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COASTWAVE PROJECT TSUNAMI WARNING AND EMERGENCY MANAGEMENT SOP WORKSHOP

5-6 October, 2022, Ispra Italy

Secretariat IOC-UNESCO:

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Derya Vennin
Assoc. Project Officer

AGENDA: Day 1

2pm-2:15pm	**Welcoming and Overview of Workshop**	Denis Chang Seng
2:15pm-2:30pm	**Logistics**	Derya Itir Vennin
2:30pm-4:00pm	**Effective End to End TWS** ○ Overview of End-to-end TWS *(MG 76, 2.1, 2.2, MG 82, 1.2)* ○ Generic Roles and Responsibilities of TSP *(MG 76, 3.2)* and NTWC *(MG 76, 3.3)* ○ NTWC SOP Development *(MG 76, 3.5, 3.6)* ○ Interactive Activity 1	Derya Itir Vennin Bernardo Aliaga
4:00pm-4:15pm	**COFFEE/TEA Break**	
4:15pm-4:45pm	**National to Local Tsunami Warning Chain and SOPs** ○ The roles and responsibilities of EMA *(MG 76, 4.2)* ○ TER and SOP Development for EMA *(MG 76 4.3, 4.4, 4.5, MG 82 Module 3-3.3)*	Derya Itir Vennin
4:45pm-5:20pm	**National to local tsunami Warning Chain and SOPs *(cont.)*** Designing Tsunami Warnings and Evacuations: What Expert Stakeholders and the Public Should Know? *(MG 76, 4.5.1, MG 82 Step 4 of Module 3)* ○ Interactive Activity 2	Denis Chang Seng
5:20pm-6pm	IOC Development of SOPs for Tsunamis Generated by Non-seismic and Complex Sources	Rick Bailey
	Meeting Close Day 1	
7:30pm-11pm	**GROUP DINNER- MiraLago Pizza, Ispra**	

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LOGISTICS

THE BUS SHUTTLE IS AT : from JRC

THE BUS SHUTTLE IS AT 19:20 from hotel

THE BUS SHUTTLE IS AT 22:15 from the restaurant

THE DINNER IS AT 19:30, at MiraLago Pizza:

OUTLINE

1. Tsunami Warning System (TWS- content, end to end TWS and supporting documents)

1. Tsunami Warning
   - TSP, NTWC roles and responsibilities
   - NTWC SOP and its development

2. Tsunami Emergency Response
   - EMA and its role and responsibilities
   - EMA SOPs and their developments

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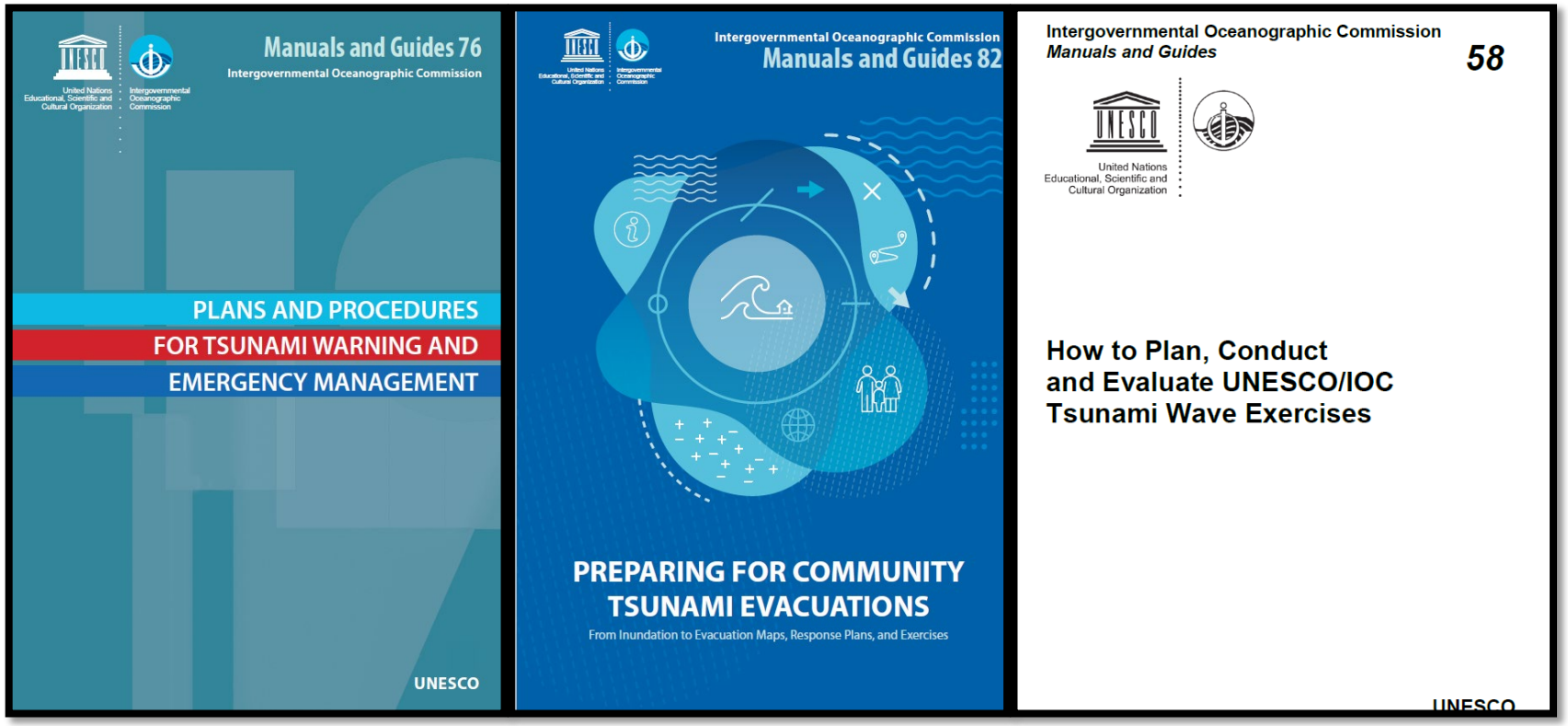
MATERIALS

Manuals and guidelines of the workshop:
MG 76, MG 82 and MG 58



End to End Tsunami Warning System

- What is ETWS?
- The four components of ETWS
- Stakeholders of ETWS
    1. TSP
    2. NTWC
- Development of SOPs

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What is ETWS?

