users' cell phones according to their location (more problematic).
- Italy (Alessandro Amato): The slide prepared for the last EGU in April 2021, in which the location of the three municipalities with which they work on South of Italy was presented, together with some details of the ongoing work. As already told in the April meeting, the summary information on the CAT (Tsunami Alert Center) website was completed. There is a specific tab on Tsunami Ready in Italian and in English. In the home page some of the news is shown, including the more recent Tsunami Ready initiatives. On the other hand, the Civil Protection Head, Fabrizio Curcio, established the national Tsunami Ready board which is composed by Alessandro Amato, Luigi D' Angelo, and Maurizio Ferla. Italy received the pleasure of the letter from the executive secretary of IOC, V.Ryabinin, with compliments and a significant support for initiative of the national tsunami board. In the end of May 2021, the community of Minturno had some meetings between the local authorities, the port authorities and the representatives of the beach facilities in the area. A point which was raised is that the TR path seems to imply the observance of a general framework of administrative rules (e.g., escape routes for each restaurant or beach facility and so on). But although TR implies this observance, these rules belong to two different ranks and must be considered separately because it is difficult to have every single shop, hotel, restaurant etc. with the whole safety procedure well in place. The second TR pilot community, Palmi, located in Calabria, in May 2021 the 10<sup>th</sup>, established the local board which again is composed by different authorities, local associations, coastal guard, local police, civil protection volunteers, and so on. They are working to reach the goal for every of the 12 indicators. The last municipality, Marzamemi (actually a fraction of the municipality of Pachino in southeastern Sicily), is a little bit behind because there is not the mayor but an extraordinary Commission. However, in the end of April 2021, the local council approved the tsunami ready activity and so they

have established their official participation. In July 1st a meeting will be held with all the local components because there will be a tsunami drill in September related to project SIMIT-THARSY (between Sicily and Malta with INGV as a scientific partner).

- Öcal Necmioglu added some points following up on Israel's presentation on novel technologies, specifying that in their interaction with Istanbul metropolitan municipality they investigated the possibility of a mobile phone application. There is already a mobile phone application that is designed for earthquakes that allows the individual person to identify the quickest path to the assembly zone. An attempt to reframe the conception of the assembly zone, to the tsunami safe zone is ongoing. The mobile phone application will guide the person to a safe zone at the time of the alerting. It seems to be a good idea; however the way it will practically be used in the field during an actual event is a challenge, especially considering that a certain group of population might have that knowledge and access to the available tool, while certain groups of the population may not have access to that tool.

#### **WEBINAR ON TR IMPLEMENTATION**

- The Group welcomed a webinar on Tsunami Ready to benefit from other ICGs experience and from the development achieved from Italy. It was highlighted that it is previously necessary to define the target audience of the webinar and the possibility to provide a direct translation in order to reach as many communities as possible in the NEAM region.
- The Secretariat welcomed the idea and suggested to explore the possibility of using direct translation, which has already been used in the Caribbean. It was also decided to invite Ardito Kodija and Christa G. von Hillebrandt-Andrade (Manager of the Caribbean Tsunami Warning Program) for their expertise in the field, to join a TR meeting.
- The Secretariat informed the Group that IOC is planning training on Tsunami Preparedness and Tsunami Ready in the third quarter of 2021. The training is organized by the Tsunami Unit, IOTIC and the OTGA.
- The webinar will align to the WTAD/ Ocean Decade Safe Ocean events.

