A Brief Review of VORTEX2: 2009 Results and 2010 Plans

National Severe Weather Workshop
6 March 2010

Lou Wicker NSSL

Member of the VORTEX2 Steering Committee

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Verification of the Origins of Rotation in Tornadoes Experiment (VORTEX)

- VORTEX1: 1994-1995
- VORTEX2: 2009-2010
  - **May 10 – June 13, 2009**
  - **May 01 – June 15, 2010**
- **NSF/NOAA Funded Experiment**

- Steering Committee:

Howie Bluestein (University of Oklahoma)

Don Burgess (OU, CIMMS)

David Dowell (NCAR)

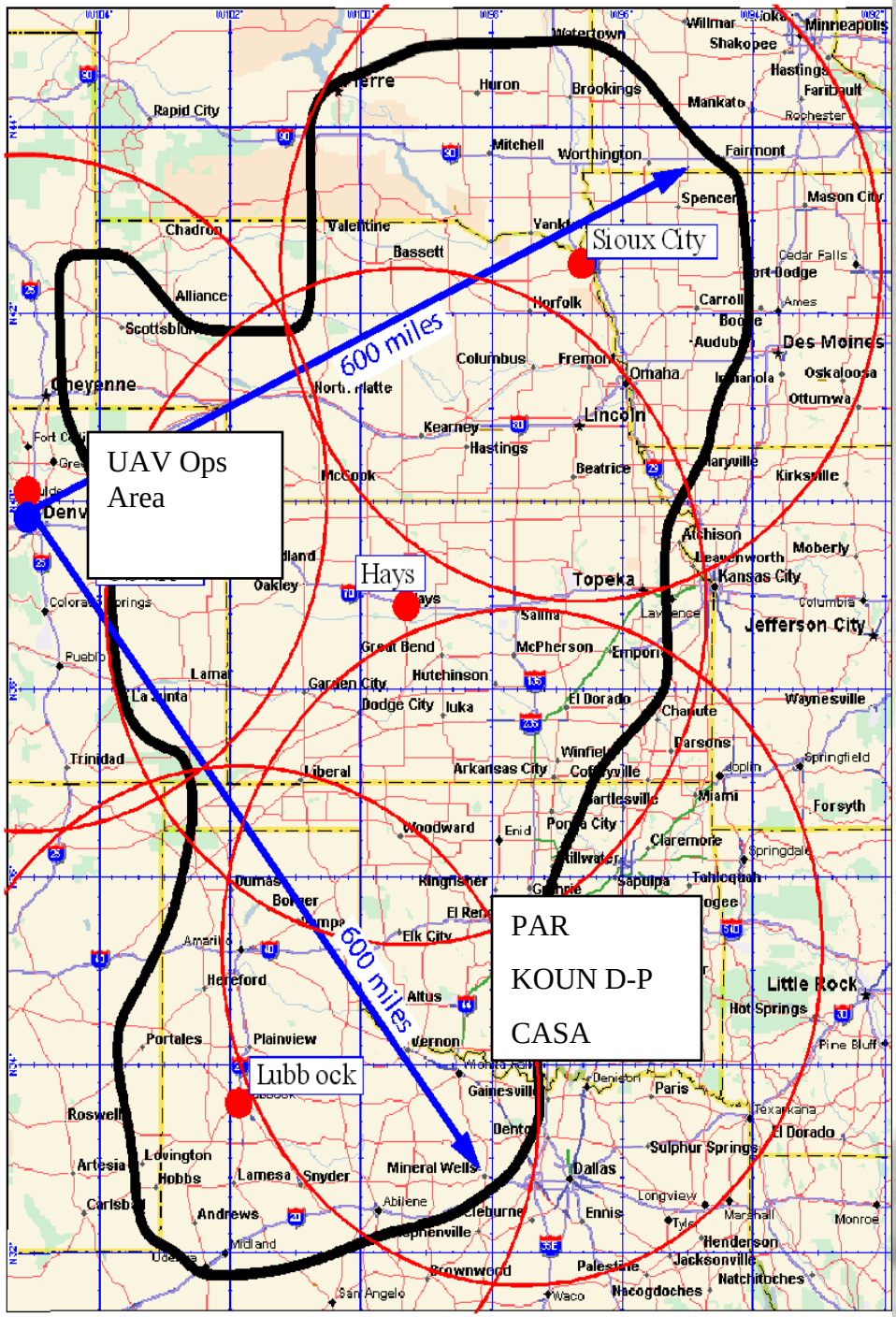
Paul Markowski (Penn State University)