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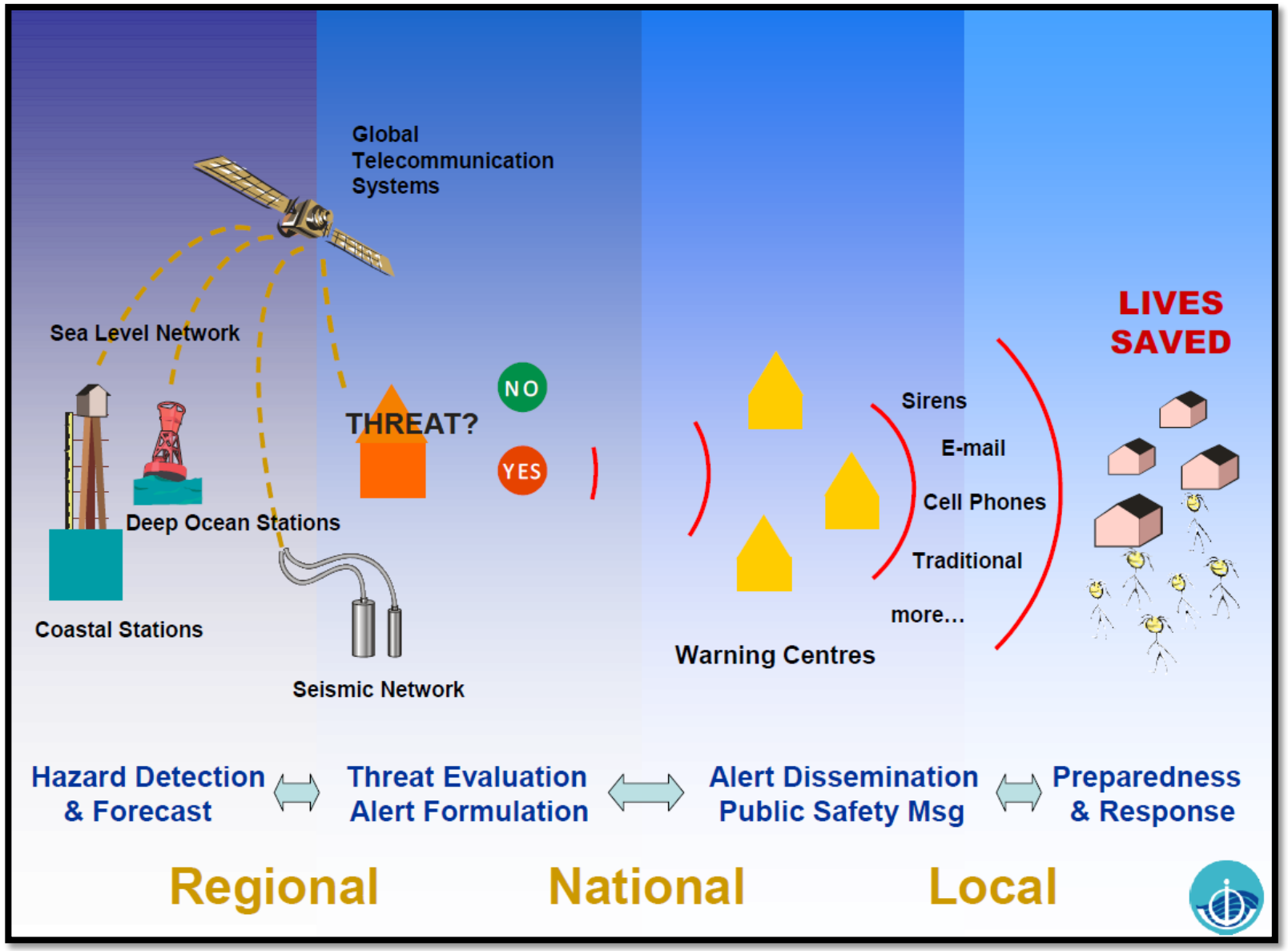
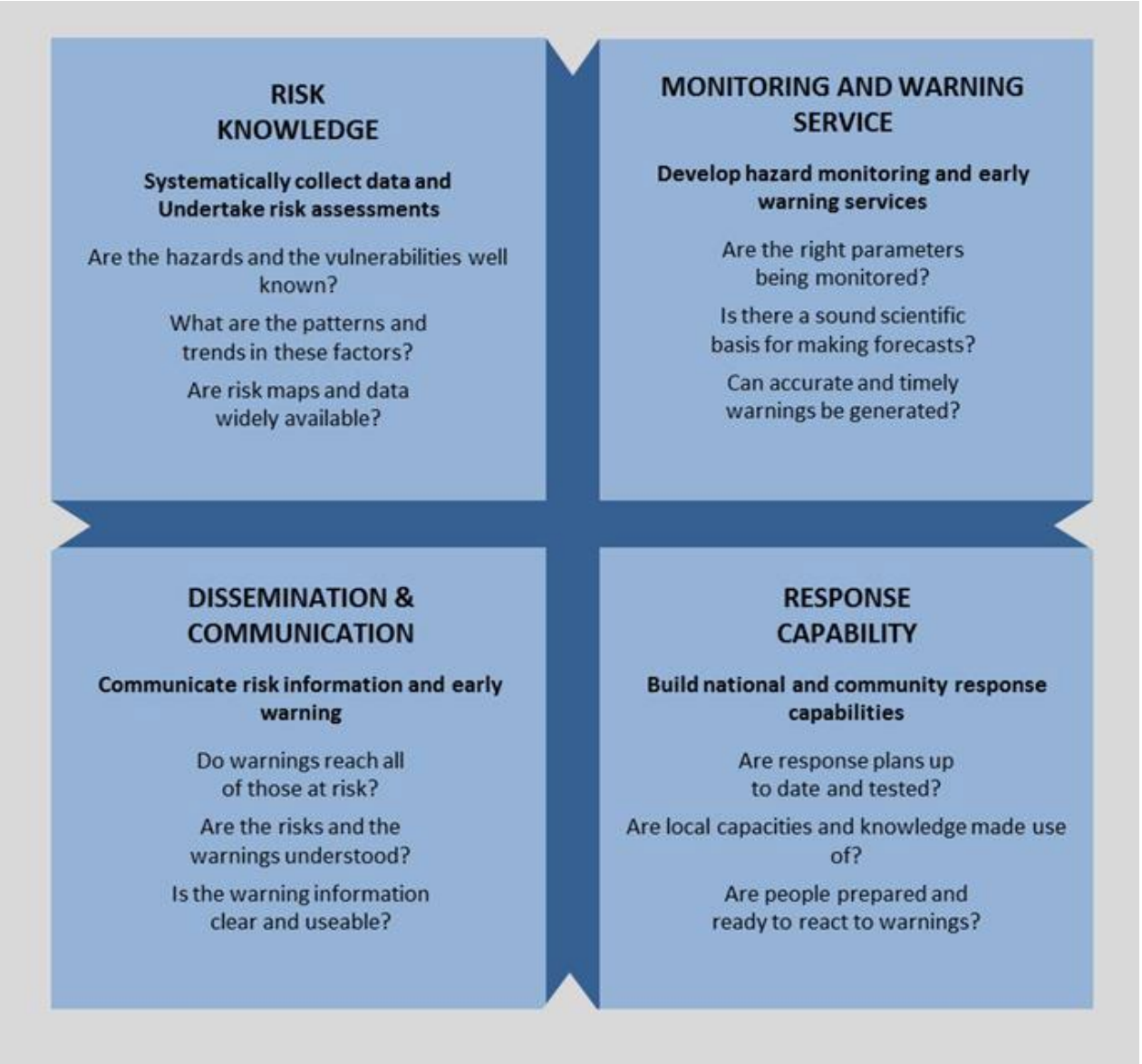


