

Ian Sears, New NTHMP Administrator

By Michael D. Angove, NOAA/NWS Tsunami Program Lead

IN THIS ISSUE:

Ian Sears, New NTHMP Administrator	1
NTHMP Winter MMS Meeting	2
NTHMP Winter Mitigation and Recovery Work Group Meeting	3
NTHMP Winter MES Subcommittee Meeting	4
2019-2020 SW Puerto Rico Earthquake Sequence	5
Puerto Rico Earthquakes an Urgent Call for Better Preparedness	7
Big Quake in Caribbean Highlights Confusion	9
Education is Best Way to Prepare for a Threat, VITEMA Director Says	11
NTHMP Events	12

As of January 1st 2020, NOAA/NWS welcomed a new member of the Tsunami Program Team: Mr. Ian Sears. Ian's official title will be Tsunami Services Program Coordinator, and his duties will include serving as the new NTHMP Administrator. Ian comes to us from the office of the NWS Deputy Assistant Administrator where he served as Executive Officer, and thus he is deeply familiar with the workings of the Agency at its highest levels.

Ian first joined NOAA in 2006 when he began as a Data Analyst at the National Data Buoy Center (NDBC). While in this role at NDBC, Ian helped transition the DART II buoy system from Pacific Marine Environmental Laboratory (PMEL) to NWS. From 2009-2018, Ian worked for NOAA's Office of Marine and Aviation Operations (OMAO) where he flew aboard NOAA's Hurricane Hunter Aircraft as the Flight Director (in-flight Meteorologist) supporting research and operations in hurricanes and tropical storms and accumulating 140 Hurricane Eye Wall Penetrations. He flew more than 2,200 hours supporting many diverse NOAA missions including disaster response, climate studies, air chemistry experiments, Arctic flux experiments, NASA ICE BRIDGE, winter storm surveillance, and satellite verification surveys. Ian has detailed at National Environmental, Satellite Data, and Information Service (NESDIS) as the Acting Branch Chief for Satellite Operations and at National Marine Fisheries Service (NMFS) Southeast Regional Office as a strategic plan execution analyst.



Before working for NOAA, Ian taught Middle and High School STEM for two years. He earned a B.S. in Meteorology from Florida State University in 2005. Ian married his High School sweetheart, Emily, in 2004. They have two sons, Anderson 10 y/o and Everett 7 y/o. Ian is an avid runner and recently ran his first Marathon. As a family, they enjoy traveling, outdoor activities, weekends at the soccer fields, music, and spending time with family and friends. Please join me in extending a warm welcome to Ian!

TsuInfo Alert

Prepared and published bimonthly by the Washington State Department of Natural Resources, Washington Geological Survey, on behalf of the National Tsunami Hazard Mitigation Program (NTHMP), a state/federal partnership led by the National Oceanic and Atmospheric Administration (NOAA).

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

<http://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/tsunamis/tsuinfo-alert>

**Assembled and edited by Stephanie Earls,
Librarian, Washington Geological Survey
Washington Dept. of Natural Resources**

1111 Washington St. SE, MS 47007

Olympia, WA 98504-7007

360-902-1473 (p) 360-902-1785 (f)

stephanie.earls@dnr.wa.gov



NATIONAL TSUNAMI HAZARD MITIGATION PROGRAM LIBRARY CATALOG:

<http://d92019.eos-intl.net/D92019/OPAC/Index.aspx>

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.

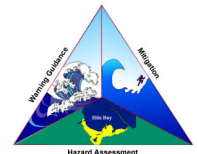
Summary of the Mapping and Modeling Subcommittee Meeting – January 28-30, 2020

By Rick Wilson, California Geological Survey

Members of the Mapping and Modeling Subcommittee (MMS) held a three-day meeting in Portland, Oregon, from January 28-30, 2020. The MMS meeting included summaries of work by each state and federal partner, and discussion of projects identified to be included in its 2019 and 2020 Annual Workplans.

Many of the 2019 tasks that were completed or ongoing into 2020 include:

- Completion of a tsunami source database for NTHMP partner use (lead: California);
- Ongoing evaluation of the maritime tsunami guidance and a customer-based platform for sharing the guidance (lead: California);
- Ongoing planning for a workshop and developing guidance for modeling sediment transport (lead: East Coast and Gulf of Mexico);
- Ongoing development of guidance for states to run HAZUS risk analyses (lead: Oregon);
- Ongoing development of guidance for tsunamigenic landslide analysis and modeling (lead: East Coast);
- Continuing evaluation of meteotsunami modeling and forecasting (lead: Gulf of Mexico with assistance from University of Wisconsin-Madison)



(Continues on page 3)

NTHMP MEETINGS

Summary of the Mapping and Modeling Subcommittee Meeting – January 28-30, 2020

By Rick Wilson, California Geological Survey

(Continued from page 2)

For 2020, the MMS also discussed tsunami source work being done by the USGS Powell Center and addressed gaps in producing probabilistic-based source outputs. The MMS supported multi-state requests to develop these source products for the Alaska-Aleutians subduction zone and to hold a workshop on completing similar work for the Cascadia subduction zone. These products are vital for states to perform tsunami mitigation and risk analysis work and to implement new and future building codes which address tsunami loads and effects.

