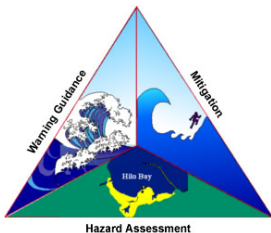


# TsuInfo Alert

prepared by the Washington State Department of Natural Resources on behalf of the  
**National Tsunami Hazard Mitigation Program**  
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## Exploring Earthquakes: Analyzing the Past to Protect Lives and Property Today

2014 Briefing Series for Members of Congress and Staff

By Kathleen Gohn, United States Geological Survey

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The Hazards Caucus Alliance [AGI, AGU, GSA, SSA] and the USGS planned a joint Congressional briefing to mark the 50th anniversary of the magnitude 9.2 earthquake that struck Alaska in March 1964. The briefing showed how science from the USGS and partners is making people safer from earthquakes and tsunamis.



**Presenters:** David Applegate, Tom Jordan, Peter Haeussler, Bill Leith, and John Schelling (left to right). **Credit:** Kathleen Gohn, USGS.

The speakers included Tom Jordan (Southern California Earthquake Center/President, Seismological Society of America), John Schelling (Earthquake/Tsunami Program Manager for Washington State Emergency Management Division), and Peter Haeussler (USGS), who is leading the USGS commemorative activities in Alaska. The briefing took place Feb. 28, 2014, in the House [morning] and Senate [afternoon].

About 35 non-USGS participants attended the two briefings. Staff from the offices of



Presentation to Congress.  
**Credit:** Jessica Robertson, USGS.

Representatives Pelosi and Schiff, Senators Boxer, Cantwell, Feinstein, and Hirono, Library of Congress, and House Energy and Commerce and Senate Energy and Natural Resources Committee attended. The following agencies had staff representation as well: FEMA, NIEHS, ASCE, NOAA, and IRIS. Various media outlets reported the event.



Follow link to view presentations: [http://www.usgs.gov/solutions/2014\\_feb28.html](http://www.usgs.gov/solutions/2014_feb28.html)

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This publication is free upon request and is available in print by mail and online at:

<http://www.dnr.wa.gov/researchscience/topics/geologypublicationslibrary/pages/tsuinfo.aspx>

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## **NOAA's Modeling and Mapping Data Enhance Nation's Ability to Provide Tsunami Warnings Along U.S. Coastlines**

By U.S. Department of Commerce

As we kick off Tsunami Preparedness Week, we pause to remember the 124 Americans who prematurely lost their lives without warning 50 years ago, when a powerful earthquake sent several tsunami waves crashing into coastal towns in Alaska, Oregon and California. On March 27, 1964, a 9.2 magnitude earthquake – the largest recorded earthquake in U.S. history and the second largest in world history – occurred in Alaska's Prince William Sound. In addition to the lives lost, the tsunamis caused an estimated \$1 billion in damage.

Since 1964, we've been reminded about the power and danger of tsunamis. The devastation and heartbreak of the 2004 Indian Ocean tsunami remains with us a decade later, and images from the Japan tsunami are still fresh in our minds three years later. These events should serve as a reminder that a powerful tsunami can strike anywhere in the world, any time of year, and the U.S. is no exception.

Coastal populations and infrastructure have increased significantly over the past 50 years, making the U.S. even more vulnerable to the impacts of a tsunami. However, the nation also has made substantial advancements in earthquake science and the ability to prepare for, detect, forecast, and warn about tsunamis. While we cannot stop a tsunami from happening, we can minimize loss of life and property through preparation.



