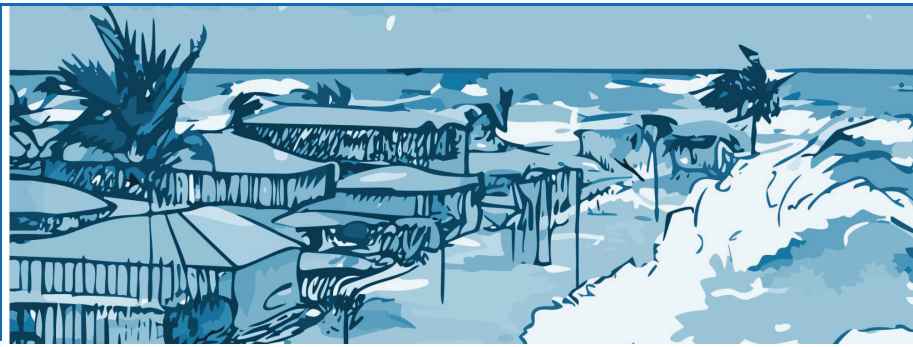
Tsunami Evacuation Mapping Workshop



CoastWAVE 2.0 Project

IOC-UNESCO (EU DG ECHO)

Dr. Matthieu Péroche
Louis Monnier

30 June – 4 July 2025

Contact : matthieu.peroche@univ-montp3.fr

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Intergovernmental Oceanographic Commission

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2021 2030 United Nations Decade of Ocean Science for Sustainable Development

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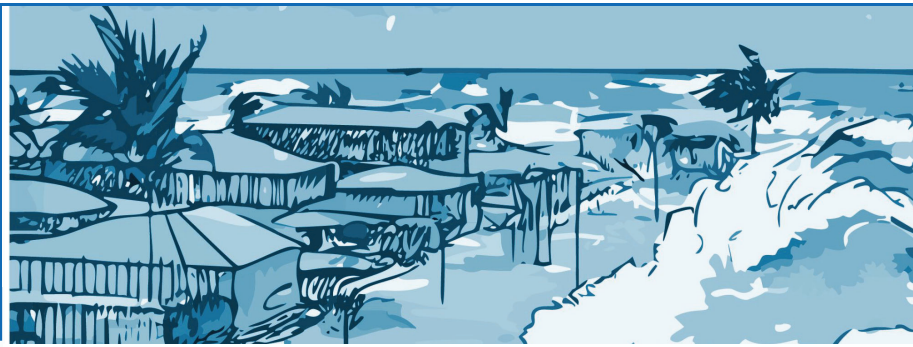
UNIVERSITÉ PAUL VALÉRY MONTPELLIER 3

Tsunami Evacuation Mapping Workshop

30 June – 4 July 2025



CoastWAVE 2.0 Project

IOC-UNESCO (EU DG ECHO)

Dr. Matthieu Péroche
Louis Monnier

Lesson #6

Tsunami evacuation signage

Contact : matthieu.peroche@univ-montp3.fr

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Lesson #6 Tsunami evacuation signage

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 three times a year.
8	**PREP-5**: A community tsunami exercise is conducted at least every two years.

The most visible way to educate the public about the tsunami hazard in the coastal zone is by using signboards. The tsunami signage will contribute to public awareness of the risk posed by tsunamis and better understanding of what should be done by the community in response to the event. It is critical that residents and tourists be aware of tsunami hazard zones, evacuation routes and safe zones in coastal areas.

- Signage needs to comply with national and/or international standards specifications.
- Signage must inform both the local population and international visitors.
- Local or national authorities have to define the number of signs by localities, but at a minimum, there must be signs for public education and signage for evacuation
- The adoption of a tsunami signage standard will provide a basis for a consistent set of signage and symbols nationwide.

Dr. Matthieu Péroche (matthieu.peroche@univ-montp3.fr) - Louis Monnier

Tsunami evacuation signage

In 2008, the International Organization for Standardization (ISO) approved international signage for tsunami hazard zones, evacuation areas and evacuation buildings.

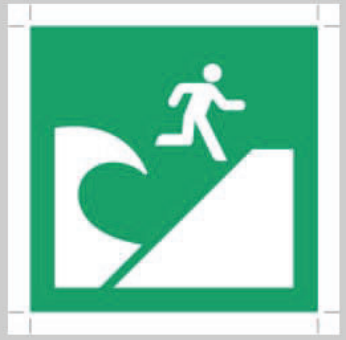
ISO 20712 on water safety signs and beach safety flags provides guidance on safety signs that provide information about aquatic hazards and the action necessary to avoid those hazards, including signage for tsunami hazard areas.

Reference No : W056

Category : Warning

Registration date : 2019-07-30

Status : Active

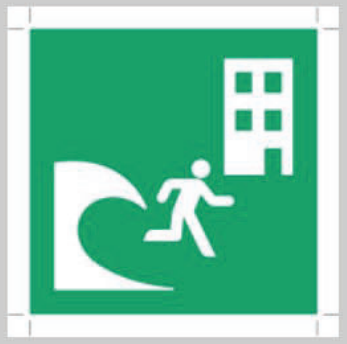


Reference No : E062

Category : Evacuation route, location of safety equipment or safety facility, safety action

Registration date : 2019-07-30

Status : Active



Reference No : E063

Category : Evacuation route, location of safety equipment or safety facility, safety action

Registration date : 2019-07-30

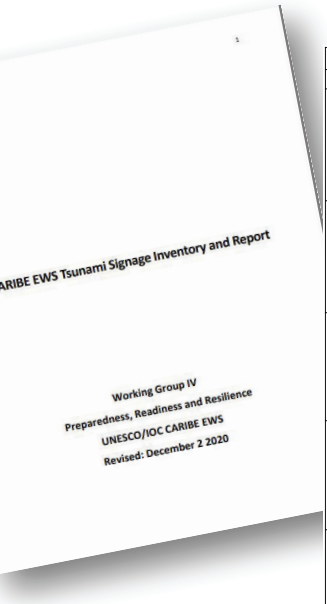
Status : Active

http://itic.ioc-unesco.org/index.php?option=com_content&view=article&id=1645&Itemid=2322

https://www.iso.org/obp/ui#iso:grs:7010:E063

Lesson #6 | Tsunami evacuation signage

CARIBE EWS Tsunami Signage Inventory and Report



Costa Rica

Signage Art/Photo	Signage Type	General Information
	Tsunami Hazard Zone	Width/Height (ft.): 90 cm x 60 cm Materials (e.g. aluminum, plastic, or fiber glass): Aluminum Number of Signs Installed: Quepos: 55 Ostional: 5
	Entering/Leaving Tsunami Hazard Zone	Width/Height (ft.): Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed: Ostional: 13
	Tsunami Evacuation Route	Width/Height (ft.): 90 cm x 60 cm Materials (e.g. aluminum, plastic, or fiber glass): Aluminum Number of Signs Installed: Quepos: 254 OOstional: 1
	Tsunami Assembly Point	Width/Height (ft.): 90 cm x 60 cm Materials (e.g. aluminum, plastic, or fiber glass): Aluminum Number of Signs Installed: Quepos: 77 Ostional: 2
	Tsunami Evacuation Map	Width/Height (ft.): 2.2 m x 2.1 m Materials (e.g. aluminum, plastic, or fiber glass): Aluminum Number of Signs Installed: Quepos: 13
	Tsunami Ready Recognition	Width/Height (ft.): Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed:

Person Completing Survey: Silvia Chacón Berrantes (silviach@una.ac.cr)

Member State Contact Information:
NTWC: Sistema Nacional Monitoreo de Tsunami, Dr. Silvia Chacón Barrantes, Coordinator. Tel: +50683096690, +50688957414, +50622102872. E-mail: sinamot@una.cr, silviach@una.ac.cr, sinamot.cr@gmail.com

Comments: There are two communities recognized as Tsunami Ready in Costa Rica: Quepos and Ostional. Both communities use two different types of tsunami signage. Quepos signage are mainly green and yellow, meanwhile the signage of Ostional are blue.

