

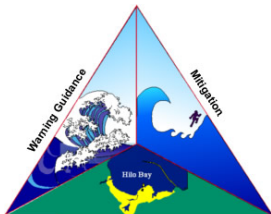
TsuInfo Alert



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)

AUGUST 2013

Volume 15, Number 4



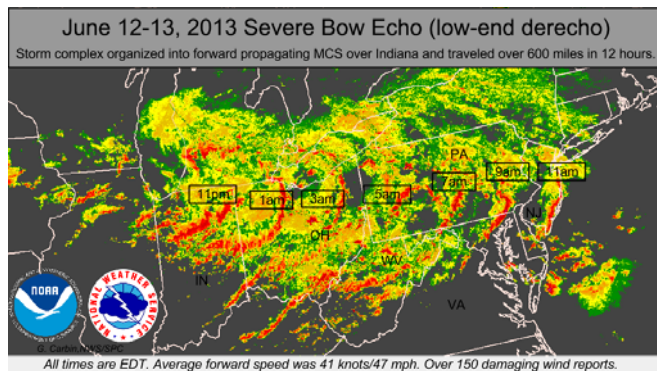
Hazard Assessment

Tsunami of 13 June, 2013 (Northwestern Atlantic Ocean) West Coast/Alaska Tsunami Warning Center, NOAA/NWS

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Tsunami-like waves were observed along the US east coast during the afternoon of June 13, 2013 (day 164). The source is complex and still under review, though the coincidence at several gages with strong atmospheric pressure fluctuations indicate that it is at least partly generated by meteorological causes. The event occurred in close conjunction with a weather system labeled by the National Weather Service as a low-end derecho which propagated from west to east over the New Jersey shore just before the tsunami. The tsunami was observed at over 30 tide gages and one DART buoy throughout the Northwestern Atlantic Ocean.



Radar image of Derecho.
 (Image by NOAA/National Weather Service)

A first-hand description was provided by Brian Coen who observed the event at Barnegat Inlet in New Jersey: Around 3:30pm on Thursday June 13, 2013, Brian Coen was spear fishing near the mouth of Barnegat Inlet; just south of the submerged northern breakwater. Earlier in the day around noon, thunderstorms had moved through the area. By 3:30pm the weather was overcast with a light east wind. At approximately 3:30, the outgoing tide was amplified by strong currents which carried divers over the submerged breakwater (normally 3-4 feet deep). This strong outrush continued for 1-2 minutes and eventually the rocks in the submerged breakwater were exposed. Brian backed his boat out before being sucked over as well.

At this point, Brian noticed a large wave coming in, approximately 6 feet peak-to-trough and spanning across the inlet. The upper 2 feet of the wave was breaking. This wave occurred in conjunction with a reversal of the current such that even though the tide was going out, a strong surge was entering the inlet. This surge carried the divers back over the submerged reef and into the inlet from where they were picked up. On the south jetty three people were swept off the rocks which were 5 to 6 feet above sea level at the time. At least two were injured requiring medical treatment. There was no more strong activity after about 5 minutes.

(Story continues on page 3)

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Prepared and published bimonthly by the Washington State Department of Natural Resources,
Division of Geology and Earth Resources,
on behalf of the National Tsunami Hazard Mitigation Program (NTHMP),
a State/Federal partnership funded through the National Oceanic and Atmospheric Administration (NOAA).

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

Tsunami Library Catalog (type tsunamis in subject term): <http://www2.wadnr.gov/dbtw-wpd/washbib.htm>



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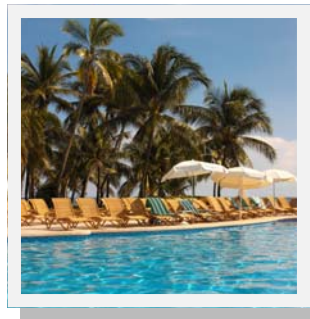
<http://www2.wadnr.gov/dbtw-wpd/washbib.htm>

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.

