

## Christa vonHillebrandt-Andrade Receives National SSA Award

By Rocky Lopes, retired NTHMP Administrator

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The Seismological Society of America (SSA) has selected Christa vonHillebrandt-Andrade for the 2020 Seismological Society of America Frank Press Public Service Award.

This international recognition honors outstanding contributions to the advancement of public safety or public information relating to seismology.

Currently, Christa serves as a voting member of the NTHMP Coordinating Committee representing NOAA, as well as a Co-Chair of the NTHMP Mitigation & Education Subcommittee.



Christa was nominated for this award in recognition of her outstanding contributions to Public Service during her long career. Some highlights include:

- Since 2009, Christa has led coordination of the international CARIBE WAVE exercise which engages public and private institutions and the public at large, through outreach and education, evacuation drills, and many more activities. More than 800,000 people participated in CARIBE WAVE in 2019.
- Christa served as the Vice Chair (2010-2012) and Chair (2012-2018) of a Working Group on preparedness, readiness, and resilience for tsunamis and other coastal hazards for UNESCO's Intergovernmental Oceanographic Commission (IOC) Warning System for the Caribbean Sea and Adjacent Regions (called Caribe EWS).
- In 2015, Christa developed the initial protocols for the International Tsunami Ready Program – an IOC-endorsed effort to recognize countries and coastal communities for consistent tsunami preparedness, mitigation, mapping, and warning coordination. The International Tsunami Ready Program was modeled after the U.S. National Weather Service TsunamiReady Program.

Overall, Christa is a highly-regarded and exceptional public servant who clearly stands on the level of previous Frank Press Public Service Award Winners: Dr. Brian Tucker of Geohazards International (2019), Dr. Lucy Jones formerly of the USGS (2018), and Dr. Lori Dengler of Humboldt State University (2017).

Christa will receive her award at the 2021 SSA Annual Conference.

Join us in celebrating a true public servant, our own Christa vonH!

# TsuInfo Alert

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**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.

## TsunamiReady® Recognition Milestones

By Ian Sears, NWS Tsunami Program Coordinator

As of June 2020, there are 170 sites recognized as TsunamiReady®.

During the period since December 7, 2019:



◆ The following sites renewed their TsunamiReady® recognition:

- Cannon Beach, OR
- Clatsop County, OR
- Monterey City, CA
- Rockaway, OR
- Indian Harbour Beach, FL
- Tillamook County, OR
- Andersen Air Force Base Guam, GU
- Beaufort County, SC
- Samoa, CA
- Surfside Beach, SC
- Lincoln City, OR
- Naval Base Ventura County, CA
- Orick, CA
- SeaWorld San Diego, CA
- Reedsport, OR
- Raymond, WA
- South Bend, WA

### Summary

Given the uncertainty surrounding COVID-19, and the non-expiration posture, there are a total of 170 tsunami ready communities. Any community that was due to expire after February 29, 2020 and has not renewed is still considered active at this time.

NWS TsunamiReady® Program: <https://www.weather.gov/TsunamiReady/>

# NTHMP UPDATES

## Tribute to Former USGS Tsunami Scientist Bruce Richmond

By SeanPaul La Selle, Bruce Jaffe, Guy Gelfenbaum, U.S. Geological Survey (USGS)

Bruce Richmond, whose passing was grieved by many in the tsunami community, was a mentor to many and a friend to all he met over his distinguished career as a geologist. Whether interacting with Bruce in the field or at conference, his mischievous grin and playful nature was always a comforting presence. Since learning of his passing, many within the USGS and tsunami communities have shared with us their sadness, but every message has been accompanied by (often hilarious) accounts of Bruce's cheerful personality and impactful science.



