Tornadic Supercells in Central Oklahoma on May 19, 20, and 31 of 2013

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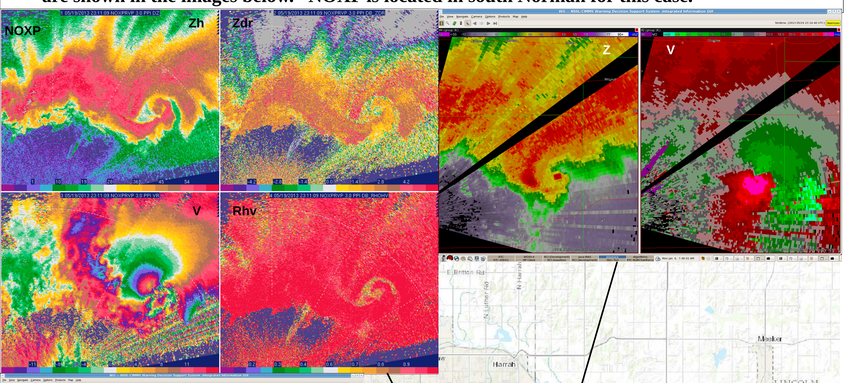
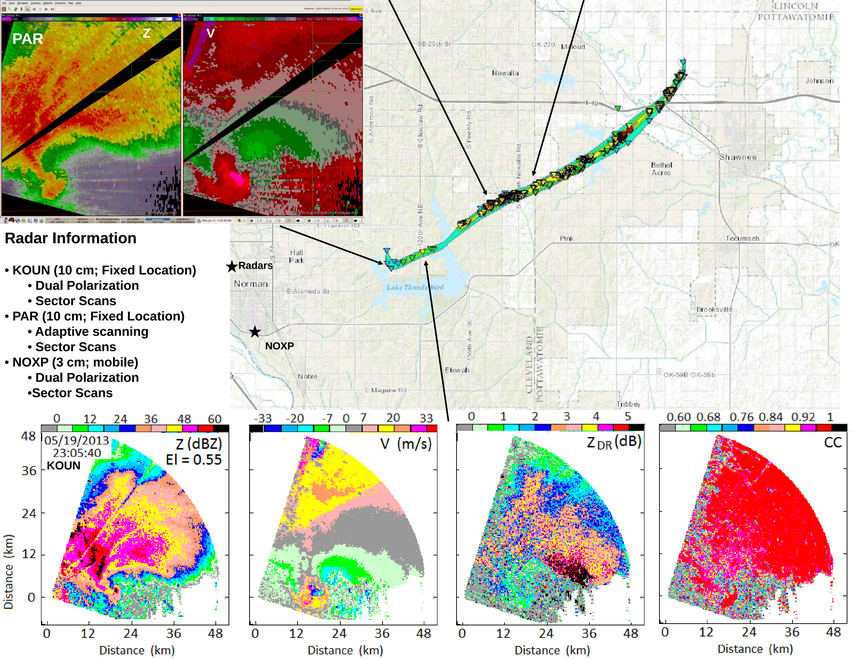
1. Introduction & May 19

- **Violent supercells with tornadoes occurred on May 19, 20, and 31 in central Oklahoma during the Rapid Supercell Dual-Polarization Experiment and the Evolution of Supercells Experiment, both being run by the NSSL Phased Array Radar and Meteorological Studies Team. In addition to the PAR, data were collected by KOUN (long-term research WSR-88D; operating in experimental modes) and NOXP (NSSL X-Band, mobile radar). All three radars collected rapid volume scans (1.5 min or faster) on the storms. Co-location of PAR and KOUN for all three storms, and co-location of all radars for May 31, allows for detailed comparisons of radar capabilities and study of supercell and tornado characteristics.**

- **On May 19th, two supercells produced 10 tornadoes in central Oklahoma, the strongest of which (EF4) formed in far eastern Norman and moved to northwest of Shawnee (see map below). Tornadogenesis (PAR : 2303Z) and intensification (KOUN: 2306Z; NOXP: 2311Z; PAR: 2315Z) are shown in the images below. NOXP is located in south Norman for this case.**