#### **TERMS OF REFERENCE OF TSUNAMI READY GROUP**

- Discussion focused on comments provided by the TR Group members related to the draft Terms of Reference of the TR Group, which will be further discussed and approved at the next ICG.
- Regarding a possible development and revision of the TR Guidelines for the NEAM region, the Secretariat informed the Group that the TR Guidelines are in a final phase of developing and highlighted that there is a very strict necessity of harmonization between ICGs.
- The possibility of opening the development of other smaller scale Tsunami Ready initiatives such as the possibility and the opportunity to recognize hotels as TR has been discussed. Secretariat suggested considering the possibility of dividing the TR project in different goals. Even if it is important not to close to any opportunity, it is necessary to reflect that the recognition of a single component of the programme does not imply the achievement of the programme itself. Possibly, this approach can be considered as a contribution to tsunami preparedness.
- The Secretariat pointed out the possible contribution to the discussion that could be provided by the DG ECHO project which is going to reach the green light.
- About the legal issues it was decided to move the goals indicated in another document such as the "Action Plan" and all the proposals made by Öcal Necmioglu have been

welcomed. So Cecilia Valbonesi (co-chair of WG4) will make modifications to the document.

- In particular, the concept of guidelines will be replaced with “standards” or “good practice”. Especially “good practises” could be a linguistic solution to clarify that we are talking about some procedures which are the result of the Group's reflections on overcoming the critical issues encountered in the application phase of the program.
- In addition, it is important to clarify what is meant by *standard*, such as provide inundation maps, provide model of interaction between local and national board or giving technical support in addition. Öcal Necmioglu suggested reflecting accurately on these standards because flexibility does not work very well when we refer to them and it is necessary to reflect about the terminology used in this document.
- Mr. Alessandro Amato suggested differentiating between general standards as the main concepts of tsunami ready and a second level, more specific, which can be adopted with more flexibility.

#### **FIRST DISCUSSION ON A POTENTIAL APPEARANCE OF TR ACTIVITIES IN NEAMTIC PLATFORM AND SOCIAL MEDIA**

- The topic was about the possibility of sharing in platform the TR initiative and maybe activities. The Secretariat has the quality to control all issues and the social media activity must go through it.
- Lorenzo Cugliari reminded to the Group that the communication activity using the social media is essential and can reach the segments of the population that are more difficult to reach. Tsunami alert centre in Italy started communicating through the site but also with the blog and they can give and support for sharing the news, updates photograph or video material. Italy remained available to share the updates or the proposal with the other members. The official social channel created by NEAMTIC certainly needs a lot of work to reach the population but everyone can contribute and share the most important news.
- Alessandro Amato added that NEAM need an interaction between classic website and social media, as Twitter, also creating/improving interactions with those managed by the TSPs and other institutional communication platforms. The message could be in Italian, in English or in French and English or Spanish or Greek and so we can reach a lot of more people.
- Denis Chang Seng said that he just received an email from Bernardo Aliaga who asked the Secretariat to create a common list for all the TICs to improve information exchange between different ICG TICs.

#### **ACTION PLAN FOR 2021 - WRAP UP-NEXT MEETING-CLOSING**

Finally, summarising the actions for 2021:

- a. The participation of TR Group in defining the most critical points of the TR guidelines.
- b. To finalize the draft ToR and the plan of action, to be further discussed and approved at the next ICG.
- c. To manage the agenda for TSP contribution in defining the points that we have discussed.
- d. To plan the webinar.

The next meeting will be scheduled for the end of October, ahead to WTAD.

## **Appendix III**

### **Terms of Reference of the ICG/NEAMTWS Group on Tsunami Ready**

#### **Mandate**

The Tsunami Ready Team will:

1. Promote the Tsunami Ready initiative in the NEAM region and encourage Member States to initiate the program.
2. Coordinate and foster cooperation among NEAM countries and other regions worldwide with Tsunami Ready programmes in place, to exchange knowledge, experiences and best practices.
3. Provide advice on the procedures to achieve a Tsunami Ready recognition.
4. Adapt the standards according to the Tsunami Ready guidelines.

#### **Modus operandi**

The Tsunami Ready Team will mainly work by correspondence. Online meetings will be scheduled as required and agreed.

#### **Membership**

- Nominated experts by Member States according to [the IOC Circular Letter No2821](#). The list of experts can be updated by Member States, if needed.
- WG4 members, after their request to join the Group and after informing their respective Tsunami National Contacts on the request.

