Recent observations of tornadoes using a mobile, rapid-scan, polarimetric, X-band, Doppler radar

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The tornadogenesis process and tornado structure were documented by RaXPol, an X-band, mobile, polarimetric, rapid-scan radar (Pazmany et al. 2013) from the University of Oklahoma, in a number of supercells in the Southern Plains during the 2012 and 2013 storm seasons. This presentation will summarize the datasets collected, and highlight and provide an overview of close-range, volumetric, rapid-update observations of two violent tornadoes on 19 May 2013 in central Oklahoma (the Edmond – Carney storm and the Norman – Shawnee storm), and a violent tornado and a weaker, anticyclonic tornado on 31 May 2013, also in central Oklahoma (near El Reno). The fine-scale structure of a satellite tornado and sub-tornado-scale secondary tornadoes in the violent El Reno tornado will be shown as manifest in the Doppler velocity, radar reflectivity, co-polar cross correlation coefficient, differential reflectivity, and spectrum width fields. Ground-relative wind speeds of at least 135 m/s were observed in at least one of these secondary tornadoes. The El Reno tornado's debris signature in co-polar cross-correlation coefficient was as wide as 5 km late in its life, perhaps as a result of debris fallout when the tornado was weakening.

Reference:

Pazmany, A. L., J. B. Mead, and H. B. Bluestein, J. C. Snyder, and J. B. Houser, 2013: A mobile, rapid-scanning, X-band, polarimetric (RaXPol) Doppler radar system. J. Atmos. Ocean. Technol., 30, 1398 – 1413.