

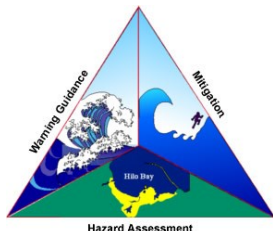


# TsuInfo Alert

prepared by the Washington State Department of Natural Resources on behalf of the  
**National Tsunami Hazard Mitigation Program**  
a state/federal partnership funded through the National Oceanic and Atmospheric Administration (NOAA)

FEBRUARY 2014

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## 1964 Great Alaska Earthquake and Tsunami—50th Anniversary

By Brynne Walker, Washington State Emergency Management

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On March 27th, 1964, a magnitude 9.2 earthquake occurred between the southern tip of Kodiak Island and Cordova, Alaska (Noson and others, 1988) generating a tsunami that was felt along the west coast from Alaska to California. This year, Washington State Emergency Management (along with many other National Tsunami Hazard Mitigation partners) will be recognizing this earthquake and tsunami as this year is the 50th anniversary of this great quake. This earthquake and tsunami took the lives of 103 people in Alaska, four people in Oregon, and 12 people in California (Noson and others, 1988). Fortunately, there were no deaths in Washington State, however this event did cause tsunami damage along the Copalis River where a small bridge was destroyed (see figure 1). This tsunami also damaged a bridge on State Route 109 over Joe Creek (see figure 2) and tore apart a house in Pacific Beach (see



Figure 1: Bridge collapse after the tsunami debris came down the Copalis River (Credit: U.S. Army Corps of Engineers)



Figure 2: Bridge collapse on State Route 109 over Joe Creek in Grays Harbor County (Credit: U.S. Army Corps of Engineers)

figure 3). The Washington State Earthquake/Tsunami program will be putting together a webpage in commemoration of this event on the Washington Military Department's Emergency Management Division tsunami webpage ([http://www.emd.wa.gov/hazards/haz\\_tsunami.shtml](http://www.emd.wa.gov/hazards/haz_tsunami.shtml)). This webpage will highlight this event and its effects on the Washington Coast.

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Figure 3: House torn apart from tsunami debris in Pacific Beach, Grays Harbor County (Credit: U.S. Army Corps of Engineers)



WASHINGTON STATE DEPARTMENT OF  
**Natural Resources**  
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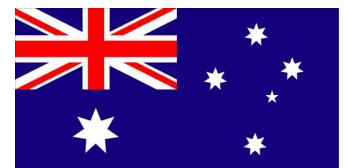
The views expressed herein are those of the authors and not necessarily those of NOAA, the Washington Department of Natural Resources, or other sponsors of TsuInfo Alert.

## The Australian tsunami database: A review

By James Goff (University New South Wales) and Catherine Chague'-Goff (Australian Nuclear and Science Technology Organisation)

### Abstract

There has been a significant increase in the number of peer-reviewed publications, critical reviews and searchable web-based databases, since the first substantial tsunami database for Australia was published in 2007. This review represents a complete reorganization and restructuring of previous work coupled with the addition of new data that takes the number of events from 57 (including 2 erroneous events) to 145. Several significant errors have been corrected including mistaken run-up heights for the event of 19 August 1977 Sumba Island, Indonesia, that suggested it was the largest tsunami in Australia's history. The largest historical event in the database is now the 17 July 2006, Java, Indonesia, tsunami that had a run-up height of 7.90 m at Steep Point, Western Australia. Although estimated wave heights of 40 ft (\*13 m) were noted for the 8 April 1911 event at Warrnambool, Victoria, no run-up data were provided. One of the more interesting findings has been the occurrence of at least 11 deaths, albeit for events that are generally poorly defined. Data gathered during the construction of this database were rigorously reviewed and as such several previous palaeotsunami entries have been removed and other potentially new ones discarded. The reasons for inclusion or exclusion of data are discussed, and it is acknowledged that while there has been an almost three-fold increase in the number of entries the database is still incomplete. With this in mind the database architecture has been brought in line with others in the region with the ultimate goal of merging them all in order to provide a larger, interrogatable and updatable data set. In essence, the goal is to enhance our understanding of the national and regional tsunami hazard (and risk) and to move towards an open-source database.



