



We develop seismic policies and share information to promote programs intended to reduce earthquake related losses.



A non-profit earthquake consortium for the western states

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**Western States
Seismic Policy Council**

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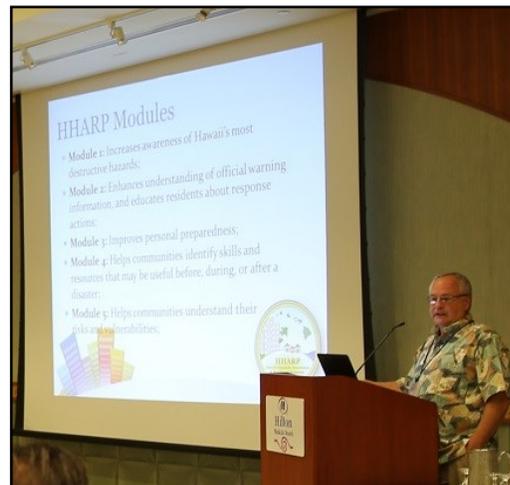
Hawaii Hosts "Building a Resilient Hawaii" Workshop

The Hawaii Earthquake and Tsunami Advisory Committee (HETAC) held a two day workshop in February to provide information about earthquakes, tsunamis, and other hazards in Hawaii. The workshop brought together federal, state and local representatives to discuss recent developments, best practices, and emerging technologies related to these hazards. The 10th anniversary of the 2006 M6.7 Kiholo Bay Earthquake, which caused significant damage to the island of Hawaii, was highlighted and a major focus was partnerships to leverage mitigation funding opportunities.

Sessions included an overview of the hazards, mitigation funding, maritime projects, existing working groups, educational resources, outreach, retrofitting post and pier homes, and building codes. The Earthquake Early Warning (EEW) and tsunami playbook projects currently underway in California were presented and the portability of those projects for use in Hawaii was discussed.



*Above: Attendees at the Building a Resilient Hawaii workshop.
Photo: HI-EMA*



*Above: Kevin Richards of Hawaii Emergency Management Agency (HI-EMA) discusses the National Award in Excellence winning Hawaii Hazards Awareness and Resilience Program (HHARP).
Photo: HI-EMA*



*Above: Presentation of the Dr. Gaylord R. Miller Award for Excellence in Tsunami Preparedness to George Curtis. Left to right, Vern Miyagi, Sandy Curtis, George Curtis, Jacquelin Miller, Patti Sutch.
Photo: HI-EMA*

The workshop was supported by the Hawaii Emergency Management Agency (HI-EMA) and the Western States Seismic Policy Council (WSSPC) with funding from the Federal Emergency Management Agency's (FEMA) National Earthquake Hazard Reduction Program (NEHRP) State Support from cooperative agreement EMW-2015-CA-00213.

NEWS

National Earthquake Conference (NEC) Will Recognize Earthquake Risk Reduction Award Winners

WSSPC congratulates this year's winners for furthering earthquake risk reduction and invites you to join us at the special awards presentation ceremony on Thursday, May 5, at the National Earthquake Conference in Long Beach, California.

For more information about the award winners: www.wsspc.org/awards/current-awards/2016-national-awards-recipient/

To register for the National Earthquake Conference: www.earthquakeconference.org



2016 WSSPC Lifetime Achievement Award in Earthquake Risk Reduction: Dr. Lucile Jones

Dr. Lucile Jones is recognized nationally and internationally as an authority on natural hazards and disaster risk reduction. Since joining the U.S. Geological Survey (USGS) in 1983, Dr. Jones has made outstanding research contributions and provided significant scientific leadership. Her research into earthquake occurrence probability and the short-term probability of foreshock and aftershock sequences is now the source of earthquake advisories issued by the State of California.

She created and implemented a new systematic approach to risk assessment research through scenario development. She built strong interdisciplinary partnerships, integrating their expertise into state-of-the-art investigations to develop comprehensive depictions of the probable consequences of catastrophic natural disasters that are being used at all levels of government and the private sector to reduce risk.

Most recently Dr. Jones served as the Science Advisor for Seismic Safety to Mayor Eric Garcetti and the City of Los Angeles. Her consensus approach involved assembling task forces to develop solutions informed by the best available science and engineering and convening stakeholders in the State's utilities to address vulnerabilities. Results included a comprehensive program to strengthen the water infrastructure in the City.

Upon the announcement of the award, Lucy Jones said, "I began my career in seismology not able to imagine it would include a public dimension. I'm humbled by this honor and grateful I could make a difference. "

A summary of Dr. Jones accomplishments is located on the WSSPC website at: www.wsspc.org/awards/current-awards/2016-national-awards-recipient/

The WSSPC Lifetime Achievement Award recognizes outstanding leaders in earthquake risk reduction who are actively practicing their profession. The recipient will have demonstrated throughout his or her career an extraordinary commitment, level of service, and contribution to the application of earthquake risk reduction to public policy.

