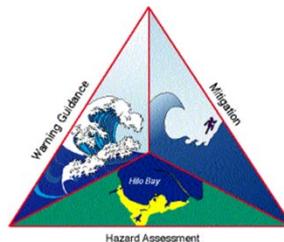


Tsunami Education and Outreach Project Update

Christa Rabenold

National Weather Service
Tsunami Program
(Syneren Technologies)

2015 NTHMP MES Summer Meeting



2014 Projects—Newly Completed

- Create NTHMP fact sheet

- Team Members

- Kara Gately
- Rocky Lopes
- Jeff Lorens
- Kevin Miller
- Dmitry Nicolsky
- Rick Wilson
- Paul Whitmore

National Tsunami Hazard Mitigation Program



As demonstrated by the 2004 Indian Ocean and 2011 Japan events, tsunamis can be devastating. In the United States, history and geologic evidence show that tsunamis are a significant threat. Since the beginning of the 20th century, 34 tsunami events have caused more than 500 deaths and over \$1.7 billion (2014 dollars) in damage to U.S. coastal states and territories. Recent studies indicate that in the future, a large U.S. tsunami could affect millions of people and cause tens of billions of dollars in damage. Tsunamis cannot be prevented, but their impacts on life, property, and the economy can be greatly reduced.

In 1995, recognizing the threat, the U.S. Congress directed the National Oceanic and Atmospheric Administration (NOAA) to form and lead a federal/state working group to develop a plan for reducing tsunami risk to U.S. coastal communities. This group formed what has become a model for federal/state partnerships—the National Tsunami Hazard Mitigation Program (NTHMP). Following the 2004 Indian Ocean tsunami, Congress passed the Tsunami Warning and Education Act to strengthen the capabilities of this partnership “to improve tsunami preparedness of at-risk areas in the United States and its territories.”

NTHMP Vision: Minimal loss of life and property should a tsunami strike any U.S. state or possession, and resilient coastal communities that are prepared for tsunami hazards

Today’s NTHMP includes NOAA, the Federal Emergency Management Agency, the U.S. Geological Survey, and 28 U.S. states and territories (states). This strong and active partnership connects states with the federal agencies responsible for the U.S. Tsunami Warning System and brings together the expertise and experiences of all the partners. This enables all levels of government to work together toward the common goals of protecting lives and reducing economic losses from tsunamis at the community level.

Reducing the Impacts of Tsunamis

Through collaboration, coordination, and funding and technical support to partner states, the NTHMP works to reduce the impact of tsunamis on the nation. NTHMP activities affect, either directly or indirectly, everyone in the United States, including coastal residents and visitors, emergency managers, land-use planners, elected officials, educators, government and business organizations, the military, and the tourism and maritime industries.

The NTHMP is led by a Coordinating Committee made up of representatives from its partner organizations. This committee guides the work of subcommittees established to address three key functions of the NTHMP: hazard assessment, warning guidance, and mitigation (sustained action to reduce or eliminate the long-term risk to human life and property). To support, supplement, and implement the work of these subcommittees, the NTHMP also provides funds to partner states through the NTHMP Grant Program.



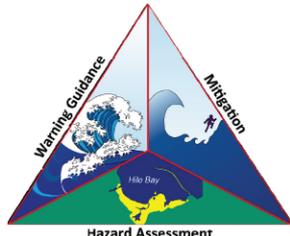
NTHMP Subcommittees

In conjunction with outside experts and other stakeholders, the three subcommittees develop guidance and set standards to ensure consistency among federal and state tsunami programs and integration with broader multihazards programs.

