Tsunami Warnings, Watches, and Advisories

When a large earthquake occurs in the Pacific Ocean area, PTWC personnel determine the earthquake's hypocenter, the initial rupture point of the earthquake, and its magnitude. If the hypocenter is under or near the ocean and not too deep within the earth, and if the magnitude is sufficiently large, then tsunami generation is possible. On the basis of this seismic evidence, the Center issues a regional tsunami warning to areas located near the epicenter. A regional tsunami watch is also issued to areas located further from the epicenter if the magnitude is so large there is the possibility of a long-range destructive tsunami. All remaining areas are issued an advisory. The initial bulletin tells participants that an earthquake has occurred, where and when it occurred, and that a destructive tsunami is possible. Because tsunamis move through the water in accordance with known physical laws, estimated arrival times are computed and given for key Pacific locations. Additional bulletins are issued at least hourly and the warning and watch areas expanded as needed.

The first indication of a tsunami usually comes within a hour or two from the sea level stations located nearest the earthquake. Fortunately, most large earthquakes with tsunamigenic potential do not generate long-range destructive tsunamis and the warning and watch will be cancelled. But if confirmation of a potentially destructive, long-range tsunami is received, the PTWC issues a Pacific-wide tsunami warning. It alerts all warning system participants to the approach of potentially destructive tsunami waves and provides estimated tsunami arrival times for key locations throughout the Pacific. This warning continues, with bulletins containing updated information issued at least hourly, until the tsunami has crossed the entire Pacific or additional evidence is received to indicate there is no further tsunami threat.

Messages are disseminated throughout the Pacific to the Member States in accordance with procedures outlined in the Communications Plan for the Tsunami Warning System in the Pacific. Dissemination agencies in the participating Member States have the ongoing responsibility for educating the public concerning the dangers of tsunamis and for developing safety measures to be taken to avoid the loss of life and reduce property damage.

Tsunami Safety Rules

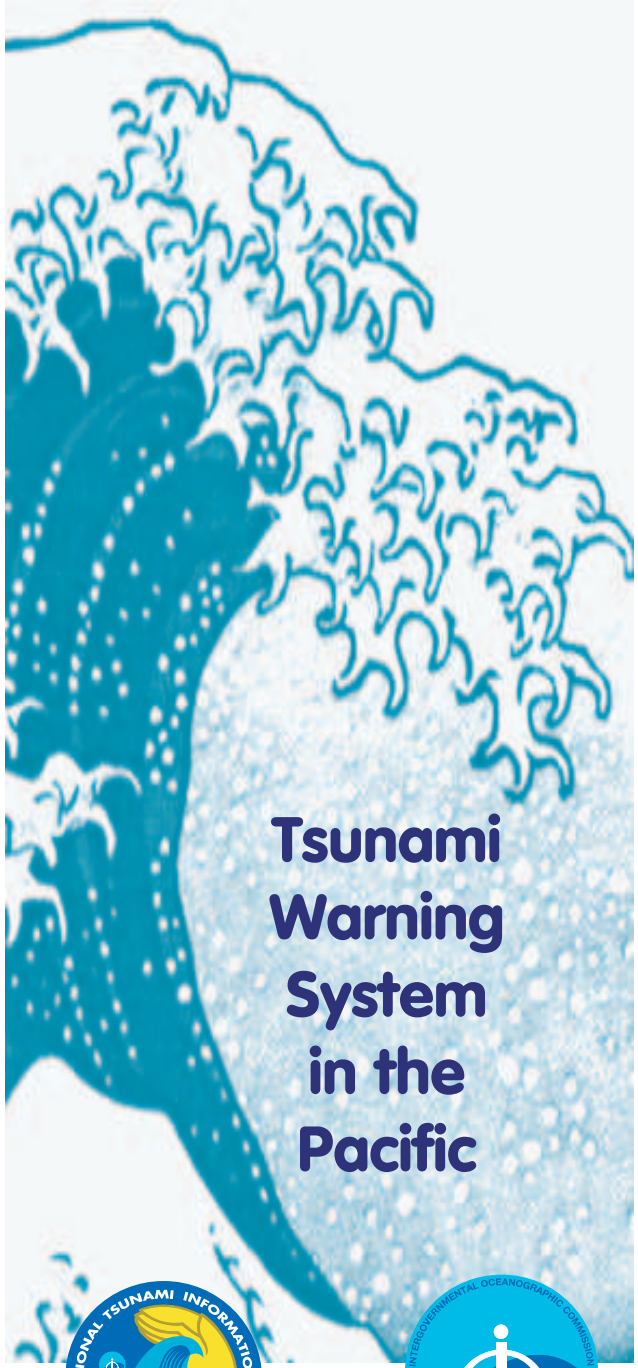
1. All earthquakes do not cause tsunamis, but many do. When you hear that an earthquake has occurred, stand by for a tsunami emergency.
2. An earthquake in your area is a natural tsunami warning. Do not stay in low-lying coastal area after a strong earthquake has been felt.
3. A tsunami is not a single wave, but a series of waves. Stay out of danger areas until an "all-clear" is issued by a competent authority.
4. Approaching tsunamis are sometimes preceeded by a noticeable rise or fall of coastal water. This is nature's tsunami warning and should be heeded.
5. A small tsunami at one point on the shore can be extremely large a few miles away. Don't let the modest size of one make you lose respect for all.
6. The Pacific Tsunami Warning Centre does not issue false alarms. When a warning is issued, a tsunami exists. The tsunami of May 1960 killed 61 people in Hilo, Hawaii, and they thought it was "just another false alarm."
7. All tsunamis, like hurricanes, are potentially dangerous, though they may not damage every coastline they strike.
8. Never go down to the shore to watch for a tsunami. When you can see the wave you are too close to escape it. Never try to surf a tsunami; tsunamis do not curl or break like surfing waves.
9. Sooner or later, tsunamis visit every coastline in the Pacific. Warnings apply to you if you live in any Pacific coastal area.
10. During a tsunami emergency, your local civil defense, police, and other emergency organizations will try to save your life. Give them your fullest cooperation.