2016 National Awards in Excellence

These awards recognize organizations and agencies for their achievements as demonstrated through exemplary programs, projects, and products that address earthquake risk reduction within the United States. The awards are given every four years at the NEC by WSSPC in partnership with the Northeast States Emergency Consortium (NESEC), the Central U.S. Earthquake Consortium (CUSEC), and the Cascadia Region Earthquake Workgroup (CREW).

Five projects were selected to receive 2016 National Awards in Excellence:

Award for Educational Outreach to Business/Government: Utah Geological Survey for "*Basin and Range Province Seismic Hazards Summit III (BRPSHSIII)*"

The BRPSHSIII brought together geologists, seismologists, geodesists, engineers, emergency planners, and policymakers to (1) present and discuss the latest seismic-hazard research in the Basin and Range Province, (2) evaluate the implications of that research for earthquake-hazard reduction and public policy, and (3) identify a path forward to further reduce risk from earthquakes in the Basin and Range Province.



Above left: Craig dePolo presenting on the 2008 M6.0 Wells, Nevada earthquake at the Basin and Range Province Seismic Hazards Summit III.

Above right: Christine Puskas presenting on geodetic measurements in Utah at the Basin and Range Province Seismic Hazards Summit III.

Photos: William Lund.

The BRPSHSIII included technical sessions, a short course titled “Characterizing Hazardous Faults – Techniques, Data Needs, and Analysis”, and a one-day field trip titled “Salt Lake City’s Earthquake Threat and What is Being Done About It”. Additionally, the U.S. Geological Survey (USGS) held a one-day workshop on “Evaluation of Hazardous Faults in the Intermountain West Region” in conjunction with BRPSHSIII, and the Intermountain Section of the Association of Environmental and Engineering Geologists and the Utah Geological Association jointly sponsored the 2015 Richard H. Jahns Distinguished Lecture in Applied Geology.

Award for Educational Outreach to the General Public: Hawaii Emergency Management Agency (HI-EMA) for "*Hawaii Hazards Awareness and Resilience Program (HHARP)*".



The goal of HHARP is to enhance community resilience following earthquakes, tsunamis, hurricanes and floods (multi-hazard) through a facilitated education and outreach program promoting understanding and awareness of the hazards. The project provides tools and information resources to guide efforts in mitigation, preparedness, response, and recovery.

HI-EMA developed a comprehensive Resource Kit, which is divided into ten modules. Each module includes instructor resources, participant activities and worksheets, visual presentations, additional reference materials, and display posters. State and

County emergency management agencies have partnered to administer HHARP in support of community leaders willing to implement the program. HHARP is designed for self-identified communities, such as traditionally geographically designated areas, apartment complexes and church groups. A representative from an emergency management agency works along with a community-identified facilitator to guide the community through a series of educational and capacity building sessions.

Award for Educational Outreach to Schools: Central Washington University (CWU), Oregon State University, and the University of Portland for "*Cascadia EarthScope Earthquake and Tsunami Education Program (CEETEP)*."

In professional development workshops, CEETEP provides Pacific Northwest coastal educators with background knowledge, strategies, and materials to engage students, visitors, and community members on the science of, and preparedness for, earthquakes and tsunamis. Each workshop has about 25 participants and targets a different section of the Cascadia coast.

The workshop instructors include expert educators on science, preparedness, and teaching methods from different learning venues (schools, parks/museums, and public outreach events). Participants receive a rich collection of physical and digital resources that are easily transferable into the learning venues at which they teach. Participants work together with an "Action Team" to make plans for action in their institutions and communities.



Above: An action team practices using a small tsunami wave tank to investigate how various factors affect tsunami inundation.

Photo: Beth Pratt-Sitaula, CWU & UNAVCO

Award for Innovations: Oregon Public Broadcasting (OPB) for "*Unprepared*".

Oregon Public Broadcasting's (OPB) "Unprepared" project was a year-long, statewide multimedia campaign that included radio stories, television stories, new online tools and mobile applications, and a special one-hour television documentary. The "Unprepared" series marked the first time that OPB created synergistic content across all of its platforms for a singular, long-term campaign.

Television stories were featured on the popular OPB original television series Oregon Field Guide that followed science and policy experts learning lessons from Japan. Online tools included the application "Aftershock", a zip code-based tool that allows users to see damage expected by neighborhood, as well as recovery time for essential resources.

OPB's program effectively educated the public on risks and increased public awareness of the need to personally prepare. In addition, the project has fostered greater civic engagement in seismic issues that the state of Oregon is wrestling with such as school resiliency, infrastructure upgrades, and land use in areas of seismic risk.

Award for Multi-jurisdictional Planning: Indiana Department of Homeland Security for "*Indiana Building Emergency Assessment and Monitoring Team (I-BEAM)*."