Other presentations and discussions included: 1) USGS and NOAA developing guidance for federal agencies performing post-tsunami field surveys; and 2) NOAA's National Centers for Environmental Information scheduling work on digital elevation modeling for numerical tsunami models.

Summary of the Mitigation and Recovery Planning Work Group Meeting – January 29, 2020

By Rick Wilson, California Geological Survey

In August 2019, the National Tsunami Hazard Mitigation Program (NTHMP) Coordinating Committee created the Mitigation and Recovery Planning Work Group (MRPWG) to improve mitigation and recovery planning and coastal community resilience nationally. The MRPWG had its first in-person meeting on January 29, 2020, during the NTHMP meetings in Portland.

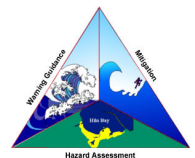
Mitigation and recovery planning work at the NTHMP is reinforced through the recommendations within the Tsunami Warning, Education, and Research Act of 2017 (P.L. 115-25 §3201 et al) as well as a recommendation in the 2017 NTHMP External Review report. The 2018-2023 NTHMP Strategic Plan includes a theme to address tsunami mitigation and recovery issues through the development of guidance and the implementation of products by NTHMP members and communities. A secondary benefit of the MRPWG will be to reduce the workloads of other NTHMP subcommittees so that they can focus on core tsunami activities, such as mapping, modeling, education, outreach, preparedness, exercises, and warning coordination.

At the January 29th meeting, the MRPWG discussed a number of potential activities to be included in its 2020 Annual Workplan and others to add to its long-term Vision Plan. The following important project tasks will be initiated in the first Annual Workplan developed by the MRPWG:

- Develop guidance for maritime mitigation activities
- Develop guidance for use and communication of probabilistic tsunami hazard analysis and other hazard products
- Develop guidance for debris plans related to tsunamis
- Develop guidance on funding strategies for mitigation and recovery products

Vision Plan activities to be addressed in future years included: guidance for vertical evacuation refuge development using existing and new structures; best practices for tsunami risk assessments, like HAZUS; and guidance for tsunami mitigation and recovery planning strategies for communities.

A number of state and federal NTHMP partners volunteered to help coordinate and lead work on each of these tasks. Much of this work in tsunami mitigation and recovery planning is evolving so most of these projects will be ongoing over next several years.



NTHMP MEETINGS

Winter Mitigation & Education Subcommittee Meeting

By Kevin Miller, California Governor's Office of Emergency Services

The National Tsunami Hazard Mitigation Program (NTHMP) Mitigation & Education Subcommittee (MES) meeting was held January 27th-30th, 2020 in Portland, Oregon. This meeting was part of the schedule of the 2020 NTHMP Winter Meetings. MES Co-Chairs Kevin Miller, Christa von Hillebrandt-Andrade, and Tamra Biasco led the meeting. The meeting began with a review of MES Terms of Reference, and overview of MES key accomplishments and purpose, and the 2018 Strategic Plan for new and returning partners. One change of note is leadership will now include two state representatives and one federal agency representatives, with a Chair, Vice-Chair, and Second-Vice-Chair on two year staggered rotation terms.

Dr. Michael Lindell presented preliminary results of a requested social science survey regarding public perception and understanding of tsunami evacuation maps. Communities from Washington, Oregon, and California were surveyed. Final results will be released in the spring following a formal presentation to and approval of the coordinating committee. A new maritime guidance informational website currently in development, which will serve a variety of maritime audiences, was presented and discussed. The website contains: NTHMP maritime tsunami guidance elements; adopted, relevant NTHMP maritime policies and procedure recommendations; existing state-level guidance; scientific research products; jurisdiction-specific response examples; resources and outreach materials; information about preparedness, mitigation, recovery and debris; and a reference section.