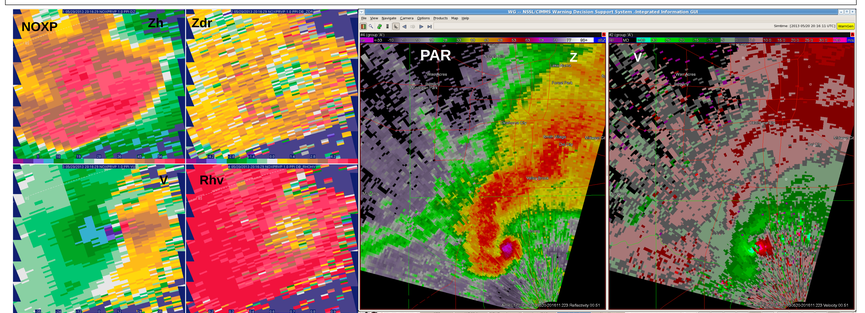
Radar Information

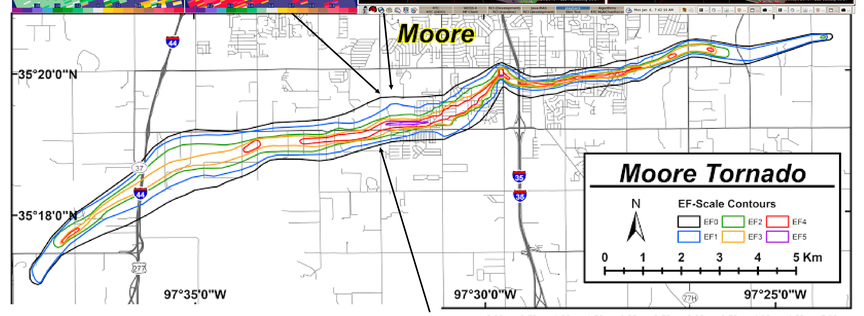
- KOUN (10 cm; Fixed Location)
  - Dual Polarization
  - Sector Scans
- PAR (10 cm; Fixed Location)
  - Adaptive scanning
  - Sector Scans
- NOXP (3 cm; mobile)
  - Dual Polarization
  - Sector Scans

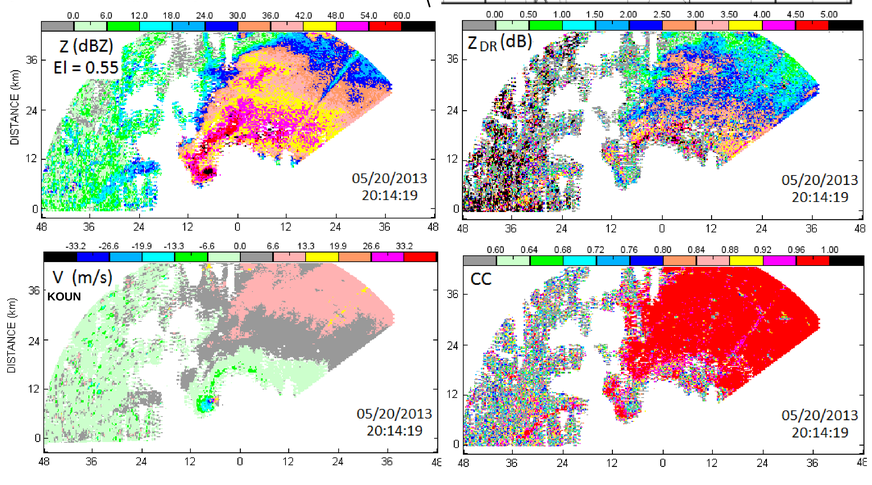
2. May 20

- **A single supercell in central Oklahoma on May 20th produced two tornadoes; the first violent and the second weak. The violent tornado began at 1956Z near Newcastle, was at a maximum of intensity (EF5) as it moved across Moore, and dissipated near Lake Stanley Draper (map below). See companion poster at this symposium by Ortega *et al* (#828) that documents the May 20 tornado damage survey, and posters by Wood (#826) and Kurdzo *et al* (#824) that document radar data from the storm.**

- **Near the time of EF5 intensity, images from KOUN (2014Z), NOXP (2016Z), and PAR (2016Z) all show the intense velocity couplet and debris ball/tornado debris signature associated with the tornado. There is evidence that tornado debris may be producing a 3-body scatter spike behind the storm. NOXP is located near Purcell for this case, approximately 40 km from the tornado.**



