CoastWAVE Meeting
Paris
05 February 2024

CoastWAVE

Strengthening the Resilience of Coastal Communities in the North East Atlantic, Mediterranean Region to the Impact of Tsunamis and Other Sea Level-Related Coastal Hazards

Partner Country: Malta

Community: Marsaxlokk

Pauline Galea, Blanca Mendiguren, Sebastiano D'Amico, Adam Gauci

Marsaxlokk


Malta
International
Airport
Marsaxlokk
Delimara
Power
Station
MARSAXLOKK BAY
LNG
tanker
Birzebbuga
Freeport

CoastWAVE activities Malta
(alert devices secured in Last Mile project)

Activity 9

Tsunami Ready pilot project implemented at selected coastal communities:

vi. Assessment estimate of the number of people at risk in the tsunami hazard zone, economic , infrastructural , political and social resources identified, preparedness;

vii. Workshop(s) and the development of government approved easily understood tsunami evacuation maps and local tsunami awareness materials;

viii. Preparation and installation of public displayed tsunami information;

ix. Social events, workshop(s) and distribution of outreach and public aw awareness and education resources. Conduct three times outreach or tsunami educational activities:

x. Organize, execute and evaluate a community tsunami exercise.

xi. Implementation and initial monitoring of the Tsunami Ready cycle

Activity 7

iv. Establishment of National Tsunami Ready Board and work procedures for recognition and management

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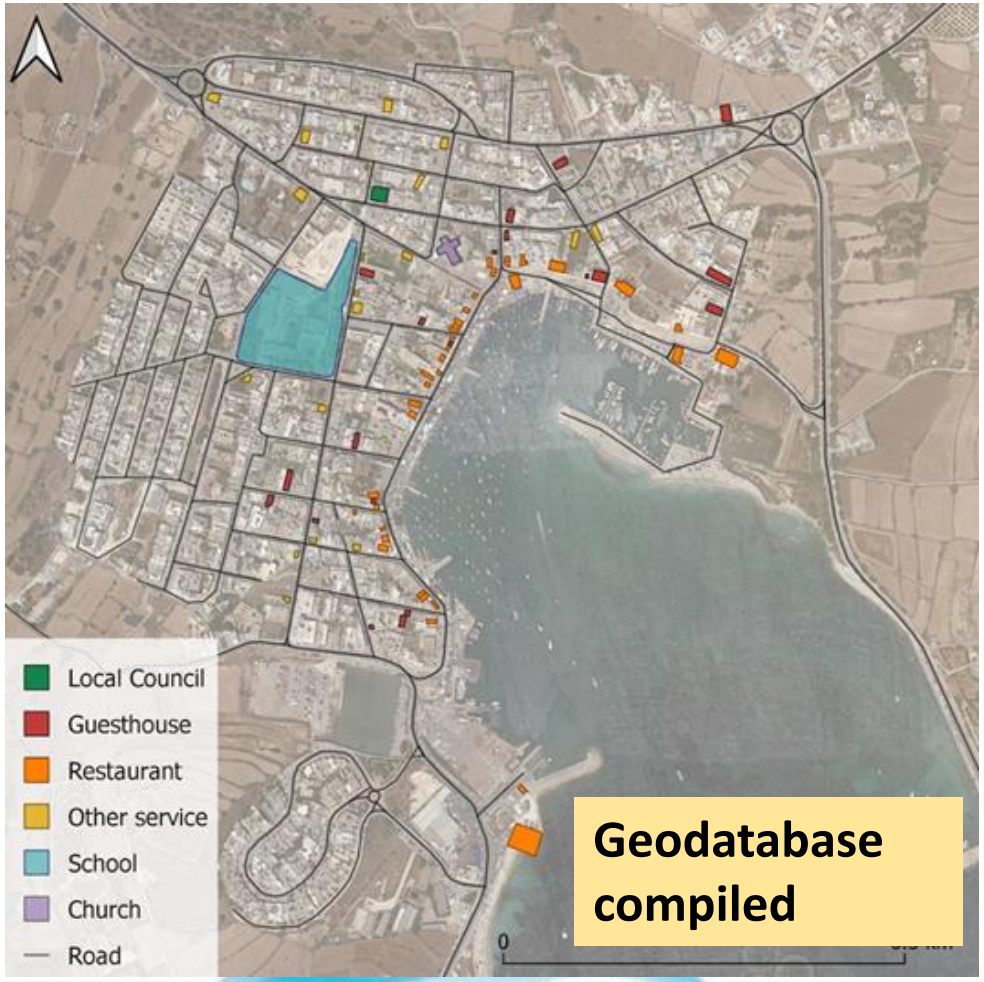
The survey Area - Marsaxlokk



- Area: 4.7 km^2
- Population: approx. 4000 (increases to >7000 on market days)
- Tourist Facilities: restaurants, guesthouses, market located on waterfront

- **Resources identified:**
  - **-Economic: Central Government of Malta, through various entities**
  - **-Infrastructural and Administrational:**
    - **CPD Operations Centre plus On-Site Coordination Centre can be deployed.**
    - **Relocation of civilians: Social housing, pre-fabricated containers, and disused hangars.**
    - **Firefighters, Police officers, Army and Transport Malta.**
    - **Medical Assessment Units at Mater Dei Hospital is prepared for major incidents and mass casualties.**
    - **Transport for rescue: Army Police CPD (heavy plant and helicopters) and NGOs (rescue boats, jet skis and buses).**
  - **-Social:**
    - **Collaboration with NGOs (Red Cross, St John Rescue Corps and The Emergency Fire & Rescue Unit).**

Risk Perception Questionnaire for Sea Level Related Multi Hazards in Marsaxlokk

Questionnaire:

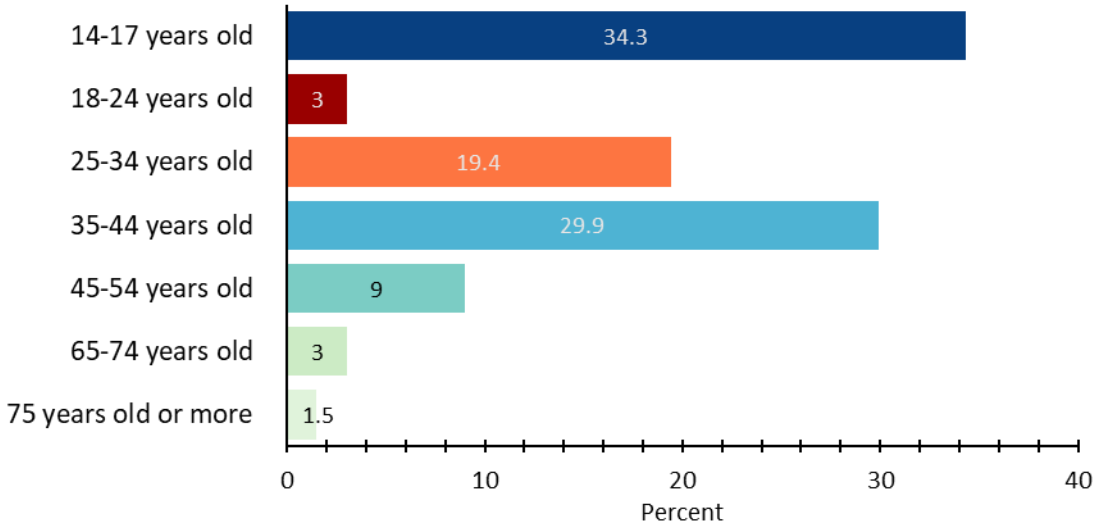
36 questions about:

- personal information
- awareness/knowledge
- sense of exposure
- assessment, preparedness, response
- Governance

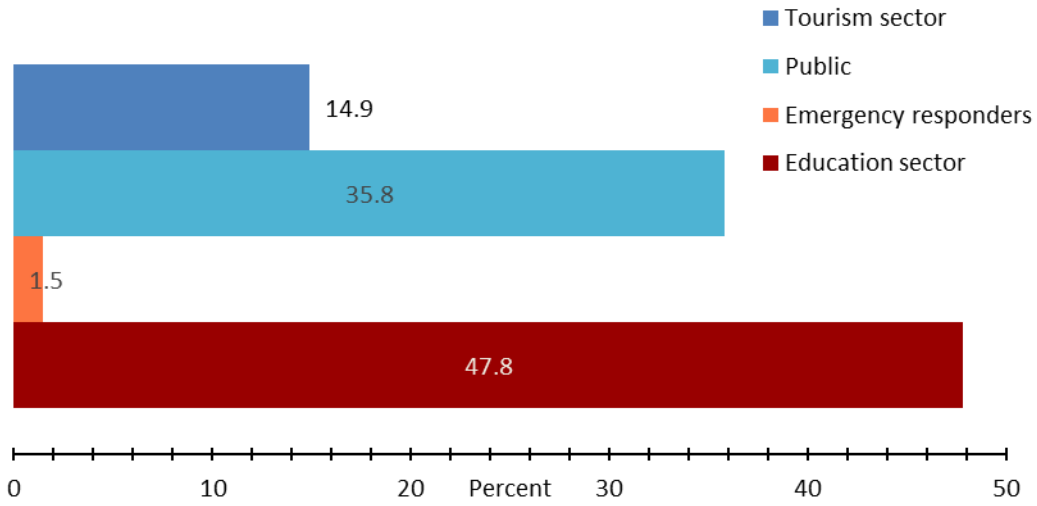
- 236 participants
- Sectors: education, hospitality, fishing community, emergency services, public

- Contact via email
- QR code poster:
  - Social Media
  - Local Council
  - Church
  - Supermarkets
  - Farmacy
  - Police station
  - School
  - Fisherman association
  - Sports club
  - Retirement home
- One-to-one interviews:
  - Fishermen
  - Locals at market
  - Emergency responders

