

A Meteotsunami on the Maine Coast

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During the afternoon of 28 October 2008, eyewitnesses reported of a series of anomalous waves entering harbors and tidal channels along approximately 30 km of Maine Coast, with strong, infrastructure-damaging currents that reversed direction on a time scale of 10-20 minutes. A time series of tide-removed sea-surface elevation extracted from video camera images at Boothbay Harbor reveals tsunami-like waves with a period of approximately 20 minutes and a maximum crest to trough height of 1.3 m. Hydrodynamics-based modeling supports the hypothesis that the event was a meteotsunami forced by a moving convective cell or rain band and its associated atmospheric pressure disturbance, which was identified from radar reflectance images and offshore buoy pressure measurements. Although the atmospheric processes generating the moving pressure disturbance are unclear, the pressure variation was approximately 2-3 millibars in magnitude, travelled towards the coast at a speed of about 41 m/s, and had an along-coast extent of about 40 km centered on the section of coast where the anomalous waves were reported. A sea-surface displacement on the order of 2-3 cm, expected through the standard reverse barometer effect, appears to have amplified by a factor of about 50 to produce the wave height observed at Boothbay.

Presenters' Bios

Jeff List is an Oceanographer with the U.S. Geological Survey in Woods Hole, Massachusetts. He received his Bachelor of Science degree in Geological Sciences at The Pennsylvania State University in 1981, and his Ph.D. in Geological Oceanography from the Virginia Institute of Marine Science in 1989. Jeff List's research is focused on the processes leading to erosion of sandy shorelines, especially processes driven by waves generated during coastal storms. In 1992 he conducted research on a meteotsunami that impacted Daytona Beach, Florida.

Maitane Olabarrieta is a postdoctoral Oceanographer with the U.S. Geological Survey in Woods Hole, Massachusetts. She received her Ph.D. in Ocean Sciences from the University of Cantabria (Spain) in 2006. Maitane Olabarrieta's research is focused on the development and application of 2D and 3D hydrodynamic numerical models for long waves and surf zone hydrodynamics. Recently she conducted research on the feasibility of an alarm system against the meteotsunamis that sporadically hit the Ciutadella harbor (Menorca, Spain).

Rich Signell, Brad Butman, and Amy Farris are Oceanographers with the U.S. Geological Survey in Woods Hole, Massachusetts.