Above: I-BEAM multi-state building inspection exercise

Photo: CUSEC Building Safety Assessment Program

The I-BEAM project provides a deployable, self-sustaining team of properly trained personnel to assist the staff of the division of Fire and Building Code Enforcement in the Indiana Department of Homeland Security (IDHS) in performing structural assessments of buildings in the event of man-made or natural disasters.

The teams consist of trained volunteers, which include design professionals and other construction professionals with forensic analysis backgrounds.

I-BEAM provides for new and continued training, including safety training, and maintains and provides equipment to the volunteers to assist them in their determination of building structural stability.

White House Establishes Earthquake Risk Management Standard for Federal Buildings and Holds Earthquake Resilience Summit

On February 2, 2016, President Obama signed an Executive Order "Establishing a Federal Earthquake Risk Management Standard" which is designed to "improve the capability of federal buildings to function after an earthquake, reducing risks to people, lowering post-quake recovery costs, and making it easier for communities to recover swiftly." The Executive Order requires that Federal agencies responsible for the design and construction of a new building, or an alteration to an existing building, ensure that the building is constructed or altered using the earthquake-resistant design provisions in the most current building codes.

Following this announcement, the White House held an Earthquake Resilience Summit which was streamed live. The summit consisted of a number of panels of speakers covering earthquake-related topics.



*Above: Lucy Jones (USGS) and Alice Hill (White House National Security Council) at White House Earthquake Resilience Summit.
Photo: White House*

Earthquake Early Warning (EEW) progress was highlighted during the summit. It was announced that the United States Geological Survey (USGS) will deploy a "beta operational phase" of the ShakeAlert EEW system with state government, academia, and private partners. The Gordon and Betty Moore Foundation announced \$3.6 million in grants for ShakeAlert system development. In addition, a number of states, cities, utilities, and businesses announced EEW programs, projects, or funding.

References:

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www.whitehouse.gov/the-press-office/2016/02/02/executive-order-establishing-federal-earthquake-risk-management-standard

www.whitehouse.gov/blog/2016/02/02/advancing-earthquake-resilience

www.sfgate.com/nation/article/Obama-orders-federal-buildings-brought-up-to-6801891.php

British Columbia Provides \$5 Million Funding for Earthquake Early Warning (EEW) System

The province of British Columbia has provided one-time funding of \$5 million to Ocean Networks Canada (ONC) for work including installation of eight offshore strong motion sensors, integration of the sensors with the existing land-based sensor network, and improvements to seismic data collection, analysis and management systems.

ONC is an initiative of the University of Victoria and operates ocean observatories for scientific research. They will be partnering with government agencies and academia to develop the EEW system.

References:

<https://news.gov.bc.ca/releases/2016TRAN0037-000297>

www.oceannetworks.ca/ocean-networks-canada-coordinate-earthquake-early-warning-system-bc

USGS Offers Earthquake Research Grants

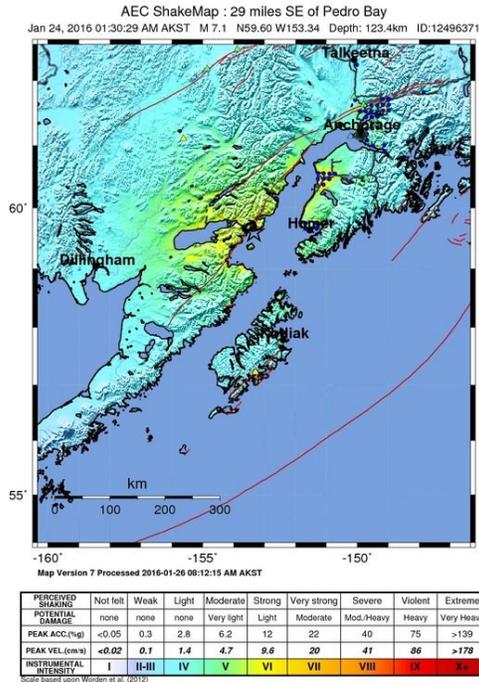
The U.S. Geological Survey will award up to \$7 million in grants for earthquake hazards research in 2017. Interested researchers can apply online at www.grants.gov under funding opportunity number G16AS00024. Applications are due May 25, 2016.

For more information:

www.usgs.gov/newsroom/article.asp?ID=4476&from=rss#.VvMAITFLWeU

M7.1 Alaska Earthquake Causes Minor Damage

On January 24, 2016, a M7.1 earthquake struck 65 miles west of Homer and 161 miles southwest of Anchorage, Alaska.



Above: ShakeMap for 01/24/16 M7.1 Alaska earthquake

Image: http://earthquake.usgs.gov/earthquakes/eventpage/us10004gqp#impact_shakemap

In the community of Kenai, a gas leak led to two explosions and fire damage to four homes. The incident highlighted some of the concerns and hazards in dealing with gas line leaks following earthquakes. The neighborhood of 30 homes was evacuated and power shut off to protect residents and workers. It took the utility more than 11 hours to shut off gas to the leaking pipe; although federal regulations require excess flow valves (EFVs) be installed to stop leaks on service lines, the leak was on a main line which was not required to have EFVs. Once the leak was located, workers had to dig eight feet down through partially frozen ground to reach the damaged line to begin repairs. Following the repair, the utility spent several weeks finding and removing pockets of gas trapped underground from the leak. It was estimated that a total of 406,000 cubic feet of gas was lost through the leak.