In addition:

*-Membership can be reconsidered according to the needs during ICG sessions, in order to ensure the efficiency of the group.*

*-Steering Committee members will be invited to attend the Tsunami Ready Group meetings.*



## Appendix IV

### TSUNAMI READY ACTIVITIES AND TSUNAMI READY ELEMENTS IN THE NEAM REGION

**France** (Mathieu Péroche): The TR pilot site for France is the municipality of Cannes. Five main actions have been carried out all year long:

1. Experiments on the population alert capacities: testing of the different channels for broadcasting an alert (siren, loudspeakers, SMS/Calls) and improvement of the alert messages broadcasted to the population;
2. Finalization of evacuation plans and the online publication of an interactive map;
3. Validation of a tsunami signage with the representatives (after having presented several samples of different supports);
4. Extension of the tsunami Charter to hotel owners: it was signed on November 5th during a seminar led by the Cannes Mayor's office;
5. Exercise on November 5 (signposting of two tsunami evacuation routes, testing of messages via loudspeakers) which mobilized the Civil Security Reserve of the city of Cannes, students from the University of Montpellier 3 and passers-by.

At the national level, it is going to be created the French regional committee (with our TNC and a representative of CEA/CENALT). We hope to submit the composition to UNESCO soon, following the model of what has been done by Italy.

A funding is being requested in order to work on the prevention of tsunami risk in France according to a particular axis around the maritime domains and the specific stakes of tourist accommodations.

Other actions carried out this year :

1. Every month, the tsunami alert chain is tested by the national civil security (DGSCGC).
2. Every three months, local authorities are associated. This is an opportunity for the municipalities to work on their procedures and to think about prevention actions.
3. The standard operating procedures of the Bouches-du-Rhône department were reviewed and tested during an exercise that took place on November 4. This exercise involved the city of Marseille (2nd French city!) and industrial sites with high technological risks.

**Greece** (Nikos Kaliggeris): The seven member national TR team, which is also part of the UNESCO TR team aims to promote and set the foundation of the TR program implementation in Greece. TR elements have been achieved in some locations in Greece. For example, in the city of Kos where the Tsunami Last Mile project has been implemented, the estimation of a tsunami hazard zone and an evacuation map have been developed. The Tsunami Last Mile included also tsunami awareness activities and a tsunami exercise. There are also other locations in Greece, where tsunami hazard maps have been developed due to research projects. Evacuation map has been developed also for Plomari (Lesvos Island). There is an ongoing process for defining suitable candidate locations for the TR implementation and webinars will be organized in the near future to inform national and local civil protection agencies.

In June was presented the plan of Greece for the implementation of the TR program at a national level. The plan includes i) examining the integration of the TR guidelines in the

regional and national SOPs, as well as examining the legal framework in general, ii) working on the establishment of the National Tsunami Ready Board/Committee; the Board will not only have the mandate to recognize communities as TR, but also to approve elements of the TR program, such as the production of tsunami hazard and evacuation maps, iii) launching a campaign to inform national, regional and local CPAs and administrations on the TR program; in that front, a TR flyer of NOAA has already been translated in Greek and adapted to the NEAM region by the Greek members of the TR subgroup. It was also proposed to make a NEAM-specific TR flyer that would be translated to all the languages of the Member States and be uploaded on the NEAMTIC website.

**Israel** (Amir Yahav): Two international exercises have already been conducted with the TSPs. Tsunami signage has been implemented to coastal cities in Israel (to be finalized). A mapping project is about to start regarding signage and signs will be used as focal points for talking to the public.

In June was announced that the tsunami signage implementation has been completed in all coastal local authorities so this project will be finished within two months. A new project has started and specific technology is investigated to provide to the public, the information needed according to their location, in case of tsunami alert. Two main technologies are possible: 1) use of the signage already in place. The public will have scan a sign mainly in the assembly zones to get the emergency information they need. 2) pushing the information specific to users' cell phones according to their location (more problematic).