Honduras

Signage Art/Photo	Signage Type	General Information
	Tsunami Hazards Zone	Width/Height (ft.): Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed:
	Entering/Leaving Tsunami Hazard Zone	Width/Height (ft.): Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed:
	Tsunami Evacuation Route	Width/Height (ft.): Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed:
	Tsunami Assembly Point	Width/Height (ft.): Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed:
	Tsunami Evacuation Map	Width/Height (ft.): Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed:
	Tsunami Ready Recognition	Width/Height (ft.): Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed:

Person Completing Survey:

Member state Contact Information:
NTWC & TWFP: Comisión Permanente de Contingencias,Mr. Juan José Reyes (Alerta Temprana) Tel: +50433994815 Email: martincito1968@yahoo.com
TNC: Comisión Permanente de Contingencias, Lic. Oscar Renan Mencia Irias (Director Nacional de Gestión de Preparación y Respuesta a la Emergencia) Tel: +50422290606 ext 3301 Email: oscarmencia@copeco.gob.hn

Comments: The signage belongs to the Cedeño community, located in the Pacific coast of Honduras.

(Note form CTWP):

Trinidad & Tobago

Signage Art/Photo	Signage Type	General Information
	Tsunami Hazards Zone	Width/Height (ft.): 24" x 24" Materials (e.g. aluminum, plastic, or fiber glass): Aluminum Number of Signs Installed: 7
	Entering/Leaving Tsunami Hazard Zone	Width/Height (ft.): Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed:
	Tsunami Evacuation Route	Width/Height (ft.): 36" x 36" Materials (e.g. aluminum, plastic, or fiber glass): Aluminum Number of Signs Installed: 7
	Tsunami Assembly Point	Width/Height (ft.): 36" x 24" Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed: 2
	Tsunami Evacuation Map	Width/Height (ft.): Materials (e.g. aluminum, plastic, or fiber glass): Number of Signs Installed:
	Tsunami Ready Recognition	Width/Height (ft.): 36" x 24" Materials (e.g. aluminum, plastic, or fiber glass): Aluminum Number of Signs Installed: 1

Person Completing Survey: Muhammad Anwar Baksh

Member state Contact Information:
NTWC: Office of Disaster Preparedness and Management (ODPM), Rodney Smart (Chief Executive Officer) Tel: +18686401285 Email: rsmart@mns.gov.tt , odpmalerts@mns.gov.tt
TWFP: Trinidad and Tobago Meteorological Services, Mr. Ezekiel Sampson (Director) Tel: +18686694392, +18686695465 Email: synop@metoffice.gov.tt , Seide.Shakeer@metoffice.gov.tt , dirmet@metoffice.gov.tt

Comments: The signage correspond to the community of Carenage.

(Note form CTWP):

http://itic.ioc-unesco.org/index.php?option=com_oe&task=viewDocumentRecord&docID=28111

Tsunami evacuation signage

The first tsunami evacuation signs in the French West Indies (Martinique, 2013)

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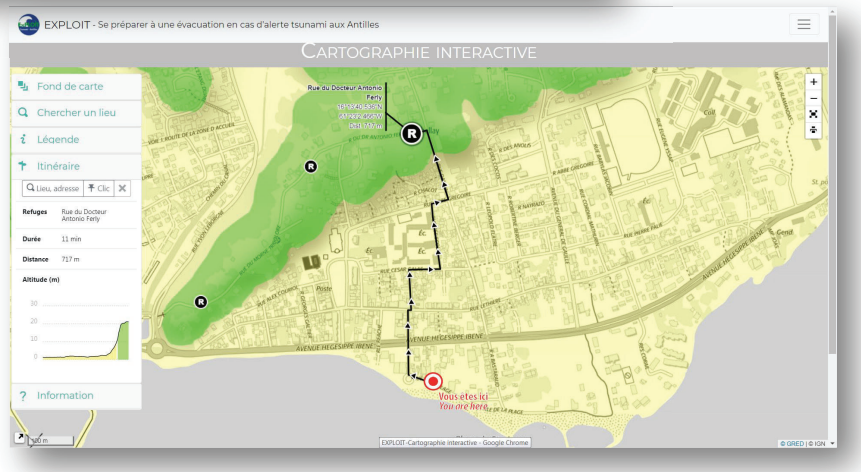
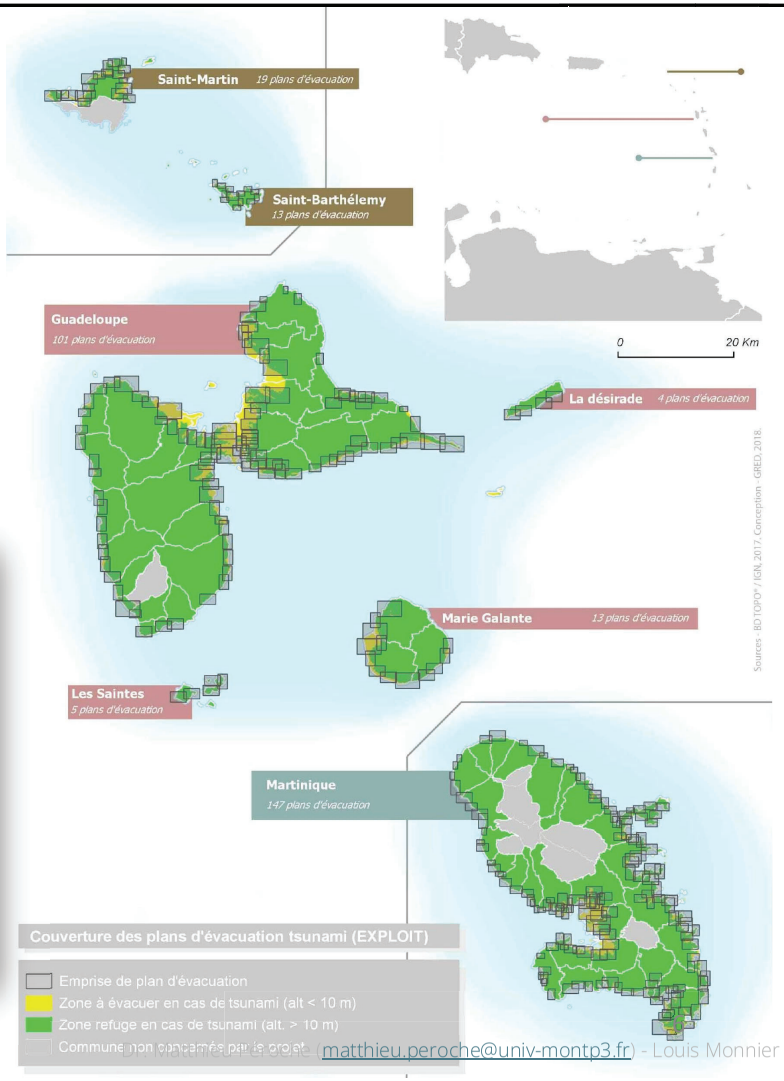
Lesson #6

Tsunami evacuation signage

Coastwave 2.0 Evacuation Mapping Workshop





https://exploit.univ-montp3.fr/

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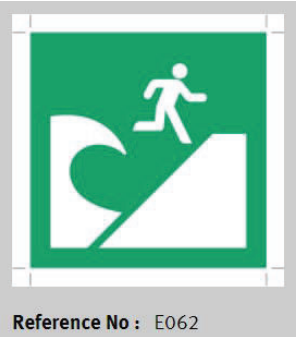
Dr Matthieu Péroche (matthieu.peroche@univ-montp3.fr) - Louis Monnier