Results

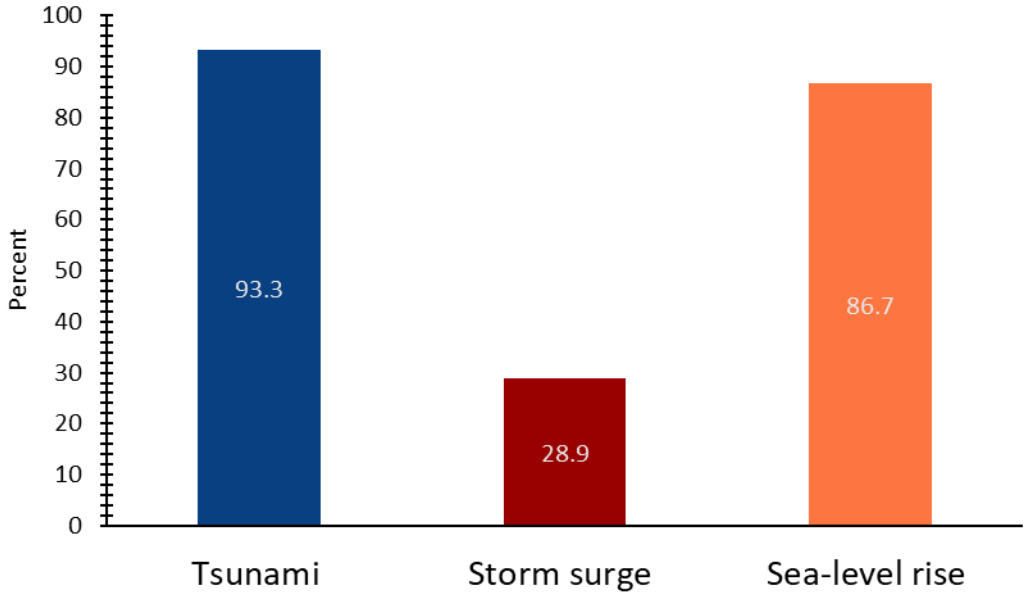


Age Group

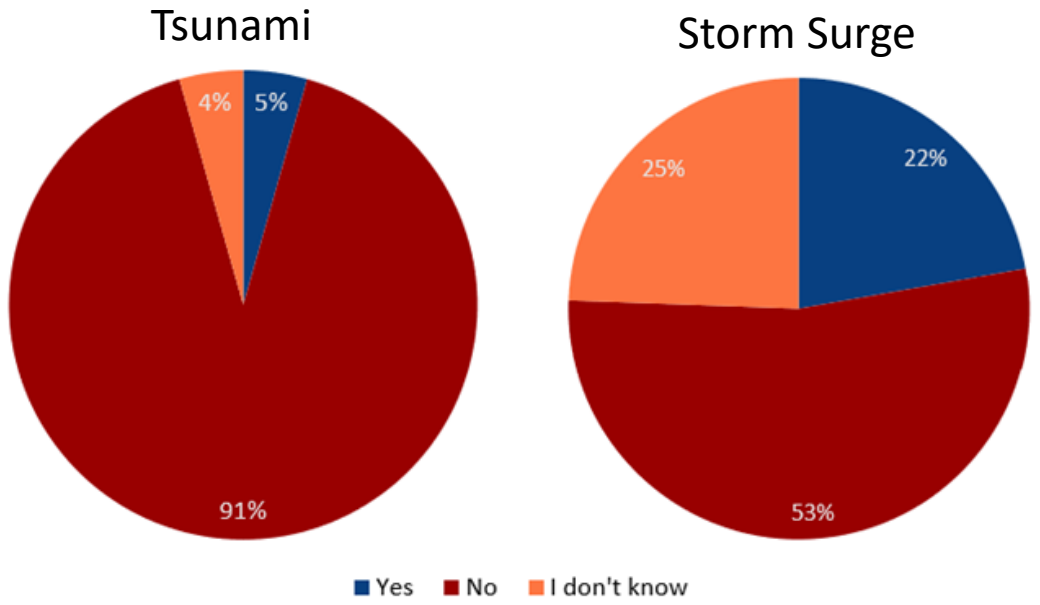


Respondent sector

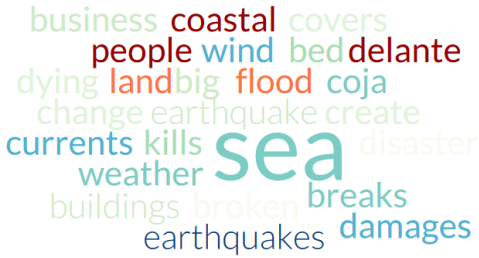
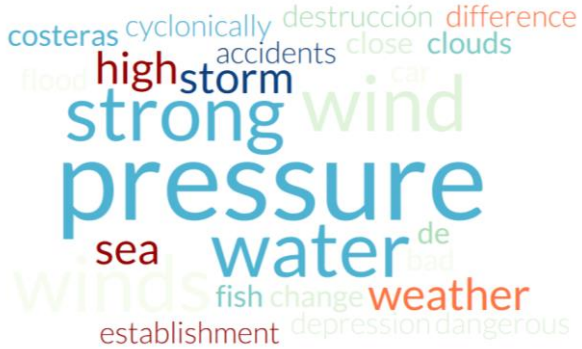
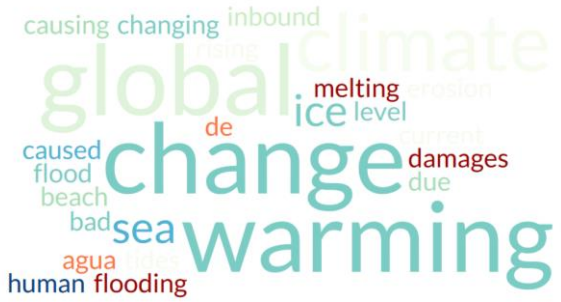
Results



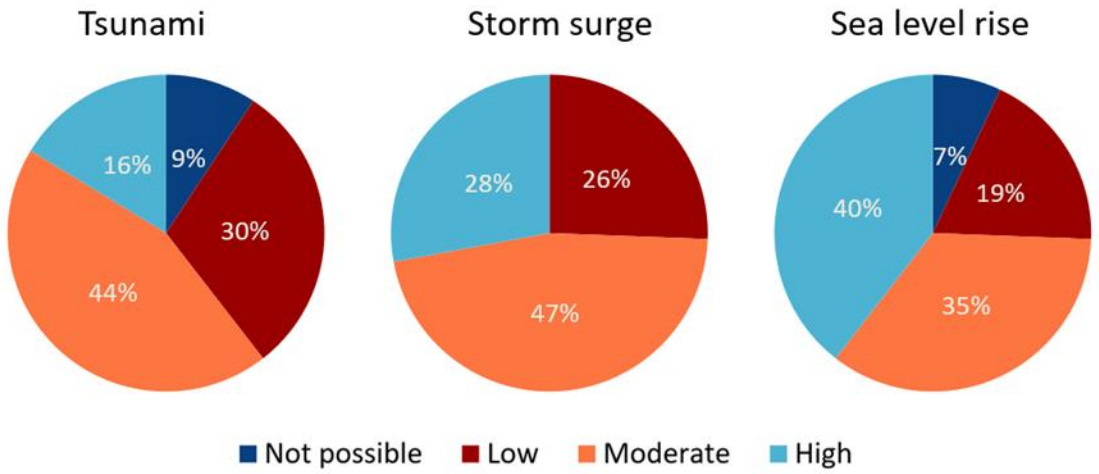
Heard of any of these hazards?



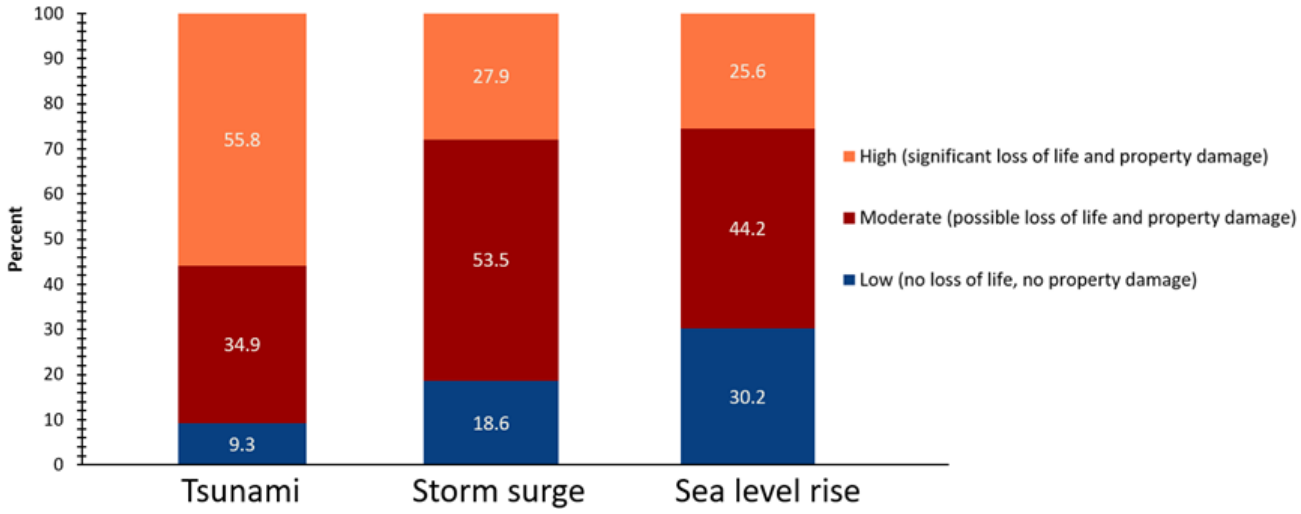
Experienced any of these hazards?

Tsunami	Storm surge	Sea-level rise
		

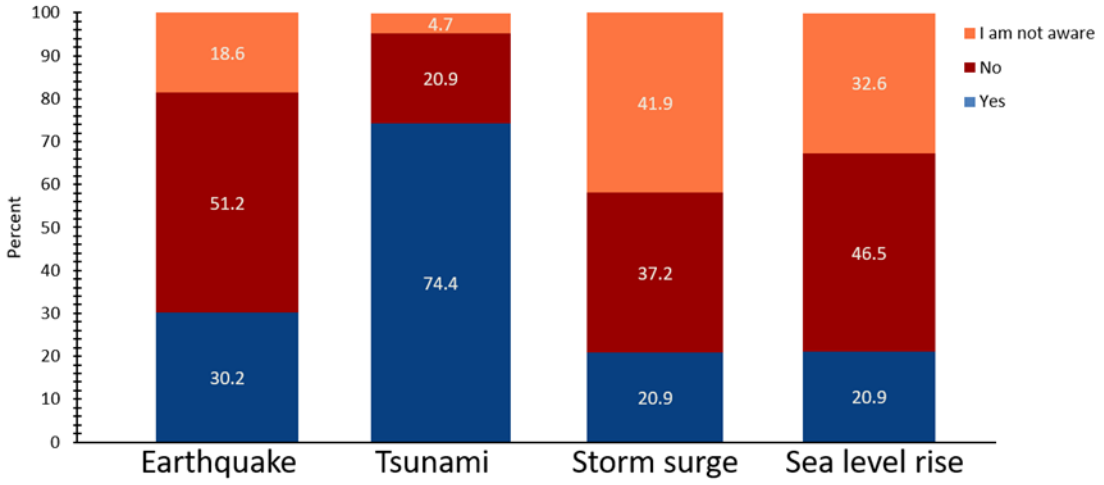
What are the causes of these hazards?



