

Meteotsunamis, destructive tsunami-like waves: from observations and simulations towards a warning system (MESSI)

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Atmospherically-generated tsunami-like waves, also known as meteotsunamis, pose a severe threat for exposed coastlines. Although not as destructive as ordinary tsunamis, several meters high meteotsunami waves can bring destruction, cause loss of human lives and raise panic. For that reason, MESSI, an integrative meteotsunami research & warning project, has been developed and will be presented herein. The project has a threefold base: (1) research of atmosphere-ocean interaction with focus on (i) source processes in the atmosphere, (ii) energy transfer to the ocean and (iii) along-propagation growth of meteotsunami waves; (2) estimation of meteotsunami occurrence rates in past, present and future climate, and mapping of meteotsunami hazard; (3) construction of a meteotsunami warning system prototype, with the latter being the main objective of the project.

Due to a great frequency of meteotsunamis and its complex bathymetry which varies from the shallow shelf in the north towards deep pits in the south, with a number of funnel-shaped bays and harbours substantially amplifying incoming tsunami-like waves, the Adriatic, northernmost of the Mediterranean seas, has been chosen as an ideal area for realization of the MESSI project and implementation of the warning system. This warning system will however be designed to allow for a wider applicability and easy-to-accomplish transfer to other endangered locations. The architecture of the warning system will integrate several components: (1) real-time measurements of key oceanographic and atmospheric parameters, (2) coupled atmospheric-ocean models run in real time (warning) mode, and (3) semi-automatic procedures and protocols for warning of civil protection, local authorities and public. The effectiveness of the warning system will be tested over the historic events.