The Four Components of ETWS



Source: MG76

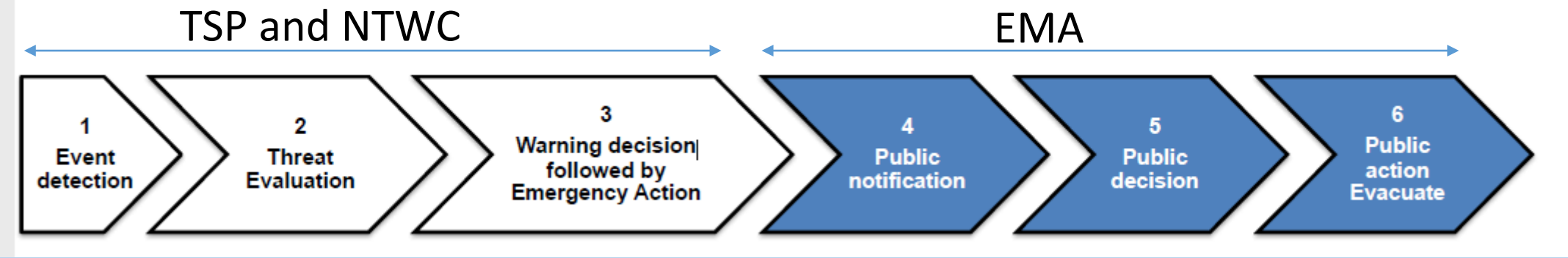
Principal Stakeholders of ETWS

TSP

NTWC

EMA

The public



Smooth coordination between stakeholders is essential.

Stakeholders of ETWS

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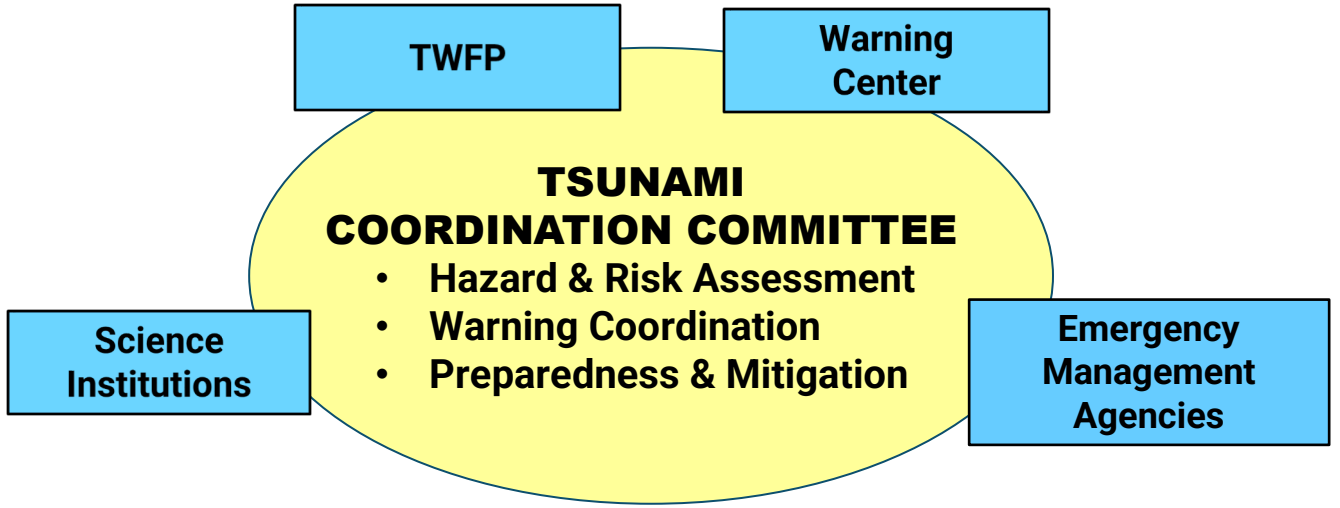
Experts/Stakeholder	Roles
Local Mayor	Sponsor evacuation planning process, approve and sign off on the Evacuation Map and Plan
Local Emergency Management Agency	Lead planning process, own and manage the Plan
Regional Emergency Management Agency	Contribute to planning; set regional arrangements
National Emergency Management Agency	Set national arrangements
National Tsunami Warning Centre	Contribute to planning for warnings
Earthquake and Tsunami Experts	Advise on tsunami sources, threat and behaviour
Local Authority	Make available relevant staff (i.e. community planners)
Emergency Services	Contribute to planning, management of evacuations and warning notification
Utilities & critical infrastructure	Advise on tsunami impact and needs
Community Groups	Advise on needs and Evacuation Maps
Non-Government Organizations	Contribute to planning for their role in management of assembly areas, relief, and awareness
Media	Contribute to planning for their role in warnings
Numerical modellers	Develop Inundation Map
GIS Mapping Experts	Support development of Inundation and Evacuation Maps
Residents	Contribute and participate in tsunami evacuation mapping, planning, and exercises
Education Community	Teach tsunami and disaster preparedness curricula in schools; Participate in evacuation, planning and exercising of school and extended communities
Tourist/Visitor Industry	Share information on tsunami awareness and evacuation. Each hotel should have an evacuation plan
Business Organizations and Private Sector	Share information on tsunami awareness and evacuation
Maritime Groups, Port and Harbour Authorities	Share information on tsunami awareness and evacuation of ports and harbours. Prepare evacuation plan for marine vessels, including for tourist cruise ships