Discussion of the MES work plan focused on a number of projects currently underway. The TsunamiZone.org website has been expanded to include a number of new web pages including Alaska, Guam, Hawaii, Oregon, and Washington, with more planned. The Caribbean and California also have robust webpages and continue to register participants in exercises and activities. Topics related to the Mitigation & Recovery Planning Work Group were also discussed, including: needs for implementing ASCE 7-16 Tsunami building code and construction guides; inundation zone updates using new modeling technology; developing a regulatory zone; guidance and planning for constructing vertical evacuation structures; and additional Probabilistic Tsunami Hazard Analysis applications.

Additional topics were discussed. Emergency response agencies continue to work with NTWC on Alert/Warning issues and potentially identified gaps, including specific issues with inland waterway notification, as well as looking at approaches for refining current coastal notification breakpoints. Suggestions were made regarding both Foundational and Tier 2 TsunamiReady designation strategies. An outreach discussion provided an opportunity for states and territories to share best practices and examples of effective products, tools, and solutions for reaching a variety of audiences and groups in their regions. The importance of post Tsunami Field Team Investigation and development of a national-level plan for Tsunami Disaster Impact Assessments aligned with earthquake clearinghouse and post-earthquake investigation were brought up. A recommendation was made that training topics provide states and territories with options to make NDPTC Tsunami Awareness courses locally relevant. Finally, a report on the recent, damaging Puerto Rico earthquakes including tsunami alert protocol considerations was presented.



TSUNAMI EVENTS

2019-2020 Southwestern Puerto Rico Earthquake Sequence

By Christa G. von Hillebrandt-Andrade, NOAA NWS CTWP,
Dr. Elizabeth Vanacore and Dr. Alberto Lopez, PRSN University of PR at Mayaguez

Starting with a 4.7 magnitude earthquake on December 28, 2019, Puerto Rico was rocked and continues to be rocked by an earthquake sequence in the Southwest (Figure 1). The seismic activity prior to the Mw 6.4 event on January 7, 2020, was concentrated along the seaward extension of the left-lateral (strike-slip) Punta Montalva Fault (yellow dashed link in Figure 2), while the main shock was a result of oblique normal faulting at shallow depth and signaled the start of a more complex seismic sequence involving stress transfers between multiple faults. The main shock has been followed by vigorous aftershock activity which extends onshore and offshore along a system of normal and strike-slip faults. The subsequent aftershock sequence has included hundreds of felt events and automatic alarms amongst the thousands of events manually located by the analysts at the Puerto Rico Seismic Network (PRSN; Lopez et al, 2020a). For dozens of the events in the sequence, the Pacific Tsunami Warning Center (PTWC) has also issued Tsunami Information Messages. The Mw 6.4 January 7, 2020 earthquake was felt throughout the island, with an intensity of up to VIII in the epicentral region. Hundreds of buildings and homes collapsed or are uninhabitable including a public middle school and Catholic Church. Satellite images processed by NASA reveal up to almost 8 inches of vertical displacement (co-seismic subsidence) in areas along the southwestern coast (Figure 2). This vertical displacement is in agreement with the normal focal mechanism associated with the event. Parts of the community of El Faro (Figure 3) and Aurora Cay

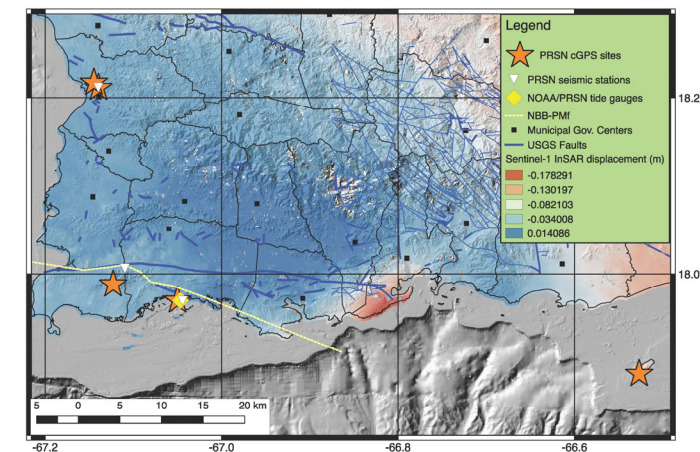


Figure 2. Vertical displacement derived from InSAR by E. Fielding (NASA)