Erik Rasmussen (Rasmussen Systems Inc)

Yvette Richardson (Penn State University)

Lou Wicker (National Severe Storms Laboratory)

Josh Wurman (Center for Severe Weather Research)



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VORTEX2 Science Objectives

- **Tornadogenesis**
  - Source[s] of tornado vorticity
  - Role of downdrafts
  - Sensitivity to microphysics & thermodynamics
- **Near-Ground Wind Field in Tornadoes**
  - Relationship between damage and wind speed (EF-Scale)
- **Relationships Between Supercell Storms and Their Environments**
  - Interaction between storms
  - Environmental heterogeneity including boundaries
- **Storm-Scale Numerical Weather Prediction**
  - Assimilation of observations, including radar
  - Predictability of supercells and tornadoes

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Observing Systems

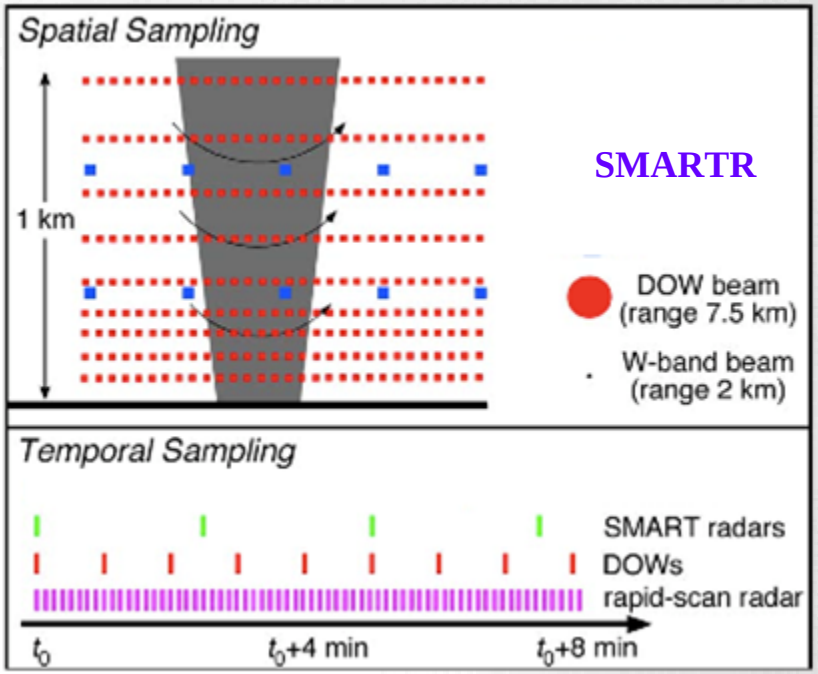
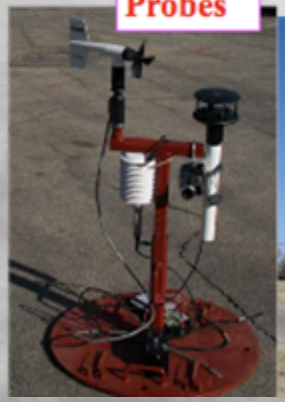


Fig. 3.2 RECUV UAV being readied for flight.