Article available soon in the journal *Progress in Physical Geography* (SAGE): <http://ppg.sagepub.com/>

# MORE ON TSUNAMIS IN ALASKA

## Articles from the Alaska Science Forum

By Ned Rozell, Geophysical Institute, University of Alaska, Fairbanks

**A great Alaska earthquake meets southern California**—An expected event in Alaska could affect millions of Americans. Here's how:

On Thursday, March 27, 2014, a slab of the seafloor larger than human imagination fractures, rumbling beneath the Alaska Peninsula. In several planet-ringing minutes, thousands of years of potential energy releases to become kinetic. A great earthquake occurs right where scientists predicted it would.

The Pacific floor plows beneath Alaska in the region between Kodiak Island and the Shumagin Islands south of Sand Point. A block of sea floor the size of Kodiak Island rises. A bulge in the Pacific Ocean rebounds toward Los Angeles.

See full article: <http://www.gi.alaska.edu/AlaskaScienceForum/article/great-alaska-earthquake-meets-southern-california>

**In Hawaii, hints of a giant Alaska tsunami**—Clues from a crater-like sinkhole on the island of Kauai point back to a giant wave that came from Alaska at about the time European explorers were pushing west, seeing the Mississippi River for the first time.

The Makauwahi Sinkhole on the southeast shore of Kauai holds the mysterious equivalent of about nine shipping containers full of rocks, corals and shells from the Pacific Ocean. For the material to breach the amphitheater-like limestone walls of the feature required a wave about 25 feet high, said Rhett Butler of the Hawaii Institute of Geophysics and Planetology in Honolulu. Butler gave a presentation on the subject at the Fall Meeting of the American Geophysical Union held in San Francisco in December 2013.

See full article: <http://www.gi.alaska.edu/AlaskaScienceForum/article/hawaii-hints-giant-alaska-tsunami>

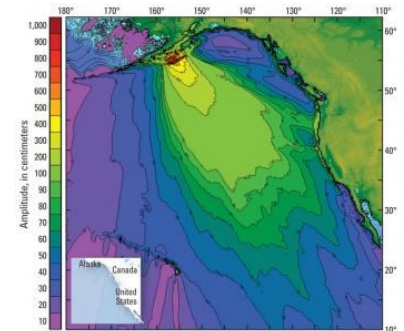
**High-and-dry log points to great Alaska tsunamis**—As Gary Carver stepped through the grasses of a treeless Alaska island with an archaeologist friend, he spotted a bleached driftwood log. The log rested on sand about a half mile from the beach and 50 feet above sea level.

Carver, on the island searching out Aleutian mummies for a Discovery Channel program, is an expert on tsunamis. He suspected that only a giant wave could have delivered a 30-foot log that high on uninhabited Sedanka Island, about 15 miles southeast of Dutch Harbor. Then he grabbed his shovel.

See full article: <http://www.gi.alaska.edu/AlaskaScienceForum/article/high-and-dry-log-points-great-alaska-tsunamis>

*Since the late 1970s, the University of Alaska Fairbanks' Geophysical Institute has provided this column free in cooperation with the UAF research community. Ned Rozell is a science writer for the Geophysical Institute.*

<http://www.gi.alaska.edu/AlaskaScienceForum>



A graphic showing the immediate effect of a hypothetical 9.1 earthquake occurring off the Alaska Peninsula. **Credit:** Vasily Titov, NOAA Center for Tsunami Research.



Researchers nearby a driftwood log record a tsunami carried some-more than 50 feet above sea level. **Credit:** Rob Witter

# TSUNAMIS PREPAREDNESS WEEK

## Tsunami Preparedness Week, March 23-29

By Christa Rabenold, NWS Tsunami Program Mitigation Specialist

At 5:36 pm ADT on March 27, 1964, without warning, the largest recorded earthquake in U.S. history, and the second largest in world history, occurred in Alaska's Prince William Sound. Valdez, Anchorage, and many villages along the Alaska Coast were significantly damaged or destroyed by the magnitude 9.2 earthquake and the tsunamis that followed. Over 130 people died in Alaska, Oregon, and California<sup>1</sup>. Damage from the tsunamis alone, which also impacted the west coasts of the United States and Canada and Hawaii, was estimated at almost \$1 billion (2013 dollars)<sup>2</sup>.