No major injuries were reported from the quake and although overall damage was minimal, several other areas had earthquake-related issues including power outages and a road that was partially closed due to quake damage.

References:

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www.adn.com/article/20160225/it-took-more-11-hours-shut-explosive-gas-leak-after-quake

www.accuweather.com/en/weather-news/breaking-magnitude71-earthquake/54982626

www.adn.com/article/20160124/magnitude-71-quake-rocks-alaska-damaging-roads-and-displacing-residents

MITIGATION & PREPAREDNESS

Los Angeles City Council Approves Retrofit Cost Sharing for Landlords and Tenants

The Los Angeles City ordinance requiring mandatory earthquake retrofitting of wood frame soft-story and non-ductile concrete buildings went into effect in November, 2015. Retrofit cost estimates were \$60,000 to \$130,000 for wood apartment buildings and possibly up to millions of dollars for larger concrete buildings. In January, 2016, a cost sharing formula for landlords and tenants was approved by the Los Angeles City Council.

A bill to provide tax credits for seismic retrofits was vetoed by Governor Brown in October, 2015. Existing law allowed for rent increases of up to \$75 per month to pay for the costs. The city reviewed housing studies and held public meetings that encouraged input from both landlords and renters before coming to a compromise solution: "Owners can pass half the retrofit costs to tenants through rent increases over a 10-year period, with a maximum increase of \$38 per month." The rent increase is approximately half of the maximum

allowable by law and is a temporary adjustment. "Under the available data with an average retrofit cost of \$4,300 per unit, a \$38 maximum monthly rent increase would be sufficient to cover the estimated monthly rent increase for seismic work and would allow recovery of 50% of work costing up to \$9,120 per unit in 120 months."

The city is still considering additional financial aid options including low-interest loans, permit fee waivers, tax breaks or assistance from the state.

References:

www.latimes.com/local/lanow/la-me-ln-retrofit-20160113-story.html

http://clkrep.lacity.org/onlinedocs/2014/14-0268-s7_rpt_hsg_1-12-2016.pdf

British Columbia School Seismic Retrofit Program Update

A M4.8 earthquake on December 29, 2015 served as a reminder that seismic retrofit of schools in British Columbia is far from completed. A progress report on seismic mitigation for schools in British Columbia from October, 2015 notes that of 342 projects in the seismic mitigation program, 149 are completed, 65 are in progress at some stage from project development to construction, and 128 high risk schools still require seismic mitigation.

CBCnews has mapped the schools considered by the Ministry of Education's seismic mitigation program overlain on earthquake risk data provided by the Institute for Catastrophic Loss Reduction: www.cbc.ca/news/canada/british-columbia/multimedia/earthquake-risk-and-school-seismic-upgrades-in-b-c-1.3051462

A seismic risk rating was assigned to each school based on reviews by project engineers. Schools receiving one of three "high" risk ratings are being structurally upgraded. Non-structural risk will also be addressed for these schools. Only schools built prior to 1992 are included as those built since then meet modern codes. According to the Government of British Columbia, a total of \$2.2 billion has already been spent or committed to seismically upgrade or replace 214 of the high-risk schools.

Earthquake sensors installed in 61 schools in British Columbia worked correctly and would have given

students between 6-16 seconds of warning had classes been in session at the time of the quake. The earthquake sensors were installed starting in 2014 as part of a data collection and warning system. More schools will be instrumented in the future.

References:

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www2.gov.bc.ca/assets/gov/education/administration/resource-management/capital-planning/seismic-mitigation/progress_report.pdf

www.cbc.ca/news/canada/british-columbia/earthquake-detector-vancouver-victoria-1.3385281

Quinault Indian Nation Plans for Tsunami Evacuation Shelter in New Parking Garage

The Quinault Beach Resort and Casino is located in Ocean Shores in Grays Harbor County, Washington. As part of a \$25 million expansion plan, the Quinault Indian Nation announced that a new four story, 500 car parking structure will also double as a tsunami evacuation shelter, the first in the North Beach area.

According to a multi-agency review, all of the developed area and all of the businesses of the community of Ocean Shores are vulnerable to tsunami damage.