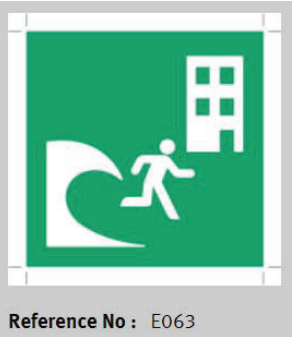
Tsunami evacuation signage

The ISO-approved signage consists of three signs :

Tsunami Hazard Zone (left) - To warn of a hazard from tsunami waves



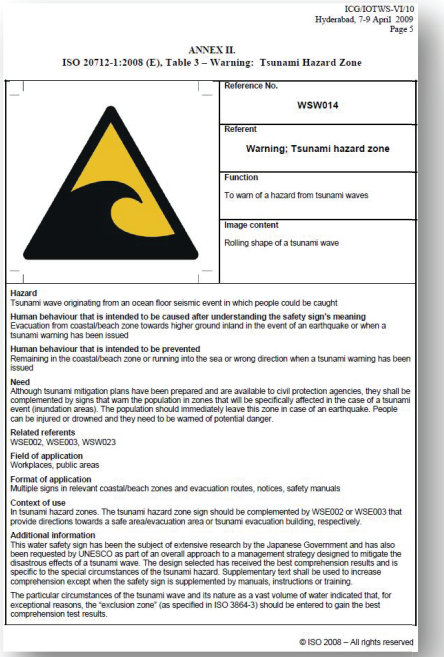
• **Tsunami Evacuation Area (middle) -** To indicate the location of a safe place/uphill area for evacuation to in the event of a tsunami



• **Tsunami Evacuation Building (right) -** To indicate the location of a safe building for evacuation in the event of a tsunami

Tsunami evacuation signage

The ISO-approved signage consists of three signs :



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Hyderabad, 7-9 April 2009
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ANNEX II.
ISO 20712-1:2008 (E), Table 3 – Warning: Tsunami Hazard Zone

Reference No.
WSW014

Referent
Warning; Tsunami hazard zone

Function
To warn of a hazard from tsunami waves

Image content
Rolling shape of a tsunami wave

Hazard
Tsunami wave originating from an ocean floor seismic event in which people could be caught

Human behaviour that is intended to be caused after understanding the safety sign's meaning
Evacuation from coastal/beach zone towards higher ground inland in the event of an earthquake or when a tsunami warning has been issued

Human behaviour that is intended to be prevented
Remaining in the coastal/beach zone or running into the sea or wrong direction when a tsunami warning has been issued

Need
Although tsunami mitigation plans have been prepared and are available to civil protection agencies, they shall be complemented by signs that warn the population in zones that will be specifically affected in the case of a tsunami event (inundation areas). The population should immediately leave this zone in case of an earthquake. People can be injured or drowned and they need to be warned of potential danger.

Related referents
WSE002, WSE003, WSW023

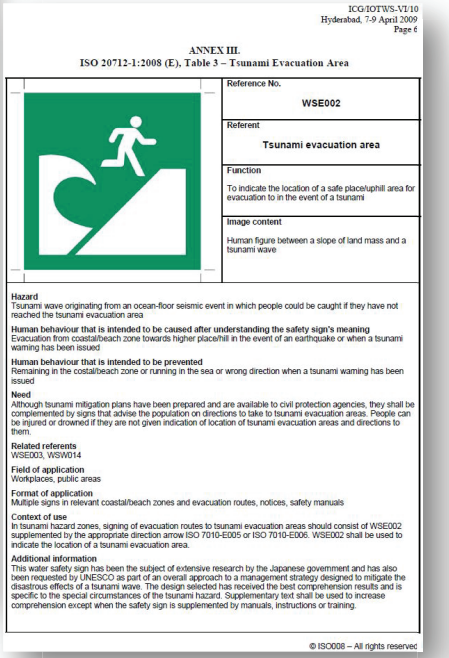
Field of application
Workplaces, public areas

Format of application
Multiple signs in relevant coastal/beach zones and evacuation routes, notices, safety manuals

Context of use
In tsunami hazard zones. The tsunami hazard zone sign should be complemented by WSE002 or WSE003 that provide directions towards a safe area/evacuation area or tsunami evacuation building, respectively.

Additional information
This water safety sign has been the subject of extensive research by the Japanese Government and has also been requested by UNESCO as part of an overall approach to a management strategy designed to mitigate the disastrous effects of a tsunami wave. The design selected has received the best comprehension results and is specific to the special circumstances of the tsunami hazard. Supplementary text shall be used to increase comprehension except when the safety sign is supplemented by manuals, instructions or training.

The particular circumstances of the tsunami wave and its nature as a vast volume of water indicated that, for exceptional reasons, the "exclusion zone" (as specified in ISO 3864-3) should be entered to gain the best comprehension test results.



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ANNEX III.
ISO 20712-1:2008 (E), Table 3 – Tsunami Evacuation Area

Reference No.
WSE002

Referent
Tsunami evacuation area

Function
To indicate the location of a safe place/uphill area for evacuation to in the event of a tsunami

Image content
Human figure between a slope of land mass and a tsunami wave

Hazard
Tsunami wave originating from an ocean-floor seismic event in which people could be caught if they have not reached the tsunami evacuation area

Human behaviour that is intended to be caused after understanding the safety sign's meaning
Evacuation from coastal/beach zone towards higher place/hill in the event of an earthquake or when a tsunami warning has been issued

Human behaviour that is intended to be prevented
Remaining in the costal/beach zone or running in the sea or wrong direction when a tsunami warning has been issued

Need
Although tsunami mitigation plans have been prepared and are available to civil protection agencies, they shall be complemented by signs that advise the population on directions to take to tsunami evacuation areas. People can be injured or drowned if they are not given indication of location of tsunami evacuation areas and directions to them.

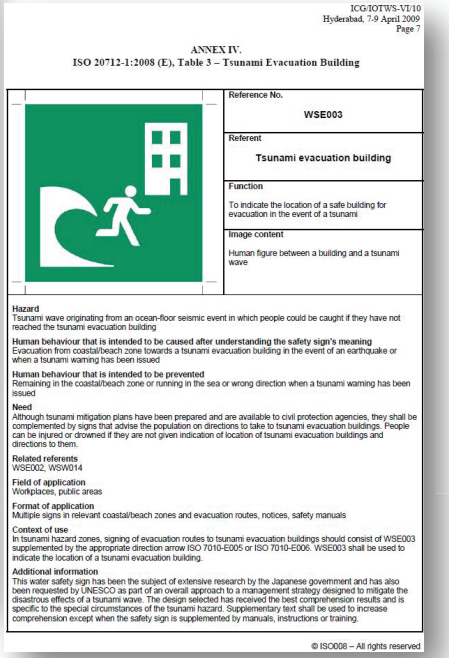
Related referents
WSE003, WSW014

Field of application
Workplaces, public areas

Format of application
Multiple signs in relevant coastal/beach zones and evacuation routes, notices, safety manuals

Context of use
In tsunami hazard zones, signing of evacuation routes to tsunami evacuation areas should consist of WSE002 supplemented by the appropriate direction arrow ISO 7010-E005 or ISO 7010-E006. WSE002 shall be used to indicate the location of a tsunami evacuation area.

Additional information
This water safety sign has been the subject of extensive research by the Japanese government and has also been requested by UNESCO as part of an overall approach to a management strategy designed to mitigate the disastrous effects of a tsunami wave. The design selected has received the best comprehension results and is specific to the special circumstances of the tsunami hazard. Supplementary text shall be used to increase comprehension except when the safety sign is supplemented by manuals, instructions or training.