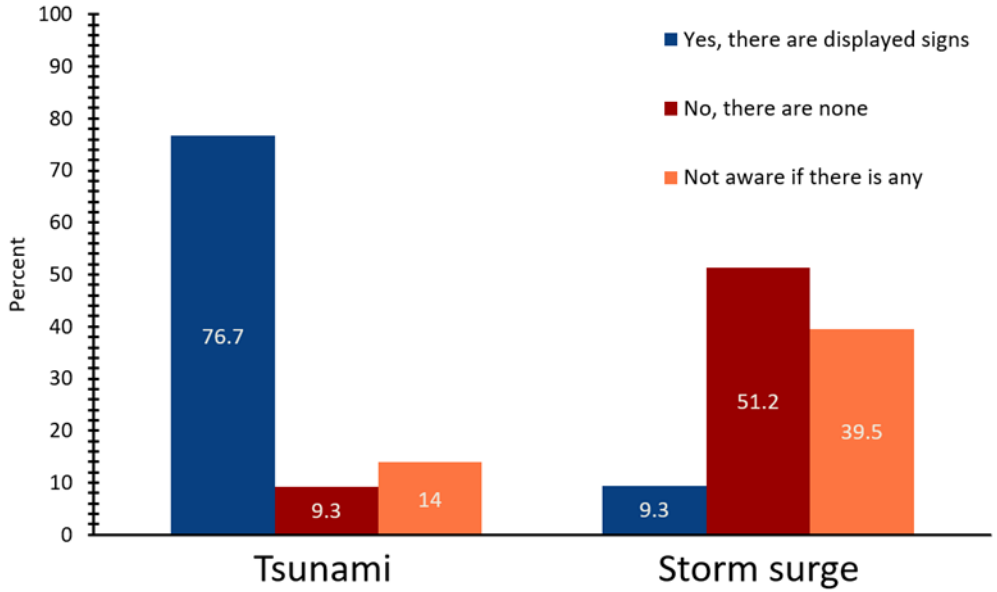
Likelihood in your community in the next 10 years



Likely impact on your community



Does your locality have the necessary capacity to inform the population?



Does your locality display evacuation signs/routes?

	Television	Radio	Internet	Audible alerts	SMS	E-mail	Responses
1	10.5%	2.6%	2.6%	52.6%	31.6%	0.0%	38
2	7.9%	15.8%	28.9%	23.7%	21.1%	2.6%	38
3	28.9%	7.9%	28.9%	2.6%	7.9%	23.7%	38
4	15.8%	15.8%	18.4%	15.8%	21.1%	13.2%	38
5	21.1%	26.3%	18.4%	2.6%	13.2%	18.4%	38
6	15.8%	31.6%	2.6%	2.6%	5.3%	42.1%	38
Totals							228

Which communication channel would you prefer to receive alert messages?

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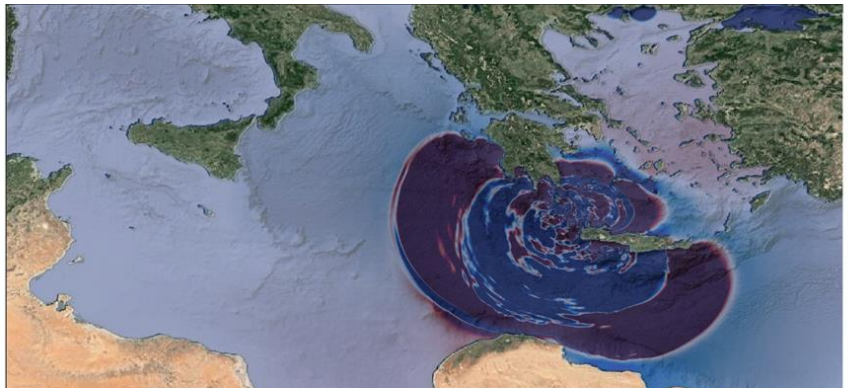
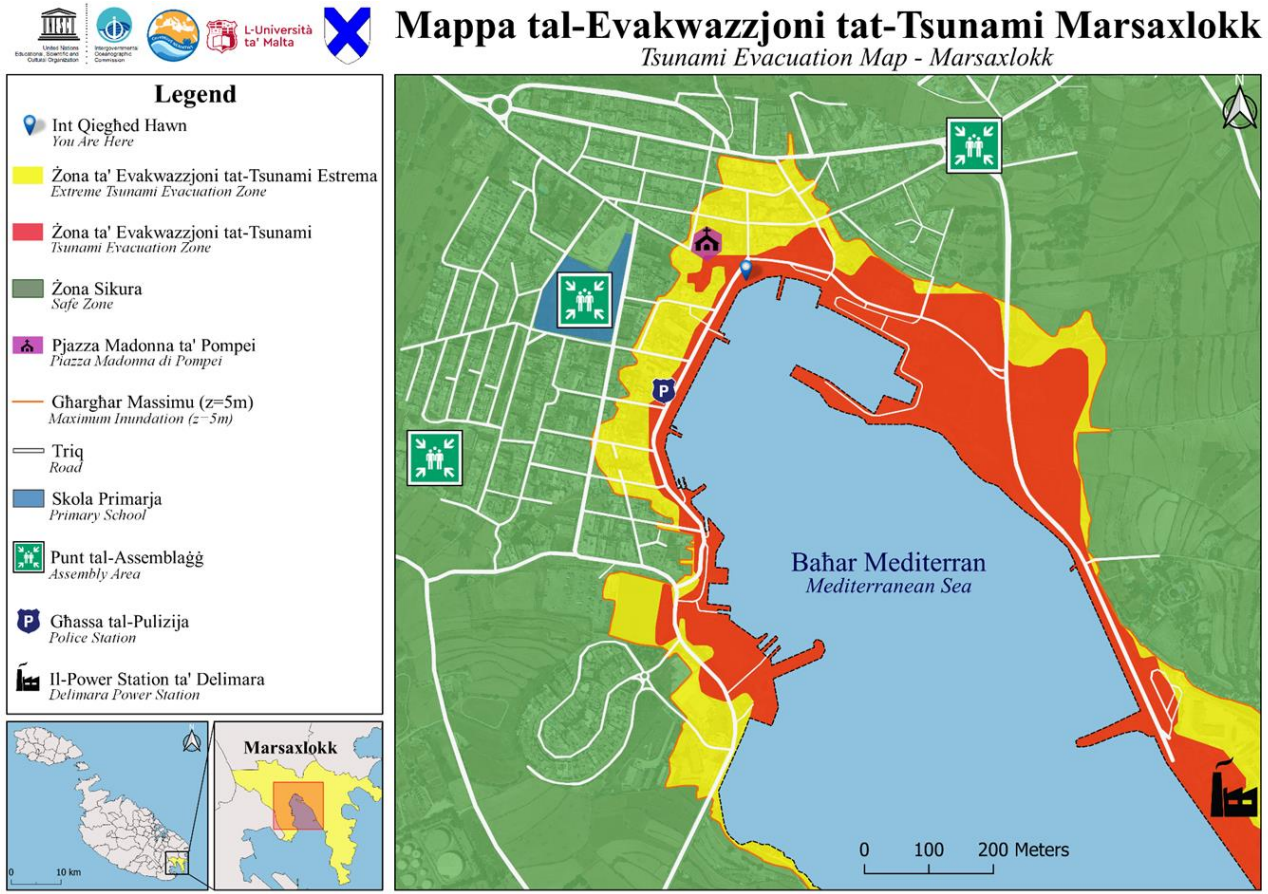
Stakeholders' Workshop

