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Ocean-atmosphere dynamics in a wind-jet region (Ebre Delta shelf, NW Mediterranean Sea).

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Combined “in-situ” and remote observations, and a coupled ocean-atmosphere-wave system (COAWST, Warner et al., 2010) were used to investigate the physical processes of a wind-jet region (Ebre delta shelf, NW Mediterranean Sea). During seaward wind-jets periods, particular wave conditions and eventual cross-shelf water circulation occurs. A nesting strategy consists in a set of different downscaling meshes with a finer resolution of 350 m for the ocean models and 1 km for the atmospheric models. Then, the validation of the model has been carried out using the available in-situ tide-gauge, buoy measurements and HF radar data with an acceptable level of agreement. Focused on intense wind events, the modelled wind-jet is observed in a limited area offshore with a strong spatial variability. Spectral analysis of water circulation shows a strong response to the offshore wind at near inertial frequencies. Sea Surface Temperature signal from remote sensing products revealed an extensive upwelling region during intense cross-shelf winds. The wave modelling is benefited by the high resolution meshes characterizing a bimodal spectra of the significant wave height.

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.