See full article: <http://tinyurl.com/myqtpto>

# TSUNAMIS & SEMANTICS

## What is a mega-tsunami?

By James Goff, James P. Terry, Catherine Chagué-Goff, and Kazuhisa Goto

Journal: Marine Geology, 2014

**Abstract:** No unambiguous and widely accepted definition currently exists for the term 'mega-tsunami'. This is in spite of the rapidly growing popularity of the expression in the scientific literature, especially in recent years following the devastation wrought by the 2004 Indian Ocean and 2011 Tohoku-oki tsunamis. A comprehensive literature search is revealing. We find that although there have been several previous attempts at a definition, the term mega-tsunami has generally been applied in a rather arbitrary fashion to a number of tsunami characteristics, such as wave height or amplitude at both source and distant locations, run-up height, geographical extent and impact. This haphazard situation is undesirable. In response we propose a stricter definition for mega-tsunami that is based solely on initial wave height/amplitude at source exceeding 100 m/50 m respectively. A source-related definition conveniently avoids any difficulties associated with the potential influence of coastal physical attributes (e.g. configuration, bathymetry, geomorphology) on tsunami parameters at affected locations. Using this definition, it becomes apparent that mega-tsunamis can only include those rare events on geological time - scales generated by large bolide impacts, violent volcanic activity or oceanic island flank collapse, and possibly extreme tsunamigenic submarine earthquakes. Most seismically-triggered events instead fall into the group of souteigai-tsunamis, i.e. 'unexpected' tsunamis, which are considered exceptional according to historical experience and local perspectives.



Article will be published in Marine Geology 2014: <http://www.journals.elsevier.com/marine-geology/>

## Typhoons and tsunamis – too easy to confuse the two

By Guy Keleny, The Independent UK

In her Monday column, Yasmin Alibhai-Brown reported that the recent floods had shocked her into taking climate change more seriously. Good for her, but halfway through the piece a common error slipped in.



2013 Typhoon Haiyan, Philippines  
Credit: 2013 JMA/EUMETSAT ©

“Just last November, Typhoon Haiyan ravaged the Philippines... The 2004 tsunami was different because several Westerners were tragically swept away. Questions were asked if such catastrophes were getting more frequent and were partly man-made.”

Slips like this ought not to matter, but they do, because they help climate-change deniers and contrarians to give the answer they want to the question they love to ask: can we trust the people who tell us that human-induced climate change is happening?

See full article: <http://tinyurl.com/mvs7dpu>

## Tsunami Glossary

By Intergovernmental Oceanographic Commission

The Tsunami Glossary includes the definition of technical terms, and information on the global intergovernmental coordination groups for tsunami warning and mitigation. The 2013



version (English, Arabic) updates terms and defines tsunami warning center products and forecast services that are now generally provided by warning centers. The 2008 version (English, Spanish, French, Indonesian) includes definitions specific to the Pacific Tsunami Warning Center and its existing services to the Pacific and Caribbean.

Download glossary:  
<http://tinyurl.com/kazumvp>

# NEWS & PROJECT UPDATES

## Twenty-fifth Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS-XXV)

By International Tsunami Information Center

The Twenty-fifth Session of the Intergovernmental Coordination Group for the Pacific Ocean Tsunami Warning and Mitigation System (ICG/PTWS-XXV) was held from 9 to 11 September 2013, hosted by the Federal Service for Hydrometeorology and Environmental Monitoring (ROSHYDROMET), in Vladivostok, Russian Federation. The ICG/PTWS, which convenes every two years, provides a critical forum for Member States to coordinate activities that will improve Pacific Ocean tsunami warnings. One of the most important activities of the PTWS is to ensure the timely issuance of tsunami alerts to save lives and reduce property damage to 46 countries throughout the Pacific Basin, including the protection of U.S. Pacific States, Territories and Commonwealths, and maritime assets. The continued strengthening of the PTWS, through its policy of free exchange of global observational data and hazard information (seismic, sea level, tsunami threat, etc.) and international collaboration yields increased capacity to protect all Pacific Member States. The UNESCO Intergovernmental Oceanographic Commission (IOC) leads the coordination of the Global Tsunami Warning and Mitigation System.



Sixty-five participants from 16 Member States gathered for the Twenty-Fifth Session of the ICG/PTWS. **Credit:** Russian Federation

The ICG/PTWS-XXV Session was chaired by the PTWS Chair, Dr. Ken Gledhill (New Zealand). The session was attended by 65 participants from 16 Member States. The main outcomes of the session were 1) for PTWC to replace current products with endorsed Enhanced Tsunami Products, starting from 1 October 2014, for use by PTWS National Tsunami Warning Centres (NTWC), 2) acceptance of China's offer to establish a South China Sea Tsunami Advisory Center (SCSTAC), 3) agreement to continue most PTWS Working Groups and Task Teams, 4) agreement to conduct Exercise Pacific Wave 2015 (PacWave 15) preferably during the first quarter of 2015, and 5) agreement to hold the next ICG/PTWS-XXVI session, which will commemorate the 50th anniversary of the International Tsunami Warning System in the Pacific, in Honolulu, Hawaii USA in April 2015.