References:

<http://northcoastnews.com/news/tsunami-safe-parking-garage-part-25-million-qbrc-expansion.html>

www.americascardroom.eu/blog/2016/01/quinault-beach-resort-casino-expansion/

www.co.grays-harbor.wa.us/info/dem/docs/tsunamifactsheets/fsoceanshores.pdf

RESILIENCE & RECOVERY

Earthquake Engineering Research Institute (EERI) School Earthquake Safety Initiative

EERI launched the School Earthquake Safety Initiative (SESI) in 2015 with a goal to "Leverage our extensive expertise and reputation to conduct regionally appropriate actions that make a tangible and positive difference in communities around the world, by protecting the lives of all who inhabit school buildings." The initial focus of the project is on U.S. schools, expansion of the program internationally in the future is a possibility. Five subcommittees were formed to tackle specific objectives: safety screening, inventory, and evaluation; classroom education and outreach; tsunami mitigation; code updating and improvements; and safety advocacy and messaging. The 2015 year-end update on the program is now available.

For more information: www.eeri.org/2015/12/school-earthquake-safety-initiative-sesi-2015-year-end-update/

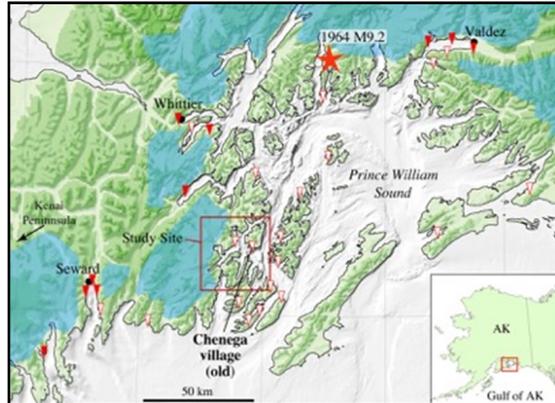
WSSPC supports these efforts; see our policy recommendations for school building safety here: www.wsspc.org/public-policy/adopted-recommendations/

RESEARCH

New Imaging Reveals Cause of 1964 Alaskan Village Destruction

According to eyewitnesses, approximately 4 minutes after the 1964 M9.2 Alaska earthquake shaking began, the village of Chenega on Prince William Sound was destroyed by a tsunami which also killed nearly a third of the population of 75. Chenega was one of several locations that recorded very high local tsunami run-up that couldn't be explained by the earthquake alone. Bathymetric data was collected shortly after the quake at relatively shallow depths

(down to 330 feet). This data showed evidence of landslides in most of the areas that were affected by local tsunamis, but not in the area around Chenega. It was posited that an undetected submarine landslide or coseismic displacement caused the Chenega tsunami.



Above: Shaded relief map of Prince William Sound and surrounding region. The old Chenega Village site and study area is in the red square. Triangles are documented locations of high wave runup during the 1964 Great Alaskan Earthquake (red star marks the epicenter). Blue shaded regions are locations of large ice fields and active glaciation.

Image: www.usgs.gov/newsroom/article.asp?ID=4446&from=rss#.VtcjYNAXvgQ

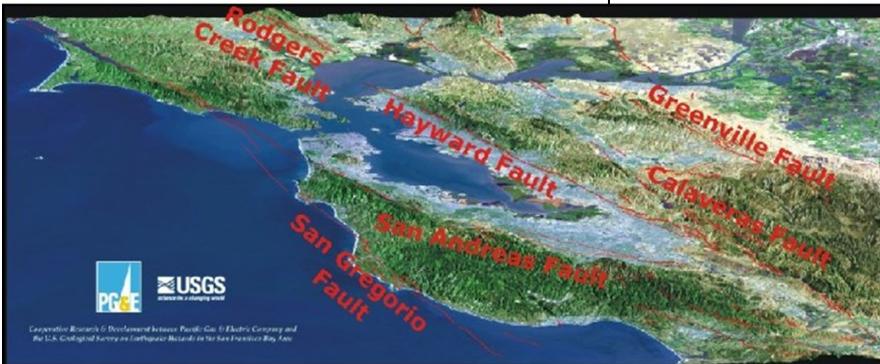
New high resolution data collected in 2014 included bathymetry and sub-surface profiles which allowed for imaging below the surface of the seafloor. The new data imaged areas deeper than previously studied and revealed a submarine landslide complex in basins initially carved out by glacial action when sea level was lower. Over time as the glaciers retreated and sea level rose, the basins became filled with sediments. The bathymetric data shows evidence of multiple landslides in the sediments and this location is now believed to be the source of the localized tsunami that inundated Chenega.

References:

www.usgs.gov/newsroom/article.asp?ID=4446&from=rss#.VtcjYNAXvgQ

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Hayward and Rodgers Creek Faults in San Francisco Bay Area Likely Linked



*Above: Faults in the San Francisco Bay Area
Image: USGS & PG&E*

New data shows that the Hayward and Rodgers Creek faults, long believed to be separate structures, may in fact be a single fault. The faults are considered part of the same system - able to influence each other but independent structures. Existing maps of the faults generally show an offset of 2 to 2.5 miles between the northern end of the Hayward fault and the southern end of the Rodgers Creek fault somewhere under San Pablo Bay.