Mapping and Modeling (MMS)

As the hazard assessment subcommittee, the MMS brings together expertise on modeling and mapping of tsunami hazards. The MMS develops, standardizes, and improves tools that show how tsunamis could affect

National Tsunami Hazard Mitigation Program



<http://nws.weather.gov/nthmp/>

2014 Projects—Ongoing

- Provide national-level support for ~~2015 National~~ Tsunami Preparedness ~~Week~~ Campaigns
 - NTHMP Recognized Tsunami Preparedness Week for 2016?
 - LANTEX – March 16 (earthquake-triggered landslide and resulting tsunami south of Nova Scotia)
 - CARIBE Wave – March 17 (2 scenarios: N. Hispaniola & N. Venezuela)
 - PACIFEX – b/w June 7 and 10 (Cascadia Rising)
 - PacWave – February (?)
- Support development of the TsunamiZone as vehicle for tsunami preparedness ~~week~~—activities *and information*

2014 Projects—Underway/Next

- Create meteotsunami awareness fact sheet

- Team Members

- Kathleen Bailey
- Ed Fratto
- Lewis Kozlosky
- Rocky Lopes
- Vasily Titov
- Paul Whitmore

- Promotion

What is a... Meteotsunami?

On June 13, 2013, despite clear skies and calm weather, tsunami-like waves crashed upon the New Jersey and southern Massachusetts coasts. In Barnegat Inlet, New Jersey, three people were injured when a six-foot wave swept them off a jetty and into the water. The waves were captured by National Oceanic and Atmospheric Administration (NOAA) coastal water-level stations from Puerto Rico to New England as well as a Deep-Ocean Assessment and Reporting of Tsunamis (DART) buoy 150 miles offshore. Due to the wave's coincidence with a severe weather pattern and the lack of a detected earthquake or landslide, scientists deemed the event a "meteotsunami."

What is a Meteotsunami?

Meteotsunamis have the same characteristics as earthquake-generated tsunamis, but are caused by air pressure disturbances often associated with fast moving weather systems, such as squall lines. These disturbances can generate waves in the ocean that travel at the same speed as the overhead system. Development of a meteotsunami depends on several factors such as the intensity, direction, and speed of the disturbance as it travels over a water body with a depth that enhances wave magnification.



This weather system generated the June 13, 2013, meteotsunami. Credit: Buddy Denham

Like an earthquake-generated tsunami, a meteotsunami affects the entire water column and can become dangerous when it hits shallow water, which causes it to slow down and increase in height and intensity. Even greater magnification can occur in semi-enclosed water bodies like harbors, inlets, and bays.

Most meteotsunamis are too small to notice, but large meteotsunamis can have devastating coastal impacts (although not to the extreme of the 2004 Indian Ocean and 2011 Japan tsunamis). Damaging waves, flooding, and strong currents can last from several hours to a day and can cause significant damage, injuries, and deaths.

A meteotsunami should not be confused with storm surge associated with tropical storms and other large coastal storms. Storm surge is a wind-driven effect that occurs when strong winds push water onshore, causing water levels to steadily rise over the course of several hours. Recent research has shown that meteotsunamis are more common than previously thought and suggests that some past events may have been mistaken for other types of coastal floods, such as storm surges or seiches, which also tend to be wind-driven.

Where Do Meteotsunamis Happen?

Meteotsunamis are regional in nature. In the United States, conditions for destructive meteotsunamis are most favorable along the East Coast, Gulf of Mexico, and in the Great Lakes, where they may pose a greater threat than earthquake-generated tsunamis. In addition to the 2013 event, notable U.S. meteotsunamis include:

- **May 27, 2012**—Lake Erie: A seven-foot wave hit the shoreline near Cleveland, Ohio, sweeping beach-goers off of their feet and swamping boats in harbors.
- **October 28, 2008**—Boothbay Harbor, Maine: A series of waves up to 12 feet high emptied and flooded the harbor at least three times over 15 minutes, damaging boats and shoreline infrastructure.