Post-coring for tsunami deposits on O'ahu, 2015

Bruce completed his B.S. in Earth Science at UC Santa Cruz and his M.Sc. from the University of Waikato, New Zealand. Bruce started at the USGS in 1978 as a Physical Science Technician in the East Palo Alto, California, Branch of Artic-Pacific Geology analyzing data on sedimentary structures of intertidal mudflats. He returned to UC Santa Cruz to complete his Ph.D. while working at the USGS. Throughout his career, his passion to understand coastal geology led him to study topics ranging from sedimentology of sand dunes and beaches to the use of geology in assessing coastal hazards. This research took him to dozens of countries spanning low-latitude carbonate Pacific Islands to high-latitude permafrost Arctic coastlines.

Bruce initiated and successfully led studies documenting long-term chronic coastal change, and important studies of the modern and geologic record of catastrophic tsunami and hurricane inundation. In a very successful collaboration with Chip Fletcher at the University of Hawaii, he co-led the crafting of the Hawaii Coastal Hazards Atlas that is used by many, including the State of Hawaii in planning for future growth, safety, and protection. The multidisciplinary teams he recently worked with in the Arctic developed novel approaches to better understand shoreline change processes where permafrost bluffs are thawing and eroding at accelerated rates, threatening native villages and critical Arctic habitat. Some of his many contributions to tsunami research include detailed descriptions of the impacts of recent tsunamis in Chile, Samoa, and Japan, advancing the interpretation of boulders in detecting past tsunamis, and paleotsunami studies in California and Hawaii that are integral to updating tsunami hazard assessments.

Throughout his career, Bruce fostered many friendships through his science and he helped inspire a new generation of geologists. From providing research opportunities to young tsunami scientists to hosting the popular tsunami after-meeting sessions at fall AGU in San Francisco, Bruce was especially adept at bringing people together to talk science and have fun doing so.



Bruce enjoying a video of himself at the Pacific Tsunami Museum in Hawai'i, 2018

Following his retirement this January, Bruce had exciting plans to build a house in Rotuma, an island in the South Pacific, with his wife Aitu. He was most recently enjoying retirement on the Central California coast surfing, fishing, and spending time with his loving family.

We look forward to sharing stories and celebrating his life with everyone.

# TSUNAMI PREPAREDNESS

## UNESCO IOC Tsunami Programme— Guidelines for Tsunami Response During COVID-19

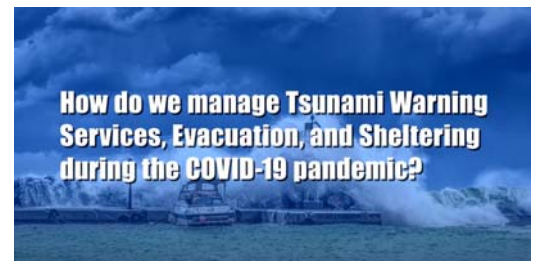
In response to the the COVID-19 pandemic, guidelines for tsunami response have been created for the following regions/organizations:

- Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS)
- Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS)
- Indonesia/IOTIC/BMKG/BNPB
- Intergovernmental Coordination Group for the North-eastern Atlantic, the Mediterranean Sea and connected seas Tsunami Warning and Mitigation System (ICG/NEAMTWS)
- Intergovernmental Coordination Group Pacific Tsunami Warning Center (ICG/PTWC)



These documents are aimed at national authorities responsible for the organisation of tsunami warning and emergency response. They clarify the status of the regional tsunami services and suggest best practices for national and local actions during the COVID-19 pandemic. Each document recognises that current national, regional and local responses to the COVID-19 may differ depending upon a number of conditions, such as the phase of the pandemic, transmission in the community, demographics, response capabilities, etc. Each Member State/Country is therefore strongly encouraged to develop nationally coordinated guidelines based on these documents to suit specific national circumstances and protocols, thus contributing to a common understanding of how to handle tsunami warnings and evacuations under COVID-19 pandemic conditions. Additionally, it is essential that the public in every country is properly sensitised to the resulting guidelines in advance of a tsunami event, so that they can act appropriately during a tsunami emergency.