The following are major activities of the Pacific Tsunami Warning Center (PTWC) and the International Tsunami Information Center (ITIC) during the inter-session period from May 1, 2011 through July 31, 2013.

In addition to the development of new enhanced products based on forecasting methodologies, PTWC responded to more than 2000 global earthquakes in support of the ICG/PTWS and its Member States. PTWC issued 771 Observatory Messages for earthquakes with magnitudes in the mid-5s and above. These messages are disseminated primarily to other earthquake observatories and are also used as input to the U.S. Geological Survey – California Integrated Seismic Network (CISN) earthquake display that is installed in many of the PTWS NTWCs. Of these, 108 earthquakes prompted the issuance of a PTWS tsunami product. There were 5 Tsunami Warnings issued, and 103 Tsunami Information Bulletins, advising that the earthquake presented very little if any tsunami threat. Initial earthquake observatory message issuance time averaged 6.5 minutes for the 1069 events (2011-2013) that PTWC responded to.

See full summary: [file:///C:/Users/sels490/Desktop/itic\\_nl\\_vol45\\_no2\\_20140328\\_low\\_res.pdf](file:///C:/Users/sels490/Desktop/itic_nl_vol45_no2_20140328_low_res.pdf)

# NEWS & PROJECT UPDATES

## CARIBE WAVE/LANTEX Tsunami Exercises Conducted on March 26 and 27, 2014

By Christa von Hillebrandt-Andrade, Manager US NWS Caribbean Tsunami Warning Program

On March 26, 2014 two regional tsunami exercises (CARIBE WAVE/LANTEX) were conducted, while the Pacific regional tsunami exercise (PACIFEX) took place on March 27, 2014. The scenarios were a hypothetical magnitude 8.5 earthquake located offshore Portugal (CARIBEWAVE/LANTEX), a submarine landslide within the Gulf of Mexico triggered by a magnitude 6.6 earthquake (LANTEX), and a major Alaska Peninsula magnitude 9.1 earthquake and tsunami (PACIFEX). These exercises were held under the framework of various tsunami warning centers and UNESCO's Intergovernmental Coordination Group for Tsunamis and Other Coastal Hazards for the Caribbean and Adjacent Regions.



Evacuation exercise of a School in the Municipality of Loiza as part of CARIBE WAVE/LANTEX 2014 exercise of March 26, 2014.

Almost 200,000 people across 31 Caribbean nations and 16 territories took part in the CARIBE WAVE/LANTEX tsunami exercises, four times more than in 2013. Participants included over 1,400 local tsunami warning focal points, international, state, territorial and local emergency management organizations, schools, governmental agencies, businesses, health facilities, media and individuals and families (up from 481 in 2013 and 300 in 2011). During the exercise, the Pacific Tsunami Warning Center (PTWC), the US National Tsunami Warning Center (US NTWC) and the Puerto Rico Seismic Network (PRSN) sent out over 31,500 emails to 2000 subscribers to the special CARIBE WAVE/LANTEX 14 notification service. Besides the emails, web sites, social media and text messages, sirens and emergency alert radios were also used to disseminate information. Drills, table top exercises, seminars, meetings and video/web, among other activities were organized as part of CARIBE WAVE/LANTEX 2014.

## State/Local Tsunami Workgroup Table Top Exercise (Pacifex 14)

By George Crawford, Washington Emergency Management Division

On March 20, 2014 the State/Local Tsunami Workgroup conducted a table top exercise to provide participants an opportunity to evaluate current response concepts, plans and capabilities. The scenario modeled by NOAA/PMEL was based on a 9.2 magnitude earthquake that generates a tsunami off of the Alaskan Peninsula. This scenario is considered the worst case distant source event for Washington coastal communities. The exercise package also included inundation maps to support the exercise inputs.