2014 Projects—Underway/Next

- Create a risk assessment summary/fact sheet to support national-level “know your risk” outreach
 - Identify reviewers (Kevin Richards)
- Update Tsunami Awareness and Safety fact sheet
 - Identify project partners
- Create online compilation of links to tsunami evacuation and inundation maps
 - Identify project partners
- Coordinate updates of COMET tsunami modules
- Develop evacuation modeling guidance

2011 Projects—Underway/Next

- Lead in development of consistent tsunami messaging through consensus process
- Revise “Local Tsunami Education and Outreach Plan” (and rename “Disaster Preparedness Education and Outreach” Guide)
 - Outline
 - Identify Project Reviewers

- Provide content for NWS Tsunami Safety website
- Create expanded NOAA Tsunami Program fact sheet
- Provide direction and content for Tsunami.gov non-operational web pages
- Coordinate updates of COMET tsunami modules
- Coordinate updates for tsunami pages on NWS JetStream Online Weather School
- Create NTHMP fact sheet
- Develop evacuation modeling guidance
- Create hazard assessment summary/fact sheet to support national-level “know your hazard” outreach
- Provide national-level support for Tsunami Preparedness Campaigns
- Support development of the TsunamiZone as vehicle for tsunami preparedness activities and information
- Update Tsunami Awareness and Safety fact sheet
- Create online compilation of links to tsunami evacuation and inundation maps
- Create materials that describe how FEMA’s Community Rating System can enhance tsunami mitigation and support efforts to achieve TsunamiReady recognition
- Update NTHMP Media Guide
- Update Compendium of Tsunami Education Resources and create independent web page
- Create meteotsunami awareness fact sheet
- Develop resource to help commemorate tsunamis as a way to further tsunami awareness and preparedness

Bonus Slide 1:

Partner Web Resources



National Tsunami Hazard Mitigation Program

– Home – About the Program – Partners – Resources – About Tsunamis

Partner Web Resources

[National Tsunami Hazard Mitigation Program Library collection](#) (part of the Washington Geology Library catalog)

Table of Contents	Linked Resources
Education and Outreach <ul style="list-style-type: none">AlaskaCaliforniaEast CoastFEMAGuamGulf CoastHawaiiITICNOAANTHMPOregonPuerto RicoUSGSU.S. Virgin IslandsWashington	Education and Outreach: Alaska <ul style="list-style-type: none">Alaska Governor Tsunami Public Service Announcement (video)Alaska Tsunami Education ProgramAre you Prepared for the Next Big Earthquake in Alaska? (2004)Seismic Network and Tsunami Information (fact sheets)<ul style="list-style-type: none">Earthquake Characteristics and Finite Fault Processes: Diagnostics for Tsunamigenic PotentialSeismic Networks in AlaskaShort-period vs. Broad-band Seismograph Stations in AlaskaTsunami Inundation Mapping for Alaska CommunitiesWhat is a Tsunami? Large Poster Small PosterTsunami Animations<ul style="list-style-type: none">Generation of Tsunami by a Subduction Zone EarthquakePropagation of Tsunami in Deep OceanTsunami Waves Inundating a Coastal TownUnderwater Slide Generating a Tsunami Wave
<ul style="list-style-type: none">Guidance, Plans, and PolicyMapsMedia ResourcesResearch and ReportsTsunami Events	Education and Outreach: California <ul style="list-style-type: none">California Tsunami Hazards, Preparedness, Education, & ResourcesEarthquake, Tsunami & Volcano ProgramsFAQ About Tsunamis

http://nws.weather.gov/nthmp/NTHMP_Web_Resources.html

Ongoing: Review and send updates (additions, deletions, changes) to:

christa.rabenold@noaa.gov

Bonus Slide 2:

Spanish Alert Terminology

- NTWC Alert Terminology

Warning	Aviso
Advisory	Advertencia
Watch	Vigilancia
Information Statement	Boletín Informativo

Thank You for Your Time!

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christa.rabenold@noaa.gov

<http://nws.weather.gov/nthmp/documents/2014edplan.pdf>