**Italy** (Alessandro Amato): The Italian TR Group consists of 6 persons (DPC, INGV and ISPRA). Italy started with 3 pilot municipalities in 3 different regions of Italy:

#### **4) Minturno (Latium, Tyrrhenian Sea)**

Started in spring 2020 - Resolution by Municipality (2020) - Local Board deliberated (March 6, 2021)- Several of the 12 indicators are completed. Minturno municipality has rolled out some field activity during NEAMWAVE 21 (vertical evacuation in a school) a video is also available (in Italian).

Composition of the Local Board (involves all the community): Mayor/Representatives from Disaster risk management, local responsible CP and Volunteers, health assistance, harbour and local police, association for the beaches, association for the hotels, commercial, camping)

#### **5) Palmi (Calabria, Tyrrhenian Sea)**

Started in Fall 2020 - Resolution by Municipality (December 30, 2020) - Local Board approval ongoing - many of the 12 indicators completed

#### **6) Marzamemi/Pachino (Sicily, Ionian Sea)**

Started end 2020- Resolution by Municipality & Local Board approval pending

*Key issues:*

- Importance of continuous dialogue between authorities and experts

- Importance of bureaucracy part (all levels from National to Local)
- Involvement of all the components of the local society
- Creation of specific web pages on CAT-INGV website
- Survey on tsunami risk perception of local authorities (presentation by Lorenzo Cugliari). The survey was conducted by telephone in 9 regions (including the TR pilot sites). The data analysis under preparation.
- Thinking of a “template” for other communities
- Importance of international exchange
- National Board Nomination soon available (nomination by DPC-NTC)

In June the slide prepared for the last EGU in April 2021, in which the location of the three municipalities with which they work on South of Italy was presented, together with some details of the ongoing work. As already told in the April meeting, the summary information on the CAT (Tsunami Alert Center) website was completed. There is a specific tab on Tsunami Ready in Italian and in English. In the home page some of the news is shown, including the more recent Tsunami Ready initiatives. On the other hand, the Civil Protection Head, Fabrizio Curcio, established the national Tsunami Ready board which is composed by Alessandro Amato, Luigi D’ Angelo, and Maurizio Ferla. Italy received the pleasure of the letter from the executive secretary of IOC, V.Ryabinin, with compliments and a significant support for initiative of the national tsunami board. In the end of May 2021, the community of Minturno had some meetings between the local authorities, the port authorities and the representatives of the beach facilities in the area.

A point which was raised is that the TR path seems to imply the observance of a general framework of administrative rules (e.g., escape routes for each restaurant or beach facility and so on). But although TR implies this observance, these rules belong to two different ranks and must be considered separately because it is difficult to have every single shop, hotel, restaurant etc. with the whole safety procedure well in place. The second TR pilot community, Palmi, located in Calabria, in May 2021 the 10<sup>th</sup>, established the local board which again is composed by different authorities, local associations, coastal guard, local police, civil protection volunteers, and so on. They are working to reach the goal for every of the 12 indicators.

The last municipality, Marzamemi (actually a fraction of the municipality of Pachino in southeastern Sicily), is a little bit behind because there is not the mayor but an extraordinary Commission. However, in the end of April 2021, the local council approved the tsunami ready activity and so they have established their official participation. In July 1st a meeting will be held with all the local components because there will be a tsunami drill in September related to project SIMIT-THARSY (between Sicily and Malta with INGV as a scientific partner).

In November, Italy communicated that, on November 15, 2021 Palmi approved new Regulatory Plan and Civil Protection Plan. Several of the TR 12 indicators are completed (see next slide)

**Lebanon** (Marleine Brax): The work was focused on the relationship between the geophysics national centre (tsunami focal point in Lebanon), and the civil defence. In particular, the

general director of the civil defence was contacted and a direct link between the operations department in the civil defence and the national centre for geophysics was established. In the future they will establish a monthly exercise, such as transferring messages between the geophysical centre and the civil defence. As a first step they decided to work on the type and the contents of the message. It was agreed that training programs will be conducted for the people involved in the civil defence, which relies mainly on volunteers.