The 50th anniversary of this event is a reminder that a tsunami could strike the U.S. coastline at any time. To boost tsunami preparedness efforts in the United States, National Oceanic and Atmospheric Administration (NOAA), the Federal Emergency Management Agency (FEMA), and the U.S. Geological Survey, in coordination with the National Tsunami Hazard Mitigation Program, are promoting and supporting national Tsunami Preparedness Week, March 23–29. During this week, NOAA and its partners will promote safety and awareness and urge coastal residents and visitors to prepare themselves and their families for a tsunami.



Tsunami damage at Kodiak, Alaska, following the 1964 Great Alaska Earthquake and Tsunamis (Credit: NOAA)

In conjunction with Tsunami Preparedness Week, the National Weather Service will lead three tsunami exercises: CARIBE WAVE/LANTEX14 (Caribbean/Northwestern Atlantic), LANTEX14 (Gulf of Mexico), and PACIFEX14 (Pacific Coast). The purpose of these exercises is to improve the effectiveness of the tsunami warning system. They provide an opportunity for emergency management organizations to test their operational lines of communications, review their tsunami response procedures, and promote tsunami preparedness. Emergency management organizations are invited to participate at varying levels ranging from drills to full-scale exercises. As emergency managers well know, regular exercising of response plans is a critical preparedness activity.

NOAA is also providing significant modeling and warning support to Alaska Shield 2014, an exercise based on the 1964 event being led by the Alaska Division of Homeland Security and Emergency Management. Recognizing the significance of the event and the importance of the exercise, FEMA has incorporated Alaska Shield 2014 into its Capstone Exercise 2014, a complex, national-level emergency preparedness exercise that will bring together federal, state, local, tribal, private sector, and other officials and representatives to assess the nation's collective preparedness for large-scale disasters.

The Tsunami Preparedness Week webpage contains information about activities taking place across the country to encourage preparedness and commemorate the 1964 event and provides links to tsunami-related preparedness information. The page is updated regularly as new information becomes available. Visit the page at <http://nthmp.tsunami.gov/tpw/tsunami-preparedness-week.html>. Additions are welcome and should be sent to [christa.rabenold@noaa.gov](mailto:christa.rabenold@noaa.gov).

<sup>1</sup>Lander, J.F. 1996. Tsunamis Affecting Alaska 1737-1996. KGRD no. 31. National Oceanic and Atmospheric Administration, National Geophysical Data Center. <http://www.ngdc.noaa.gov/hazard/data/publications/Kgrd-31.pdf>.

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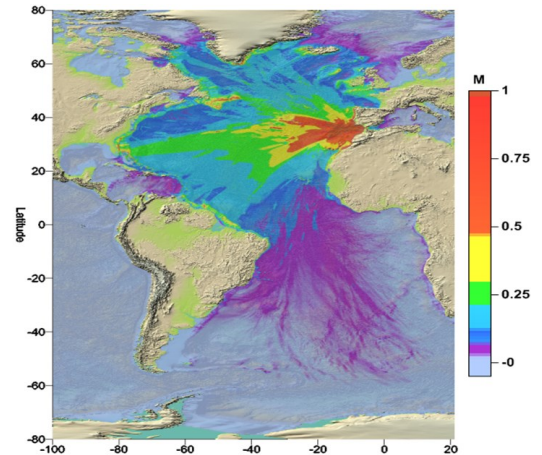
<sup>2</sup>NOAA/WDC Tsunami Event Database, National Oceanic and Atmospheric Administration, National Geophysical Data Center, Boulder, CO, <http://www.ngdc.noaa.gov/nndc/struts/form?t=101650&s=70&d=7>. Accessed Feb. 21, 2014. Dollars converted using Consumer Price Index Calculator.