The current COVID-19 response has resulted in a shift of priorities, alterations in work processes and venues (home office), physical distancing, self-isolation and quarantine measures, as well as temporary lockdowns of entire communities. This may create ambiguity or confusion with regards to tsunami warning services and response actions like evacuation, under co-existing COVID-19 protocols. In particular, it must be taken into account that the rapid-onset nature of tsunamis not only requires immediate action by official authorities to provide warnings and initiate evacuation processes, but may also require quick and autonomous decisions on the part of the population for self-evacuation in the case of near-field threats. This is of course also true in COVID-19 times and it is therefore necessary to ensure that the population is not prevented from taking life-saving action by possible official restrictions aimed at the containment of the virus. As has been shown tragically in the past, tsunamis can also claim thousands of lives.



Additionally, videos are being developed to communicate these guidelines to the public. View the video recently published by the UN Office for Disaster Risk Reduction (UNDRR): <https://www.youtube.com/watch?v=G9nKpio7HUI&feature=youtu.be>

Access the list of guidance documents at the [UNESCO IOC Tsunami Programme website](#).

# TSUNAMI PREPAREDNESS

## PreparedBC Master of Disaster Program

By PreparedBC

The PreparedBC [Master of Disaster](#) program is a classroom resource for grades 4 to 8 that teaches youth about the hazards they face and how to prepare for them.

While the program includes a unit on disease outbreaks, no one was expecting a global pandemic to arrive this year with such far-reaching impacts. The extraordinary event prompted the creation of new Master of Disaster resources to help students, teachers and parents navigate what has become a new normal.

The expanded suite of materials focuses on the personal health and safety of youth across British Columbia and peeks at the science behind disease outbreaks and how they become pandemics. Specific offerings include window coloring sheets, crosswords, word searches and a “disaster catcher” that can be downloaded from the [Master of Disaster website](#). There are also educational videos answering questions from kids, debunking COVID-19 myths and explaining why handwashing works to control transmission and spread.

To promote the new resources, PreparedBC hosted a COVID Coloring Contest in May, drawing hundreds of entries from across the province. Winners received a deluxe household emergency kit and set of walkie talkies. You can check out the winning artwork [here](#).

Additional materials will be released this fall in anticipation of a second bump of COVID-19 cases.

### Key links:

- [Master of Disaster COVID-19 resources](#)

### Videos:

- [Answering kids COVID-19 questions](#)
- [Debunking COVID-19 myths](#)

### About Master of Disaster

Originally launched in 2016, Master of Disaster was transformed and re-launched in fall 2019. The program engages with teachers and learners by offering free educational resources, activities and emergency supplies to kick-start personal preparedness. It takes an all-hazards approach, covering preparedness and response information for the Top 10 hazards in BC, including earthquakes and [tsunamis](#). The recent revision also incorporated Indigenous perspectives through traditional stories gifted to us from First Nations across BC—these include one story about the devastating historical impact of tsunamis on the Huu-ay-aht First Nation; you can read the story [here](#).

### About PreparedBC

PreparedBC is British Columbia’s official emergency preparedness public education program serving the general public, local authorities, schools and Indigenous communities. Learn more at [www.preparedbc.ca](http://www.preparedbc.ca).



# TSUNAMI PREPAREDNESS

## Puerto Rico Tsunami Evacuation Plans Updated During COVID19 Pandemic

By Wildaomaris Gonzalez Ruiz (PREMB) and Roy Ruiz (PRSN)

Since September 2017, Puerto Rico (PR) has experienced countless situations that have made citizens more vulnerable and caused the need to revisit previously established emergency plans. Events such as Hurricane Maria in 2017, and the high seismicity that began on December 28, 2019 and continues at present, combined with the COVID19 pandemic, have generated concern among citizens. Despite the fact that there are 46 TsunamiReady® communities on the island, these events have provided an opportunity to improve citizen education and emergency plans of all kinds, but with a particular focus on tsunamis since response time is so important during this type of emergency. Among the questions that arise today due to the pandemic are: What if the Pacific Tsunami Warning Center (PTWC) issues a Tsunami Warning for Puerto Rico and the Virgin Islands while we are under curfew? Are people aware that a tsunami warning takes precedence over the order to maintain physical distance? Are protective face masks and hand sanitizer part of the items that citizens have in their emergency backpacks?