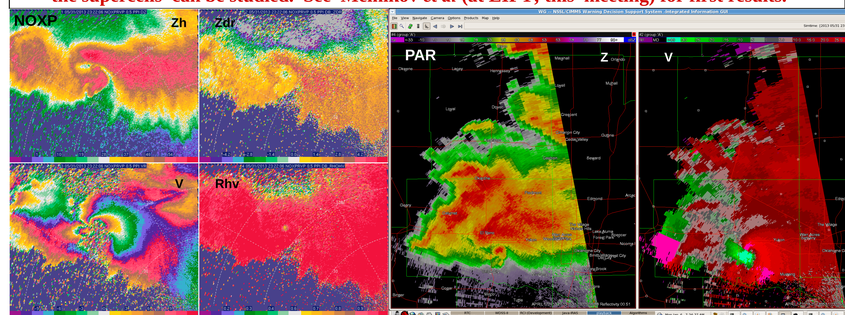


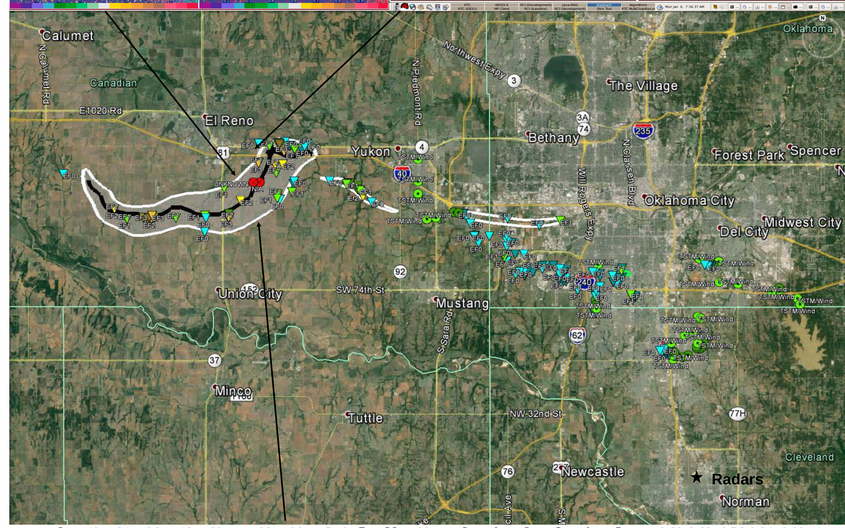


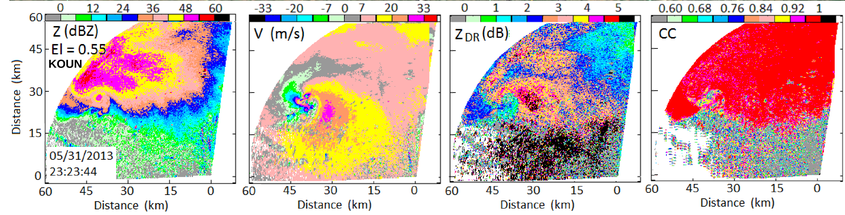
3. May 31 & Conclusion

- **Three supercells struck central Oklahoma on May 31. The leading supercell produced 7 tornadoes, including a very large EF3 (or greater intensity) in rural areas near El Reno, and an EF2 anticyclonic tornado. As the supercell moved across southern Oklahoma City, it produced large amounts of wind damage and several weak tornadoes. (damage mapping below). A second supercell produced 3 weak tornadoes and wind damage, and a third supercell produced wind damage, both to the south of the leading supercell; damage not shown. Near the time of peak intensity of the EF3 El Reno tornado, images below show NOXP (2322Z), PAR (2323Z), and KOUN (22324Z).**

- **A large amount of data exists for all three cases. When combined with high-resolution data from TOKC (see Poster by Wood), 3-D winds at 1-2 minute intervals can be done. Rapidly evolving storm dynamics (including tornadogenesis) and rapidly evolving microphysical changes within the supercells can be studied. See Melnikov *et al* (at EIPT; this meeting) for first results.**







Mike French helped with May 20 NOXP data

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