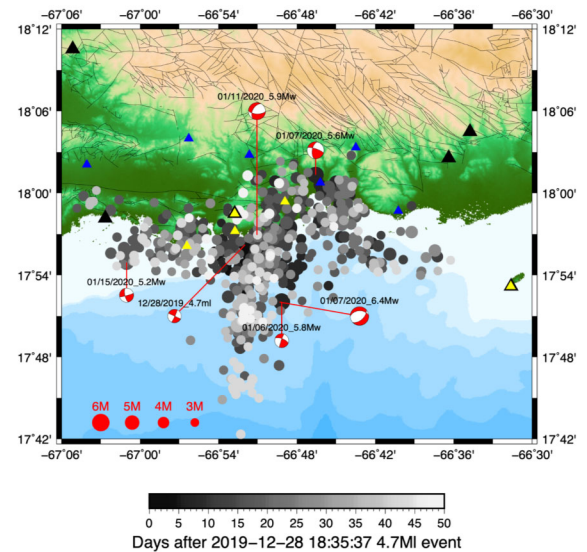


Figure 1. The figure shows the seismicity with $M \geq 3.0$ in the region. The color of the circles indicate the time after the initial Dec. 28, 2019 magnitude-4.7 event, and the size corresponds to magnitude. The triangles show the location of permanent PRSN seismic stations (black), pre-existing PRSN stations improved with additional equipment added to monitor the sequence (black and yellow), temporary stations installed by PRSN (yellow), and temporary stations installed by the USGS (blue).

Gilligan's Island) along the southern coast have been permanently flooded since the earthquake, possibly as a consequence of this subsidence, lateral spreading and/or sea level anomalies.

The very strong ground shaking was taken as a natural warning sign of a tsunami by many people who self-evacuated validating the success of tsunami education and outreach efforts in the island. When a local tsunami advisory was issued by PRSN with the Puerto Rico State Emergency Management Bureau, many municipalities, following protocol established as part of the implementation of the TsunamiReady program, activated

(Continues on page 4)

TSUNAMI EVENTS

2019-2020 Southwestern Puerto Rico Earthquake Sequence

By Christa G. von Hillebrandt-Andrade, NOAA NWS CTWP,
Dr. Elizabeth Vanacore and Dr. Alberto Lopez, PRSN University of PR at Mayaguez

(Continued from page 3)

their siren systems. These actions resulted in widespread tsunami evacuations throughout the island. Within 10 minutes, a tsunami with an amplitude of 1.5 inches was recorded at the closest tide gauge, Magueyes Island located west of the epicentral region (location shown as yellow diamond on Figure 2), and within 23 minutes a tsunami amplitude was measured in Esperanza, Vieques to the east of the island (Figure 4). With these data, PRSN cancelled the tsunami advisory and the PTWC re-confirmed there was no tsunami threat.

Seismic activity in the region continues to be monitored 24/7 by PRSN, the USGS, and PTWC. PRSN in collaboration with the USGS have installed temporary stations to better monitor and study the sequence (for details see Lopez et al, 2020a). According to the USGS, while the frequency and magnitude of the aftershocks will most likely



Figure 3. Permanent Coastal flooding attributed to co-seismic vertical displacement of the Mw 6.4 earthquake (Photo credit: Christa von Hillebrandt-Andrade)

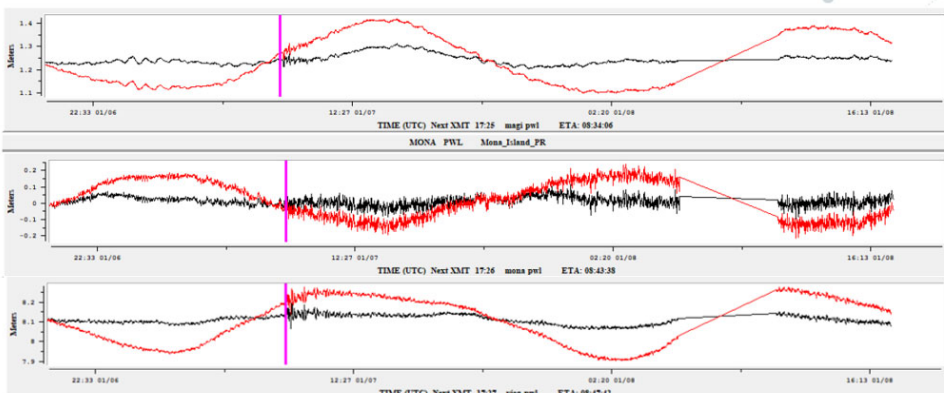


Figure 4. Sea Level records from Magueyes, Mona Island and Esperanza Vieques. The magenta line indicates the expected time of arrival given the epicenter. (Image: NOAA NWS CTWP)

continue to decline, there is still a probability of 5% that a M 7.0 earthquake could occur in the epicentral region through this year.

Lessons learned from the earthquake and the response to the perceived tsunami threat will be the object of future analysis and research and used to strengthen the preparation for these and other hazards.