But new detailed seismic mapping of the subsurface of San Pablo Bay led by Janet Watt of the U.S. Geological Survey has found evidence of connection of the faults under the Bay along a previously unmapped strand. The new findings lead to the possibility that the entire combined 99 mile length of the two faults could rupture in a single earthquake event of greater magnitude than if either fault segment ruptured independently.

References:

www.sfgate.com/bayarea/article/New-data-on-2-Bay-Area-faults-cause-worry-about-6731300.php

www.contracostatimes.com/breaking-news/ci_29350526/earthquakes-are-hayward-and-rodgers-creek-faults-linked

Subducting Seamounts May Have Limited Size of 2014 M8.1 Iquique, Chile, Earthquake Rupture

Subduction of structural features such as seamounts (underwater mountains, usually volcanic in origin) is a complex process that is not well understood. Seamount subduction had been credited with both

causing small aseismic earthquakes and reducing the magnitude of large earthquakes. Off the coast of Chile, the Nazca Plate is subducting under the South American Plate. In the case of the 2014 M8.1 Iquique, Chile earthquake, researchers believe subducting seamounts may have prevented an event as large as M9 from occurring.

According to the lead researcher of the study, Jacob Geerson of the

GEOMAR Helmholtz Center for Ocean Research in Kiel, Germany, the Iquique earthquake occurred in a 550 km (340 mi) "seismic gap"; an area that had not had a major earthquake since 1877. The quake was roughly centered in the area of the gap but did not rupture the entire area and is not believed to have been large enough to reduce the overall stress build-up in the area.

The researchers reviewed the seafloor topography and seismic imagery of the area around the subduction zone and noted a ridge of seamounts on the Nazca Plate. The seamounts are inactive and are up to 2.3 km high and 15 km wide. Seamounts on the surface of the Nazca Plate had previously been mapped, but the new data collected by seismic reflection revealed seamounts that had already been subducted and some that "are pushed up along the interface of the two plates, thereby actively deforming the interface and the overlying South American Plate" according to Geersen.

The researchers suggest that deformation due to the subduction of the seamounts causes fracturing of the surrounding area which creates areas of discontinuous faults. The fractured zone reduces the ability for a large earthquake; "It seems this fractured network cannot build up or efficiently transmit seismic energy, thus preventing rupture along the entire length of the seismic gap".

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www.nature.com/ncomms/2015/150930/ncomms9267/full/ncomms9267.html

www.earthmagazine.org/article/subducting-seamounts-blocked-big-quake-chile-0

<http://geology.gsapubs.org/content/39/9/819.short>

www.geomar.de/en/

www.geomar.de/en/news/article/erloschene-tiefseevulkane-als-erdbebenstopper/

Evidence of Historic Tsunamis Found in Aleutian Islands, Alaska

Field work by a team of U.S. Geological Survey researchers led by Robert Witter on Sedanka Island, near Dutch Harbor in the Aleutian Islands of Alaska, has documented evidence of multiple historic tsunamis.



Above: An outcrop composed of six tsunami deposits on the inland side of the lowland backing Stardust Bay over 0.5 miles from the sea. Brown soils developed into the top of each sand sheet and black tephra (air fall volcanic ash) layers between two of the sand deposits aided correlation of the six sand sheets across the study area. Location: Stardust Bay, Sedanka Island, Alaska.

Photo: U.S. Geological Survey/Richard Koehler

The study area is in the Aleutian Subduction Zone within a region of approximately 125 miles along the Aleutian Islands that has not had a recent major earthquake. Earthquakes have occurred recently in areas outside the zone; ruptures in 1946 and 1957 caused tsunamis and damage in both Alaska and Hawaii. Scientists had believed that because this area of the Aleutian Subduction Zone is creeping it would not likely build up enough stress to produce a tsunamigenic earthquake. However, sand sheet deposits found a half a mile inland from the shore show that the area has been the recipient of multiple

tsunamis in the past. Dating of the sediments has shown that the oldest layer was deposited approximately 1700 years ago and the return interval is 300-340 years on average. The most recent sand sheet was correlated to the 1957 M8.6 Andreanof Islands earthquake.

The new information provides additional potential sources for earthquakes that could cause tsunamis and has already been used by the state of Hawaii to improve their tsunami evacuation zones.

References:

www.usgs.gov/newsroom/article.asp?ID=4431#.Vtd3adAXvgQ

<http://bigstory.ap.org/article/e1608923fc7f4b85889b0d8515c7b726/geologists-find-tsunami-hazard-eastern-aleutian-islands>

WSSPC is a non-profit consortium whose members are the directors of a total of 39 emergency management agencies, geological surveys, and seismic commissions from 18 states, provinces or territories.

WSSPC Mission

The mission of WSSPC is to develop seismic policies and share information to promote programs intended to reduce earthquake-related losses.

WSSPC Goals

- ◆ Promote regional cooperation and the interaction of the State Emergency Management, State Geological Surveys, and State Seismic Councils and Commissions in the formation of, and advocacy for, seismic policy.