Tsunami Safety Course for Tourism, Hotel and Security Stakeholders in the Dominican Republic

By Christa von Hillebrandt-Andrade, Manager, NWS Caribbean Tsunami Warning Program, Mayagüez, Puerto Rico

On July 29-31, 2013 Global Foundation for Democracy and Development (FUNGLODE) of the Dominican Republic hosted the first Tsunami Safety Course tailored for the Tourism, Hotel and Security industries. Forty people participated in this event which was organized by its Global Institute for Higher Studies in Social Sciences and delivered in Santo Domingo. The objective was to provide the tourism and hotel sectors with basic knowledge on tsunamis, the national response protocols and elements for their preparedness and response plans. The format of the course included lectures as well as hands on exercises for the development of plans and responding to local and regional tsunamis.



Josefina Reynoso of FUNGLODE and General Luis Luna Paulino of Civil Defense emphasized that although tsunamis occur infrequently, the impact could be devastating and the task to prepare for such an event has to be ongoing. Dominican Republic has been affected by local and distant tsunamis. In 1946 two tsunamis are reported to have caused the death of over 1800 people along its northern coast. Currently, the county receives over 4 million visitors a year, 1.5 of which are US citizens. They are mostly attracted by its beautiful beaches where almost the entire tourism infrastructure is concentrated.

(Story continues on page 3)

COASTAL COMMUNITY UPDATES

Japan: Earthquake and Tsunami 24 Month Report

by Japanese Red Cross Society

This two-yearly report focuses on achievements and progress of JRCS relief and recovery programmes for Great East Japan Earthquake and Tsunami. The operation consists of eight areas of intervention:

- Emergency Relief
- Health Infrastructure and Care
- Assistance for those Affected by Nuclear Power Plant Accident
- Improving the Living Conditions of Affected People
- Social Welfare Support
- Children's Education Support
- Community Based Disaster Preparedness
- Capacity Building of JRCS National Disaster Preparedness



The details of JRCS achievements in each area are shared in this report.

See full report: <http://reliefweb.int/report/japan/japan-earthquake-and-tsunami-24-month-report>

Tsunami Safety Course for Tourism, Hotel and Security Stakeholders in the Dominican Republic

(continued from page 2)

The NWS Caribbean Tsunami Warning Program (CTWP), Puerto Rico Seismic Network (PRSN) and UNESCO IOC Tsunami Program developed the syllabus and coordinated with the local experts and stakeholders from the Civil Defense, National Meteorological Office, the Autonomous University of Santo Domingo, Ministry of Environment and Global Matrix Corporation for the organization and delivery of the course. Given the positive



Bernardo Aliaga (UNESCO) and Carolina Hincapie (PRSN), facilitating an exercise with course participants.

feedback, FUNGLODE has already requested the CTWP, UNESCO and PRSN to help co-organize additional courses in the summer of 2014 with deliveries in key tourist areas. The syllabus and material used for this course could also serve as the base for other trainings for the tourism sector.

Tsunami of 13 June, 2013 (Northwestern Atlantic Ocean) West Coast/Alaska Tsunami Warning Center, NOAA/NWS

(continued from page 1)

This event produced a tsunami that was recorded at tide gages monitored by the West Coast/Alaska Tsunami Warning Center (WCATWC). Many observatories provide data to the centers; such as the NOAA National Ocean Service, the U. of Hawaii Sea Level Center, the Chilean Navy, the Japan Meteorological Agency and the National Tidal Facility in Australia among others. Click on the site name to see a graph of the tsunami, when available. Listed wave heights are maximum amplitude in cm (above sea level). Observed Arrival time is the actual tsunami arrival time in UTC on gages where it could be determined. The Sample Interval column shows the time between data samples. For more information, visit NOAA Center for Tsunami Research: <http://nctr.pmel.noaa.gov/eastcoast20130613/>



COASTAL COMMUNITY UPDATES

Hawaii Hazards Awareness and Resilience Program (HHARP)

By Hawaii State Civil Defense

The Hawaiian Islands are frequented by numerous hazards that affect the lives and livelihoods of residents each year. The islands' volcanic origin, steep terrain and surrounding ocean make them susceptible to severe weather, land-based, and coastal hazards – including earthquakes, volcanic eruptions, high surf, tsunamis, flooding, and tropical cyclones.