**Portugal** (Luis Matias): In Portugal initiatives that promote a bottom up approach are being developed. There is not a specific update for the moment and more details will be illustrated in the next meeting.

In november, Portugal updated his activity with this news:

For Tsunami Awareness Day, 5<sup>th</sup> November 2021

ANEPC organized a webinar on “Management of Tsunami Risk: Alert, Warning and Evacuation”.

The same day ANEPC announced the publication of the “Reference Guide for Tsunami Evacuation Planning” available online in the collection of technical documents PROCIV: [http://www.prociv.pt/bk/EDICOES/CADERNOSTECNICOS/Documents/CT\\_28\\_Guia%20de%20Refer%C3%Aancia%20para%20Planeamento%20de%20Evacua%C3%A7%C3%A3o%20em%20caso%20de%20Tsunami.pdf](http://www.prociv.pt/bk/EDICOES/CADERNOSTECNICOS/Documents/CT_28_Guia%20de%20Refer%C3%Aancia%20para%20Planeamento%20de%20Evacua%C3%A7%C3%A3o%20em%20caso%20de%20Tsunami.pdf)

Many institutions (IDL, IH, UC, LNEC, IPMA, CERU) followed the recommendations of the Portuguese IOC Delegation and advertised publicly the day and distributed the tsunami leaflet on Tsunami Risk prepared in 2019 by CERU available at [http://www.ceru-europa.pt/pt/downloads/Folheto\\_Tsunami\\_v6.pdf](http://www.ceru-europa.pt/pt/downloads/Folheto_Tsunami_v6.pdf)

For NEAMWAVE’21 Exercise

ANEPC participated on all exercise phases with the objective to test the effectiveness of the information transmission procedures as defined by the Operational Directive (4105/2018) regarding the reception of the tsunami alert messages produced by the Tsunami Service Providers in the NEAM region operational at the time of the exercise. This tabletop exercise aimed to identify eventual bottlenecks in the information flow and simulated the actions on the field as a response to a real event.

ANEPC tested the procedures that consider a simultaneous notification of the information provided by IPMA to the headquarters (CNEPC) and to the Regional Commands for Relief Operations (CDOS). The information flow effectiveness between the different levels for Emergency Response was assessed until the last mile, the field operations.

The exercise was conducted by ANEPC in mode CPX (Command Post Exercise) involving all coastal districts from North to South of Portugal mainland. Several notification methods were tested, namely SMS, e-mail, fax and voice, between the National Command for Emergency and Civil Protection (CNEPC), the District Commands (CDOS), the Municipality Services for Civil Protection (SMPC), the Firefighters Brigades, the General Direction for the Maritime Authority (DGAM), the National Maritime Search and Rescue service (MRCC) and 8 entities responsible for critical infrastructures and to provide essential services.

The Regional Services for Emergency and Civil Protection from Madeira and the Azores participated for the first time on a tsunami exercise.

IPMA and CENALT were the agencies at ICG/NEAMTWS responsible for the preparation of the tsunami scenario that was run in Portugal and other participating countries in the NE Atlantic. IPMA, as a Tsunami Service Provider for the NE Atlantic and the National Authority for Tsunami Warning, issued the Tsunami Alert Messages according to the scenario, using the established communication protocols to the service subscribing countries, among others, Morocco, Spain, United-Kingdom, Denmark, France, Germany, Ireland.

**Spain** (Mauricio Gonzalez Rodriguez): Chipiona city is a test site for the TR initiative. At the moment there is a complication and political clearances are needed. Evacuation maps and the emergency plan are under preparation and posters for local public awareness have been developed to provide information to the local community.

In June was announced that an important meeting with the Andalusian community has been organized. The emergency plan for the Andalusian coast, included in the national directive for Tsunami is under development. Different aspects regarding the warning and emergency plans are included. The local government is preparing a public information space, some posters and different information for the public about tsunami risk.

