Meteotsunamis
An overlooked public safety hazard

Panelists
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Storm Speed

Wind Speed

Air Pressure

Wave Speed

Radar Reflectivity
Wave Response (m)

Wave Peak

Wave Trough

Chicago Water Level

22 ft

Wind Speed

Air Pressure

Wave Speed

Storm Speed

21
'Great Lakes tidal wave' causes 5-foot immediate rise in water on Lake Superior shoreline

The New York Times  MAY 6, 1952
SMALL 'TIDAL' WAVE SWEEPS LAKE HURON

TIDAL WAVE SWEEPS ERIE:
Steamer Wrenched from Moorings on Lake Rams Large Freighter.

Additional resources: bit.ly/2sl2xMB
Frequency of Events

Historic Events
- Death
- Damage
- Injury
- Other Event

Additional resources: bit.ly/2sl2xMB
Meteotsunami events across the globe

Additional resources: bit.ly/2sl2xMB
Meteotsunami events on the Atlantic Coast
June 13, 2013 Meteotsunami Event

Credit: Buddy Denham

NOAA Technical Report (Bailey et al., 2014)
Journal Article (Wertman et al., 2014)

Additional resources: bit.ly/2sl2xMB
June 13, 2013 Meteotsunami Event
1996-2016 East Coast Climatology

- About 20 events per year – most are under 1 ft.
- Most frequent in winter and summer and during afternoon and early evening
- Occur often in the Carolinas, northern Florida, and Long Island Sound

Additional resources: bit.ly/2sl2xMB
Can we detect and predict meteotsunamis?
So far, we have made progress on:

- Researching meteotsunamis cause and process.
- Establishing the Great Lakes and East Coast meteotsunamis database and climatology.
- Working to improve weather forecast and hydrodynamic model accuracy.
- Working to build a sensor network for better detection.
- Coordinating with NOAA Tsunami Program, Tsunamis Warning Centers and local forecast offices on the creation of warning protocols.
- Leveraging advances made by Croatian scientists on meteotsunamis warning system.
- Organizing an international symposium on meteotsunamis research, development, forecasting and warning system.

Additional resources: bit.ly/2sl2xMB
What’s next? Build a reliable warning system.

To do this we need:

- International collaboration;
- A real-time meteorological, pressure, and water level sensor network;
- Accurate weather forecasts and hydrodynamic models;
- To establish warning protocols and coordinate with NOAA Tsunami Program, Tsunamis Warning Centers and local forecast offices to issue advisories and warnings; and
- To educate the public on meteotsunami risks and the appropriate response to warnings.

Additional resources: bit.ly/2sl2xB
Questions?

Meteotsunamis: An overlooked public safety hazard

This slide deck and additional resources, including animations, can be found at: bit.ly/2sl2xMB

Upcoming AGU Sessions on meteotsunamis:
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

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

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Bonus slides
Historic meteotsunami events in the Great Lakes
Grand Haven, July 4th, 1929

- Storm passage early in day
- 2 waves produced
- 6-meter height
- Swimmers swept off pier and beaches
- 10 dead
Holland, July 13, 1938

- A strong westerly squall line thunderstorm crossed Lake Michigan
- Meteotsunami “surges” over breakwater, sweeping people off (~100 ft inland)
- 5 dead
Chicago, Ill. – June 26th, & July 6th 1929

June 26
- 3 meter wave struck Chicago
- 7 people drowned

July 6
- 2 meter wave struck Chicago
- “Much more severe” than June 26th
- Swept cars from parking lot

Chicago, June 26, 1954

Additional resources: bit.ly/2sl2xMB

- Derecho moves across Lake Michigan
- Tug boat in channel reports “storm surge” with storm
- Sudden retreat in water pushes tug into a barge, then rolls and sinks

- Thunderstorm crosses Lake Michigan
- 7 swimmers drown, attributed to rip currents
- Moderate meteotsunami detected at time of drowning, likely contributor

Warren Dunes, July 4, 2003

Additional resources: bit.ly/2sl2xMB