References

- López, A. M.; Hughes, K. S.; Vanacore, E., 2020, Puerto Rico's Winter 2019-2020 Seismic Sequence Leaves the Island On Edge: Temblor, <http://doi.org/10.32858/temblor.064>.
- López, A. M.; Vanacore, E.; Hughes, K. S.; Báez-Sánchez, G.; Hudgins, T. R., 2020a, Response and initial scientific findings from the southwestern Puerto Rico 2020 Seismic Sequence: Temblor, <http://doi.org/10.32858/temblor.068>.

TSUNAMI PREPAREDNESS

Towards a Safer Ocean? Puerto Rico Earthquakes an Urgent Call for Better Early Warning and Awareness in the Ocean Decade

By Christa G. von Hillebrandt-Andrade, NOAA NWS CTWP

The 2019-2020 earthquake sequence in Puerto Rico – the first of such destructive disasters of the new year and Decade – may have highlighted the need to raise disaster research and readiness above the whim of changing fiscal and political priorities. If the right lessons are learned, the new Decade of Ocean Science for Sustainable Development (2021-2030) could keep society and public policy makers on track to ensure we have “the time, depth of knowledge and confidence to make split second decisions when lives are at stake.”

After 10 days of non-stop tremors and earthquakes, including a Magnitude 5.8 event on one of the most important Puerto Rican holidays (3 Kings Day), people in southern Puerto Rico were violently awoken January 7, 2020 at 4:24 a.m. local time. An earthquake just offshore of Magnitude 6.4 sent its powerful seismic waves across the island. The last time something of this intensity and devastation happened was during the 11 October 1918 Earthquake and Tsunami.



Coastal area that has suffered subsidence from the earthquake

Although the Southern Puerto Rico earthquake could not be predicted in space and time, for over 30 years the scientific, engineering and emergency management community had been urging people and government to take more action to reduce our vulnerability. Over and over again in local, national and international forums the need for greater understanding of the hazard and the corresponding preparedness and mitigation measures had been expressed. Despite significant advances in earthquake and tsunami monitoring, an updated building code and improved awareness, the safety of buildings and catastrophe planning lagged behind. We were caught underprepared.

Fortunately, in the days leading up to the main event, the government authorities and the people paid attention to the earths unsettling signs and put aside the Holiday activities to inform and prepare for a possible large event. Thanks to this proactive approach, the earthquake sequence left only one reported death.

Images of a collapsed school and church as well as hundreds of destroyed homes and businesses circled the world, but that was not all. Additional consequences included an island-wide power outage, thousands of displaced, significant delays in providing citizens with essential services, small business interruption, financial distress and a shutdown of public education.

In the wake of the damage and the ensuing weeks of non-stop aftershock activity, even those who may not have had any physical loss were anxious, nervous and fatigued. The emotional impact has affected the whole island. The fear of returning to homes in southern Puerto Rico has been intense, keeping thousands of peoples sleeping in formal and informal camps and outside their homes. Several suicides and heart attacks have been reported. Once the houses have been rebuilt, how much longer will it take Puerto Rico to reconstruct people’s well being?

(Continues on page 6)

TSUNAMI PREPAREDNESS

Towards a Safer Ocean? Puerto Rico Earthquakes an Urgent Call for Better Early Warning and Awareness in the Ocean Decade

By Christa G. von Hillebrandt-Andrade, NOAA NWS CTWP

(Continued from page 5)

Within all this tragedy, people are also anxious about potential tsunamis. Fortunately, as of 2016 all municipalities at risk of tsunami have been recognized by the US National Weather Service as TsunamiReady®. Given the strong groundshaking from the M 6.4 earthquake, a local tsunami advisory (indicating no inundation, but potential hazardous marine conditions) was issued, and one could hear the sirens sounding the evacuation for the hills. A small tsunami of just a couple of centimeters was detected within minutes at nearby sea level stations, the Advisory was cancelled and the Pacific Tsunami Warning Center was able to reconfirm there was no tsunami threat.

Fortunately, to date we do not know of any injuries associated with the evacuation, but the experience from that day and the ensuing weeks has revealed vulnerabilities in our tsunami warning system, precisely many of the challenges that the tsunami community has proposed to address in the upcoming UN Decade of Ocean Science for Sustainable Development (2021-2030).

After the M 6.4 event and the likelihood, albeit very small, of a larger earthquake with greater tsunami potential, the questions flooded in. How would the impact of a tsunami from southern Puerto Rico differ from that on the evacuation maps? What was the possibility and the potential impact of submarine landslide? What actions, if any, needed to be taken by people on the other side of the island? Are Advisories and warnings not the same thing? How fast we will know there is a tsunami threat? How will we know a tsunami is coming if the sirens aren't working?