# TSUNAMIS PREPAREDNESS WEEK

## Tsunami exercises to be conducted on March 26 and 27, 2014

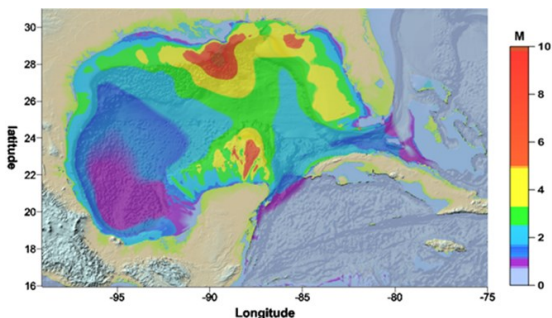
By Christa von Hillebrandt-Andrade, Manager US NWS Caribbean Tsunami Warning Program

On March 26, 2014 two regional tsunami exercises (CARIBE WAVE/LANTEX) will take place, while on the 27th will be the Pacific regional tsunami exercise (PACIFEX). The U.S. National Tsunami Hazard Mitigation Program (NTHMP) together with UNESCO and other regional organizations are providing the framework for these exercises as a means for emergency responders throughout the Northwestern Atlantic, Caribbean, Gulf of Mexico, and Northeast Pacific to test and update tsunami response plans. The scenarios are a hypothetical earthquake located offshore Portugal (CARIBEWAVE/LANTEX), a submarine landslide within the Gulf of Mexico (LANTEX), and a major Alaska Peninsula earthquake and tsunami (PACIFEX). The Portugal scenario simulates a tsunami generated by a magnitude (M) 8.5 earthquake located approximately 270 km off the Portugal coast, while the Gulf of Mexico Scenario simulates a M 6.6 earthquake in the Mississippi Canyon which triggers a large slump. The Alaska Peninsula event is based on a M 9.1 earthquake scenario developed by the USGS south of the Alaska Peninsula. The initial kick off messages



Forecasted wave heights for CARIBE WAVE/LANTEX Portugal exercise of March 26, 2014.

will be issued by the US National Tsunami Warning Center (NTWC) and Pacific Tsunami Warning Center (PTWC) on 26 March 2014 at 10:05 UTC (Universal Time Coordinated) for Portugal scenario, at 14:02 UTC for the Gulf of Mexico scenario, and at 18:54 UTC on March 27 for the Alaska Peninsula scenario. These messages will be disseminated over all their standard broadcast channels. The dummy message is issued to test communications with Tsunami Warning Focal Points (TWFPs) and Emergency Management Organizations (EMOs), and to start the exercise. It will be the only exercise message broadcast from the PTWC/NTWC, excluding special email messages. In the US, the



Forecasted wave heights for LANTEX Gulf of Mexico exercise of March 26, 2014.

Weather Forecast Offices of the National Weather Service and state offices of emergency services are the points of contact for coordinating activities as part of this exercise. The exercise handbooks, as well as additional background materials and the links for registration and evaluation, are posted at [www.caribewave.info](http://www.caribewave.info) and [ntwc.arh.noaa.gov](http://ntwc.arh.noaa.gov) under the Exercise tab. High levels of vulnerability and risk to life and livelihoods from tsunamis along the Caribbean and Adjacent regions as well as the U.S. and Canadian coasts, should provide a strong incentive for countries and local jurisdictions to prepare for a tsunami and participate in this exercise. For the Gulf of Mexico, where seismicity is much lower than other regions, studies indicate that tsunamis could be generated and thus the planning for such an event is important and participation in the exercise is encouraged.

# 2014 NTHMP MEETING

## 2014 National Tsunami Hazard Mitigation Program annual meeting recap

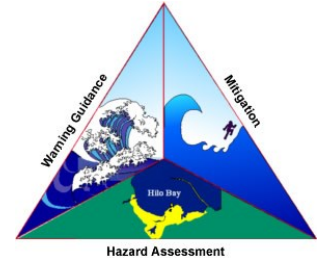
By Rocky Lopes, Deputy Program Manager for Stakeholder Engagement NOAA/NWS Tsunami Program

The 2014 Annual Meeting of the National Tsunami Hazard Mitigation Program was held January 28 – 31, 2014. The meeting was hosted by the USGS at its Menlo Park, California, Science Center facility.