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Hyderabad, 7-9 April 2009
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ANNEX IV.
ISO 20712-1:2008 (E), Table 3 – Tsunami Evacuation Building

Reference No.
WSE003

Referent
Tsunami evacuation building

Function
To indicate the location of a safe building for evacuation in the event of a tsunami

Image content
Human figure between a building and a tsunami wave

Hazard
Tsunami wave originating from an ocean-floor seismic event in which people could be caught if they have not reached the tsunami evacuation building

Human behaviour that is intended to be caused after understanding the safety sign's meaning
Evacuation from coastal/beach zone towards a tsunami evacuation building in the event of an earthquake or when a tsunami warning has been issued

Human behaviour that is intended to be prevented
Remaining in the coastal/beach zone or running in the sea or wrong direction when a tsunami warning has been issued

Need
Although tsunami mitigation plans have been prepared and are available to civil protection agencies, they shall be complemented by signs that advise the population on directions to take to tsunami evacuation buildings. People can be injured or drowned if they are not given indication of location of tsunami evacuation buildings and directions to them.

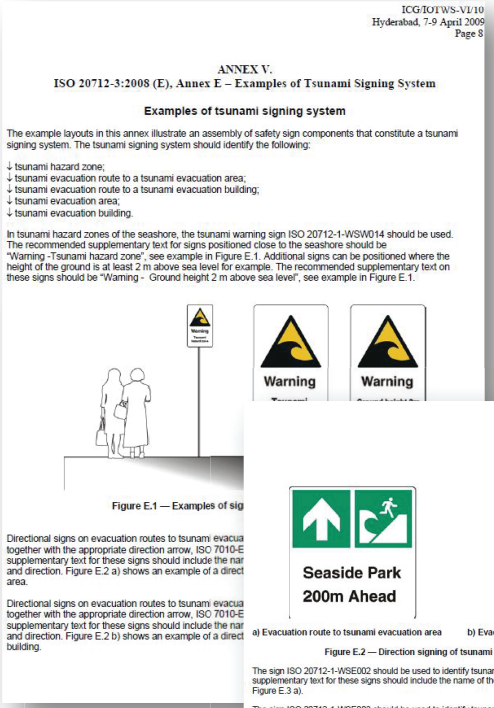
Related referents
WSE002, WSW014

Field of application
Workplaces, public areas

Format of application
Multiple signs in relevant coastal/beach zones and evacuation routes, notices, safety manuals

Context of use
In tsunami hazard zones, signing of evacuation routes to tsunami evacuation buildings should consist of WSE003 supplemented by the appropriate direction arrow ISO 7010-E005 or ISO 7010-E006. WSE003 shall be used to indicate the location of a tsunami evacuation building.

Additional information
This water safety sign has been the subject of extensive research by the Japanese government and has also been requested by UNESCO as part of an overall approach to a management strategy designed to mitigate the disastrous effects of a tsunami wave. The design selected has received the best comprehension results and is specific to the special circumstances of the tsunami hazard. Supplementary text shall be used to increase comprehension except when the safety sign is supplemented by manuals, instructions or training.



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ANNEX V.
ISO 20712-3:2008 (E), Annex E – Examples of Tsunami Signing System

Examples of tsunami signing system

The example layouts in this annex illustrate an assembly of safety sign components that constitute a tsunami signing system. The tsunami signing system should identify the following:

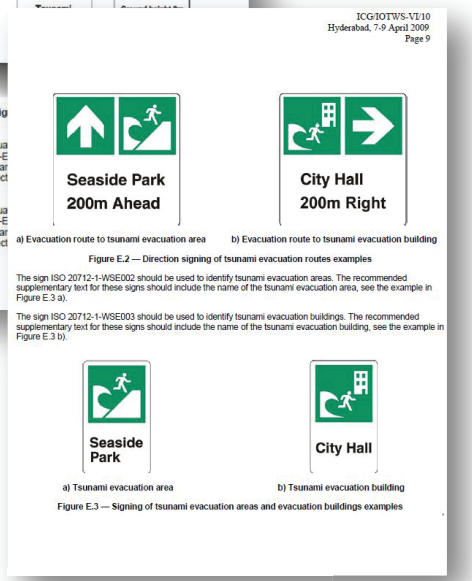
↓ tsunami hazard zone;
↓ tsunami evacuation route to a tsunami evacuation area;
↓ tsunami evacuation route to a tsunami evacuation building;
↓ tsunami evacuation area;
↓ tsunami evacuation building.

In tsunami hazard zones of the seashore, the tsunami warning sign ISO 20712-1-WSW014 should be used. The recommended supplementary text for signs positioned close to the seashore should be "Warning -Tsunami hazard zone", see example in Figure E.1. Additional signs can be positioned where the height of the ground is at least 2 m above sea level for example. The recommended supplementary text on these signs should be "Warning - Ground height 2 m above sea level", see example in Figure E.1.

Figure E.1 — Examples of sig

Directional signs on evacuation routes to tsunami evacua
together with the appropriate direction arrow, ISO 7010-E
supplementary text for these signs should include the nar
and direction. Figure E.2 a) shows an example of a direct
area.

Directional signs on evacuation routes to tsunami evacua
together with the appropriate direction arrow, ISO 7010-E
supplementary text for these signs should include the nar
and direction. Figure E.2 b) shows an example of a direct
building.



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a) Evacuation route to tsunami evacuation area b) Evacuation route to tsunami evacuation building

Figure E.2 — Direction signing of tsunami evacuation routes examples

The sign ISO 20712-1-WSE002 should be used to identify tsunami evacuation areas. The recommended supplementary text for these signs should include the name of the tsunami evacuation area, see the example in Figure E.3 a).

The sign ISO 20712-1-WSE003 should be used to identify tsunami evacuation buildings. The recommended supplementary text for these signs should include the name of the tsunami evacuation building, see the example in Figure E.3 b).

a) Tsunami evacuation area b) Tsunami evacuation building

Figure E.3 — Signing of tsunami evacuation areas and evacuation buildings examples

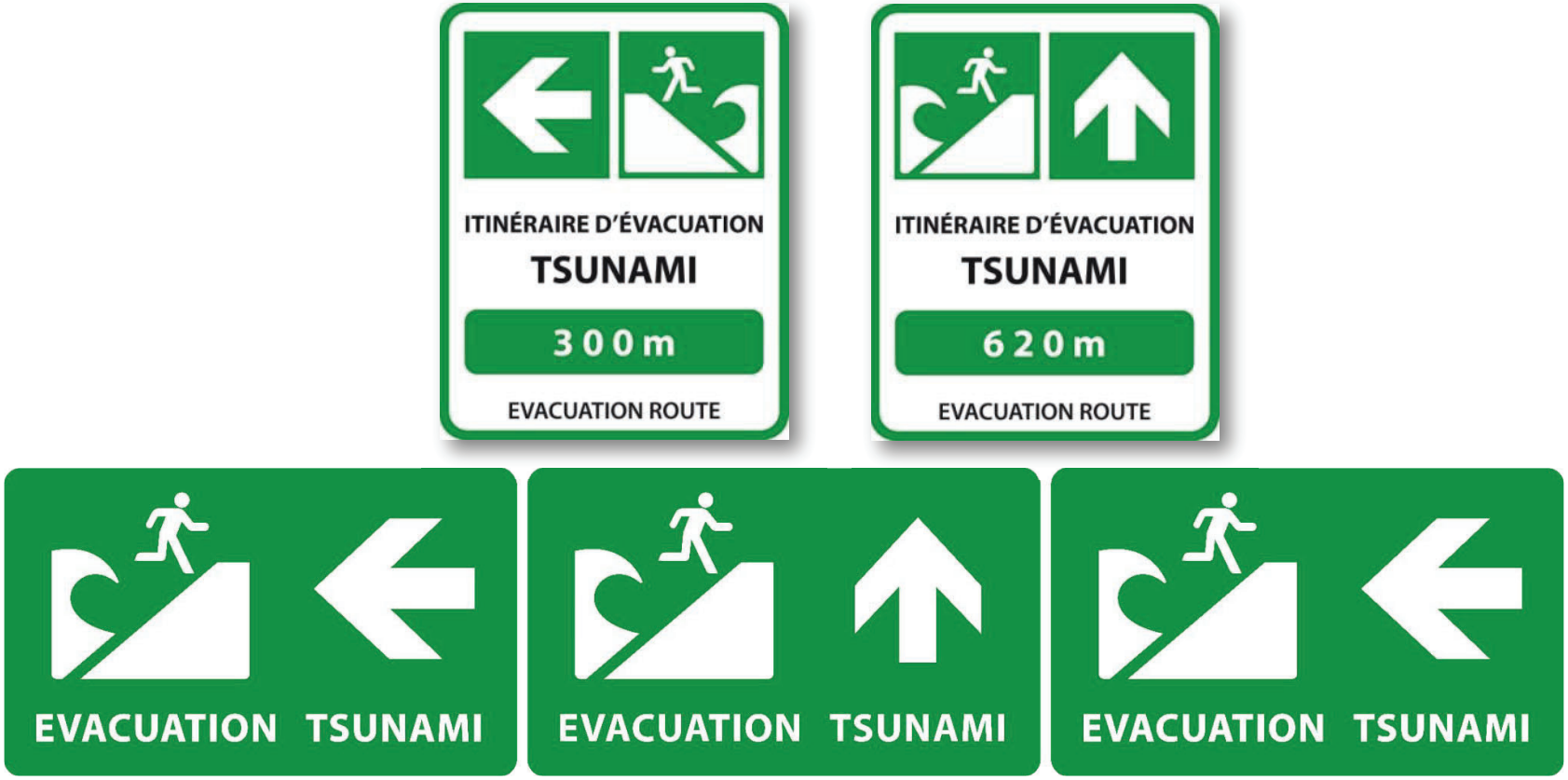
https://oceanexpert.org/downloadFile/6200