In November, Spain announced that IHCantabria is finalizing the first phase of a project, with the support of the University of Malaga and sponsored by the Municipality of Chipiona, aimed at preparing the municipality of Chipiona for a potential tsunami event.

To this end, the project is framed within the internationally recognized Tsunami Ready program, coordinated by the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO), which seeks to prepare communities exposed to the threat of tsunamis.

Throughout this first phase of the project, coordinated by IHCantabria experts Ignacio Aguirre Ayerbe and Mauricio González, several activities have been carried out with the purpose of obtaining such recognition. First, tsunami inundation and evacuation maps were modelled and produced for the municipality and the preliminary results of these maps were presented last September to a group of key stakeholders in the municipality at an on-site desk validation workshop. The results of the desktop workshop were further validated and fine-tuned through detailed field visits. Among these stakeholders are emergency managers and decision makers, such as the municipal government team, local Police, Civil Guard, Civil Protection and Red Cross. In addition, other stakeholders who have extensive knowledge of the territory and involved in one way or another in the management of the coast were also involved, such as civil, environmental, sports and cultural associations, a representation of the municipality's educational centres and the Spanish Institute for Disaster Reduction (IERD).

The work developed also included an exercise, held last October, in which the time needed for the population to move on foot to a safe area along the evacuation routes was analysed. This took into account, on the one hand, different types of population in terms of age, gender, individual physical limitations and physical limitations that imply dependence on other people for moving and, on the other hand, different conditions of the routes, in terms of limitations and intensity of use.

At the same time as this exercise, the regional drill "Respuesta 21" took place, coordinated by the Junta de Andalucía, where the mechanisms and response times in terms of communication in the municipality of Chipiona were examined, in the event of a potential tsunami event.

Finally, with the support of the tsunami team of IHCantabria, the municipality of Chipiona inaugurated last Wednesday November 3, 2021, a Tsunami Ready office with a permanent exhibition open to the public to raise awareness and thus to contribute to the preparation of the community for such events. The opening was framed in a week with various events on the

occasion of the anniversary of the Lisbon earthquake and tsunami of 1755 (November 1) and the International Day for Tsunami Risk Awareness (WTAD 2021, on November 5).

**Turkey (Öcal Necmioglu):** The Last Mile project that was implemented in Bodrum contributed to the development of some TR indicators/ TR “elements” (preparation of high resolution tsunami inundation and evacuation maps, awareness and preparation activities, such as seminars and workshops, a tsunami exercise in Bodrum). Hence, Bodrum has a great potential to be identified as a possible Tsunami Ready location in Turkey and is given a priority. In addition, progress has been made in Istanbul (tsunami modelling, vulnerability and hazard analysis), where the Marmara coasts can be considered as potential Tsunami Ready communities in the near future.

In June was announced that the Turkey is focusing on the interaction with the Istanbul municipality. An example of a municipality action plan was presented for one district of Istanbul metropolitan municipality demonstrating the inundation danger zones and a detailed report including an evacuation analysis and associated risk analysis. The work was provided by a deep interaction with the Middle East Technical University. The report was published in 2020 and implied the installation of tsunami signs, the development of local tsunami warning system that would be applicable for the whole Marmara Region, exercises and various other elements already included in Tsunami Ready guidelines. Öcal Necmioglu underlined that they don't have concrete results yet but the work is in progress and hopefully a Memorandum of Understanding will be signed with the Istanbul metropolitan municipality by the end of this summer.

Prof. Dr. Ahmet Cevdet Yalçiner from METU was nominated on 5 July 2021 as an additional member of WG4-Tsunami Ready Group. His expertise as one of the previous vice-chairs and chairs of the ICG/NEAMTWS and direct involvement in the preparation of the tsunami hazard, inundation and evacuation mapping both in Bodrum during the Last Mile-Turkey project and also for Istanbul Metropolitan Municipality, makes him a strong and unique candidate as a member of this group.

In September 2021, Istanbul Metropolitan Municipality begun with the installation of tsunami evacuation signages in Büyükçekmece district in the European part of Istanbul as a pilot project. The municipality aims to finalize the installation of tsunami evacuation signages in all coastal districts facing Marmara Sea by the end of 2022.