The exercise scenario worked through notification concepts leading to initial response and evacuation, to tsunami warning cancellation, and recovery issues. With tsunami wave arrival less than four hours, participants had to make critical decisions on how to deal with multiple jurisdictional issues, multi-county/tribal coordination, large numbers of visitors and transit personnel, as well as local citizens and businesses. This included dealing with numerous media and communication issues, as well as wide-spread inundation, and strong destructive currents in the harbors to simulate multiple jurisdictional areas that were either unsafe to enter or off limits due to hazmat, fires etc.

Several issues identified included: managing the media, jurisdiction/cross coordination including the Red Cross, maritime/Coast Guard/State Ferry coordination, and recovery issues such as temporary housing and food for displaced citizens and cleaning up of multiple impacted areas.

These and other issues will be addressed in upcoming State/Local Tsunami Workgroup quarterly meetings.

# NEWS & PROJECT UPDATES

## Powerful earthquake strikes off Chile, triggers tsunami

By Dana Ford and Saeed Ahmed, CNN

A mighty 8.2-magnitude earthquake struck off the coast of northern Chile late Tuesday, triggering small landslides, cutting power and generating a tsunami.

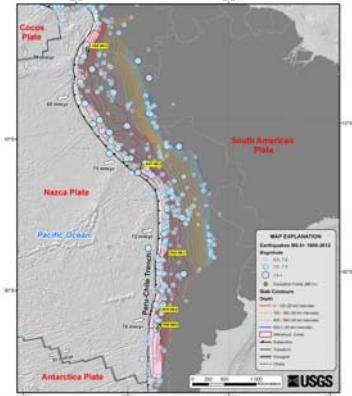
Four men and one woman died -- two who suffered heart attacks and three who were crushed, said Interior Minister Rodrigo Penailillo.

About 300 prisoners escaped from the northern port city of Iquique in the immediate aftermath, he said.

The quake struck about 8:46 p.m. local time, some 60 miles northwest of Iquique. It had a depth of 12.5 miles, the U.S. Geological Survey said.

Chile's National Emergency Office asked coastal residents to evacuate.

"The fact is, we will know the extent of the damage as time goes by and when we inspect the areas in the light of day," Chile's President Michelle Bachelet said early Wednesday. "The country has faced these first emergency hours very well."



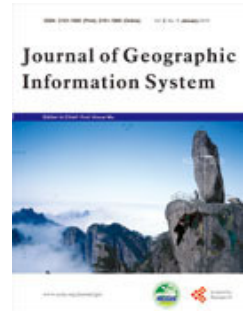
Seismotectonic map of South America by the USGS.

See full article: <http://www.cnn.com/2014/04/01/world/americas/chile-earthquake/>

## Integration of Spatial Analysis for Tsunami Inundation and Impact Assessment

By Abu Bakar Sambah and Fusanori Miura

Disaster mitigation and reconstruction plan due to tsunami can be implemented with various actions. An integration of spatial analysis through Geographical Information System (GIS) application and multi-criteria analysis through Analytical Hierarchy Process (AHP) is one of the methods for tsunami inundation and impact assessment. In this study, vulnerability, inundation and impact assessment due to tsunami hazard in Ofunato city, Iwate Prefecture, Japan was carried out. Appropriate input parameters were derived from Digital Elevation Model data, and satellite remote sensing and field data were analyzed through GIS. We applied the parameter of elevation and slope created from Aster GDEM version 2, coastline distance created from vector map of the study area and vegetation density created from ALOS ANVIR-2 image. We applied AHP process for weighting the parameter through pair-wise comparison using five iterations of normalized matrix. Five classes of vulnerability were defined and analyzed for tsunami inundation mapping. We used weighted overlay through spatial analyst in GIS to create the final map of tsunami vulnerability. The assessment results indicate that 7.39 square kilometer of the study area was under the high vulnerability zone due to tsunami, and 8.13 square kilometer of building area was under the inundation area. Our result showed good agreement with the observed data and historical map. The result presented here can aid as preliminary information for the coastal zone management related to disaster mitigation and for the evacuation process and management strategy during disaster.



**Citation:** Sambah, A. B.; Miura, F., 2014, Integration of Spatial Analysis for Tsunami Inundation and Impact Assessment: Journal of Geographic Information System, v. 6, no. 1, p. 11-22.

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