Salini Resort, Malta, 11th July 2023

Wave / inundation modelling and evacuation maps





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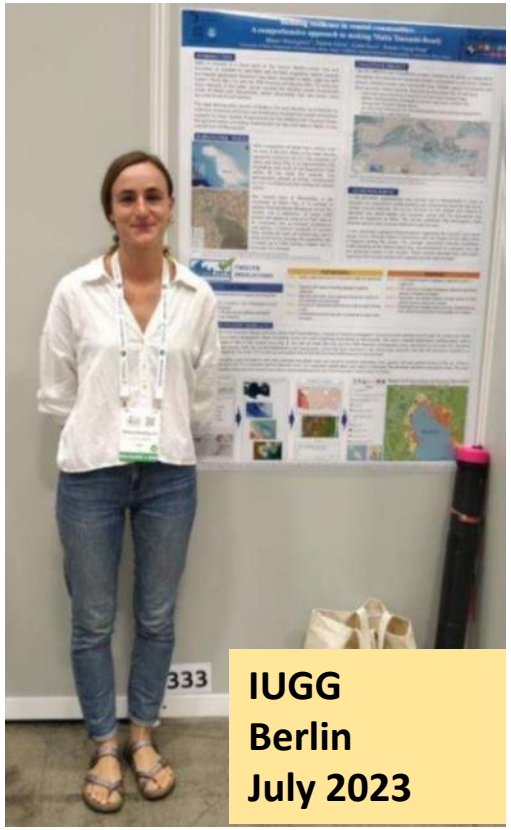
Outreach

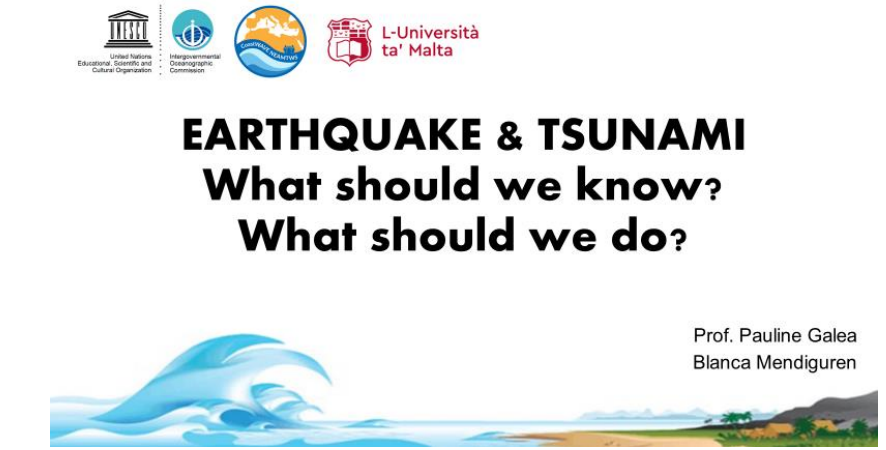
Primary School activity Nov2023



IUGG Berlin July 2023

Social activity Nov2023

Primary School activity March2023



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NEAMWAVE23

- 07 November 2023
- Eastern Mediterranean Scenario – Hellenic Arc

Earthquake parameters

Mw 8.1

Longitude 24.57 °E

Latitude 34.52 °N

Depth (km) 10.0

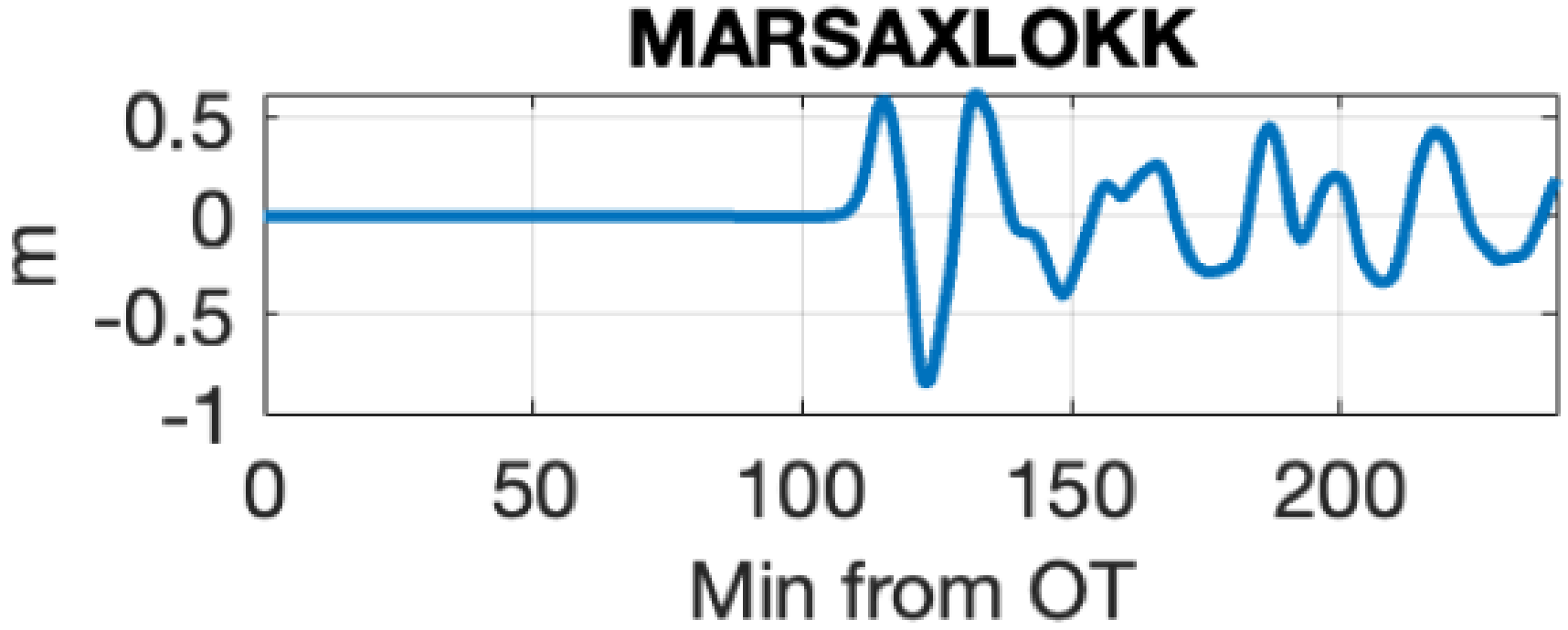
Rupture Area (km2) ~17000

Slip (m) 3.3 (average)

