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Multi-sensor precipitation measurements during HyMeX Special Observation Period in Northeast Italy

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The Northeast Italy Hydrometeorological Observatory represents one of the three HyMeX sites that participated in the first Special Observation Period (Sept-Nov 2012). Located in the center of the Alps, the site represents a strategic location for collecting hydrometeorological observations on heavy rainfall events triggering flash floods and debris flows in complex terrain. The intensively monitored area (1600 km2) is located in the Upper Adige river basin (Italy), at the boundary between Italy, Austria and Switzerland. The area covers a partially glaciated surface ranging in altitude from 600 m to 4000 m asl. Within this area, a set of experimental watersheds (ranging in size from 8 to 64 km2) with dedicated instrumentation for the high frequency sampling of runoff, soil moisture, piezometric response and sediment transport are included.

The instrumentation dedicated to the observation of rainfall parameters involves: a dense network of rain-gauges located at different elevations, an X-band polarimetric mobile radar, two C-band Doppler radar covering the area at a 60-70 km range, one 2DVD and two Parsivel disdrometers.

The hydrometeorological data collected in this experiment range in scale from in situ to regional radar observations that can facilitate studies of hydrological processes and remote sensing of precipitation in complex terrain basins. In this study we will compare rainfall data derived from three observational scales: in situ stations (1 meter, 1 min), locally deployed X-POL radar (200 meters, 1 min) and two regional radars (1km, 5-10 min). We will present a methodology to transfer radar algorithm calibration across scales considering the in situ observations as ground truth, then transferring calibration to the local XPOL radar observations, which will be finally used to transfer calibration to the regional C-band radar-rainfall algorithms. Regional radar-rainfall estimates will then be used to investigate hydrological processes at a range of basin scales and evaluate high-resolution satellite rainfall retrievals during two major flood events that took place during the SOP.