Nearly 2,500 miles from any other populated land mass, Hawaii's remoteness, growing populations, single-sector economy, and dependence on imported goods, are challenges that increase the vulnerability of the islands to the impacts of natural hazards, and can slow recovery processes after a disaster.



To strengthen the capacity of Hawaii residents to prepare for, respond to, and recover from hazard events, Hawaii State Civil Defense and Pacific Disaster Center collaborated to develop the Hawaii Hazards Awareness and Resilience Program (HHARP). The goal of the program is to enhance community resilience to multiple hazards through a facilitated education and outreach program that promotes hazard understanding and awareness, and offers tools and information resources to guide preparedness, response and recovery.

Outreach sessions are led by community leaders and supported by state and county partners. HHARP will assist communities to: learn about hazards; understand hazard warning information; identify community resources; assess and mitigate hazard risk; develop a disaster plan, and ultimately, meet program guidelines, or milestones, that help improve community resilience. Communities that accomplish program milestones will receive recognition for their efforts.

Modeled after the Tsunami Awareness Program – Hawaii (TAP), developed in 2012, a HHARP Resource Kit composed of instructional materials and information resources supports those facilitating the education and outreach activities. The Kit draws upon established programs (TsunamiReady and StormReady) and resources that are instructive, hazard focused, and enabling. The developers have adapted resources as needed to make them locally relevant. Templates, step-by-step instruction, reference documents and presentation materials support communities in accomplishing and documenting HHARP milestones.



State and county program administrators work closely with community members to provide guidance and expertise as communities implement the program. Periodic onsite visits by program administrators ensure that communities have the resources, support, and encouragement to achieve and document milestones.

To obtain a HHARP Resource Kit, or for additional information, please contact Hawaii State Civil Defense at: (808) 733-4300 or <http://www.scd.hawaii.gov/preparedness.html>.

COASTAL COMMUNITY UPDATES

Tsunami warning and response strengthened

By Nicki Kaye, Member of Parliament, Auckland Central, New Zealand

Civil Defence Minister Nikki Kaye today opened an international workshop to train Pacific Island countries and consult on planned new Pacific Tsunami Warning Centre (PTWC) information products.

PTWC's planned new information tools will be launched next year. The aim is to enable countries that currently cannot create tsunami threat models to issue more accurate warnings.

The new tools will include predicted wave heights, which are not provided in the current bulletins, as well as more localised and graphical threat information for regions of the Pacific.



"With the majority of the world's earthquakes and tsunami occurring in the Pacific and the seas on its margins, it is very important that Pacific Island nations are prepared," Ms Kaye says. "Similarly, it is crucial that knowledge in the region is shared, to help ensure we are all as equipped as we possibly can be for response and recovery.

The workshop and consultation is being run by the Ministry of Civil Defence & Emergency Management and GNS Science. Fifteen Pacific island countries are attending, and officials from New Zealand, Australia the United States and the Intergovernmental Oceanographic Commission of UNESCO will provide expert input.

"Between 2009 and 2013 we have seen several destructive and deadly tsunami in the Pacific. While we can't prevent tsunami from happening, we can work towards improving our warning and response arrangements, to help limit the loss of lives and property that they cause.

"It is great for us to have the likes of the Director of the PTWC, Dr Charles McReery, and the Chair of the Intergovernmental Coordination Group of the Pacific Tsunami Warning System, Dr Ken Gledhill here so we can learn from them."

Participants are officials from Pacific island countries' meteorological and national disaster management offices.

The countries attending are: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu.