Distance from Malta: 970 km

Sea Level time Series at Marsaxlokk

- First Peak arrives 2 hours after origin time
- Second Peak slightly higher, after 20 minutes



Malta Exercise Team

ROLE	RESPONSIBLE	DUTIES
National Exercise Director (NED)	**Fredrick Sammut** Chief Assistance Rescue Officer, CPD	-Responsible to run the exercise. -Takes actions during the exercise and manage the scenario event as it would be in real case for a director of an agency. -Supervises the speed and flow of the exercise and addresses any issues during the exercise. -Monitoring the Master Schedule of Events List to ensure the exercise is proceeding according to plan. -Involved in the production of the end of exercise report -May have responsibilities to implement recommendations made in the report.
National Contact for Exercise (NCE)	**Michel Galea** Chief Assistance Rescue Officer, CPD	-Official country point of contact for the NEAMWave exercises. -The Tsunami National Contact (TNC) serves as NCE. -Ensure that the commitment of participating Member States is fully coordinated by the Exercise Coordinator, who is responsible for the actual implementation of the stages of the exercise.
Exercise Coordinator (EC)	**Pauline Galea** Coordinator of CoastWAVE project, UM	-Coordinating all the activities related to the exercise, before, during and after, responsible for the communications with the TT-TE, responsible for filling the exercise evaluation questionnaires. -Master schedule of events list, forms, exercise documents, reporting, liabilities, organizing cold and hot debriefs
Technical Coordinator	**Martin Aquilina** Leading Assistance and Rescue Officer, CPD	Co-coordination of all the activities related to the exercise, before, during and after, especially those related to own agency.
Technical Assistant	**Adam Gauci** UM	Ensuring for correct functioning of Tsunami Alert Device (TAD), large-range sirens and communications.
Field Assistant	**Blanca Mendiguren** Research Officer of CoastWAVE project, UM	Assistance in the evacuation exercise. Guidance of the local population regarding their participation on the exercise Field video recordings. Distribution of evacuation maps and brochures.
Local Council Representative	**Daniel Zerafa** Marsaxlokk Local Council	
Evaluator 1	**Dr Matthew Agius** (on site) Seismologist at the Department of Geosciences, UM	- Evaluating against allocated objectives. - Observing and assessing processes, procedures, and techniques. - Evaluating and reporting on the achievement of outcomes and the extent to which the overall exercise objectives have been met. - Evaluating the effectiveness of exercise facilitation and management - Providing input into the exercise debrief
Evaluator 2	**Dr Stephanie Pappalardo** (at CPD Control Room) MHAS	
Observer 1	**Dr Ritienne Gauci** Physical Geographer at the Department of Geography, UM	
Observer 2	**Ms Audrey Zammit** OMRG, UM	

Master Schedule of Events

Malta Table Top Exercise - NEAMWAVE23 - 7 November 2023							TAD PANEL			
Time (UTC)	**Time (Local Time)**	**Elapsed Time**	**Event**	**Who**	**What**	**Notes**	**PAGE 1**	**PAGE 2**	**LONG-RANGE SIREN**	**VOICE MESSAGE**
08:00	09:00	00:00	Earthquake M 8.1 Hellenic Arc (Crete)	None	None					
08:05	09:05	00:05	Initial EQ Parameters		Reference epicentre identification					
08:07	09:07	00:07	Message #1 - TSUNAMI WATCH - AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS: ORIGIN TIME - 0900Z 07 NOV 2023 COORDINATES - 34.52 NORTH 24.57 EAST DEPTH - 10 KM LOCATION - TEST MAGNITUDE - 8.1	CPD	Receives email from INGV. Duty Officer informs Fredrick Sammut or Michel Galea by phone (Contact Points).				**NO**	**NO**
				UM	Receives email and SMS from Seiscomp and TOAST.					
				CPD	Informs Police,LESA, Local Council, Power Station, Fire stations (by SMS and phone)					
				CPD	Calls UM to understand what is happening					
				UM	Checks EQ parameters. Confirms to CPD that the EQ has occurred. Sends "automated" report					
08:15	09:15	00:15	Message #2- TSUNAMI WATCH ONGOING- AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS: ORIGIN TIME - 0900Z 07 NOV 2023 COORDINATES - 34.52 NORTH 24.57 EAST DEPTH - 10 KM LOCATION - TEST MAGNITUDE - 8.1 Report of tsunami wave activity: Greece: Gavdos_Karave 3.82m, Paleochora 0.8m and Harakleio 0.15m	CPD	CPD should receive email from INGV					
				UM	Perform TOAST simulation. (Compare with tide gauges.) Call CPD.					
				CPD	Communicate with Police, Mxlokk council, LESA, Power station, Health authority, AFM.					
				CPD	Internal exercise to check timing - Evacuate Delimara Fire Station. Ask assistance from nearby stations.					
				CPD	Update TAD message		A TSUNAMI HAS BEEN GENERATED BY AN EARTHQUAKE NEAR CRETE. WAVES EXPECTED AT 10:40	MOVE TO HIGH GROUND OR INLAND	**YES**	**YES**
08:40	09:40	00:40	Message #3- TSUNAMI WATCH ONGOING- AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS: ORIGIN TIME - 0900Z 07 NOV 2023 COORDINATES - 34.52 NORTH 24.57 EAST DEPTH - 10 KM LOCATION - TEST MAGNITUDE - 8.1 Report of tsunami wave activity: Greece: Gavdos_Karave, Paleochora, Harakleio, Kasos ...	CPD	Should receive email from INGV					
				CPD	Activate long-range siren					
				CPD	Evacuate school children from shore					
				CPD	Get updates from all emergency responders.					
09:00	10:00	01:00		CPD	Update TAD message		TSUNAMI CONFIRMED. DANGEROUS WAVES EXPECTED	MOVE QUICKLY TO HIGH GROUND OR INLAND	**YES**	**YES**
09:46	10:46	01:46	Wave detected in Masaxlokk MALTA-02							
10:05	11:05	02:05	Message #4- TSUNAMI WATCH ONGOING- AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS: ORIGIN TIME - 0900Z 07 NOV 2023 COORDINATES - 34.52 NORTH 24.57 EAST DEPTH - 10 KM LOCATION - TEST MAGNITUDE - 8.1 Report of tsunami wave activity: Greece, Italy, Cyprus, Turkiye, Malta, Egypt and Israel.							
11:30	12:30	03:30	Message #5- END OF TSUNAMI WATCH. Final Message. End of Exercise (even if this is not the case in a real case)	CPD	Declares the end of Exercise		END OF EXERCISE. HAVE A NICE DAY. CPD MALTA and Univ of MALTA.		**NO**	**NO**
12:00	13:00	04:00	Hot Debriefing							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Mappa tal-Evakwazzjoni tat-Tsunami Marsaxlokk
Tsunami Evacuation Map - Marsaxlokk
Legend
Int Qiegħed Hawn
You Are Here
Żona ta' Evakwazzjoni tat-Tsunami Estrema
Extreme Tsunami Evacuation Zone
Żona ta' Evakwazzjoni tat-Tsunami
Tsunami Evacuation Zone
Punt tal-Assemblaġġ
Assembly Area
Rotta ta' Evakwazzjoni
Evacuation route
Pjazza Madonna ta' Pompei
Piazza Madonna di Pompei
Għargħar Massimu (z=5m)
Maximum Inundation (z=5m)
Skola Primarja
Primary School
Għassa tal-Pulizija
Police Station
Il-Power Station ta' Delimara
Delimara Power Station
Marsaxlokk
10 km
More information:
Baħar Mediterran
Mediterranean Sea
0
100
200 Meters
DUNCAN
KRN 137