These are important issues that the global tsunami community aims to tackle in the course of the next years, and surely by the end of the Ocean Decade in 2030. Specifically, we must:

- (1) address all sources of tsunamis: local and distant, whether generated by straightforward or complex earthquakes, volcanoes, landslides;
- (2) integrate more observations into the early warning systems, not just seismic and sea level;
- (3) fill the gaps in coastal and deep ocean bathymetry (the height of the ocean floor);
- (4) generate computational power for faster and more effective forecasts;
- (5) improve tsunami preparedness and mitigation in coastal communities.

The Ocean Decade is a golden opportunity to ensure that our ocean threats, which challenge our predictive abilities with their fast onset, infrequency and devastating impact, are not forgotten before disaster strikes.

You can learn more about the UN Decade of Ocean Science for Sustainable Development at <http://oceandecade.org>

Link to original article:

<https://en.unesco.org/news/towards-safer-ocean-puerto-rico-earthquakes-urgent-call-better-early-warning-and-awareness>

TSUNAMI PREPAREDNESS

Big Quake in Caribbean Highlights Confusion

By Lori Dengler, Humboldt State University

What is the most important way to tell that a tsunami is coming? Whatever warning you get first. The biggest tsunamis are caused by earthquakes nearby. You will feel the shaking before any official alert messages are issued. If you are near the coast or in a tsunami hazard zone, recognizing the shaking as a warning and heading to high ground may save your life.

On Tuesday January 28th, a magnitude 7.7 earthquake struck the Caribbean. The earthquake was felt by many in the region and triggered a series of tsunami messages. There was confusion in the media as to what the messages meant. This is a good time to talk about the earthquake and what you should know about tsunami warnings.

The earthquake was located in the Cayman trough almost equidistant from Cuba and Jamaica. It was felt in Jamaica, Cuba, Haiti and the Cayman Islands. Some tall buildings swayed in Miami nearly 450 miles away and a few felt it on the Yucatan Peninsula, at a distance of 530 miles. Fortunately, the earthquake was too far from population centers to cause significant damage or injuries. Minor damage was reported on Grand Cayman, where the shaking caused cracks in roads and sewage mains to spill.



Large earthquakes cannot be adequately represented by a dot on a map. Epicenter maps only show where the rupture started. That representation works for smaller earthquakes where the fault length is small. Tuesday's quake ruptured a fault about 150 miles long and seismic waves are produced along the entire rupture area, not just from the spot where the rupture began. The epicenter was 160 miles to the east of Grand Cayman, but the rupture propagated to the west and ended up only 30 miles away, so it isn't surprising that some damage was observed on the island.

Earthquakes in the Caribbean are not unexpected. On Jan. 7, a magnitude 6.4 earthquake struck off of Puerto Rico's southwest coast, causing over \$3 billion in damages to buildings and infrastructure and four deaths. Since 1900, nearly 100 earthquakes of magnitude 6 or larger have been reported in the Caribbean including three as large as 7.7. That makes Tuesday's earthquake as large as any in the era of seismic instrumentation.

The Puerto Rico quake was over 750 miles away from Tuesday's earthquake and not directly related. But both are a result of the complex plate interactions in the region. In the Caribbean, a bit of the North American plate subducts beneath the Caribbean plate forming the Lesser Antilles and a volcanic arc that extends from Antigua to Grenada. The Caribbean plate is bounded by two nearly parallel transform faults trending roughly east-west. The southern transform parallels the north coast of South America and the northern transform slices along the north coast of Hispaniola, just south of Cuba, and heads west, cutting through Guatemala.

Tuesday's earthquake was within the northern transform section, where plate motions have created the Cayman trough, the deepest area in the Caribbean and one of the deepest parts of the Atlantic Ocean at a depth of more than 25,000 feet. It was a strike-slip earthquake, with the Cuba side of the fault moving west relative to the Jamaica side, like the way cars move on an American highway.

(Continues on page 8)

TSUNAMI PREPAREDNESS

Big Quake in Caribbean Highlights Confusion

By Lori Dengler, Humboldt State University

(Continued from page 7)

Whenever a large earthquake occurs beneath the sea floor, there is always a chance that a tsunami could follow. Had I been in Jamaica, Cuba or the Caymans, I would have felt the shaking and there would have been no question in my mind that the shaking was very long. It might not have felt very strong, but the length of shaking would have been a clear signal that a tsunami was possible and, if I were near the coast, this natural warning is my cue to head to higher ground, immediately.

