

Identification of the mechanisms producing different precipitation patterns over North-Eastern Italy: insights from HyMeX-IOP18 and 19 and previous events

S. Davolio, A. Volontè, A. Buzzi, A. Manzato, A. Pucillo, M. Ferrario, A. Fornasiero

Institute of Atmospheric Sciences and Climate, CNR-ISAC, Bologna, Italy
Dep. of Physics, University of Milan, Milano, Italy
ARPA Friuli Venezia Giulia – OSMER, Visco (Udine), Italy
ARPA Veneto, Teolo (Padova), Italy
ARPA Emilia Romagna - SIMC, Bologna, Italy

During the first HyMeX Special Observing Period (SOP1) field campaign, the target site of North Eastern Italy (NEI) experienced quite a large amount of precipitation, locally exceeding the climatological values. During the two-month period of the SOP1, rainfall was distributed among several heavy precipitation events (monitored in the frame of different Intense Observing Periods – IOPs). This study aims at investigating two IOPs occurred during the last period of the campaign, associated with remarkable precipitation episodes that affected Veneto and Friuli Venezia Giulia regions in NEI. Although being very close in time and displaying some common large scale features, IOP 18 and IOP 19 showed quite different patterns of precipitation. During IOP18 (31 October – 1 November 2012) the development of convective systems was responsible for intense rainfall mainly located over a flat area of the eastern Po Valley. On the other hand, during IOP 19 (4 – 5 November 2012) heavy precipitation affected only the Alpine area.

Several other heavy precipitation episodes, occurred in the last years over NEI and displaying similar precipitation patterns, have been also analysed. A detailed investigation of the two IOPs, as well as of the other events, based both on high resolution models and observations (radars, profilers, ground network, radiosoundings), has been undertaken in order to explain the two different observed patterns of precipitation, one located over the plain far upstream of the orography, the other located over the Alpine area. The thermodynamic characteristics of the incoming low-level south-easterly flow from the Adriatic sea and its interaction with the Alpine orography play a key role in modulating the precipitation.