

Polarimetric WSR-88D network, observation highlights

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The dual polarization upgrade of the U.S. Doppler weather radar (WSR-88D) network was completed in spring of 2013. During and after the deployment process, legacy radar data and the new polarimetric fields were carefully monitored by a data quality team comprised of personnel from the Radar Operation Center (ROC), the Weather Decision Training Branch (WDTB) and the National Severe Storms Laboratory (NSSL). Throughout this monitoring process interesting observations predicated by meteorological conditions specific to radar sites have been made. Furthermore, for some time during and following the deployment, the WDTB provided "Storm of the Month" nationwide seminars on the WEB to exchange experiences among the National Weather Service (NWS) forecasters. Examples of polarimetric fields observed by the data quality team and by NWS will be shown and discussed. These include the following. Tornado debris signatures associated with violent tornadoes extended up to 12 km above ground; the observed maximum debris heights correlated well with the tornado intensity. Lowering of the melting layer caused by a cold front and the progressive descent of the snow level in the mountains of Arizona prompted forecasters to amend their outlook. A smoke plume was observed to have a localized minimum of differential reflectivity above the fire initiation area in the midst of otherwise large values associated with an advecting plume. Chaff can have positive and negative differential reflectivity; some physical mechanisms that could produce such values will be presented. Quite often several types of scatterers were identified in a scan. For example a sharp contrast in values of polarimetric variables was observed at the interface of shallow and deep water over the ocean. These and other examples illustrate the potency of this large polarimetric network of radars to quickly identify an intriguing spectrum of signatures associated with diverse climate regions and environments.