Even if it was a tweener and I wasn't sure that it was really long enough to produce a tsunami, I would start my evacuation plans. Always better to go through the motions of evacuating and find out later that no big tsunami was produced than the opposite. As we say, when in doubt, drill it out. Consider it an opportunity to practice your evacuation skills.

But not everyone may have felt the shaking, and some tsunamis are capable of causing damage far from areas where the earthquake was felt. Nations and Territories of the Caribbean are part of UNESCO/IOCs Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE EWS) which is supported by NOAA's Caribbean Tsunami Warning Program. Alert messages for the region come from the Pacific Tsunami Warning System (PTWC). The two US tsunami warning centers, PTWC and the National Tsunami Warning Center (NTWS), monitor seismic data and water level information 24-7. When an earthquake above a certain magnitude level occurs in the Pacific, northwest Atlantic, Caribbean or Gulf of Mexico occurs, they analyze the signals and assess the potential hazard.

Here's where things become confusing. These centers are a part of NOAA and U.S. entities have no authority to issue tsunami warnings to foreign countries. For foreign countries, PTWC can only issue a threat message. Although warning/threat may sound similar, the two terms mean different things. PTWC has an agreement with nations in the Pacific and Caribbean through UNESCO's International Oceanographic Commission to provide information on potential threats after larger earthquakes occur. It is up to the countries to decide whether or not to issue a WARNING based on this information and other data they may have. On Tuesday, the threat message stated a small tsunami up to three feet high might occur at coastal areas with 190 miles of the epicenter.

PTWC issued an initial message four minutes after the earthquake. Updates were issued about every half hour until the final message cancelling the threat came out about an hour and a half later. Again the media got this wrong too — BBC saying PTWC had “withdrawn the warning.” Cancellation is a normal part of the messaging process and whenever a threat message (or a warning if the alert is for U.S. states/territories) is issued, it will always eventually be cancelled when the data from tide gauges shows the threat has substantially passed. Cancellation does not necessarily mean it is safe to return to coastal areas. That decision can only be made by local authorities.

A five-inch tsunami was observed on Grand Cayman. There was never any tsunami threat to U.S. coastlines. All ended up OK on Thursday. But the next big quake, whether in the Caribbean, California or elsewhere in the world might not be as benign. Please remember that feeling the shaking IS THE WARNING, and take actions as if your life depended on it because it just may.

See original article: <https://www.times-standard.com/2020/02/02/lori-dengler-big-quake-in-caribbean-highlights-confusion/>

TSUNAMI PREPAREDNESS

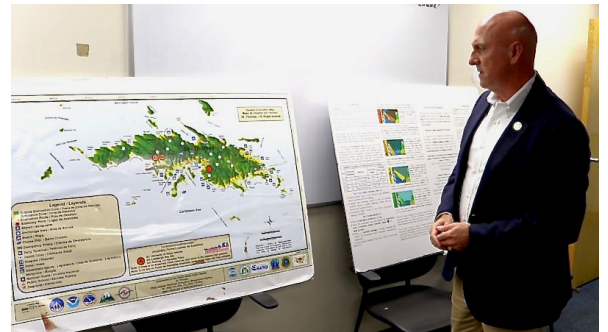
Education is Best Way to Prepare for a Threat, VITEMA Director Says

By James Gardner, Writer for The Source, St. Thomas/USVI

Education is the best way to fight “anything that comes to us unknown,” like earthquakes and tsunamis, according to V.I. Territorial Emergency Management Agency Director Daryl Jaschen.

That’s why Jaschen and his team have been hosting a series of town halls to make residents more aware of these threats, how to prepare for them and the territory’s likelihood of being affected. Jaschen said that with the U.S. Virgin Islands, Puerto Rico and the British Virgin Islands wedged between two plates, seismic activity has been ongoing for the past decade. Lately, however, the magnitude of those quakes have increased, resulting in the last few weeks with a 6.4 magnitude quake in Puerto and a 7.7 quake between Cuba and Jamaica.

Puerto Rico’s quakes have been happening around a plate located on the south side of the territory, which he said has a connection to the Virgin Islands. Regardless of whether they are felt on the ground here, the impact of a tsunami is just as real and that’s why residents should pay attention and monitor any alerts that come out.



VITEMA Director Daryl Jaschen points out local danger and evacuation zones. (Source photo by James Gardner)

“The quake ... near Cuba centered around a plate to the north,” Jaschen said. “We don’t know exactly why the activity is going back and forth, but it makes us just as concerned. We spoke to the Tsunami Warning Center for the Pacific region, which is based in Hawaii, and we paid attention to their analysis of what happened. A warning wasn’t issued for us, it was for other areas, but it is still very key to watch what continues to happen.”

