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Application of a wind-wave-current coupled model in the Catalan coast (NW Mediterranean Sea)

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This work shows the main results of HAREAMAR project (including HAREMAR, ENE2012-38772-C02-01 and DARDO, ENE2012-38772-C02-02 projects), concerning the local Wind, Wave and Current simulation at St. Jordi Bay (NW Mediterranean Sea).
A coupled ocean-atmosphere-wave model (COAWST, Warner et al., 2010) has been implemented in the region considering a set of downscaling nested meshes to obtain high-resolution outputs.
The main problem in these ocean areas is the lack of data (especially wind data), which neither allows for estimating the wind, wave and current energy potential, nor performing a proper forecasting model validation.
The main objective of this work is to reduce the local prediction errors, in order to make the meteo-oceanographic hindcast and forecast more reliable. To achieve this goal, a practical coupling strategy has been designed and validated with a set of benchmark cases.
The adaptation to this particular area, combining the different wind, wave and ocean model domains has been far from simple, because the grid domains for the three models differ significantly.
This work shows the main results of the COAWST model implementation to this particular area, including both monthly and other set of tests in different atmospheric situations, especially chosen for their particular interest.
The time period considered for the validation is the whole year 2012. A comparative study between the WRF, SWAN and ROMS model outputs (without coupling), the COWAST model outputs, and a buoy measurements moored in the region was performed for this year.

References

Warner, J.C., Armstrong, B., He, R., and Zambon, J.B., 2010, Development of a Coupled Ocean-Atmosphere-Wave-Sediment Transport (COAWST) modeling system: Ocean Modeling, 35 (3), 230-244.