Rationale of Exercise

- CPD/UM to test communication protocols with TSP and local ER
- CPD to test mobile incident command unit, and getting responders on site.
- UM to test tsunami simulation and support to CPD
- Test alert devices – TAD's, sirens
- Marsaxlokk primary school is outside threat area. Instead of evacuating the school, a school outing was simulated, and the children evacuated from the shore to a safe area on hearing the sirens.

Mobile Incident Control Unit


PROTEZZJONI ĊIVILI
MALTA

Separate unit set up for UM to work “remotely” on tsunami simulation

Tsunami Alert Devices – activated remotely on tsunami confirmation.


MARSAXLOKK INFORMATION AND ALERT PANEL
EXERCISE
TSUNAMI IS ONGOI
REMAIN IN HIGH G
L-Università ta' Malta

Long-Range Siren

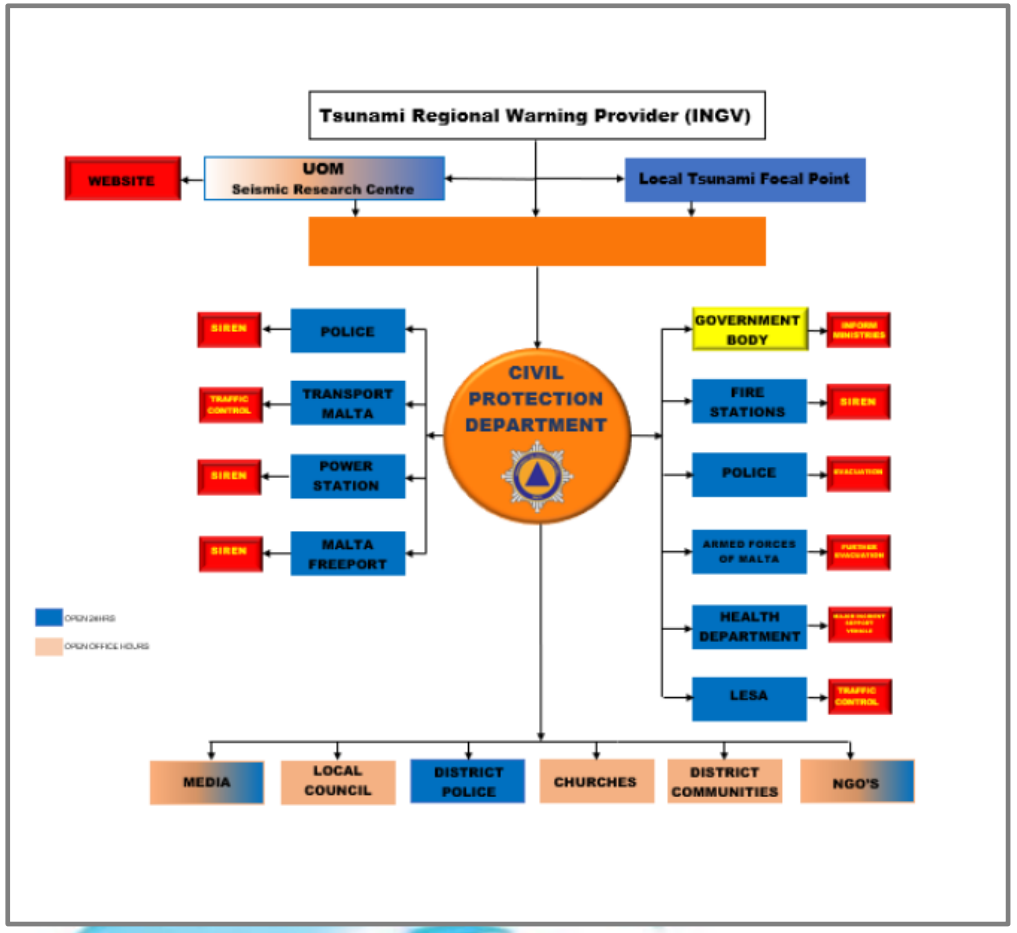
Evacuation of schoolchildren

Registration of schoolchildren at Assembly Point

Other activities organised for schoolchildren

Presence of Minister and Media

Upgrading of SOP's



TSUNAMI EMERGENCY PROTOCOL FOR MARSAXLOKK, MALTA

Version 1.0

Civil Protection Department

Date: November 2023

CoastWAVE activities Malta

Activity 7

iv. **Establishment of National Tsunami Ready Board and work procedures for recognition and management**