Without speculating on what exactly is triggering the increase in seismic activity – though, he did say teams have ruled out anything manmade after checking for drilling in the area – Jaschen explained that the best thing someone can do is be aware of the danger zones in their area and the evacuation routes, because once a quake occurs, a tsunami can be right behind and its impact could be different based on the topography, structure and design of each island.

A wave comes in at 300-400 miles per hour and is basically a wall of water that can vary in height. Historical data indicates safety can be found around 82 feet above sea level or higher. He urged residents to stay away from areas close to the coastline and out of buildings that could be unsafe, such as those built on filled land. Jaschen said a phenomenon called “liquefaction” turns that ground into something like quicksand, which will cause a structure to quickly fall or sink.

Further, in heavily populated or flatter, low-lying areas close to the water, residents would have, at most, 20-30 minutes to get to safety. The territory’s tsunami warning sirens have been offline since the hurricanes in 2017, and VITEMA is working to get them back online by September. Once up and working again, they will sound if a threat is imminent – about four to five minutes before impact – but before that, residents should pay more immediate attention to the series of messages, warnings and alerts that come out from the agency across other channels.

(Continues on page 10)

TSUNAMI PREPAREDNESS & NTHMP EVENTS

Education is Best Way to Prepare for a Threat, VITEMA Director Says

By James Gardner, Writer for The Source, St. Thomas/USVI

(Continued from page 9)

The Alert V.I. system is a subscription-based service that notifies residents by email, text and voicemail. Jaschen said that he's heartened by the number of residents that have signed up since VITEMA switched platforms and described it as the best way to monitor a threat. For those who haven't signed up in advance, or visitors who may be just getting off a cruise ship or airplane, VITEMA's next line of communication is an Integrated Public Alert and Warning System that sends a message to cellphones, over the radio and to public information stations.

Bull horns and messages issued by first responders on the streets are the third line of defense, followed by the sirens, which Jaschen said are not designed to warn people in their homes. The sirens will sound only when a warning is issued, and are meant to alert people outside, in a danger zone, that a tsunami is on its way.

Jaschen said he has been working to finalize a contract to get the territory's sirens up and active by September. The system will go from a manual to an automated one and from wooden poles to galvanized dipped poles for better protection. The sirens were installed in 2017 but were rendered inactive after hurricanes Irma and Maria, and while the agency received a grant for 90 percent of the funding, they were focused in the last year on finding a contractor, securing the last 10 percent and getting through the following hurricane season.

Residents, meanwhile, are encouraged to keep coming out to VITEMA's town halls, which Jaschen said have been packed and have generated some important questions. Those meetings have finished on St. Croix and move to St. Thomas. All sessions begin at 6 p.m. They will be Tuesday, Feb. 4, at Ivanna Eudora Kean High School; Wednesday, Feb. 5, in the Charlotte Amalie High School cafetorium; and Friday, Feb. 7, in the Administration and Conference Center at the University of the Virgin Islands.

Eight-hour tsunami workshops with experts in the field are also scheduled for Feb. 24 and 25 on St. Croix, and Feb. 26 and 27 on St. Thomas. More information is online at the VITEMA website: <http://www.vitema.vi.gov/>.

See original article:

<https://stthomassource.com/content/2020/02/02/education-is-best-way-to-prepare-for-a-threat-vitema-director-says/>

UPCOMING NTHMP & RELATED EVENTS

- ◆ March 19, 2020—CARIBE WAVE 20 Tsunami Exercise <https://www.weather.gov/ctwp/>
- ◆ March 24, 2020—Lantex Tsunami Exercise <https://nws.weather.gov/nthmp/tsunamiexercises.html>
- ◆ March 26, 2020—Pacifex Tsunami Exercise <https://nws.weather.gov/nthmp/tsunamiexercises.html>
- ◆ March 31-April 3, 2020—Washington State Inner Coast Tsunami Roadshow (Puget Sound/Strait of Juan De Fuca) <https://mil.wa.gov/tsunami>
- ◆ April 27-30, 2020—SSA Annual Meeting (Albuquerque, NM) <https://www.seismosoc.org/annual-meeting/>
- ◆ July 20-24, 2020—NTHMP Annual Meeting (Sacramento, California) <https://nws.weather.gov/nthmp/>
- ◆ September 15-20, 2020—AEG Annual Meeting (Portland, Oregon) <https://www.aegannualmeeting.org/>
- ◆ November 3-6, 2020—Washington State Outer Coast Tsunami Roadshow <https://mil.wa.gov/tsunami>