At peak, over 60 people attended from states, territories, commonwealths, universities, as well as NOAA, FEMA, and the USGS.

Information was shared on these topics:

- NWS Tsunami Program Update, led by Mike Angove, NWS Tsunami Program Manager. Angove reviewed the current status of the Tsunami Program and budget.
- NOAA Response to National Academy of Sciences Report – the NOAA Response became public when it was transmitted to Congress in December, 2013, and is now posted on the NTHMP website, publications page.
- TsunamiReady Program – the TsunamiReady Program within the National Weather Service has been separated from the StormReady Program and transferred to the Tsunami Program office, assigned to the portfolio of Rocky Lopes. Lopes and Dr. Chris Gregg gave an update on the status of a report that is due in March, and will give recommendations for a suggested revision to the TsunamiReady Guidelines. Lopes worked with the NTHMP Mitigation & Education Subcommittee to develop a collaborative plan for how to move forward with discussing the development of updated TsunamiReady Guidelines *in concert with all stakeholders* once Dr. Gregg's report is released.
- Evacuation Response – several presentations were given about the latest research and thinking about tsunami evacuation by Paul Whitmore, Dr. Nate Woods, Dr. Chip McCreery, and Rick Wilson.
- Vertical Evacuation – John Schelling gave a presentation describing how a grass-roots group learned more about tsunami vertical evacuation and eventually won the support of the community by having them pass a bond issue to add on a vertical evacuation structure to a new school building.
- Marine Guidance Project – Rick Wilson and Dr. George Priest gave presentations and updates on guidance in planning for tsunami effects in harbors and marine impact zones.
- Tsunami Sources – Dr. Kwok Fai Cheung, Rick Wilson, Dr. Stephanie Ross, and Paul Whitmore gave presentations on tsunami sources and their implications for planning, modeling, and evacuation guidance.
- National Tsunami Assessment – Sue McClean and Paula Dunbar (remote) gave a presentation on the status of the update of the National Tsunami Assessment.
- Each NTHMP partner gave an update about their accomplishments during 2013.



All of the presentations listed above, plus meeting notes from NTHMP Subcommittee Meetings, have been posted to the NTHMP website, here: <http://nthmp.tsunami.gov/2014annualmeeting/>

In related news, the NTHMP Coordinating Committee met on Friday, January 31, 2014. During this meeting, the members of the Coordinating Committee discussed the results of the updated National Tsunami Assessment and agreed to grant full membership on the Coordinating Committee to American Samoa, the Commonwealth of the Northern Marianas Islands, and Guam. Other actions at the meeting included voting to have Aimee Devaris serve as NTHMP Chair for the next two years. Congratulations, Aimee!

Dr. Rocky Lopes at NWS Headquarters was appointed as the official NTHMP Program Administrator. This position serves as staff support to the operations of the NTHMP and its partners.

# POST TSUNAMI UPDATE

## 2004 Indian Ocean tsunami remembered

**Nine Years After Tsunami, Wounds Still Fresh in Aceh**, by Nurdin Hasan, Jakarta Globe—Banda Aceh. The people of Aceh on Thursday paid their respects to the more than 170,000 people who perished nine years ago today when a 9.3 magnitude earthquake caused a massive tsunami to sweep through the region, leaving a path of devastation in its wake and turning the eyes of the world upon the province.

The provincial government, flying their flags at half-mast, held the nine-year commemoration event at Ratu Safiatuddin park, where thousands of locals, government officials and students took part.

Arie Ginanjar Agustian, a well-known Indonesian motivational speaker, led prayers and gave a speech, while Illiza Sa'aduddin Djamal, the mayor of Aceh, also spoke, as did Aceh Deputy Governor Muzakir Manaf and Administrative Reform Minister Azwar Abubakar. Azwar was the acting governor when the disaster took place on Dec 26, 2004.