Adaptation of the international tsunami hazard signage (ISO 20712 standards) – TSUNAMI EVACUATION ZONE

Download link : https://exploit.univ-montp3.fr/5-ressources.html

Tsunami evacuation signage

Adaptation of the international tsunami hazard signage (ISO 20712 standards) – EVACUATION ROUTE



Download link : https://exploit.univ-montp3.fr/5-ressources.html

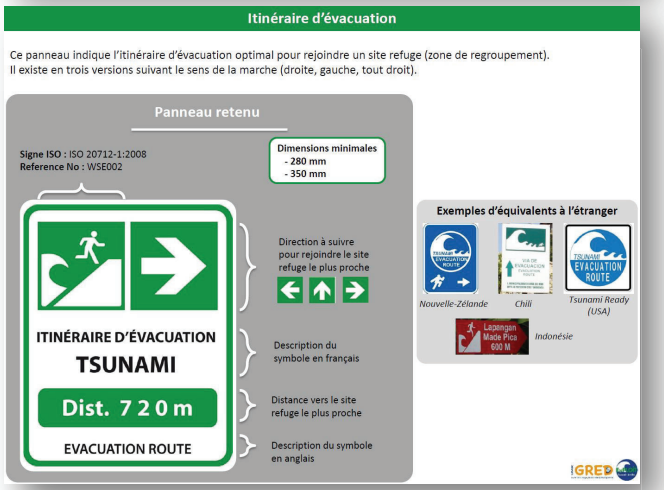
Tsunami evacuation signage

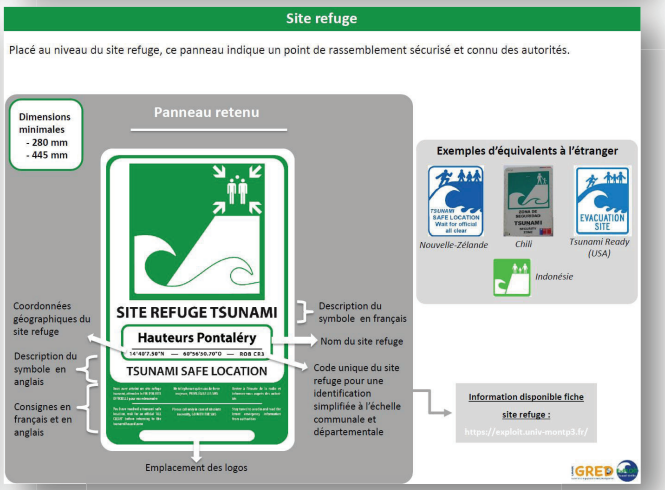
Adaptation of the international tsunami hazard signage (ISO 20712 standards) – SAFE LOCATION

Download link :
https://exploit.univ-montp3.fr/5-ressources.html

Lesson #6

Tsunami evacuation signage





Download link :

https://exploit.univ-montp3.fr/data/RESSOURCES/Panneaux/Charte_panneaux.pdf

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Tsunami evacuation signage

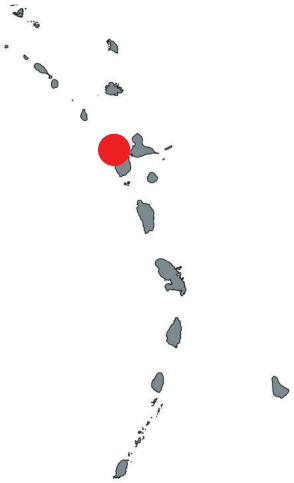
Tsunami evacuation exercise

Middle School of Robert 2016

Dr. Matthieu Péroche (matthieu.peroche@univ-montp3.fr) - Louis Monnier

Tsunami evacuation signage

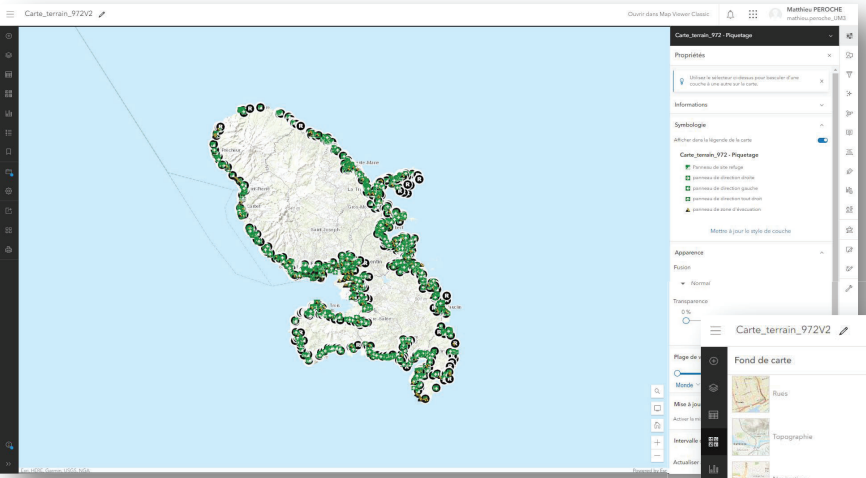
Present-day situation in FWI
Guadeloupe island