On the other hand, at the government preparedness level, there are many factors that emergency managers must take under consideration. For example, tsunami evacuation emergency plans have established that citizens must evacuate tsunami inundation zones (i.e. yellow zone on the map), to an area outside the evacuation zone (i.e. the green zone). Then they must get to the Assembly Points where Emergency Management will later transport them to designated shelters, such as schools. But what if the schools suffered significant damage from the earthquake and aftershocks? Do the classrooms that have been identified have the space for the number of people they will receive during the evacuation, taking into consideration the physical distance required by the pandemic? Do municipalities have enough protective equipment to protect citizens from being infected with COVID19? Have municipalities identified open areas to establish temporary camps to handle this type of emergency if the shelters cannot be used? To ensure proper planning, the TsunamiReady Committee in PR has developed a document titled: “Servicios de tsunami y desalojo / refugio considerando prácticas de distanciamiento físico” (Tsunami evacuation / shelter services considering physical distancing practice).

This document was developed for Puerto Rico using the UNESCO/IOC, ICG/CARIBE-EWS regional guidelines as a basis and adapted with the local protocol and tsunami service provider manuals. This was a collaborative effort between Puerto Rico Seismic Network (PRSN), Puerto Rico Emergency Management Bureau (PREMB), NOAA/NWS Caribbean Tsunami Warning Program (CTWP) and National Weather Service San Juan Forecast Office (NWS SJU). The document lists suggested actions during times of a pandemic, what to do in case of a temporary closure of a tsunami warning focal point (TWFP) because of infection, and what agreements need to be done to guarantee the continuity of operation in case of tsunami warning, among other necessary actions.

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# NTHMP UPDATES

## Puerto Rico Tsunami Evacuation Plans Updated During COVID19 Pandemic

By Wildaomaris Gonzalez Ruiz (PREMB) and Roy Ruiz (PRSN)

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The idea is that TsunamiReady® municipalities in Puerto Rico can update their tsunami evacuation plans taking under consideration the recommendations of how to manage a tsunami emergency during a pandemic such as COVID19. At the same time, PREMB has established a Planning Committee to assist emergency managers update plans in accordance to this document and Federal Emergency Management Agency (FEMA) recommendations on the same topic. This committee will ensure that local emergency managers have the accurate information and tools to educate communities on how to proceed during a Tsunami Warning resulting in resilient citizens. This resilience is vital during a tsunami emergency where seconds counts to minimize life loss. The TsunamiReady® program will continue to work with state, regional and local Emergency Operations Control (EOC) on the implementation of this guidance for the good of our citizens.

## Use NOAA Visualization Tool to Expand Outreach Efforts

By NOAA Office for Coastal Management Communications Department

You have lots of facts and figures to share about dangerous tsunami flood zones. A NOAA visualization tool, recently made available for tsunami-prone areas, can help you step up your outreach efforts even more.

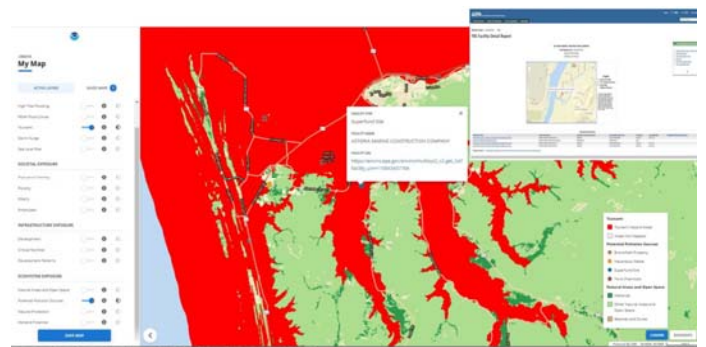
With the Coastal Flood Exposure Mapper ([coast.noaa.gov/digitalcoast/tools/flood-exposure.html](https://coast.noaa.gov/digitalcoast/tools/flood-exposure.html)), you can quickly create custom maps that feature vetted, hazard-related data from different sources. The tool includes not only flood zone information, but also maps that depict data about vulnerable populations, ecosystems, infrastructure, employment numbers, and more.

