



A study of storm surges and seiches in the Adriatic Sea by means of observations and modelling

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Storm surges and seiches are common phenomena in the Adriatic, causing floods in the northernmost part of the basin. Since seiches can persist several days, they can overlap to new storm surges. Therefore a correct reproduction of these events is very important also for forecast purposes. In this study we have analysed several storm-surge events, mostly preceded by the seiche oscillations. The events were reproduced by means of the finite element hydrodynamic model applied to the whole Mediterranean, and results were evaluated using measurements from twelve stations located along the entire Adriatic coastline. Extensive sea-level dataset allowed a very detailed description of the selected episodes. The goal of this study is to make sensitivity analysis in order to find the best configuration of the model and to investigate the seiche phenomenon. Also, model is used to study interaction of seiches and tides as well as the seiche decay mechanisms (bottom friction and radiation through Otranto). Analysis was carried out by varying the physical parameters, resolution and boundary condition of the model, and by evaluating the quality of reproduced seiche period and corresponding decay time. Preliminary results show that, in order to reproduce these events properly, a very high resolution is not necessary nor is a 3D formulation. On the other hand, bottom friction definition and imposed boundary condition, even for the boundary far away (i.e. in the Atlantic Ocean), proved to be crucial for storm-surge and seiche reproduction. Analysis of the seiche decay time, documented by both modelled and observed sea levels, highlights the fact that free seiches are rare and that even a moderate wind influences the decay time.