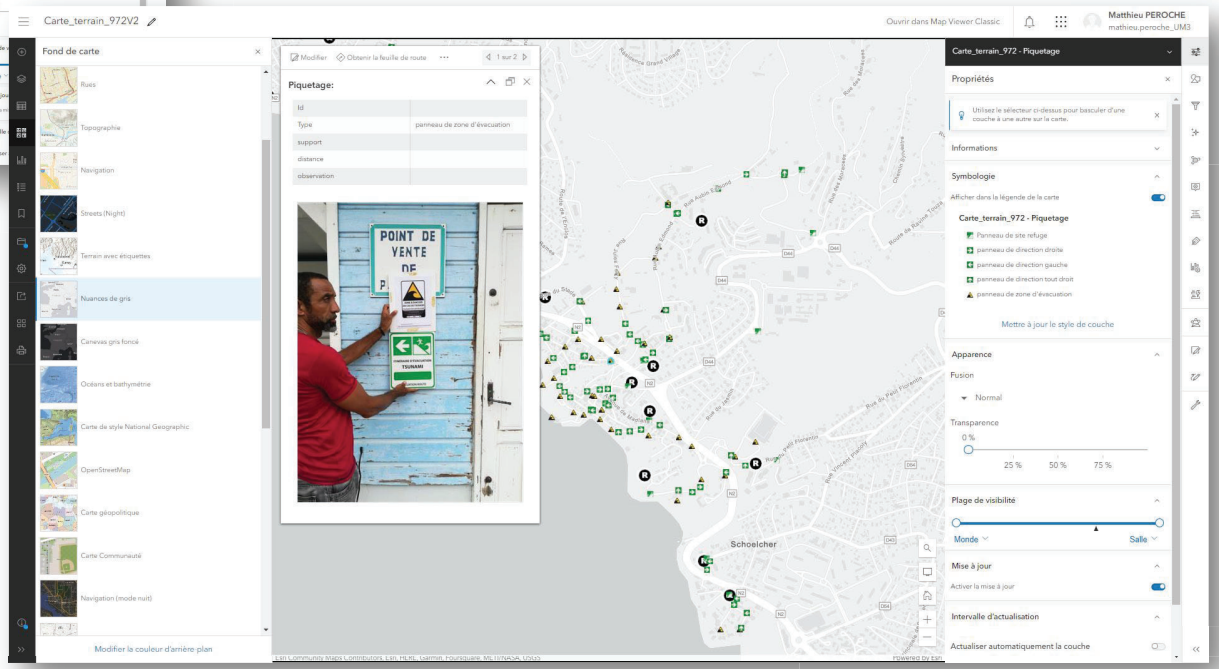
Dr. Matthieu Péroche (matthieu.peroche@univ-montp3.fr) - Louis Monnier

Lesson #6

Tsunami evacuation signage



Present-day situation in FWI
Martinique island

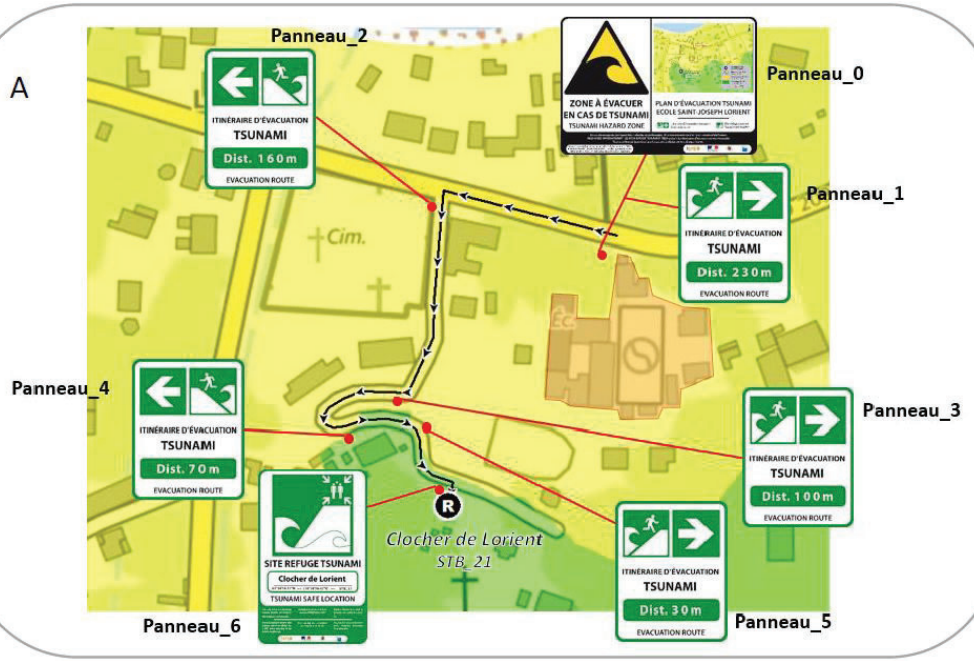


Titre	5048
Panneau de site refuge	552
panneau de direction droite	815
panneau de direction gauche	838
panneau de direction tout droit	1058
panneau de zone d'évacuation	1785

Dr. Matthieu Peroche (matthieu.peroche@univ-montp3.fr) - Louis Monnier

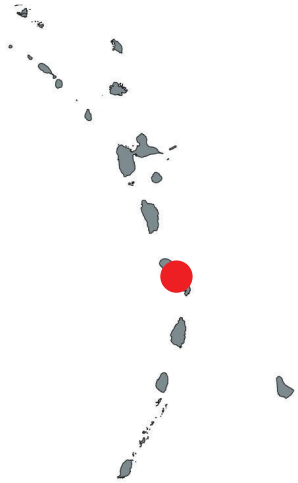
Tsunami evacuation signage

A



Example of files issued to communes (A: plan of sign locations for an evacuation route; B: ready-to-print signs for an evacuation route)

Present-day situation in FWI
Martinique island



B

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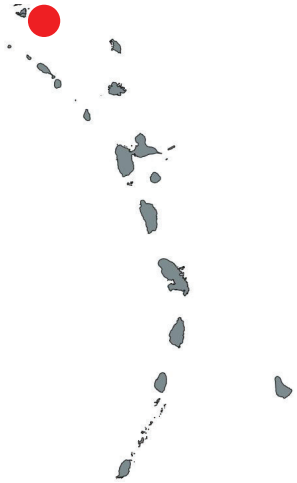
Lesson #6

Tsunami evacuation signage



Present-day situation in FWI – Saint-Barthélemy island

Tsunami evacuation signage

New Zealand's famous "blue line" would become "green line“ in Saint Barthelemy !

Blue lines on Island Bay streets show tsunami-safe zones

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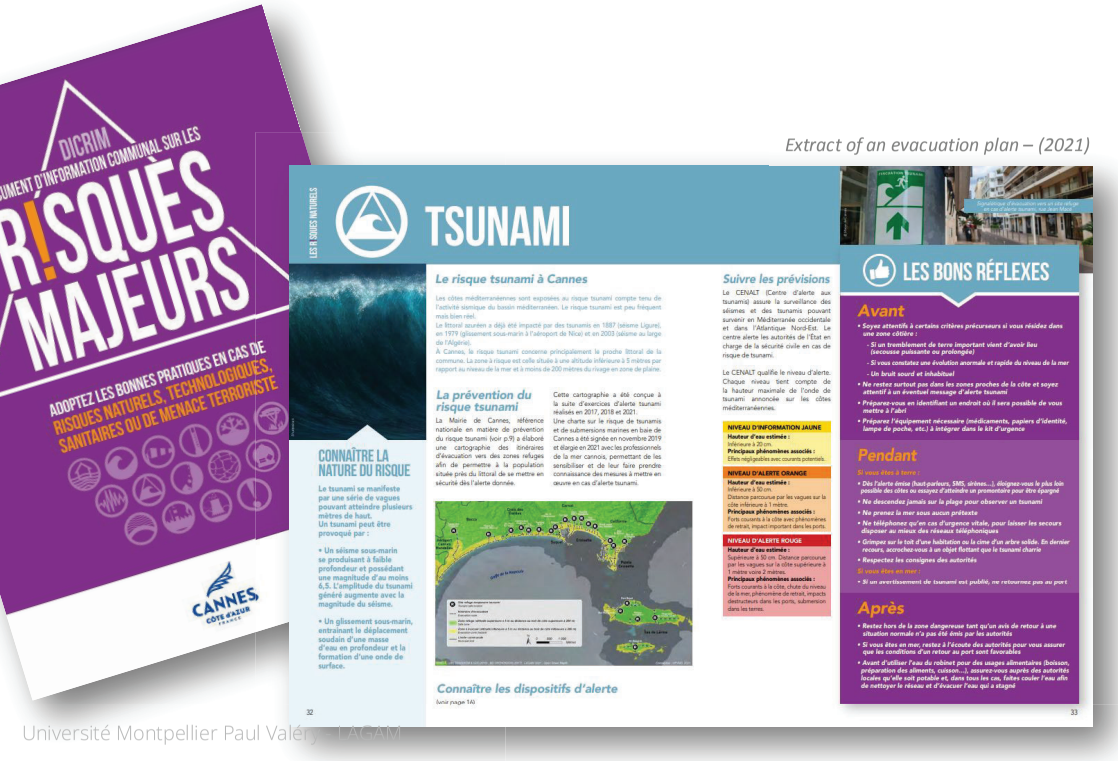
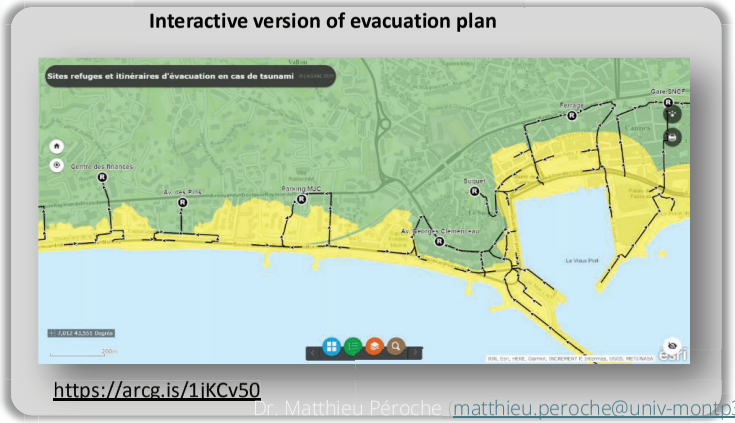
Tsunami evacuation signage

