



Analysis of coastal hydrodynamic variations using modeling to assess climate changes on a local scale

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Climate change and its effects in the coastal zone are becoming central aspects for environmental studies. This contribution discusses some results of the studies done under the umbrella of the EU Theseus Project to assess the future variations of some meteorological and hydrodynamic parameters over the Adriatic Sea. We first analyze the meteorological data computed by a regional downscaling of a global climate model for the IPCC scenario A1B. The regional climate model identifies a general decrease in the atmospheric pressure and an increase in the mean wind speed. The analysis of the 99 percentile for the wind speed and the atmospheric pressure shows a slight decrease in the extreme pressure values and an increase in extreme wind events along the Italian coasts of the Adriatic Sea. In a second step, the computed wind and pressure fields have been used to force a high resolution finite element coastal model in the study area. Both the wind and pressure variations strongly affect the circulation wave coastal climate. As a chain from the global to the local scale marine variables, in terms of sea level variation, wave climate and statistics on extreme events are computed and provided for the implementation of flooding models in the Northern Adriatic Sea (Emilia Romagna coastal area). The whole analyses, with a good degree in spatial resolution, with a coherent reproduction of coastal dynamics, can be considered useful inputs for a set of hydraulic models used to investigate flooding occurrence, erosion risks and the presented modelling chain is considered precious for decision support systems, nowadays so needed.