FAQs and Additional Resources on Meteotsunamis
2018 Ocean Science Meeting Press Conference

What are meteotsunamis?

Meteotsunamis are a relatively unknown or misidentified phenomenon. As the name suggests, these are waves that are similar to the more commonly referenced seismic tsunami waves, which are caused by earthquakes along the ocean floor. However, meteo-tsunami waves are created by significant changes in wind and air pressure that often accompany convective thunderstorms instead of seismic activity, hence they are meteorologically-driven and thus the name tsunami for short. Like the more familiar seismic tsunami waves, meteotsunamis are rapid changes in water level over a short period of time from a few minutes up to an hour.

These are unusually fast changes in water level than can catch people off guard and inundate the coast, damage waterfront property, disrupt maritime activities, and create strong currents. Although an unfamiliar name to most, meteotsunamis make up about 20 percent of the tsunamis in the world, and occur all around the globe, from ocean coasts to the Great Lakes. For most of the historical record, these waves have been misidentified as either freak waves, tidal waves, or a seiche (as well as mislabeled as rip currents at the shoreline). In recent years significant research has led to a better understanding of what causes these waves and the impact they have on the coasts. Recently, we've been investigating historical cases in order to determine exactly what conditions cause meteotsunamis, particularly in the Great Lakes, and how this understanding may lead to the ability to forecast such events and protect life and property.

What is the research community doing to advance our understanding of meteotsunamis?

Scientists have been investigating historical cases in order to determine exactly what conditions cause meteotsunamis, particularly in the Great Lakes, and how this understanding may lead to the ability to forecast such events and protect life and property.

The aim of our current research and the focus of our meteotsunami session at the Ocean Science Meeting is to highlight the climate conditions of meteotsunamis around the world, understand commonalities and differences between different regions, in order to develop meteotsunami warning and forecast capability. At this year's meeting, we are presenting research on new meteotsunami cases from Lake Superior, Lake Michigan, and Lake Huron, as well as a long-term database of frequency, intensity, hot-spots of meteotsunamis in the Great Lakes), and NOAA's work to develop a forecast model for meteotsunamis.

We represent a collaborative team of international researchers from NOAA and universities around the world, which aims to further our understanding of meteotsunamis for this global phenomenon. We are organizing the 1st World Conference on Meteotsunamis, to be held in Split, Croatia in May 2019, and will be using our Ocean Sciences session to build this international collaboration.

We are chairing an entire session on meteotsunamis At AGU Ocean Sciences 2018:

PO31A: Meteotsunami Causes and Formation, Recent Events, and Forecast-Warning Systems I
Wednesday, February 14, 2018 08:00 AM - 10:00 AM Oregon Convention Center - A107-A109
PO34A: Meteotsunami Causes and Formation, Recent Events, and Forecast-Warning Systems II Posters
Wednesday, February 14, 2018 04:00 PM - 06:00 PM Oregon Convention Center - Poster Hall

Panelist posters/presentations at AGU Ocean Sciences 2018:

Eric Anderson NOAA GLERL
Revisiting the 1952 Lake Huron Meteotsunami and Gravity Wave Induced Storm Surge in Lake Erie
Wednesday, February 14, 2018 04:00 PM - 06:00 PM Oregon Convention Center - Poster Hall

Philip Chu NOAA GLERL
Towards a reliable detection and early warning system for Meteotsunami events in an operational environment
Wednesday, February 14, 2018 04:00 PM - 06:00 PM Oregon Convention Center - Poster Hall

Greg Dusek, NOAA NOS
A Meteotsunami Climatology of the U.S. East Coast using NOAA Tide Gauges
Wednesday, February 14, 2018 08:00 AM - 08:15 AM Oregon Convention Center - A107-A109

Chin Wu, University of Wisconsin
Meteotsunamis in the Great Lakes: An Overlook Hazard
Wednesday, February 14, 2018 04:00 PM - 06:00 PM Oregon Convention Center - Poster Hall

Additional abstracts of note:

(1) Rip currents can often be caused by meteotsunamis: PO31A-03: Meteotusnami-induced rip currents on 4 July 2003 in Warren Dunes, Lake Michigan
(2) Meteotsunami forecast development in Croatia: PO31A-08: The Adriatic meteotsunami early warning system: deterministic and stochastic modelling components

Have these results been previously promoted by your university or institution?

These specific results are new and have not been promoted by our institutions or agencies. However, past meteotsunami research has been published and promoted, see Additional resources below. NOAA and the National Weather Service held a National Meteotsunamis Workshop trying to develop a meteotsunamis warning system protocol. In addition, the Cooperative Institute for Great Lakes Research hosted a summit "Meteotsunami Forecasting and Warning System for the Laurentian Great Lakes: New Paradigm for Big data Challneges and Analytics" in June of 2017.

Additional resources:

- Meteotsunami fact sheet, National Tsunami Hazard Mitigation Program, National Weather Service
- Meteotsunamis in the Laurentian Great Lakes: Bechle, A., C.H. Wu, D.A.R. Kristovich, E.J. ANDERSON, D.J. Schwab, and A.B. Rabinovich. Meteotsunamis in the Laurentian Great Lakes. Scientific Reports (DOI:10.1038/srep37832) (2016).ANDERSON, E.J.,
- Reconstruction of a meteotsunami in Lake Erie on 27 May 2012: Roles of atmospheric conditions on hydrodynamic response in enclosed basins. Bechle A. J., Wu, C.H., Schwab, D.J. Mann, G.E. and Lombardy, K.A. Reconstruction of a meteotsunami in Lake Erie on 27 May 2012: Roles of atmospheric conditions on hydrodynamic response in enclosed basins. Journal of Geophysical Research: Oceans (DOI:10.1002/2015JC010883) (2015).

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