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Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Role of ocean-atmosphere interactions in the description of the lee cyclogenesis events over the western Mediterranean Sea

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In this work we analyse the representation of the lee cyclogenesis events developing in the western Mediterranean, as depicted by a regional earth system model compared against the outputs from the corresponding atmospheric stand-alone component.
The Regional Earth System developed by ENEA-ICTP, the PROTHEUS system, is an optimal modelling tool for this purpose as it explicitly accounts for the various components of the hydrological cycle and their interactions. In particular, the PROTHEUS system provides a reliable description of high-resolution and high-frequency sea surface temperature and wind fields over the ocean, in close agreement to observations thereby providing a reliable description of air-seas fluxes (in particular latent heat flux). To analyse the impact of high-resolution SST's on the description of the lee-cyclogenesis events over the western Mediterranean, we consider simulations driven with lateral boundary conditions from ERA40 and from ECHAM5-MPIOM and compare the output of coupled and stand-alone atmospheric component for the PROTHEUS system. The ocean-atmosphere interactions permitted in the coupled system critically affect the spatial pattern and the amplitude of the rainfall associated with the cyclogenesis events. Out analysis highlights the crucial role of air-sea interactions in the description of high frequency disturbances, especially in the western Mediterranean.
The modelling tools presented in this work, developed in the framework of CIRCE EU Project RL2, will also contribute to the Med-CORDEX activities.