See original article: <http://www.beehive.govt.nz/release/tsunami-warning-and-response-strengthened>

Oregon Coast now fully mapped for tsunami dangers

IN Tillamook Headlight Herald, Oregon

Beach goers this summer should pack not only their sunscreen and favorite novel, but also a tsunami evacuation map. For the first time, Oregon's entire coast has maps showing where to evacuate in the event of a tsunami. This information could save your life and those you love.

A catastrophic Cascadia earthquake and tsunami is a matter of when, not if. But our state is now more tsunami-ready than before. The Oregon Department of Geology and Mineral Industries (DOGAMI) has completed its work under a federal grant to create a new generation of tsunami maps and to educate vulnerable coastal communities how to prepare.



"We're the first generation in Oregon to fully understand the threat from earthquakes and tsunamis," said Governor John Kitzhaber. "This project has brought coastal communities together to become more prepared, thanks to federal funding, state expertise in mapping and outreach, and a local sense of responsibility. Coastal residents want to live with peace of mind and also let visitors know they're open for business and will know where to go if a tsunami strikes," Kitzhaber said.

See full article: <http://alturl.com/edviw>

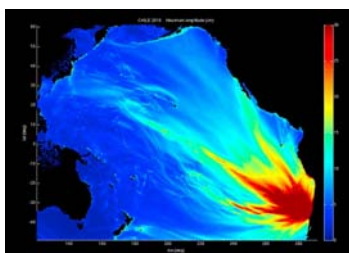
TSUNAMIS & TECHNOLOGY

Tsunamis could be spotted from magnetic anomalies

By Ian Randall, PhysicsWorld

Magnetic anomalies created by tsunamis could be detected by satellites. That's the claim of researchers in China, who have created a model that simulates the effect of huge ocean waves on the Earth's magnetic field. The team believes that its work could lead to an early-warning system that can detect the deadly waves in real time.

Tsunamis are huge ocean waves often associated with earthquakes. While they can be tens of metres high when they reach land – often with devastating effects – they tend to have amplitudes of a metre or so in the open ocean. As a result it can be difficult to spot a tsunami against a background of normal waves.



Map showing the maximum amplitude of the 2010 Chile tsunami as it moved across the South Pacific. The height scale is in centimetres. (Courtesy: NOAA)

While a tsunami in the open ocean might not be tall it is extremely long and fast moving and therefore involves the rapid displacement of large amounts of water. When a body of salt water moves through the Earth's magnetic field its conductive nature induces a small anomaly in the field, which can be with a magnetic sensor mounted on a low-Earth-orbit satellite or high-altitude balloon.

Real and model tsunamis

Now, Benlong Wang and colleagues at Shanghai Jiao Tong University have developed a way to predict the local changes in the Earth's magnetic field caused by a variety of model tsunamis. The basic models can then be combined to simulate the magnetic behaviour of a real-life tsunami.

See full article: <http://physicsworld.com/cws/article/news/2013/jun/28/tsunamis-could-be-spotted-from-magnetic-anomalies>

Geographic Research To Help Protect Lives From Future Tsunamis

By Nathan J. Wood, USGS

In 2011, more than 15,000 people lost their lives from tsunamis associated with an $M_w 9.0$ earthquake off the coast of Japan. Although some may think tsunami disasters only occur in other countries (from dramatizations in movies like "The Impossible"), the reality is that many U.S. coastal communities are threatened by tsunami hazards. Low-lying areas along many parts of the U.S. coastline also could be inundated minutes after a local earthquake, such as off the coasts of the Pacific Northwest, Alaska, Puerto Rico, and American Samoa.