- ◆ Improve the overall awareness of earthquake hazards and methods to mitigate the associated risks; develop strategies to enhance earthquake preparedness; and support earthquake studies and earthquake preparedness activities that will reduce or eliminate deaths, injuries and property damage.

- ◆ Serve as a resource for earthquake-related materials, information, training programs and workshops, in coordination with other regional and national earthquake organizations.

Learn more at www.wsspc.org

Pacific Disaster Center Provides Comprehensive Support for Hazards with DisasterAWARE

For 20 years, the Pacific Disaster Center (PDC) has worked to equip disaster professionals with the right tools, information, skills, and support for effective planning and decision-making for earthquakes and other hazards. PDC does this by conducting risk and preparedness assessments, deploying early warning systems, providing exercise support and training, developing situational awareness products, and much more. Most often, these activities are undertaken with one of the Center's many partners and in close collaboration with the disaster management community.

Perhaps the single greatest outcome of this work is PDC's multi-hazard disaster monitoring and early warning platform, DisasterAWARE. The systems powered by DisasterAWARE provide visualized, worldwide, geolocated hazards with continual updates, accompanied by hazard consequence modeling and a suite of relevant geospatial data. These allow users to better understand the hazards that they face and to make better decisions about what actions to take to mitigate risks.

Today, in addition to several discrete, custom versions of the platform developed for U.S. and foreign-government clients, three different tools provide nearly two million users access to DisasterAWARE: Disaster Alert, Global Hazards Atlas, and EMOPS.

(Right) **Disaster Alert:** Available to the public, Disaster Alert is PDC's free-download mobile app for iOS and Android devices, powered by DisasterAWARE. Users are alerted to active hazards, whether close to home or around the world.

www.pdc.org/solutions/tools/disaster-alert-app/



(Left) **Global Hazards Atlas:** The Atlas is an interactive global map viewer that provides the general public with a way to learn about hazards and historical disasters. The Atlas offers a continually updated information stream on current hazards worldwide, along with other geospatial data.

www.pdc.org/solutions/tools/global-hazards-atlas/

(Right) **EMOPS:** Designed to meet the information needs of disaster managers and decision makers, Emergency Operations (EMOPS) provides a secure environment for accessing, updating, and sharing reports and assessments before, during, and after a disaster. EMOPS rapidly posts significant earthquake information from the USGS and NEIC, PAGER alert levels, ShakeMap shaking intensity, as well as tsunami bulletins and tsunami travel times. In addition, reporting tools in EMOPS provide easy-to-understand information on hazards and exposure as well as Risk, Vulnerability and Coping Capacity of hazard-impacted areas. Live camera and social media feeds supplement the situational awareness products. Members of the emergency management community are able to apply for access at emops.pdc.org.

www.pdc.org/solutions/products/disasteraware-emops/



For more information visit the PDC website at www.pdc.org or contact the Center at info@pdc.org. Submitted by Jamie Swan, PDC Corporate Communication, Partnership, and Outreach Specialist

ADDITIONAL RESOURCES & PUBLICATIONS

MyShake App for Android Cell Phones Collects Earthquake Data

MyShake is a free application for Android phones that has the ability to recognize earthquake shaking using the sensors already in every smartphone. The app was developed by the University of California Berkeley Seismological Laboratory and runs in the background on the phone. When the shaking fits the vibrational profile of an earthquake, the app sends anonymous information to a central system that confirms the location and magnitude of the quake. This application makes a smartphone part of a worldwide seismic network; the data collected will supplement data in areas already outfitted with earthquake sensory equipment but could be particularly useful in providing data in areas without earthquake detection equipment. Ultimately it is hoped the application will become part of an earthquake early warning system.

The application also provides users with information about recent earthquakes. An iPhone version is planned in the future.

References:
myshake.berkeley.edu/

www.latimes.com/local/lanow/la-me-ln-app-mobile-phone-detect-earthquakes-20160212-story.html

Seattle Hazard Explorer Interactive Map Released

The city of Seattle has released an on-line tool for the community providing information on a number of natural hazards that may affect the area.

For more information:
seattlecitygis.maps.arcgis.com/apps/MapSeries/?appid=0489a95dad4e42148dbef571076f9b5b

NTHMP Tsunami Awareness and Safety Fact Sheet

For more information: <http://nws.weather.gov/nthmp/tsunamisafety.html>

Webcast of 2016 Northern California Earthquake Hazards Workshop Now Available

For more information: <http://earthquake.usgs.gov/regional/nca/workshop/2016/>

California Geological Survey Releases New Preliminary Alquist-Priolo Maps

The California Geological Survey (CGS) released seven new preliminary Alquist Priolo Fault Zone maps in December, 2015. The new maps cover areas near Lake Tahoe in El Dorado County and areas in San Bernardino County. The review period for these maps was open until March 10, 2016. The new zoning becomes effective on June 10, 2016.

