



In-situ microphysical measurements of banded structures in cold-season extra-tropical cyclones

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Observations acquired during the Profiling Of Winter Storms project (PIOWS) are used to characterize the microphysical properties of banded cloud and precipitation structures in cold-season extra-tropical cyclones. From 1 November and 15 December 2009 and from 15 January to 10 March 2010, cyclones were sampled by the National Center for Atmospheric Research C-130 aircraft over the central United States at a range of times within their life cycles. Horizontal flight legs, frequently conducted at a variety of altitudes, profiled the changing microphysical structure across the bands.

Cloud and precipitation particles were measured with a Cloud Droplet Probe (CDP), a standard Forward Scattering Spectrometer Probe (FSSP), an FSSP with tips designed to reduce large crystal shattering and 3 two-dimensional optical array probes, while a Cloud Spectrometer and Impactor probe provided measures of bulk mass content. Data from all probes were used to characterize how particle number concentrations, size distributions, cross-sectional areas, median mass diameters, and mass contents varied horizontally relative to the banded structure's positions and vertically with altitude and air temperature. Data from the University of Wyoming Cloud Radar and Lidar were used to supplement the in situ measurements with extremely high-resolution profiles of particle characteristics through the banded structures. Implications of these measurements for characterizing precipitation growth mechanisms of the banded structures sampled during PIOWS will be discussed.