- ✔ Mapping of the area to be evacuated and quantification of the main issues in this area (population, critical infrastructures, etc.)
- ✔ Identification of horizontal refuge sites and evacuation routes according to a scientific protocol adapted from work carried out in the Caribbean
- ✔ Mapping of evacuation plans according to a standardised graphic chart



Extract of an evacuation plan – (2021)



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Lesson #6 Tsunami evacuation signage

✔ Suggested signage to be installed along evacuation routes

Tested signage (ground paint), august 2020

Information and public survey stand, august 2020

Different supports and materialss

Lesson #6

Tsunami evacuation signage

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Tsunami evacuation signage

Lesson #6

Tsunami evacuation signage

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Tsunami evacuation signage

Some key steps

- Identify the location of evacuation signage based on existing evacuation plans

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Tsunami evacuation signage

Some key steps

- Identify the location of evacuation signage based on existing evacuation plans
- Produce a photographic report of the signage location

Vue aérienne

Type de signalétique

Modèle de macaron	Nom du site refuge	Distance (m)
	Bd de la Source	Distance : 450 m

1

Vue Street View

Légende

Point d'implantation (Point GPS : 43.543404,7.042216)

Orientation de la flèche sur le macaron

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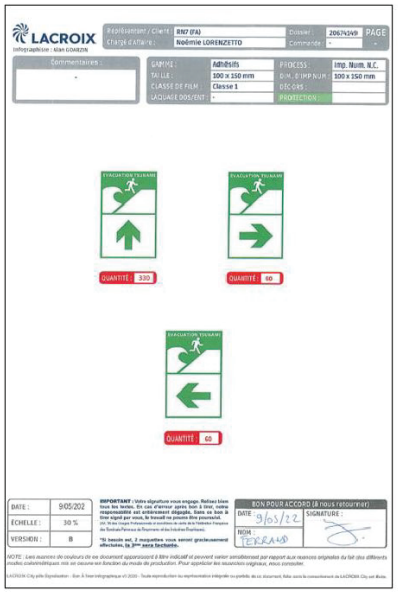
Some key steps

- Identify the location of evacuation signage based on existing evacuation plans
- Produce a photographic report of the signage location
- Produce maps showing the signage locations

Some key steps

- Identify the location of evacuation signage based on existing evacuation plans
- Produce a photographic report of the signage location
- Produce maps showing the signage locations
- Draft the technical file / the mock-ups for the selected company.



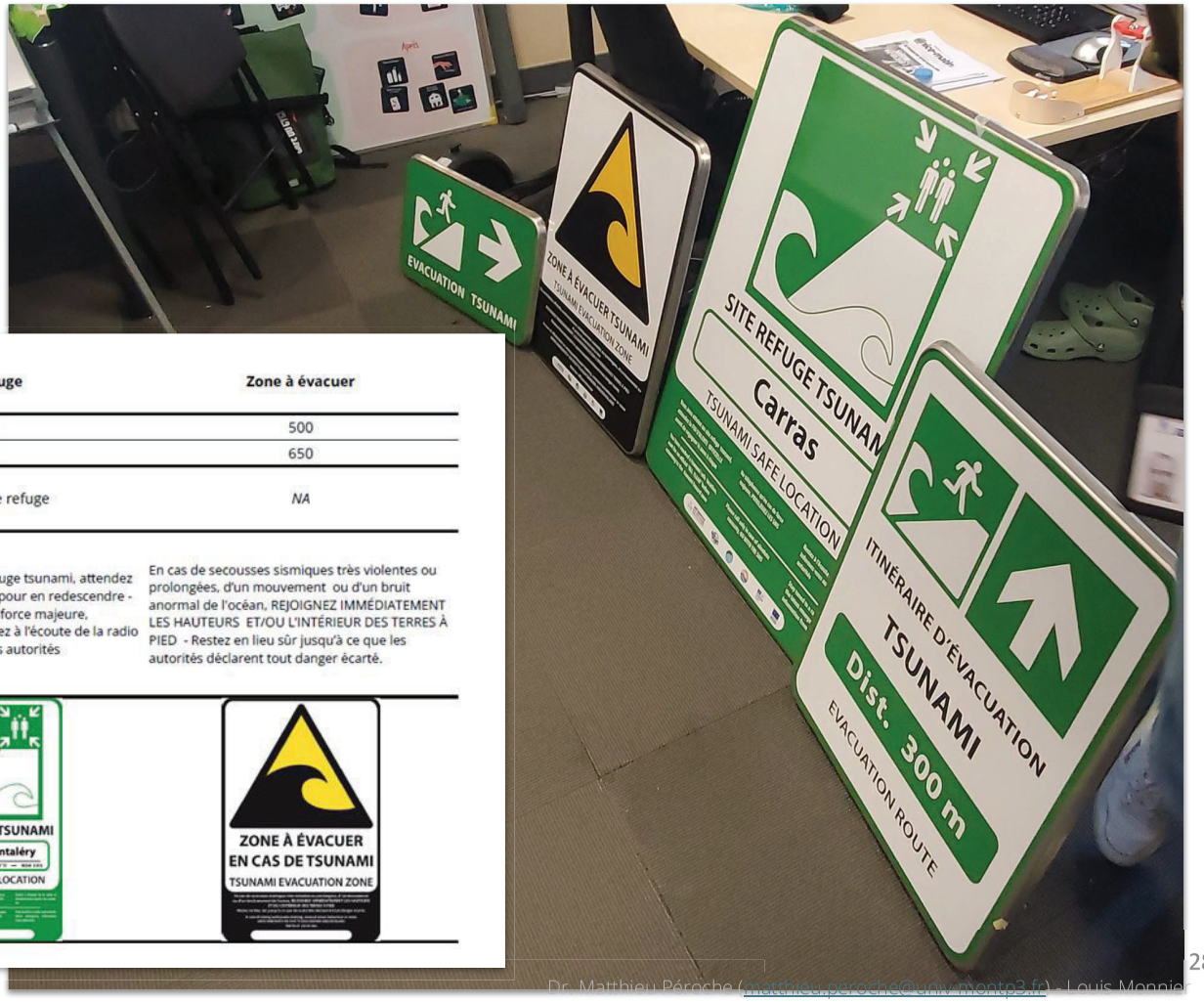
Tsunami evacuation signage

Some key steps

- The sign dimensions should be discussed with both the stakeholder and the selected company.
- Standard dimension signs cost less and are faster to produce.

