



## **High-resolution simulations of heavy precipitation events: role of the Adriatic SST and air-sea interactions**

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Strong Bora and Sirocco winds over the Adriatic Sea favour intense air-sea interactions and are often associated with heavy rainfall that affects the mountainous areas surrounding the basin.

A convection-permitting model (MOLOCH) has been implemented at high resolution (2 km) in order to analyse several precipitation events over northern Italy, occurred during different seasons of the year and presenting different rainfall characteristics (stratiform, convective, orographic), and to possibly identify the relevant physical mechanisms involved. With the aim of assessing the impact of the sea surface temperature (SST) and surface fluxes on the intensity and location of the rainfall, sensitivity experiments have been performed taking into account the possible variability of SST analysis for model initialization. The model has been validated and specific diagnostic tools have been developed and applied to evaluate the vertically integrated moisture fluxes feeding the precipitating system or to compute a water balance in the atmosphere over the sea.

The results show that the Adriatic Sea plays a role in determining the boundary layer characteristics through exchange of heat and moisture thus modifying the low-level flow dynamics and its interaction with the orography. This in turn impacts on the rainfall. Although the results vary among the analysed events, the precise definition of the SST and its evolution can be relevant for accurate precipitation forecasting.