Credit: AusAID 2005

See full article: <http://www.thejakartaglobe.com/news/nine-years-later-tsunami-wounds-still-fresh-in-aceh/>

**From The Ruins Of A Tsunami, A Rebuilt Aceh Rises Anew**, by Michael Sullivan, NPR—As survivors of Haiyan — November's super typhoon in the Philippines — slowly put their lives back together, the rest of Asia has been marking the anniversary of another disaster.



Credit: AusAID 2005

Shortly after Christmas nine years ago, a huge tsunami swept across the region, killing at least a quarter of a million people.

Some of the worst damage was in the Indonesian province of Aceh, where whole villages were swept away by a wall of water so powerful it picked up ships and left them several miles inland.

Poverty is still widespread in the province. But nine years on from the tsunami, the devastation left in its wake has given way to reconstruction of housing and infrastructure, a peace deal between separatists and the Indonesian government, and some economic progress.

In the world's most populous Muslim-majority nation, the Acehnese are proud of the fact that their province is among the first places — if not the first place — Islam arrived in Southeast Asia, brought not at the point of a sword but by Muslim traders from the Arabian Peninsula.

See full article: <http://www.npr.org/blogs/parallels/2014/01/03/259405561/from-the-ruins-of-a-tsunami-a-rebuilt-aceh-rises-anew>

Photos by AusAID from the Australian Department of Foreign Affairs and Trade photo library:

<http://www.flickr.com/photos/dfataustralianaid/>

# IN THE NEWS

## This house is built to withstand the force of a tsunami

By Tuan C. Nguyen, Smithsonian Magazine

In 1820\*, Camano Island, one of the many scattered bits of land along the mouth of Puget Sound, had a piece of its south end break off and slide into the ocean. The violent incident triggered a tsunami that crashed into nearby Hat Island, drowning many of the local Tulalip people.

Fortunately, life in the area since that deadly disaster has been mostly calm. Camano Island today is home to around 13,000 residents, along with roughly 4,000 who come each year in search of a relaxing respite from city life.

On the northern end of the island sits a picturesque 3,140 square-foot waterfront home that



Credit: Lucas Henning (<http://www.lhenning.com/>)

lead architect Dan Nelson of Designs Northwest Architects has dubbed the [Tsunami House](#). Standing roughly 30 feet tall, it's designed to

stay erect should a similar chain of events

strike just as suddenly. And though no building is tsunami-proof (just as there's no such thing as an earthquake-proof building), Nelson says that the remodeled structure his team drew up is expected to withstand the impact of high-velocity wave walls with heights of up to eight feet as well as a 7.8 scale earthquake and 85 mph lateral winds.



Credit: Lucas Henning

See full article: <http://www.smithsonianmag.com/innovation/house-built-withstand-force-tsunami-180949455/>

\*See 2001 TsuInfo article for more information on the estimated date of this event

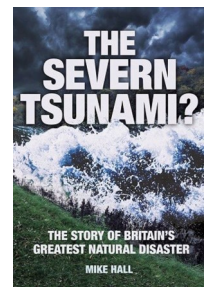
[http://www.dnr.wa.gov/Publications/ger\\_tsuinfo\\_2001\\_v3\\_no6.pdf](http://www.dnr.wa.gov/Publications/ger_tsuinfo_2001_v3_no6.pdf)

## NEW TSUNAMI BOOK PUBLISHED:

### The Severn tsunami? The story of Britain's greatest natural disaster

By Mike Hall

On January 30, 1607, a huge wave, over 7 meters high, swept up the River Severn, flooding the land on either side. The wall of water reached as far inland as Bristol and Cardiff. It swept away everything in its path, devastating communities and killing thousands of people. Historian and geographer Mike Hall pieces together the contemporary accounts and the surviving physical evidence to present, for the first time, a comprehensive picture of what actually happened on that fateful day and its consequences. He also examines the possible causes of the disaster: was it just a storm surge, or was it, in fact, the only recorded instance of a tsunami in Britain?



**Citation:** Hall, Mike, 2013, The Severn tsunami? The story of Britain's greatest natural disaster: The History Press, 160 p.