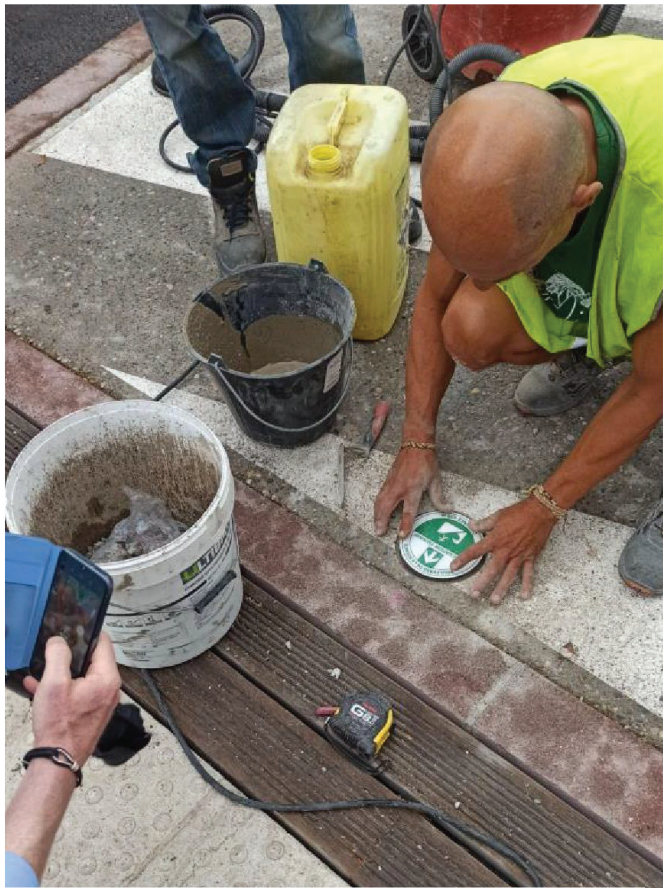
		Itinéraire d'évacuation*	Itinéraire d'évacuation (panonceau)*	Site refuge	Zone à évacuer
Dimensions	Hauteur (mm)	600	300	900	500
	Largeur (mm)	500	500	600	650
Information spécifique figurant sur le panneau		Distance restante jusqu'au site refuge	*NA*	Nom du site refuge	*NA*
Information générale figurant sur le panneau (avec traduction en anglais)		Itinéraire d'évacuation tsunami	Evacuation tsunami	Vous avez atteint un site refuge tsunami, attendez la FIN D'ALERTE OFFICIELLE pour en redescendre - Ne téléphonez qu'en cas de force majeure, PRIVILÉGIEZ LES SMS - Restez à l'écoute de la radio et informez-vous auprès des autorités	En cas de secousses sismiques très violentes ou prolongées, d'un mouvement ou d'un bruit anormal de l'océan, REJOIGNEZ IMMÉDIATEMENT LES HAUTEURS ET/OU L'INTÉRIEUR DES TERRES À PIED - Restez en lieu sûr jusqu'à ce que les autorités déclarent tout danger écarté.
Modèle					

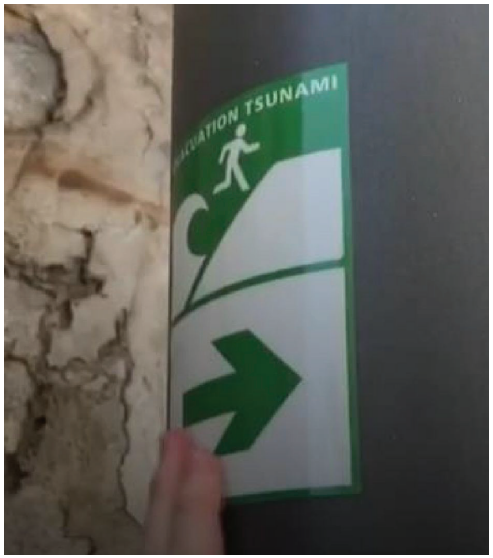
* 3 variantes en fonction de la direction indiquée : gauche, droite et face



Some key steps

- Identify the location of evacuation signage based on existing evacuation plans
- Produce a photographic report of the signage location
- Produce maps showing the signage locations
- Draft the technical file / the mock-ups for the selected company.
- Guide the company on site for installation





Some key steps

- Identify the location of evacuation signage based on existing evacuation plans
- Produce a photographic report of the signage location
- Produce maps showing the signage locations
- Draft the technical file / the mock-ups for the selected company.
- Guide the company on site for installation
- Map the installed signage

Some key steps

- Identify the location of evacuation signage based on existing evacuation plans
- Produce a photographic report of the signage location
- Produce maps showing the signage locations
- Draft the technical file / the mock-ups for the selected company.
- Guide the company on site for installation
- Map the installed signage
- Communicate to media

Tsunami evacuation signage

Of all the criteria to be recognized as IOC-UNESC Tsunami Ready, the installation of tsunami signage is the most difficult:

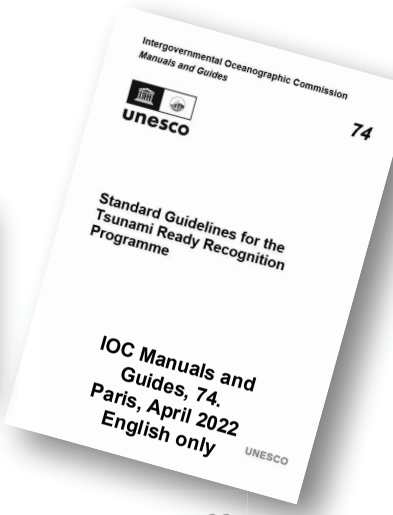
- Signage and its installation are costly
- Signage materializes the spatial extent of the risk
- Signage requires several levels of approval (administrative, financial, legal, etc.), and the process can be lengthy.

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 three times a year.
8	**PREP-5**: A community tsunami exercise is conducted at least every two years.

Two French experiences:

#1 Importance of following the pictograms and colors proposed by the ISO standard to create a national standard.

#2 Allow some flexibility in the choice of signage supports and materials to encourage stakeholders to adopt the system.



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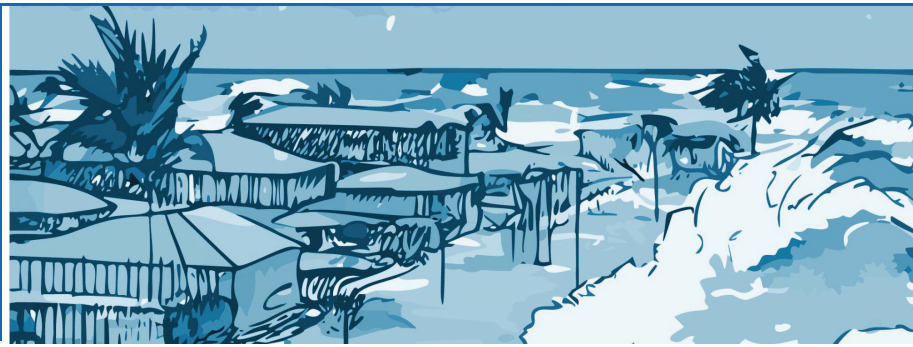
Tsunami Evacuation Mapping Workshop



CoastWAVE 2.0 Project

IOC-UNESCO (EU DG ECHO)

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30 June – 4 July 2025

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CoastWAVE NEAMTWS

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