



An Operational Forecasting System for the Meteorological, Hydrological and Marine Conditions in Coastal Areas

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The coupling of a suite of meteorological limited area models with a wave prediction system based on the nesting of different wave models on different scales allows for medium-range sea state forecasts at the Mediterranean, regional and coastal scale. The system has been operational at ISPRA since September 2012, after the upgrade of both the meteorological (BOLAM-MOLOCH) and large-scale marine components of the original SIMM forecasting system and the implementation of the new regional and coastal (WAM-SWAN coupling) chain of models. The coastal system, which had been previously tested over a large number of hindcasts in deep and shallow water, has been upgraded in the operational version by extending the domain of the regional areas, by increasing the resolution of the wind forecasts and by refining the bathymetries of the coastal areas. In order to assess the accuracy and the skill of the system, statistical methods traditionally used in meteorology have been applied to the verification of the forecasts and the results are shown in the present work. The forecast series of mean sea level pressure, wind and waves in the Mediterranean Sea (at 1/30 deg. resolution), in six regional (at 1/60 deg. res.) and five coastal (at 1/240 deg. res.) areas have been compared with the available buoy data collected in the one year period of service at several locations. The impact of the wind forecast resolution on the accuracy of wave forecasts in deep and shallow waters has also been investigated and discussed. Finally, the analysis of the wave fields over the last year have been applied to estimate the seasonal average flux of wave energy per wavefront length (wave power) in five Italian coastal areas with complex morphology (presence of islands and gulfs).