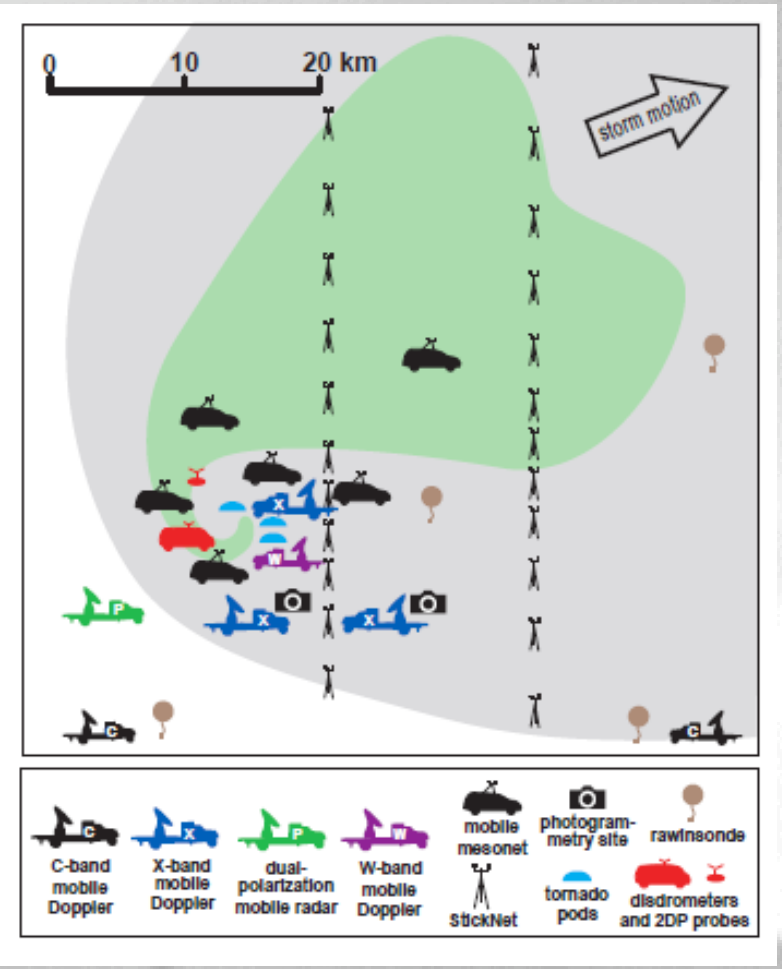
A variety of instruments, focusing on mesoscale observations, radar, and direct T, RH, wind

All Mobile



VORTEX2 Choreography

- 50 Scientific Vehicles
- Many Mobile Instruments
  - Radars -- Mesonets
  - Sticknets -- Rawinsondes
  - Disdrometers – Tornado Pods
  - Photogrammetry -- UAV practice
- ~125 Scientists and Crew



http://www.vortex2.org and http://www.nssl.noaa.gov/projects/vortex2/

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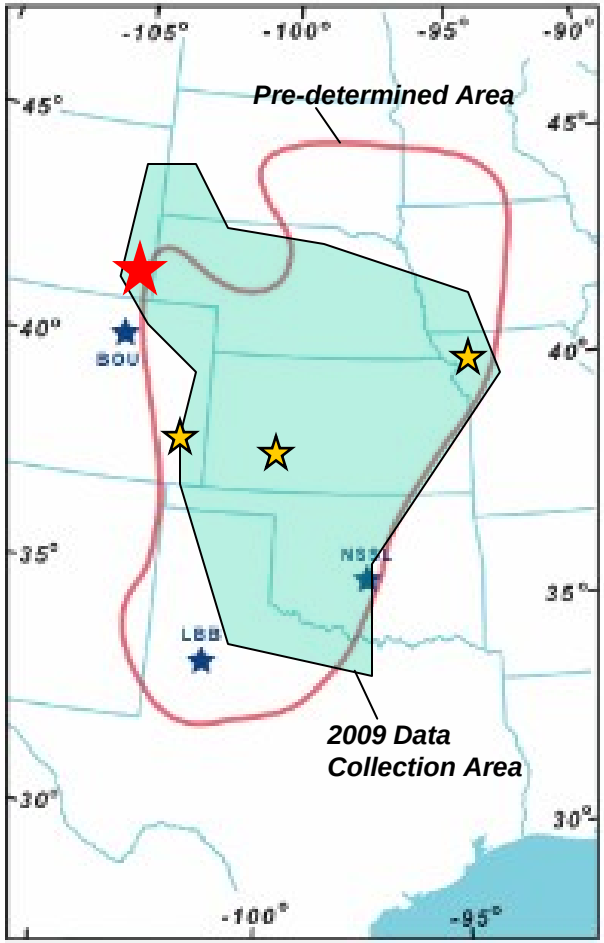
VORTEX2 2009 OVERVIEW

