**Doppler Radar and Remote Sensing Research (DRARSR)**

The Doppler Radar and Remote Sensing Research (DRARSR) team is traditionally involved in the development of weather radar technology including Doppler, dual-polarization, and phased-array radars and their meteorological applications. Recent polarimetric upgrade of the National Weather Service operational network of the WSR-88D radars was to a large extent a result of two decades of research performed by the DRARSR team. Currently, the team participates in testing and engineering evaluation of the prototype of the Multifunction Phased Array Radar (MPAR).

One of the thrusts of the DRARSR team research is development of operational algorithms for radar quantitative precipitation estimation and hydrometeor classification including automatic detection of tornadoes, hail, and high-impact adverse winter weather associated with freezing rain and heavy snowfall accumulation. These algorithms have been implemented on the WSR-88D network and their optimization continues. Identification of the convective updrafts and nowcasting of convective development using polarimetric radar signatures and their assimilation into the storm-scale numerical weather prediction (NWP) models is another facet of the DRARSR research.

The most recent trend in the DRARSR team activities is utilization of the multiparameter radar data for optimization of the performance of the NWP models and their microphysical parameterization in particular. This implies developing the methods for radar microphysical and thermodynamic retrievals, forward observational radar operators, and close partnership with cloud modelers in the US and abroad.

Next two plots illustrate some of the recent research products developed by the DRARSR team. One of them presents results of classification of winter precipitation (Fig.1) and another shows so-called Quasi-Vertical Profiles (QVP) of multiple radar variables depicting the evolution of a cold-season storm in a height vs time format with unprecedented statistical accuracy and vertical resolution (Fig. 2).

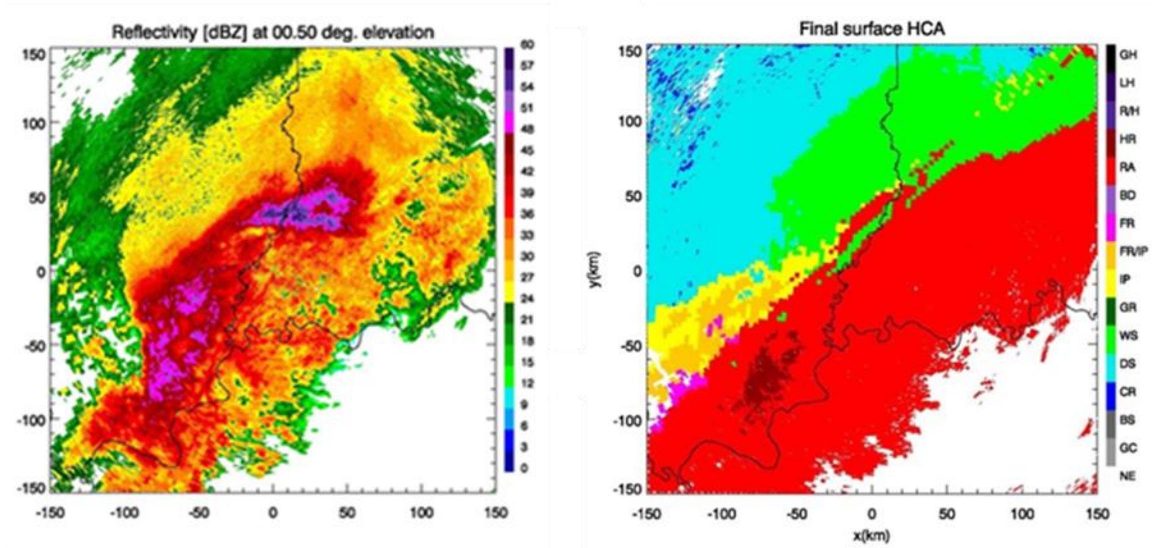


Fig. 1. Fields of radar reflectivity (left panel) and results of precipitation classification (right panel) for the storm observed with the KVNX (Evansville, IN) on 5 January 2014 at 1702 UTC.
GC stands for ground clutter, BS – for biota, CR – ice crystals, DS – dry snow, WS – wet snow, GR – graupel, IP – ice pellets, FR/IP – freezing rain / ice pellets mixture, FR – freezing rain, BD – "big drops", RA – light and moderate rain, HR – heavy rain, RH – rain / hail mixture, LH – large hail, GH – giant hail.

