

The vertical structure of Mediterranean precipitation during HyMeX special observation periods in 2012 and 2013

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The HYdrological cycle in the Mediterranean Experiment (HYMEX, <http://www.hymex.org/>) is an international experiment aiming at a better understanding of the global water cycle in the Mediterranean region.

In this framework, an X-band Dual-polarization Doppler weather radar (MXPol), belonging to the Environmental Remote Sensing laboratory (LTE) of the EPFL of Lausanne (CH), was deployed for two special observation periods during fall 2012 and fall 2013, in the Ardèche region (FR) in order to sample the intense precipitation events that likely occur during these seasons, in the mountainous areas poorly covered by operational measurements.

More than 30 precipitation events were sampled during the two seasons. Different precipitation types were observed: purely stratiform precipitation, convective precipitation (and squall lines), and shallow convection with limited vertical development.

In this work we investigate the dominant microphysical precipitation processes occurring in the vertical direction by extracting vertical profiles of polarimetric variables from multiple range height indicator (RHI) scans, and analyzing the polarimetric signature characterizing these profiles at the scale of the precipitation event (or event type). Additional information, provided by hydrometeor classification and drop size distribution (DSD) retrieval schemes, is discussed and related to the observed vertical structures.

The results allow to better define the characteristics of precipitation events that are, given the orographic configuration, prone to produce large amount of rainfall and social impacts but difficult to fully monitor and characterize using networks of operational sensors.