Using dual-polarized radar data in LAPS system

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Local Analysis and Prediction System (LAPS) is designed to accept and exploit all available data sources: surface (SYNOP, METAR data and data from automatic weather stations), soundings, satellite and radar data. The aim is to create analyzed fields with the focus on the mesoscale weather systems and build products for specific forecast applications. To accomplish this goal the radar data play a very important role. Doppler velocity data are used in the wind analysis using a multiple iteration successive correction technique. Radar reflectivity data are combined with the surface observations, satellite and pilot reports in the cloud analysis, which play the important role in wind and mass dynamic adjustment. Beside these radar parameters dual-polarization provide the additional information that can be used in the cloud and precipitation analyses. Differential reflectivity, specific differential phase and correlation coefficient between horizontal and vertical polarized radar signal are the parameters that open the new possibilities especially in the precipitation analysis by improving quantitative precipitation estimation and identification of precipitation significant in winter storms.