



Intense air-sea exchanges and heavy rainfall: impact of the northern Adriatic SST

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The Adriatic Sea may affect the structure of the atmospheric boundary layer through the exchange of heat and moisture. Over the northern Adriatic basin, intense air-sea interactions are usually associated with Sirocco or Bora winds, characterized by strong low-level south-easterly or north-easterly flow, respectively. These events are also often responsible for heavy precipitation over the mountainous areas surrounding the basin.

In this study, a high-resolution (2 km) numerical weather prediction (NWP) system, based on BOLAM and MOLOCH mesoscale models, is used to analyse several heavy precipitation events affecting northern Italy and associated with intense air-sea exchanges in the northern Adriatic. The main scope is to evaluate the impact of the Sea Surface Temperature (SST) on the intensity and location of the rainfall, identifying the relevant physical mechanisms involved.

Different Bora and Sirocco events, associated with heavy rainfall, and distributed along different seasons of the year, are analysed through numerical simulations. Different SST fields are employed to initialize the modelling chain, in order to take into account the possible variability, in terms of resolution and accuracy, among different data or analysis sources.

The response in terms of surface fluxes and vertical profiles of the flows impinging on the orography is analysed to provide a physical explanation of the sensitivity of the rainfall field to the SST of the Adriatic.