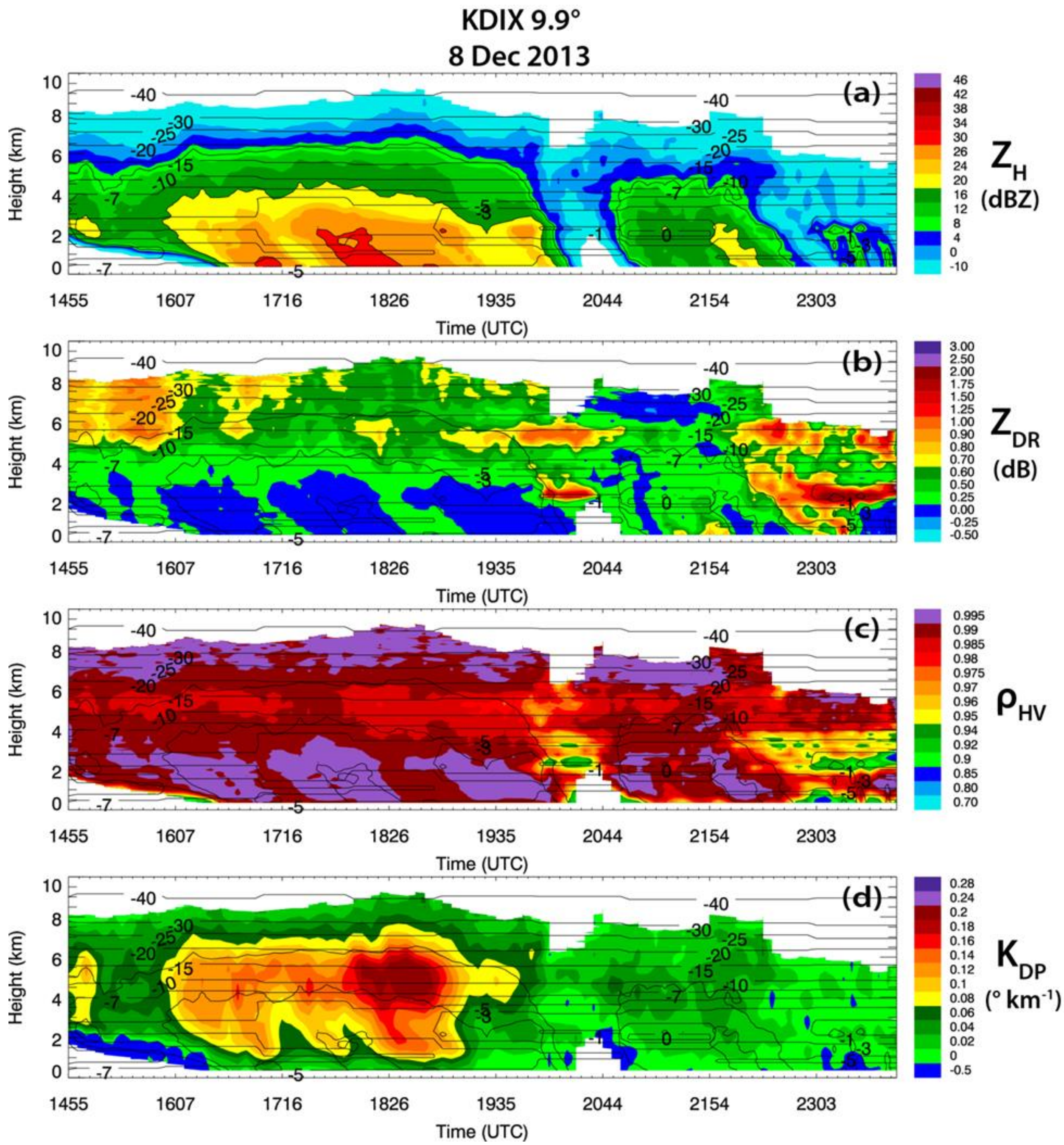


Fig. 2. Quasi-vertical profiles of radar reflectivity Z, differential reflectivity $Z_{DR}$, cross-correlation coefficient $\rho_{hv}$, and specific differential phase $K_{DP}$ retrieved from the KDIX (Fort Dix BJ) WSR-88D data collected on 8 December 2013. Contours of HRRR model wet-bulb temperature (°C) are overlaid in each panel.

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