For further information, contact:

International Tsunami Information Centre
737 Bishop St., Ste 2200, Honolulu, HI 96813-3213 USA
Tel: <1> 808-532-6422 FAX: <1> 808-532-5576
Email: itic.tsunami@noaa.gov
http://ioc.unesco.org/itsu/, http://www.prh.noaa.gov/itic/

RHH Pacific Tsunami Warning Centre
91-270 Fort Weaver Rd., Ewa Beach, HI 96706 USA
Tel: <1> 808-689-8207 FAX: <1> 808-689-4543
http://www.prh.noaa.gov/ptwc/

Revised, October 2003



Tsunami Warning System in the Pacific

International Tsunami Information Centre

Intergovernmental Oceanographic Commission

Tsunami

The phenomenon we call a "tsunami" is a series of travelling ocean waves of extremely long length and period, generated by disturbances associated primarily with earthquakes occurring below or near the ocean floor. Underwater volcanic eruptions and landslides can also generate tsunamis, although these sources are significantly less frequent. As the tsunami crosses the deep ocean, sometimes at speeds exceeding 1000 km/h (600 mph), its length from crest to crest may be 200 km (124 miles) or more and its period 15 minutes to an hour, but its height from trough to crest may only be a few tens of centimeters (a few inches or feet), even for a very destructive tsunami. It cannot be felt aboard ships in deep water. As the tsunami enters shallow water near coastlines in its path, the velocity of its waves decreases and its wave height increases. It is in these shallow waters that tsunamis become a threat to life and property for they can crest to heights of more than 10 m (30 feet), strike with devastating force, and flood low-lying coastal areas.

Tsunami Warning System in the Pacific

Under the auspices of the Intergovernmental Oceanographic Commission (IOC), an International Coordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU) was established in 1968. An international cooperative effort involving many Member States of the Pacific Region, ICG/ITSU meets every two years to review progress and coordinate activities resulting in improvements of the service. Present membership of ICG/ITSU is comprised of the following Member States:

Australia, Canada, Chile, China, Colombia, Cook Islands, Costa Rica, Democratic People's Republic of Korea, Ecuador, El Salvador, Fiji, France, Guatemala, Indonesia, Japan, Mexico, New Zealand, Nicaragua, Peru, Republic of the Philipines, Republic of Korea, Russian Federation, Samoa, Singapore, Thailand, and the U.S.A.