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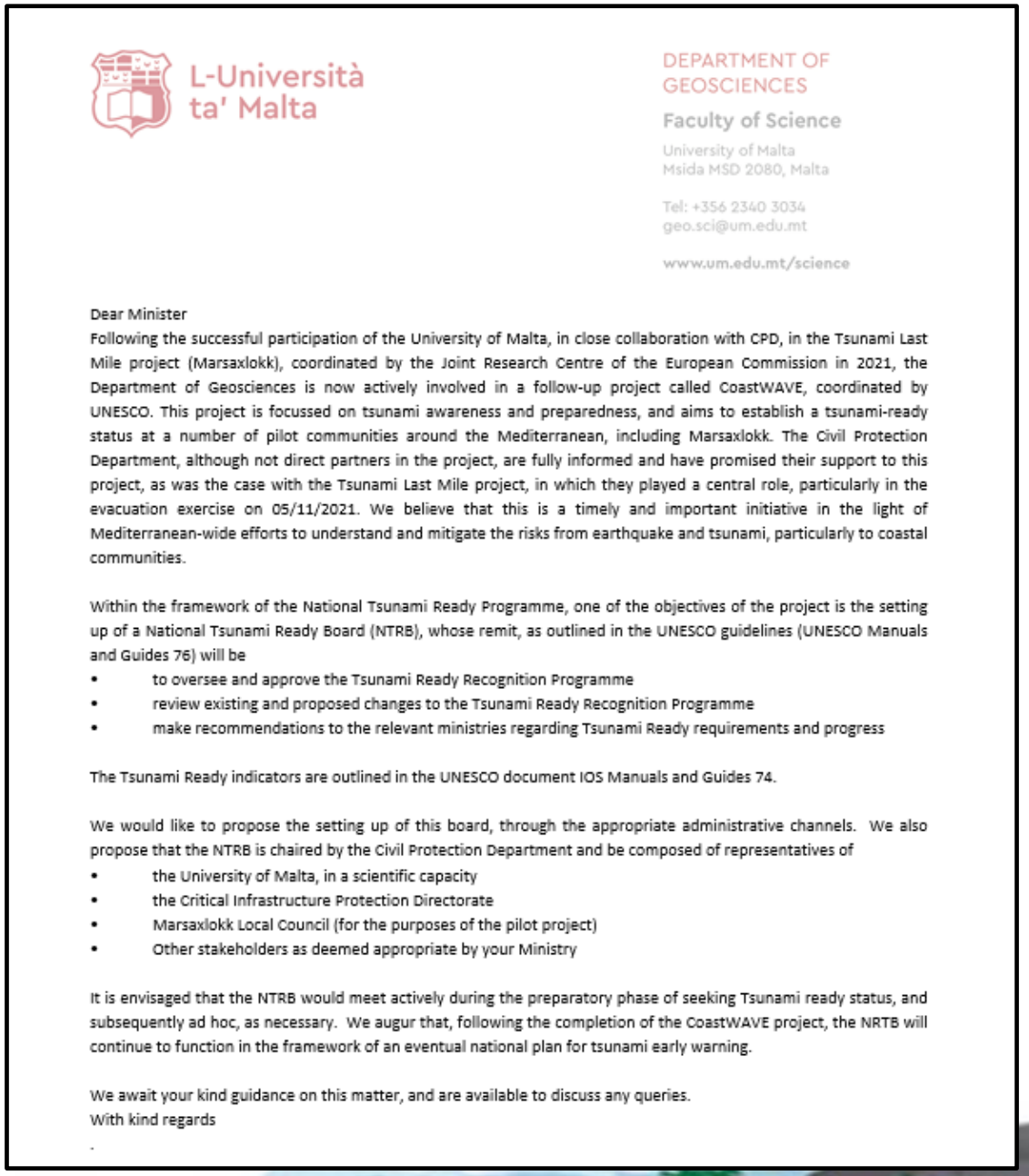
Setting up of NTRB

- Meeting held with Minister for Home Affairs on 29 January 2024
- A fast way forward was proposed by incorporating the NTRB within an existing strategic committee.
- We hope to see the board set up by April.



L-Università ta' Malta

DEPARTMENT OF GEOSCIENCES
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Dear Minister

Following the successful participation of the University of Malta, in close collaboration with CPD, in the Tsunami Last Mile project (Marsaxlokk), coordinated by the Joint Research Centre of the European Commission in 2021, the Department of Geosciences is now actively involved in a follow-up project called CoastWAVE, coordinated by UNESCO. This project is focussed on tsunami awareness and preparedness, and aims to establish a tsunami-ready status at a number of pilot communities around the Mediterranean, including Marsaxlokk. The Civil Protection Department, although not direct partners in the project, are fully informed and have promised their support to this project, as was the case with the Tsunami Last Mile project, in which they played a central role, particularly in the evacuation exercise on 05/11/2021. We believe that this is a timely and important initiative in the light of Mediterranean-wide efforts to understand and mitigate the risks from earthquake and tsunami, particularly to coastal communities.

Within the framework of the National Tsunami Ready Programme, one of the objectives of the project is the setting up of a National Tsunami Ready Board (NTRB), whose remit, as outlined in the UNESCO guidelines (UNESCO Manuals and Guides 76) will be

- to oversee and approve the Tsunami Ready Recognition Programme
- review existing and proposed changes to the Tsunami Ready Recognition Programme
- make recommendations to the relevant ministries regarding Tsunami Ready requirements and progress

The Tsunami Ready indicators are outlined in the UNESCO document IOS Manuals and Guides 74.

We would like to propose the setting up of this board, through the appropriate administrative channels. We also propose that the NTRB is chaired by the Civil Protection Department and be composed of representatives of

- the University of Malta, in a scientific capacity
- the Critical Infrastructure Protection Directorate
- Marsaxlokk Local Council (for the purposes of the pilot project)
- Other stakeholders as deemed appropriate by your Ministry

It is envisaged that the NTRB would meet actively during the preparatory phase of seeking Tsunami ready status, and subsequently ad hoc, as necessary. We augur that, following the completion of the CoastWAVE project, the NRTB will continue to function in the framework of an eventual national plan for tsunami early warning.

We await your kind guidance on this matter, and are available to discuss any queries.
With kind regards

Tsunami Ready Indicators - mostly achieved

	TSUNAMI READY INDICATORS
I	**ASSESSMENT (ASSESS)**
1	**ASSESS-1**. Tsunami hazard zones are mapped and designated.
2	**ASSESS-2**. The number of people at risk in the tsunami hazard zone is estimated.
3	**ASSESS-3**. Economic, infrastructural, political, and social resources are identified.
II	**PREPAREDNESS (PREP)**
4	**PREP-1**. Easily understood tsunami evacuation maps are approved.
5	**PREP-2**. Tsunami information including signage is publicly displayed.
6	**PREP-3**. Outreach and public awareness and education resources are available and distributed.
7	**PREP-4**. Outreach or educational activities are held at least 3 times a year.
8	**PREP-5**: A community tsunami exercise is conducted at least every two years.
III	**RESPONSE (RESP)**
9	**RESP-1**. A community tsunami emergency response plan is approved.
10	**RESP-2**. The capacity to manage emergency response operations during a tsunami is in place.
11	**RESP-3**. Redundant and reliable means to timely receive 24-hour official tsunami alerts are in place.
12	**RESP-4**. Redundant and reliable means to timely disseminate 24-hour official tsunami alerts to the public are in place.

Challenges

- Lack of National Disaster Management Agency
- Difficulties by Local Councils (Municipalities) to maintain alert devices in the absence of direct funding
- Resistance of public to regular exercises – reluctance to take part in evacuation drills
- Perception – Marsaxlokk public is used to “meteotsunamis” and seiches that cause frequent flooding, and “equate” it to tsunami

Next steps

- Further meetings with Local Council and Ministry to discuss the way forward after end of project, and maintenance of alert devices;
- Meeting of NTRB ?
- Printing of more tsunami information material for display in Marsaxlokk;
- Possible additions to signage
- Planning of outreach activities for 2024

GRAZZI.
THANK YOU.