To use the map, pick an address and decide which baseline map you want to use. Then pick the hazard-related map layers you want to include. You can electronically share the map you made or print it for future use. The tool includes coverage for the West Coast, Gulf of Mexico, East Coast, and Pacific and Caribbean territories. Through a partnership with the National Tsunami Hazard Mitigation Program, tsunami inundation zones are now included where available.

“We’ve found this tool to be a good rallying point for communities performing risk assessments,” says Russell Jackson, coastal hazards specialist with NOAA’s Office for Coastal Management.

But the maps made with this tool are also helpful after disasters.

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# NTHMP UPDATES

## Use NOAA Visualization Tool to Expand Outreach Efforts

By NOAA Office for Coastal Management Communications Department

(Continued from page ?)

After Hurricane Maria hit Puerto Rico, officials recognized the need to adopt new advisory base flood elevation requirements to better plan and prepare for future coastal hazards. NOAA worked with FEMA and the territorial government to incorporate the new flood data into the Coastal Flood Exposure Mapper so it could be used to identify areas of potential flood exposure during the development of the Hurricane Maria Recovery Plan.

Many states have also used this tool during stakeholder workshops and events. In some instances, participants worked with event leaders to add the layers, one at a time, as a discussion starter. Other workshops have taken on more of a “train-the-trainer” flavor, as people who work with the public are schooled on the best way to create, use, and share the maps. Interested parties include local and regional government staff members, planners, GIS technicians, and other officials.

Community and regional planners use these maps to integrate sea level rise adaptation into their comprehensive, hazard mitigation, and post-disaster redevelopment plans. Planners can also use the tsunami maps to integrate tsunami mitigation into these same plans. The maps are useful for receiving FEMA Community Rating System credits when used to identify vulnerabilities and incorporate flood risk reduction strategies.

The Coastal Flood Exposure Mapper is easy to use, but the site also includes a short (2 minute) video that provides a helpful overview. This tool is available from NOAA’s Digital Coast ([coast.noaa.gov/digitalcoast](https://coast.noaa.gov/digitalcoast)) where there are hundreds of helpful resources focused on data, tools, and training. Examples include:

### DATA

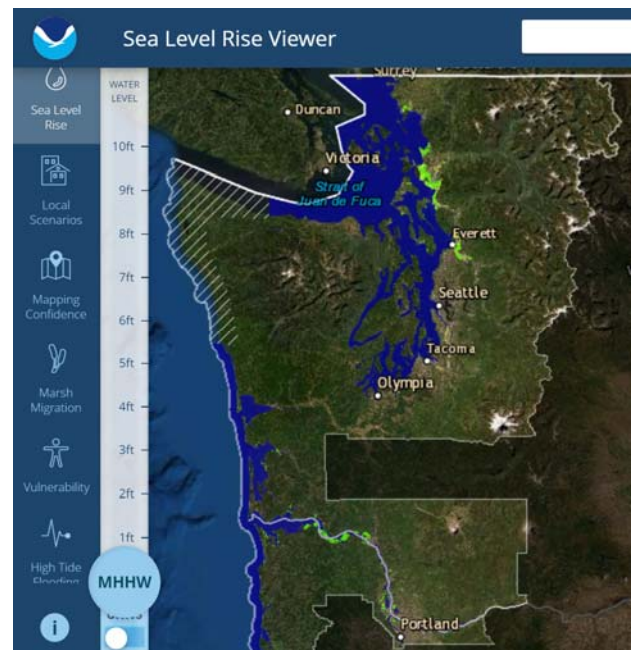
- [Coastal Topographic Lidar](#)
- [Coastal Topobathy Lidar](#)
- [C-CAP Regional Land Cover and Change](#)
- [Coastal Flood Frequency](#)
- [National Flood Hazard Layer](#)
- [Sea Level Rise Inundation](#)

