



Sirocco and Bora, intense air-sea exchanges and heavy orographic precipitation

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Sirocco and Bora winds typically affect the Adriatic Sea basin for several days each year and are characterized by intense air-sea interaction. Moreover, they are often associated with heavy precipitations affecting northeastern Italy and the northern/central Apennines, respectively.

The present study aims at investigating the role of the Adriatic Sea as moisture and heat source for the air mass, which is transported by low-level winds toward the orography where uplift and condensation take place.

High resolution simulations of different Bora and Sirocco events, leading to intense precipitation and distributed along different seasons of the year, are performed using a convection permitting model (MOLOCH), with the purpose of better understanding the role played by the Adriatic Sea. In particular the impact of sea surface temperature (SST) and surface fluxes on rainfall distribution and intensity is investigated. To attain this aim, a diagnostic tool, aimed at providing water budget in the atmosphere over the Adriatic Sea, has been developed and applied together with computation of vertical profiles and column integrated water vapour fluxes across the Italian coast, characterizing the air mass that feeds the precipitating systems.

Preliminary results show that the effect of the Adriatic SST on precipitation is complex and varies considerably among different events. The Adriatic Sea (SST) does not influence markedly the atmospheric water budget, which is instead modulated primarily by large-scale/mesoscale circulation. It mainly impacts on the characteristics of the atmospheric boundary layer and thus influences the flow dynamics and its interaction with the orography.