Stakeholder Coordination is Essential



Civil Society & NGOs

- **Community organizations** (social, gender, cultural, age, language, religious …)
- Trade, business organizations
- Disaster response & relief

Government Agencies:

- Planning & Development
- Transportation
- Health & Education
- Coastal Management
- Social Services

Other:

- Media
- Utilities
- Tourism
- International Agencies

Source: MG76

Figure 2.5 Participants in a Tsunami Coordinating Committee (Source: ITIC)

Principal Stakeholders of ETWS

- TSP
- NTWC
- EMA
- The public

TSUNAMI SERVICE PROVIDERS

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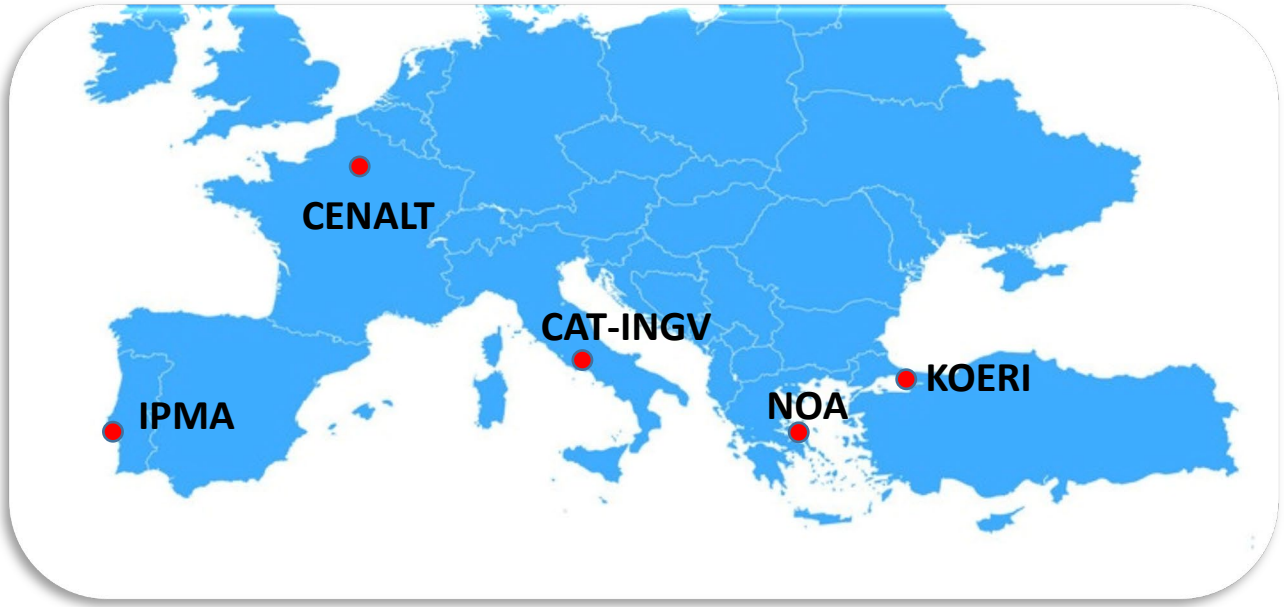
Tsunami Warning Principal Stakeholder

TSUNAMI SERVICE PROVIDERS (TSP)



5 in NEAM:

1. CENtre d'Alerte aux Tsunamis (CENALT)
2. Kandilli Observatory and Earthquake Research Institute (KOERI)
3. National Observatory of Athens (NOA)
4. Centro di Allerta Tsunami (CAT-INGV)
5. Instituto Português do Mar e da Atmosfera (IPMA)

A center with the capability to detect and assess tsunami threats over a large region, and to disseminate their threat assessment to other Member States

Tsunami Warning Principal Stakeholder-
TSP-roles & responsibilities

Event Response Operations

- regional Monitoring & Detection (24/7) of seismic and seal level activity
- provide timely initial earthquake information
- determine more specific threat info
- provide timely tsunami forecast
- monitor tsunami propagation
- serve as an NTWC for the country in which it resides
- serve as a backup center to other TSPs

Tsunami Warning Principal Stakeholder-
TSP-roles & responsibilities

In non-emergency/routine cases:

- document and regularly review and update SOP
- regularly test and carry out exercises
- perform calibration and validation of forecasting tools and models.
- review and update observations from seismic and sea level data streams.

NATIONAL TSUNAMI WARNING CENTERS

Tsunami Warning-Principal Stakeholder:

NTWC-roles & responsibilities

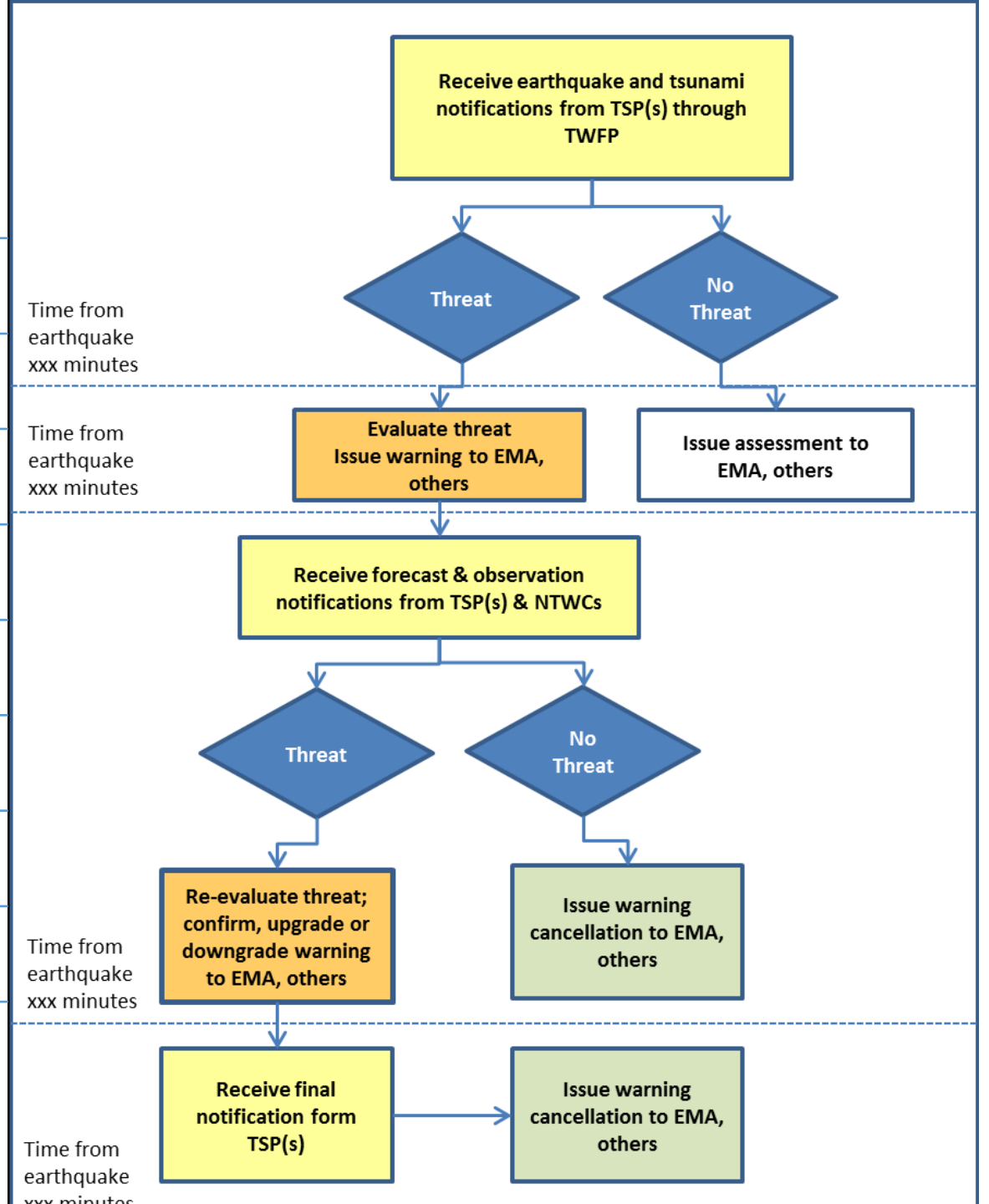
Event Response Operations:

- operates on 24/7 basis to receive **EQ** and tsunami information from TSPs
- evaluates the threat to coastal communities and issues warnings about threats or cancellations to EMAs and other stakeholder agencies.

Must respond quickly, be as accurate as possible and be reliable to be effective

Principal NTWC event response steps and flowchart on receipt of EQ data

1. Detect and analyze large **earthquake**
2. Assess tsunami threat based on pre-determined criteria
3. Issue initial tsunami warning message
4. Receive and/or carry out further seismic analysis and receive/calculate tsunami forecast
5. Detect and analyze sea level data for tsunamis
6. Re-assess tsunami threat
7. Issue supplementary warning message
8. Repeat steps 4-7 until “No dangerous tsunami waves coming ashore”
9. Issue tsunami warning cancellation message



Tsunami Warning:
Principal Stakeholder: NTWC

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NTWC during non-event or routine operations

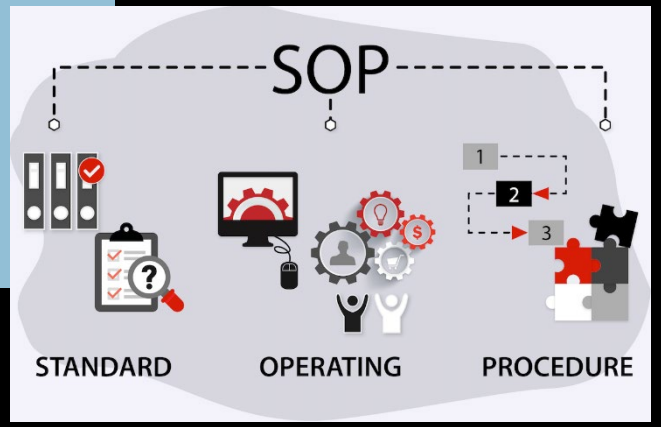
- Routine and daily office operations and watch duty staffing
- Data quality control, equipment/instrument repair, and maintenance
- Data and warning communications
- Staff training and exercising
- Contingency planning or backup in case the primary tools become inoperable
- Education and training of stakeholders.

Tsunami event response operations and non-event operations are described in Operations Manual of NTWC!

SUPPORTING DOCUMENTS OF ETWS

National Tsunami Warning and Emergency Response Plan:

- HIGH LEVEL DOCUMENT
- describe the collective system components
- and assign responsibilities and actions



Standard Operatiing Procedures Plan:

- Each system component and responsibility requires an SOP

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The Roles & Responsibilities for:

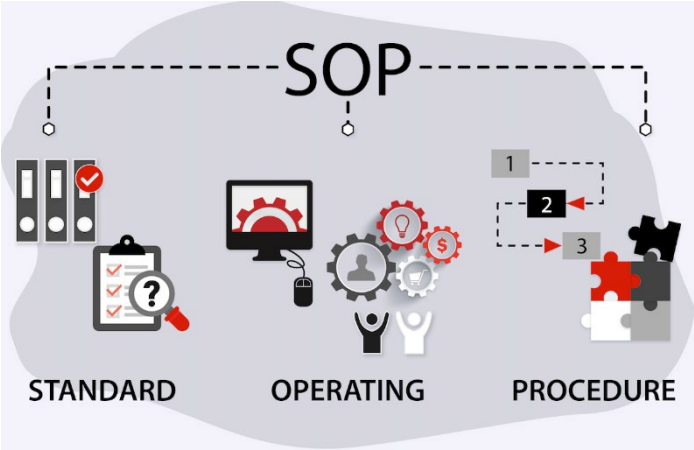
NTERP

The Roles & Responsibilities for:

- TSP (short description who they are and the type of bulletins they provide)
- Receipt & assessment of TSP bulletins
- Receipt/development & assessment of national information
- Dissemination of warnings to EMAs and other response agencies and authorities
- Alerting of local communities and mariners
- Deciding and taking emergency response measures such as evacuations
- Cancellation of warnings and “All- Clear” to return
- Media management (formal role of the media as part of the system if any)
- Public education (on-going)

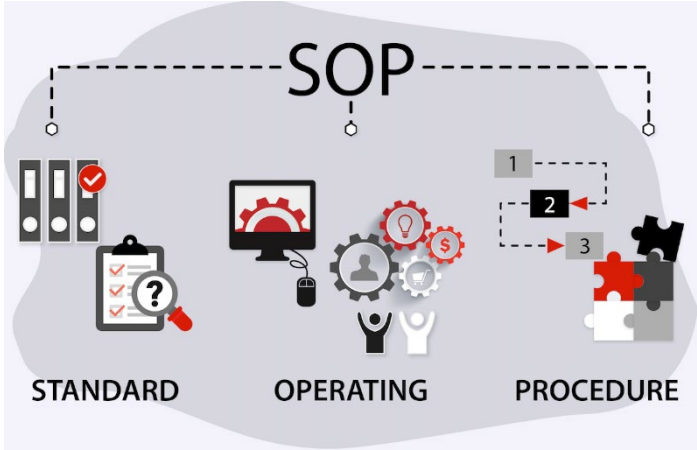
- The warning concept (thresholds, threat levels, danger zones as applicable)
- The types of warnings (including describing when each type will be used, and how the information is to be used by recipients)
- Key stakeholder addresses

What are SOPs?



What are SOPs?

A written instructions and work processes for organizations, to follow procedures on agreed steps used in coordinating who, what, when, where and how for tsunami early warning and response so that activities are performed with consistent conformance to the system requirements and organizations' mission.



Why are SOPs important?

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- Foundation of effective, reliable warning systems

- All warning systems require SOPs, but for tsunami, rapid evaluation, warning and response is essential to save lives

- In an end-to-end system, communications links between stakeholders must be robust or warning chain will be broken

- SOPs should be developed, practiced and modified as necessary – a "living document"

SOPs

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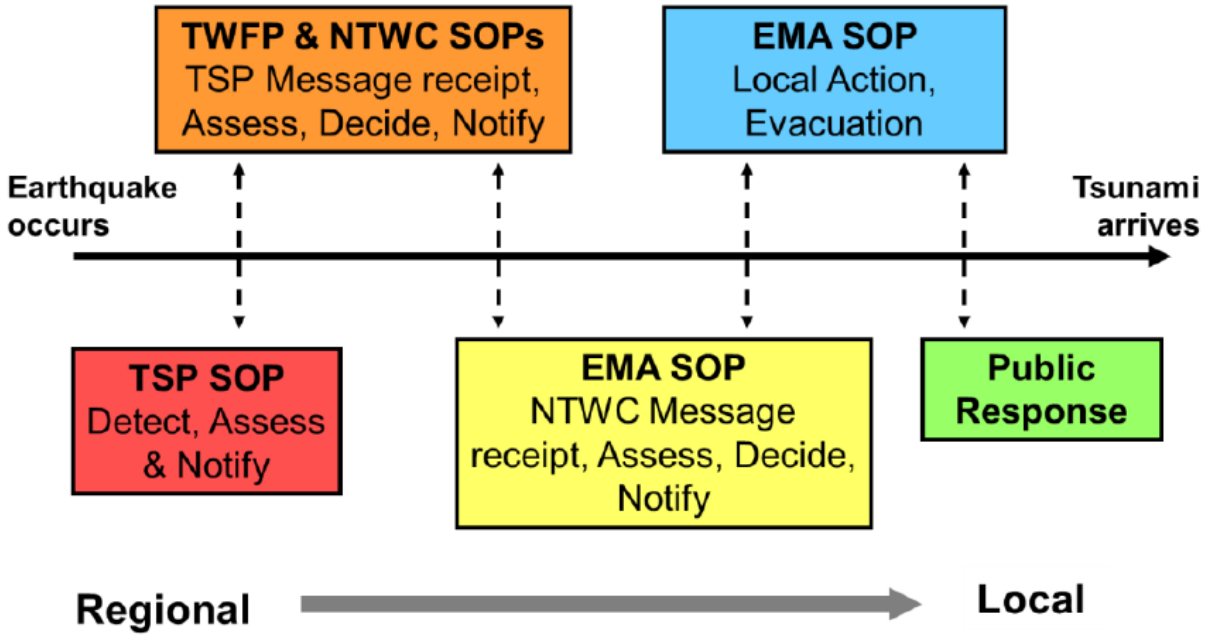

