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# Ocean response in numerical mesoscale modelling during high-wind events over the Gulf of Lions

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The near-sea surface meteorological conditions associated with strong wind events constitute a strong forcing on the ocean mixed layer. The Gulf of Lions is one of the most windy region of the Mediterranean basin, with frequent Mistral and Tramontane events. These northerly and north-westerly low-level flows, generally induced by a cyclogenesis in the Ligurian basin, transport cold continental air over sea and induce strong momentum and heat exchanges at the air-sea interface. The local continental shelf circulation with sometimes transient coastal upwellings is also sensitive to these intense meteorological events.
A preliminary study addresses the question of the sea surface scheme used in mesoscale atmospheric numerical modelling to represent the ocean mixed layer response under these severe wind events. Several slab ocean models have been used coupled with the *Weather Research and Forecasting* (WRF) model at 21 and 7-km resolution and applied on two Mistral/Tramontane cases. We mainly focused on the slab models performances to represent the ocean mixed layer response under Mistral and Tramontane situations at mesoscale, i. e. local and fast cooling and deepening, and finally we investigated the feedbacks of an interactive ocean mixed layer on the atmospheric simulation.
In a second experimental set, the downscaling of the NCEP reanalyses over the full Mediterranean basin has been done with the WRF model between August 1998 and July 1999. The atmospheric fields obtained are then used to drive the regional *NEMO-MED12* ocean model with a 1/12° resolution in a perpetual mode. The benefit of increasing the space and time resolutions of the atmospheric forcing (20 to nearly 7 km; daily to 3-hourly) is estimated by a comparison of the ocean model performances to represent the general Mediterranean circulation as the characteristics of the mixed layer, of the deep convection and of the upwellings between the sensitivity experiments, and by a comparison of our experiments to observations and climatologies. A special focus on the local 3D circulation in the Gulf of Lions under high-wind events in these simulations will be presented during the conference.