On 5 October 2021, Turkey communicated IOC Tsunami Secretariat our confirmation of support and interest in the involvement in the "Strengthening the Resilience of Coastal Communities in the North-East Atlantic and Mediterranean Region to the Impact of Tsunamis and Other Sea Level-Related Coastal Hazard" project jointly undertaken by DG-ECHO and IOC Tsunami Secretariat. This project is expected to play a key role in the adaptation of Global Tsunami Ready Standards and Guidelines and pilot Tsunami Ready within the framework of the ICG/NEAMTWS. Prof. Dr. Ahmet Cevdet Yalçiner has been nominated as the in-country liaison/focal point for the project. One important achievement was the agreement we have received from Istanbul Metropolitan Municipality regarding their participation in this initiative. In addition, based on important achievements made thanks to the "Last Mile-Turkey" project in Bodrum executed in 2019, we anticipate similar support from the Bodrum Municipality and we are hopeful to inform the ICG/NEAMTWS positively at its upcoming

session. In addition to the Istanbul Metropolitan and possibly Bodrum Municipality, key national stakeholders and partners are expected to be AFAD (Disaster and Emergency Presidency), İstanbul and Muğla Provincial Directorates of AFAD, and Bodrum Governorate. Engagement of relevant NGO's is considered to be a possibility.

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<https://depremezmin.ibb.istanbul/guncelcalismalarimiz/#istanbul-tsunam-eylem-plani>

<https://depremezmin.ibb.istanbul/guncelcalismalarimiz/#le-tsunam-blg-ktapiklari>

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**Tsunami Ready pilot projects:**

**Malta** (Manrzia Santini for JRC) exposed to the Group that two test sites were chosen for the implementation of the DG ECHO-funded Tsunami Last Mile 2 project, one in Indonesia and one in Malta, in Marsaxlokk. The final exercise of the project in Malta took place in the morning of 5 November 2021, i.e. the Tsunami World Awareness Day, and it was the first tsunami exercise ever organized in the country. The Civil Protection Department and the University of Malta worked hard to plan this full-scale exercise.

During the exercise:

- all the newly installed devices for tsunami warning of the local community were tested (2 seismographs; 2 IDSLs – Inexpensive Devices for Sea Level monitoring; 2 TADs – Tsunami Alerting Devices; 1 long-range siren)
- the alert messages from the regional tsunami service provider (CAT-INGV) were received and integrated in the draft tsunami emergency protocol (SOP) at test during the exercise
- all the emergency response system, local and national, was mobilized
- all the residents in the expected inundation area of Marsaxlokk were invited to evacuate via newly identified evacuation routes, following the tsunami evacuation signs (temporarily installed for the exercise), towards the meeting/assembly points.

A team of 10 experts (from University of Malta, Malta Local Council, Malta hotels and restaurant organisation, Malta Civil Protection, JRC, ECHO and IOC/UNESCO) was observing/evaluating the exercise and will report about final outcomes, highlighting strengths of the adopted approach and identifying room for improvements. An analysis of the exercise outcomes against the Tsunami Ready indicators will also be performed.

From the initial findings, we can already mention that Marsaxlokk didn't have any tsunami mitigation measure before the implementation of the Tsunami Last Mile 2 project. Today, in addition to the mentioned suite of devices for locally warning the population, they have:

- Detailed tsunami modelling (University of Malta)
- Detailed analysis of expected inundation areas (University of Malta)
- Tsunami emergency protocol for Marsaxlokk (Malta Civil Protection Department)
- Tsunami evacuation routes & meeting points (Malta Civil Protection Department)
- Prototype tsunami signs (Malta Civil Protection Department)
- Information material (leaflets in Maltese and English) about tsunami risk (Malta Civil Protection Department)
- A local community informed about tsunami risk in their area (see pictures in the attached "evaluation instructions" document; further details will come with the final evaluation report)