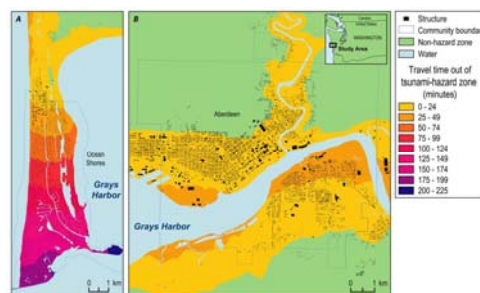


Figure 1. Maps of (A) Ocean Shores, Wash., and (B) Aberdeen, Wash., showing modeled pedestrian travel times to high ground out of tsunami-hazard zones, assuming a travel speed of 1.1 m/s. Tsunamis associated with a Cascadia subduction zone earthquake are predicted to arrive in these communities within 25 minutes after generation (modified from Wood and Schmittlein, 2013).

To protect lives from future tsunamis, local emergency managers need to know whether or not individuals in tsunami-hazard zones would have enough time to reach natural high ground before tsunami waves arrive. In areas where evacuations are possible, education and training can be provided to help at-risk individuals understand how to interpret signs of imminent tsunamis and to know what to do to reach high ground. In areas where successful evacuations are not realistic, vertical-evacuation strategies may be warranted, such as creating berms, raised platforms, or other structures to provide safe havens in the event of future tsunamis.

See full article: <http://alturl.com/zcakh>

TSUNAMIS & TECHNOLOGY

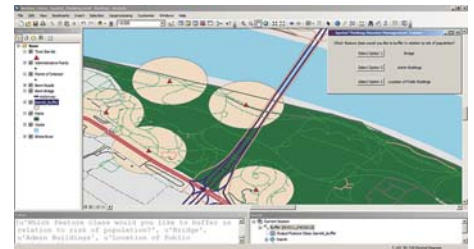
A Serious Game for Measuring Disaster Response Spatial Thinking

By Kevin Blochel, Amanda Geniviva, Zachary Miller, Matthew Nadasreski, Alexa Dengos, Emily Feeney, Alyssa Mathews, Jonathan Nelson, Jonathan Uihlein, Michael Floeser, Jorg Szarzinski, and Brian Tomaszewski, Rochester Institute of Technology

"Serious" games are games with a nonentertainment purpose. Spatial thinking is the idea of using the property's space to structure and solve problems. It is critical to decision making in response to a disaster.

A team of student researchers at the Rochester Institute of Technology (RIT), working in partnership with the United Nations University Institute for Environment and Human Security (UNU-EHS) in Bonn, Germany, have developed a serious game in ArcGIS designed to measure the spatial thinking ability of disaster responders.

The game uses a disaster response scenario where toxic substances have washed up on the shore of the Rhine River in Bonn, Germany, after a flood. The game player is given a series of questions designed to measure spatial thinking abilities based on which ArcGIS tools they would use to respond to the disaster. Using real GIS data and tools in the game makes it particularly useful for realistic disaster management training. The following sections discuss the game in further detail and provide ideas for future work.



At the start of the Spatial Thinking Game, the player can choose one of three buffer distances around the toxic waste barrels (shown as red triangles). The GIS tool choices selected by the game player are used to score the game player's spatial thinking ability. The Python window displays the code, which incorporates the ArcPy library, used to create the game and an external JSON file.

See full article: <http://www.esri.com/esri-news/arcuser/summer-2013/a-serious-game-for-measuring-disaster-response-spatial-thinking>

Infrequently Asked Questions

Can you outrun a tsunami?

Maybe the fastest man in the world could run a 6-minute mile for 6 miles (10 kilometers) while a terrifying wall of water chased him through a coastal city. But most people couldn't. Yet a myth persists that a person could outrun a **tsunami**. That's just not possible, tsunami safety experts told LiveScience, even for Usain Bolt, one of the world's quickest sprinters.

Source: <http://www.livescience.com/37497-no-outrunning-tsunami.html>

What is a meteorological tsunami?

Meteorological tsunamis (meteotsunamis) are large amplitude short period (from a few min to a few hrs) sea level oscillations generated by meteorological disturbances. They have approximately the same time and spatial scales as ordinary tsunami waves in affects coasts in a similar destructive manner, but are induced not by seismic sources or submarine landslides, but by atmospheric processes.