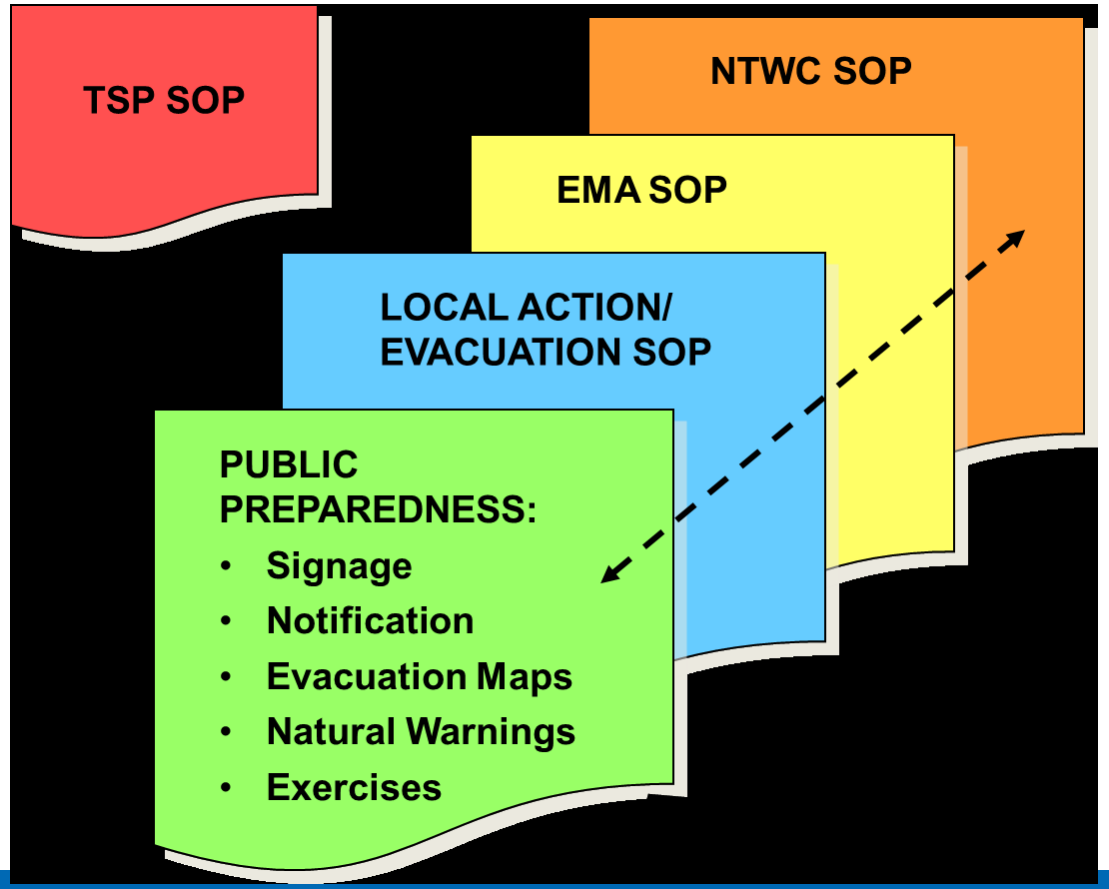

Different Types of SOP Documents

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1. Official SOP documents for management purposes

2. Comprehensive TW operations SOP documents with many details for study and reference during non-crisis

3. Quick-Reference SOP documents for reference during crisis

4. Systems SOP documents so recipients understand TWC/TER

Official SOPs for Management

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☐Directives

- ■TWC Performance Expectations
- ■Roles & Responsibilities / Concept of Operations
- ■Maintained by Parent Organization
- ■Formal Review / Change Process with Organizational Stakeholders

☐Station Duty Manual

- ■Duty Staff Performance Expectations
- ■Maintained by TWC Management
- ■Includes tasks outside Crisis Operations
- ■Formal Review / Change Process with Staff

Comprehensive TW operations SOP documents

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100% Operational Reliability

1. Data availability monitoring
2. Data quality monitoring
3. Maintenance and repair priorities
4. System Alteration Procedures
5. System Failure Procedures

Long Term Readiness:

1. Communication Tests
2. Table-top Exercises

Quick Reference SOPs for an effective presentation

1. Timeline-driven activities

- Need to act rapidly (minutes)
- How much time do you have?
- What information is wanted?

Quick Reference SOPs for an effective presentation

1. Timeline-driven activities

STEP	TIME since EQ*	ACTIVITY	ACTION AND PROCEDURES
1	1 min	Seismic Alarm Trigger	• Alarm sounds from automated seismic processing system • Feel earthquake and respond, receive phone call or other • For a strongly felt earthquake (greater than Modified Mercalli Intensity Scale VI), alert should be issued immediately to the public and EMA EOC advising to clear the beach
2	2 min	Earthquake Monitoring and Analysis	• Monitor RTED/CISN and other information tools • Receive Information provided by TSP/other Centres • Review/update automatic phase picks and solution. Perform Interactive analysis if required. Highest priority for review is earthquake magnitude and focal depth

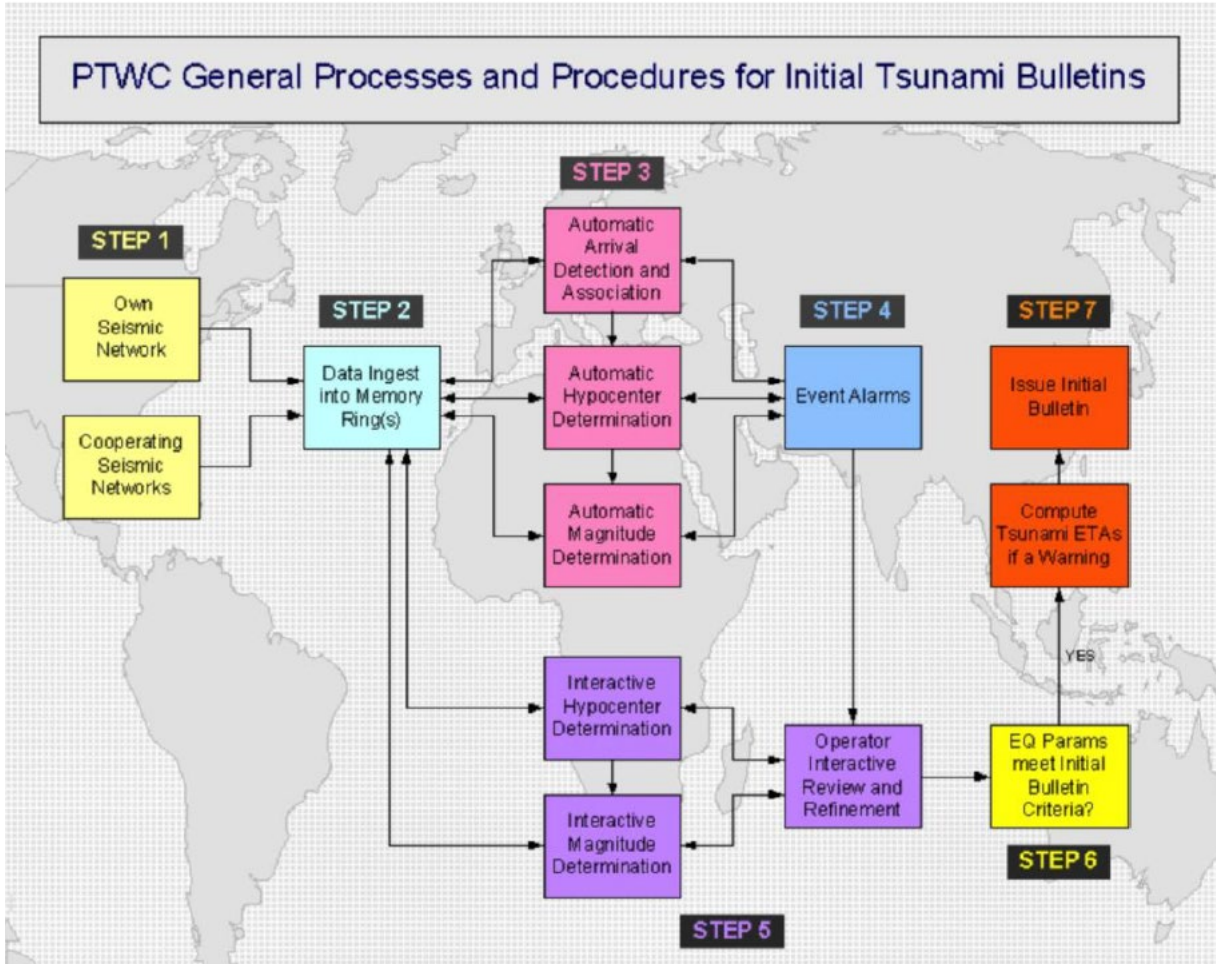
3	3 min	Tsunami Threat Assessment	• Obtain ETA by look up in TSP Message
			• Obtain threat by look up in TSP Message
			• Calculate tsunami travel times/ETA to nearest coasts or refer to pre-calculated reverse tsunami travel time map ('bullseye' with country as centre
			• Estimate Threat by
			  ○ Tsunami Scenario Database look up
			  ○ Earthquake location, depth, magnitude as proxy for tsunami threat height and area

