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Study of the effects on the hydrodynamic field and energy assessment of a hypothetical offshore wind farm in Puglia region (Italy)

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This work concerns the studies for the implementation of a potential offshore wind farm for electricity generation. The study area is located off the coast of Puglia (south-east of Italy) and extends from the bathymetry of 20 to 45 m. The first part of the study regards the assessment of the energy availability using the historical data measured at the weather station of Vieste (RNM, ISPRA), available from 1990 to 2010. This analysis allowed to derive the actual plant energy productivity and perform a feasibility analysis of the farm.
The second part of the study concerns the analyse the environmental effects in the area, including wave and current fields both, in the farm area and in the coastal zone. To analyse the effects on the hydrodynamic field, ADCIRC coastal model was used while the wave field was simulated using the STWAVE model. Wind induced currents have been obtained by two different scenarios in which it was simulated the Maestrale wind (from north-west direction) and the Tramontana wind (from north direction) that represent the strongest intensity wind for the study area. The wave climate was derived from the analysis of neighbourhood ondameter stations. The littoral current was calculated through the process of steering between the two models. This study assesses the effects on the hydrodynamic field in the presence and absence of the work. The study aimed to establish a methodology to assess wind energy potentiality and to analyse the impact that offshore wind farm might have on the coastal area.