Source: <http://jadran.izor.hr/tmews/results/Report-Rabinovich-TGdata-catalogues-analysis.pdf>

SCIENCE OF TSUNAMIS

Articles from Science of Tsunami Hazards v.32 #3

Journal of Tsunami Society International

Numerical Model Study of Tsunami Generated by Potential Earthquake within the Komandorsky Seismic Gap in the Western Aleutian Island Arc

By R. Kh. Mazova, B. V. Baranov, L. I. Lobkovsky, N. A. Baranova, K. A. Dozorova, and O. N. Chaykina

ABSTRACT: The Komandorsky seismic gap has distinctive boundaries and a length of 650 km. Its period of “seismic silence” comes close to the maximum recurrence interval for great earthquakes in the Aleutian Island Arc - the stress concentration here probably having reached the critical value. So, estimation of possible earthquake and tsunami characteristics within this gap becomes a significant problem. The closest analog of a similar gap is the area where the 2004 Sumatra-Andaman catastrophic event occurred. Thus, for the present study we used the same modeling scheme as we used for that event. It was assumed that a source length of 650 km, consisting of 9 blocks, and an earthquake with a moment magnitude $MW=8.5$. Several block motion scenarios were considered. The tsunami generation and propagation in the Pacific Ocean and the possible wave characteristics on near and far-field coasts were estimated. Modeling of such an event showed that the wave heights on different Pacific coasts will vary from 3 to 9 meters. A tsunami wave with a 9-meter height is capable in causing significant loss of human life and economic damage.

Geological Investigation of Palaeotsunamis in the Samoan Islands: Interim Report and Research

Directions By Shaun Williams, James Goff, Johnny Ah Kau, Faigame Sale, Catherine Chagué-Goff, and Tim Davies

ABSTRACT: The September 29, 2009 Samoa Tsunami provided the opportunity to sample the sediments deposited in the Samoan Islands landscape by the tsunami. Analysing the characteristics of the sediment deposits using an established suite of diagnostic criteria, and assessing how they differ from cyclone deposits enables the identification and dating of similar events in the geologic record. This helps to better understand the long-term frequency and likely magnitude of these events. Here we report on a pilot palaeotsunami field-sampling investigation carried out in 2010 at selected sites on Upolu and Savaii Islands in the Independent State of Samoa, and on Ta'u Island in American Samoa. We present empirical stratigraphic data for the investigated sites, and we demonstrate the existence of high energy marine inundation deposits at some of these sites which were laid down by past tsunamis and/or cyclones. We review and discuss the analytical outcomes, as well as summarise the overarching directions of this research. We propose that there is a need for this study to continue and for such studies to be carried out in other islands in the Pacific. By doing this, we can build on the sparse palaeotsunami database in the region, thereby helping to improve our understanding of the long-term frequency, impact distribution, and likely magnitude of these events. Further, we can start assessing their likely sources and the long-term risk these hazards pose to coastal cities and communities in the Pacific.

Hanging Ten—Measuring Big Wave Intensities By Nancy Livingston Potter

ABSTRACT: The entire world is still feeling the effects of the devastating 2011 Honshu earthquake and tsunami. The Cascadia subduction zone, spanning over 800 miles from Vancouver Island to northern California, is soon expected to complete its 500-year quake cycle with a magnitude 8+ tsunamigenic earthquake. Much attention is being given to planning for this potential disaster and its collateral impacts from landslides, fires, hazardous material spills and infrastructure damages. The devastating impact of future tsunami events in this region and elsewhere, may result in millions of deaths and billions of dollars in damages. Over the years numerous attempts have been made to quantify tsunami severity but none of the devised scales have been completely satisfactory. The present study reviews and discusses the scales of magnitude and intensity that have been developed to describe the severity of tsunami events both qualitatively and quantitatively. Furthermore, it defines a new quantitative scaling measure of tsunami severity which is an improvement over widely reported current scales, by comparing the ‘Top Ten Lists’ of devastating tsunami as calculated by each of the scales.