### TOOLS

- [Data Access Viewer](#)
- [C-CAP Land Cover Atlas](#)
- [Coastal County Snapshots](#)
- [Flood Event Viewer](#)
- [Sea Level Rise Viewer](#)

### TRAINING

- [Adaptation Planning for Coastal Communities](#)
- [Introduction to Lidar](#)
- [Building Risk Communication Skills](#)
- [Coastal Inundation Mapping](#)
- [Green Infrastructure Mapping Guide](#)
- [Incorporating Sea Level Change Scenarios at the Local Level](#)
- [Using Flood Maps](#)



To learn more, visit the [Digital Coast](#) or contact [Russell.Jackson@noaa.gov](mailto:Russell.Jackson@noaa.gov).



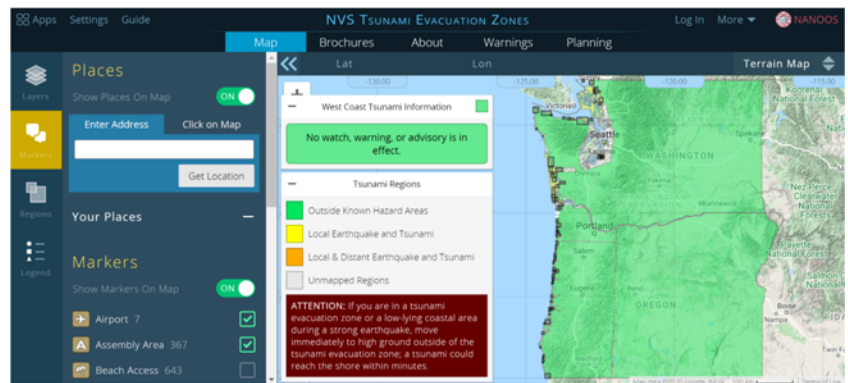
# NTHMP UPDATES

## NANOOS Visualization System Tsunami Evacuation Zones – Ten Years in the Making

By Jonathan Allan DOGAMI

Beginning in 2009, the Oregon Department of Geology and Mineral Industries (DOGAMI) and the Northwest Association of Networked Ocean Observing System (NANOOS) have worked in partnership to develop a web-based platform to ensure unfettered access to critical tsunami evacuation information for the Pacific Northwest region as part of the NANOOS Visualization System (NVS). Leveraging funds from NANOOS, the NVS Tsunami Evacuation Zones application (<http://nvs.nanoos.org/TsunamiEvac>) has achieved a level of sophistication that is both robust and feature rich. In parallel with development of the “web app” has been a similar effort to build an effective smartphone application (iOS and Android, [http://www.nanoos.org/mobile/tsunami\\_evac\\_app.php](http://www.nanoos.org/mobile/tsunami_evac_app.php)), providing users with the ability to locate themselves in the tsunami zone, making it easier to identify potential escape routes to high ground, and most recently the inclusion of push notifications emanating from the Tsunami Warning Center (TWC).

At their core, the web and smartphone applications allow residents, planners, emergency responders, and others to visualize the extent of areas affected by both local and distant evacuation zones. Information contained in the overlays include access to various critical and essential facilities (e.g. bridges, evacuation structures, assembly areas, etc.), while recent additions reflect the inclusion of spot ground elevations as well as evacuation arrows that highlight key routes where available. Users can search by address and a pop-up is displayed telling the user if the location is either in or outside a tsunami zone. Other features include access to static evacuation brochures (PDFs) as well as a brochure tool that allows the user to build their own custom brochure. Although the overall concept of the applications were developed within NANOOS, with considerable input from DOGAMI, periodic refinements have been included as a result of local stakeholder input.



