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US NOAA Pacific Tsunami Warning Center

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Using PTWC New Products for National Warnings and Evacuation Land Coastal Flooding, Marine Threats, and Public Safety

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FORECAST => EMERGENCY RESPONSE

- **Amplitude > 3 m**
  => Major Land Coastal Flooding Threat:
  Evacuate Tsunami Coastal Evacuation Zones
- **1 m ≤ Amplitude ≤ 3 m**
  => Coastal Land Flooding Threat:
  Evacuate Tsunami Coastal Evacuation Zones
- **0.3 m ≤ Amplitude < 1 m**
  => Marine Threat:
  Clear beaches, harbors, low lying coastal areas
- **Amplitude < 0.3 m** => No Threat, No Evacuation
- **Value not computed** => Monitor Event

Marine Threat

Eddies generated by the interactions of tsunami waves as they hit the coast of Sri Lanka, 26 December 2004. Photo courtesy of Digital Globe.

Santa Cruz, CA, USA
Chile tsunami, February 2010

Land Coastal Flooding Threat

New Zealand, Chile tsunami, February 2010

Major Land Coastal Flooding Threat

Sendai, Japan, Japan tsunami, March 2011

Alert Criteria Table
OT + 10 min: No PTWC Forecast

1. CRITERIA TABLE - NO QUANTITATIVE PTWC FORECAST PRODUCT

Criteria Table for NTWC tsunami alerts and emergency response actions based upon the initial PTWC product, typically issued within 10 minutes of any large Pacific earthquake, prior to the computation of a quantitative tsunami forecast. Key criteria for each situation are indicated in bold red letters.

PTWC Product Type	Earthquake Parameters	Potential Tsunami Type	Are Possible Hazardous Tsunami Waves Indicated for Your Country or Area	Threatened Coast	Time left to Initial Wave Arrival (ETA)	NTWC Alert Level for Threatened Coast	Emergency Response Action
Tsunami Information Statement	Magnitude of 6.5-7.0, or on land, or ≥ 100 km depth	None or Very Minor	**No**	None	Not applicable	INFORMATION	No action required
Tsunami Threat Message	**Magnitude of 7.1-7.5**, undersea or very near the sea, and < 100 km depth	Local Tsunami	**Yes**	< 300 km from earthquake	< 1 hr typical	WARNING	Evacuate threatened coast
			No	≥ 300 km from earthquake	Not given	INFORMATION	Monitor subsequent messages
	Magnitude of 7.6-7.8, undersea or very near the sea, and < 100 km depth	Regional Tsunami	**Yes**	< 1000 km from earthquake	< 3 hrs typical	WARNING	Evacuate threatened coast
			No	≥ 1000 km from earthquake	Not given	INFORMATION	Monitor subsequent messages
	Magnitude of 7.9 and greater, undersea or very near the sea, and < 100 km depth	Basin-wide Tsunami	**Yes**	Potential for a basin-wide tsunami	**< 3 hours**	WARNING	Evacuate coast within 3 hours of ETA
			No		**3 to 6 hours**	WATCH	Prepare to evacuate
			No		**> 6 hours**	INFORMATION	Monitor subsequent messages

NOTES:

- In a local tsunami situation, in order to provide the fastest alert, earthquake magnitude criteria should be used. Issuance of a Warning, Watch, or Information is dependent on the magnitude of the earthquake and its closeness to coastlines. Smaller magnitude earthquakes that are closer to the coast may warrant issuance of a Warning.
- Local tsunami warning threshold criteria based solely on magnitude should be determined after examining a country's historical earthquake tsunami hazard. In some places, the local tsunami magnitude threshold may need to be lower than M7.1. The M7.1 threshold is used by PTWC for its Caribbean Tsunami Watch Service and was used by the PTWC for its Indian Ocean Tsunami Watch Service.
- The 3-hour time criteria is based on the amount of time required for a country to safely complete a coastal evacuation. The 3-hr threshold used by PTWC is considered a conservative, but reasonable time criteria. Historically, the value is from a requirement from Hawaii State Emergency Management Agency as the time required to safely evacuate all coasts of the State of Hawaii. Each country should consider their situation.

Alert Criteria Table
OT + 30 min: Quantitative PTWC Forecast – 1 m

PTWC Product Type	Earthquake Parameters	Maximum Tsunami Wave Amplitude Indicated for Your Country or Area	Threatened Coast	Time left to Initial Wave Arrival	NTWC Alert Level for Threatened Coast	Emergency Response Action
Tsunami Threat Message	Magnitude of 7.1 or greater, undersea or very near the sea, and < 100 km depth	**≥ 1 m**	Sections of coast with forecast amplitudes ≥ 1 m	**< 3 hrs**	WARNING	Evacuate threatened coast
				3 to 6 hrs	WATCH	Prepare to evacuate
				> 6 hrs	INFORMATION	Monitor for subsequent forecasts
		< 1 m	None		INFORMATION	Monitor for subsequent forecasts

NOTES:

- Threatened coast information can be gotten from the public text message, coastal forecast amplitude maps or the KMZ file. If only the Public Text message is used, then the entire country should be placed in a Warning.
- The 3-hour time criteria is based on the amount of time required for a country to safely complete a coastal evacuation. The 3-hr threshold used by PTWC is considered a conservative, but reasonable time criteria. Historically, the value is from a requirement from Hawaii State Emergency Management Agency as the time required to safely evacuate all coasts of the State of Hawaii. Each country should consider their situation.

Alert Criteria Table

OT + 30 min: Quantitative PTWC Forecast – 0.3 / 1 m

PTWC Product Type	Earthquake Parameters	Maximum Tsunami Wave Amplitude Indicated for Your Country or Area	Threatened Coast	Time left to Initial Wave Arrival	NTWC Alert Level for Threatened Coast	Emergency Response Action
Tsunami Threat Message	Magnitude 7.1 or greater, undersea or very near the sea, and < 100 km depth	**≥ 1 m**	Sections of coast with forecast amplitudes ≥ 1 m	**< 3 hrs**	WARNING	Evacuate threatened coast
				3 to 6 hrs	WATCH	Prepare to evacuate
				> 6 hrs	INFORMATION	Monitor for subsequent forecasts
		0.3 to 1 m	Sections of coast with forecast amplitudes 0.3 to 1 m	**< 3 hrs**	ADVISORY	Evacuate beaches and harbors
				3-6 hrs	WATCH	Prepare to evacuate
				> 6 hrs	INFORMATION	Monitor for subsequent forecasts
		< 0.3 m	None		INFORMATION	Monitor for subsequent forecasts

NOTES:

- Threatened coast information from public text message, coastal forecast amplitude maps or the KMZ file. If only the Public Text message is used, then the entire country should be placed in a Warning.
- The 3-hour time criteria is based on the amount of time required for a country to safely complete a coastal evacuation. The 3-hr threshold used by PTWC is considered a conservative, but reasonable time criteria. Historically, the value is from a requirement from Hawaii State Emergency Management Agency as the time required to safely evacuate all coasts of the State of Hawaii. Each country should consider their situation.

School Evacuation Drills

- Annual – Every school in evacuation zone
- Drill is Evacuation only
- Coordinated by Ministry of Education, in cooperation with Emergency Management Agency

Thank You

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