4	5 min	Issuance of warning and related information	• Use Country Criteria Table to decide on Alert Level. If warning thresholds (for earthquake magnitude or expected tsunami amplitude) are exceeded, issue warning to tsunami-threatened areas immediately. For warning, issue ETAs at forecast points.
5	7 min	Re-analysis, Tsunami monitoring	• Monitor for updates to earthquake parameters by TSP/other Centres • Obtain tsunami observations by loop up in TSP Message • Monitor sea level stations near the epicentre

- Need to act rapidly (minutes)
- How much time do you have?
- What information is wanted?

Quick Reference SOPs for an effective presentation

2. Communication Flow Charts-Effective Way of Presenting SOPs



- Steps to be followed
- Decision Tree
- Systems or subsystems involved
- often not useful in real event

(experience is most important)

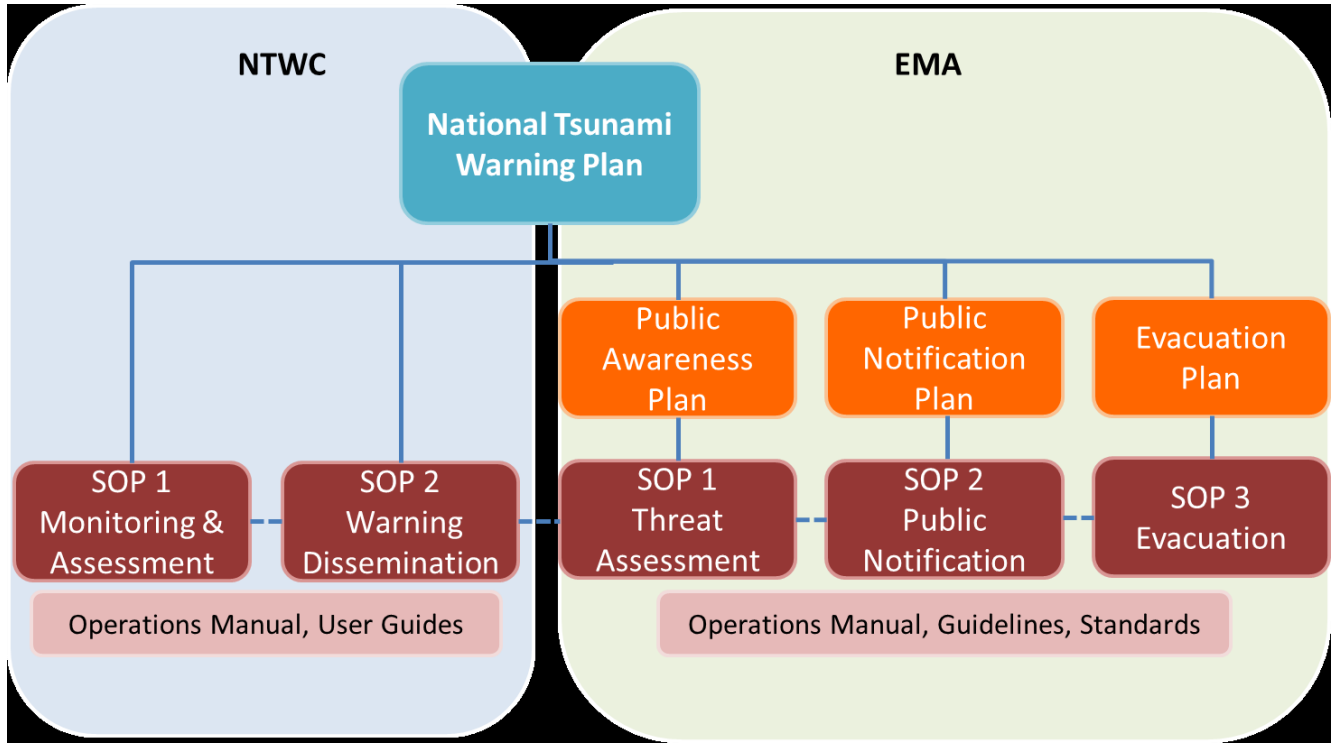
Quick Reference SOPs for an effective presentation

3. Checklists

- ‘Cheat sheets’
- Useful during the fast response

Evacuation Checklist		
This is a simple checklist to use when doing an evacuation. Make sure to include the date, who filled out the checklist, and the time each task was completed by.	Date: _____	
	By:	Time:
Tsunami message received		
Call in staff		
Activate emergency centers / Notify public safety agencies		
Sound public sirens and alarm notifications		
Initiate media notifications and evacuation announcements		
Initiate evacuation of people away from coast (Tsunami Evacuation Maps)		
Put boats/ships out to sea if wave impact time permits		
Setup road-blocks and evacuation routes		

SUMMARY



- Develop SOPs
- Use SOPs (Real Event or Exercise)
- Did they work? No?,revise them!
- Follow your procedures
- It becomes your basis for action

KEEP IT CLEAR, CONCISE, SIMPLE!

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THANK YOU