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Meteorological tsunamis along the U.S. coastline

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Meteotsunamis, or meteorological tsunamis, are atmospherically induced ocean waves in the tsunami frequency band that are found to affect coasts in a destructive way in a number of places in the World Ocean, including the U.S. coastline. The Boothbay Harbor, Maine, in October 2008 and Daytona Beach, Florida, in July 1992 were hit by several meters high waves appearing from “nowhere”, and a preliminary assessment pointed to the atmosphere as a possible source for the events. As a need for in-depth analyses and proper qualification of these and other events emerged, National Oceanographic and Atmospheric Administration (NOAA) decided to fund the research, currently carried out within the TMEWS project (Towards a MEteotsunami Warning System along the U.S. coastline). The project structure, planned research activities and first results will be presented here.

The first objective of the project is creation of a list of potential meteotsunami events, from catalogues, news and high-resolution sea level data, and their proper assessment with regards to the source, generation and dynamics. The assessment will be based on the research of the various types of ocean (tide gauges, buoys), atmospheric (ground stations, buoys, vertical soundings, reanalyses) and remote sensing (satellites) data and products, supported by the atmospheric and ocean modelling efforts. Based on the earned knowledge, the basis for a meteotsunami warning system, i.e. observational systems and communication needs for early detection of a meteotsunami, will be defined. Finally, meteotsunami warning protocols, procedures and decision matrix will be developed, and tested on historical meteotsunami events. These deliverables are expected also to boost meteotsunami research in other parts of the World Ocean, and to contribute to the creation of an efficient meteotsunami warning systems in different regions of interest, such as Mediterranean Sea, western Japan, Western Australia or other.