In the last few years, progress has been made to integrate alert information provided by the TWC. These enhancements culminated with a major update to the NVS smartphone application (released in April 2020), that enables the user to receive push notifications directly from the TWC, even if the app is closed. Fortuitously, testing of this new capability has been aided by recent events (e.g. Kuril Island, Mw7.8 on March 25th, 2020), which allowed us to refine the notifications pushed to smartphones to ensure they are entirely consistent with messaging coming out of the TWC. While the focus of the web and smartphone applications are geared toward preparation, the inclusion of push notifications is an important step towards addressing distant tsunami threats and ultimately in informing and educating the public. As we look to the future, development is already underway to incorporate routable road networking guided by tsunami evacuation modeling that will eventually allow the user to enter an address and visualize an evacuation route unique to their location. It is hoped that such a capability will help to further reduce much of the guess work about where to evacuate.

# NTHMP UPDATES & NEW RESEARCH

## Twitter SMS Alerts Discontinued

By Elyssa Tappero, Washington Emergency Management Division

For those who are unaware, Twitter recently turned off the ability to receive tweets as SMS (Short Message Service) notifications in all but a few countries. This means you can no longer receive tsunami warning center alerts via Twitter as texts to your cellphone unless you have the app itself downloaded. Here are some options for you moving forward:

To continue receiving notifications when a tweet from @NWS\_NTWC or @NWS\_PTWC is sent, you must choose to be notified within the Twitter app on your mobile device and/or through the twitter.com website. For instructions on how to set up tweet notifications (also known as “push” notifications) to your device, check out <https://help.twitter.com/en/managing-your-account/notifications-on-mobile-devices>.

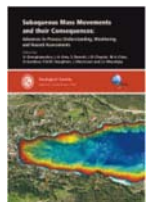
The United States’ National Weather Service provides InteractiveNWS (iNWS), an application suite able to send NWS products to local partners in multiple ways, including as emails and texts. Visit <https://inws.ncep.noaa.gov/> to learn more or to sign up for the service. Once your registration has been accepted you can go onto the site and set up text alerts by county/parish, lat/long, or street address. You can also draw a polygon on the map provided to set up a custom alerting area.

This is a great reminder to diversify your alerting methods to ensure you receive tsunami alerts in a timely manner no matter the situation. Along with national systems like EAS (Emergency Alert System) and WEA (Wireless Emergency Alerts) in the US, many local jurisdictions also have unique methods such as apps, opt-in systems, automated notifications, and Reverse 9-1-1.



## NEW TSUNAMI RESEARCH

**Citation:** Georgiopoulou, A.; Amy, L. A.; Benetti, S.; Chaytor, J. D.; Clare, M. A.; Gamboa, D.; Haughton, P. D. W.; Moernaut, J.; Mountjoy, J. J., 2020, Subaqueous Mass Movements and their Consequences: Advances in Process Understanding, Monitoring and Hazard Assessments: Geological Society Special Publications, v. 500, <https://doi.org/10.1144/SP500>.



**Abstract:** This volume focuses on underwater or subaqueous landslides with the overarching goal of understanding how they affect society and the environment. The new research presented here is the result of significant advances made over recent years in directly monitoring submarine landslides, in standardizing global datasets for quantitative analysis, constructing a global database and from leading international research projects. Subaqueous Mass Movements demonstrates the breadth of investigation taking place into subaqueous landslides and shows that, while events like the recent ones in the Indonesian archipelago can be devastating, they are at the smaller end of what the Earth has experienced in the past. Understanding the spectrum of subaqueous landslide processes, and therefore the potential societal impact, requires research across all spatial and temporal scales. This volume delivers a compilation of state-of-the-art papers covering topics from regional landslide databases to advanced techniques for in situ measurements, to numerical modelling of processes and hazards.