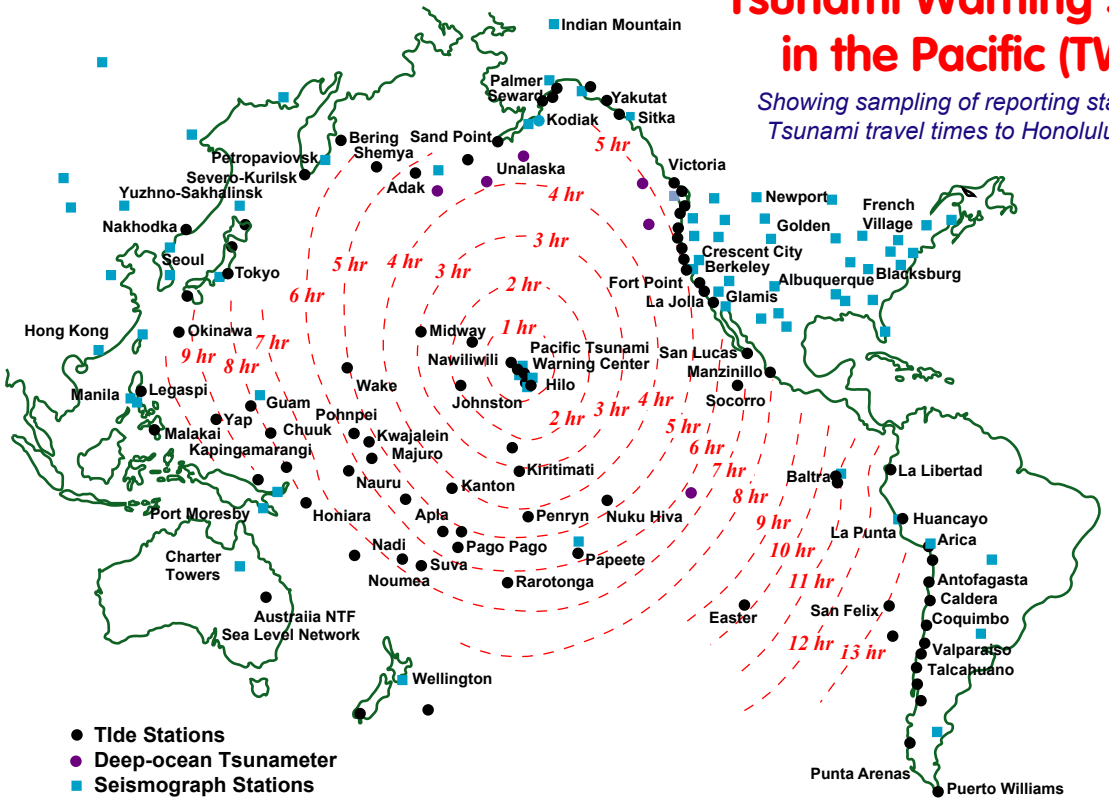
The IOC also maintains the International Tsunami Information Centre (ITIC). Established in 1965 and hosted by the U.S.A., the ITIC works closely with the Richard H. Hagemeyer Pacific Tsunami Warning Centre (PTWC). Both centers are located in Hawaii, U.S.A, and hosted by the National Weather Service.

The ITIC's responsibilities include:

- monitoring the international tsunami warning activities in the Pacific and recommending improvements with regard to communications, data networks, data acquisition, and information dissemination;
- bringing to Member and non-member States information on tsunami warning systems, on the affairs of ITIC and on how to become active participants in the activities of ICG/ITSU;
- assisting Member States of ITSU in the establishment of national warning systems and improving preparedness for tsunamis for all nations throughout the Pacific Ocean;
- gathering and promulgating knowledge on tsunamis and fostering tsunami research and its application to prevent loss of life and damage to property.

Tsunami Warning System in the Pacific (TWSP)

Showing sampling of reporting stations and Tsunami travel times to Honolulu, Hawai'i



The PTWC serves as the operational headquarters for the Tsunami Warning System in the Pacific (TWSP). PTWC works closely with other regional national centers in monitoring seismological and tidal stations and instruments around the Pacific Ocean to evaluate potentially tsunamigenic earthquakes. The TWSP makes use of hundreds of seismic stations throughout the world to locate potentially tsunamigenic earthquakes, and accesses nearly 100 water level stations throughout the Pacific to verify the generation and evaluate the severity of a tsunami. The system disseminates tsunami information and warning messages to well over 100 points scattered across the Pacific.

The International Tsunami Warning System in the Pacific is one of the most successful international scientific programmes with the direct humanitarian aim of mitigating the effects of tsunami to save lives and property.

1993, Okushiri Island, Japan