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Modelling of storm surges in the German Baltic Sea

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This paper summarises the results of numerical model simulations of the storm surges in the German Baltic Sea in November 1872, February 2002 and January 2010. The investigations were carried out with simultaneously coupled flow and wave models downscaling from the Baltic Sea to high resolving nearshore models of the most affected coastal regions. The reconstruction of the hydrodynamic reactions to the three cyclones resulted in good agreement with observations. A good spatial correlation was found between high energy levels of the computed coastal impacts and reported damages. The analysis of the temporal and spatial variability of water levels and wave heights during the extreme events provide useful information for the design of coastal protection measures. Both, hazard hot spots common to all of the storms as well as individual patterns were identified along the coast. Results of the investigations on the effects of sea level rises are also presented.