For more information: www.conservation.ca.gov/cgs/rghm/ap/Pages/PreliminaryMaps.aspx

PEOPLE & TRANSITIONS

WSSPC Welcomes New Members and Representatives:

Ryan Arba, Branch Chief, Earthquake & Tsunami Programs, California Governor's Office of Emergency Services

Brad Avey, State Geologist, Oregon Department of Geology & Mineral Industries

Robert White, Seismic Specialist, Emergency Management British Columbia

**There are so many ways
to stay connected!**



Website- www.wsspc.org

Twitter- [@WSSPC](https://twitter.com/WSSPC)



Facebook- www.facebook.com/WSSPC

State of Oregon Announces New State Resilience Officer

Oregon Governor Kate Brown has appointed Derek Smith to the new position of State Resilience Officer. The position will "... direct, coordinate, and oversee seismic safety and resilience planning and preparation by state agencies and communities." Smith was previously the CEO of Clean Energy Works (now Enhabit), a non-profit energy efficiency program based in Portland, OR.

For more information: www.oregon.gov/newsroom/Pages/NewsDetail.aspx?newsid=927

2016 Bruce A. Bolt Medal Recipient Announced

Roger D. Borchardt will receive the Bruce A Bolt medal at the Seismological Society of America (SSA) Annual Meeting in April 2016. SSA noted that "Borchardt is a foremost authority on use of strong-motion data to characterize site response for use in building codes and seismic hazard evaluations."

The annual award is presented jointly by the Consortium of Strong Motion Observations Systems (COSMOS), Earthquake Engineering Research Institute (EERI), and the SSA to recognize individuals worldwide whose accomplishments involve the promotion and use of strong-motion earthquake data and whose leadership in the transfer of scientific and engineering knowledge into practice or policy has led to improved seismic safety.

For more information:

www.seismosoc.org/news/ssa-press-releases/roger-d-borchardt-wins-the-2015-bruce-a-bolt-medal/
www.eeri.org/about-eeri/honors-awards/the-bruce-a-bolt-medal/

Applied Technology Council (ATC) and Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE) Announce 2015 Champions of Earthquake Resilience Awards

ATC and SEI announced the winners of the 2015 Champions of Earthquake Resilience Awards in December, 2015. The awards recognize innovative earthquake engineering programs and projects that have (or will have) substantial impact on public safety and property loss reduction.

Extraordinary Innovation in Development of a Community Earthquake Safety Program:

- City of Los Angeles for the Los Angeles Resilience by Design Program
- City of San Francisco for the San Francisco Earthquake Safety Implementation Program

Extraordinary Innovation in Seismic Protection of Buildings and Lifelines:

- Association of Professional Engineers and Geoscientists of British Columbia (BC), University of BC's Earthquake Engineering Research Facility, and the BC Ministry of Education for Development of Performance-based Seismic Retrofit Guidelines for Schools
- Transbay Joint Powers Authority and the Design and Construction Team for the Transbay Transit Center, San Francisco
- San Francisco Public Utilities Commission for the San Francisco Water System Improvement Program

Exceptional Public- and Private-Sector Research and Development (R&D) Programs:

- Pacific Earthquake Engineering Research (PEER) Center and the Los Angeles Tall Buildings Structural Design Council for Development of Guidance and Procedures for the Seismic Design of Tall Buildings
- Federal Emergency Management Agency (FEMA) for Development of FEMA P-58 Seismic Performance Assessment of Buildings Methodology and Companion Performance Assessment Calculation Tool

For more information:

<https://www.atccouncil.org/docman/workshops/5-atc-seiawards-presskit/file>

CONFERENCES, WORKSHOPS & EVENTS

68th EERI Annual Meeting

April 5–8, 2016
San Francisco, California, USA
www.eeri.org/2015/12/registration-open-eeri-68th-annual-meeting-april-5-8-2016/

Seismological Society of America 2016 Meeting

April 20–22, 2016
Reno, Nevada, USA
www.seismosoc.org/meetings/ssa2016/

2016 National Earthquake Program Managers Meeting

May 2–3, 2016
Long Beach, California, USA
www.earthquakeconference.org

WSSPC Committee Meetings

- Basin & Range Province
 - Engineering, Construction & Building Codes
 - Tsunami Hazard Mitigation
- May 3, 2016
Long Beach, California

2016 National Earthquake Conference

May 4–6, 2016
Long Beach, California, USA
www.earthquakeconference.org

WSSPC Board Meeting

May 6, 2016
Long Beach, California

WSSPC Annual Business Meeting

May 6, 2016
Long Beach, California

41st Annual Natural Hazards Research and Applications Workshop

July 10-13, 2016
Broomfield, Colorado
<https://hazards.colorado.edu/workshop>

Early Bird Registration Ends April 1st!



National Earthquake Program Managers Meeting
May 2-3, 2016

National Earthquake Conference
May 4-6, 2016

Long Beach, California

earthquakeconference.org/



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If you have a newsworthy item for our e-Newsletter, please forward it to
Johanna Fenton, Program Manager at: news@wsspc.org