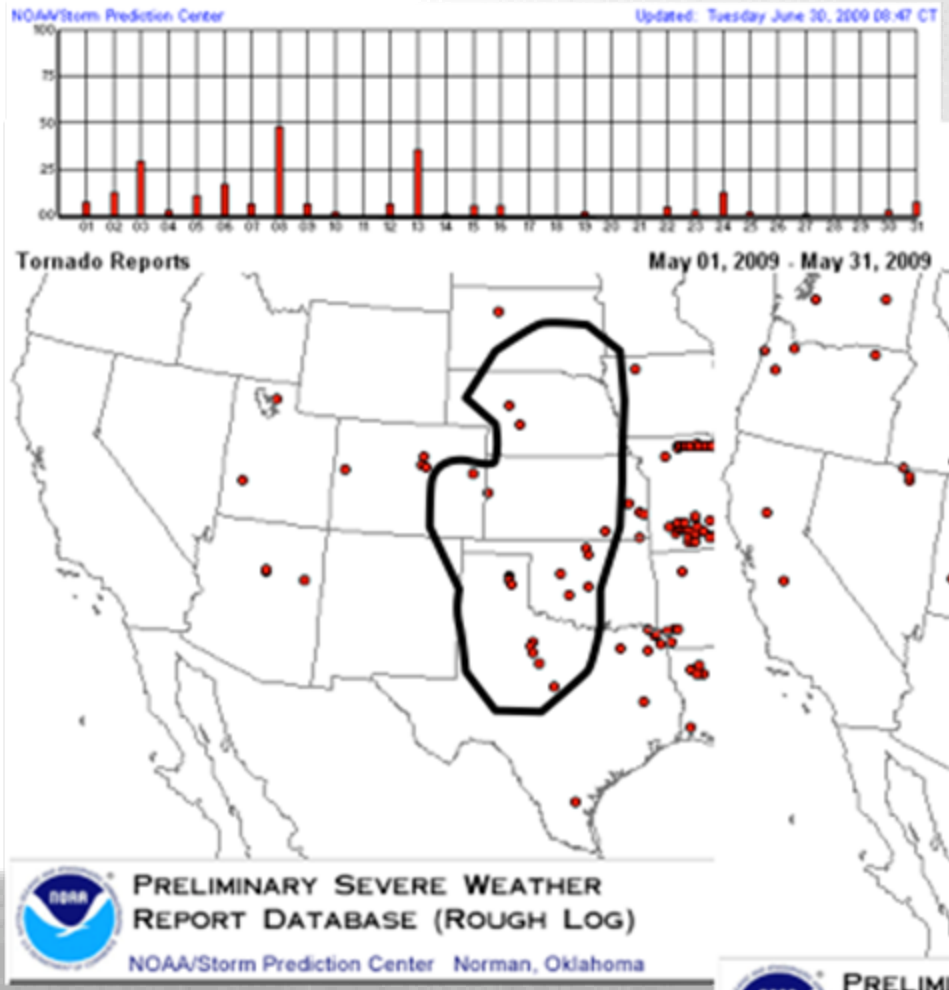
- Spring 2009 Field Campaign was 35 days (10 May – 13 June)
- Armada drove 11,000 miles
- Collected data in 9 states on 19 different days
- NOXP Deployed 30 times (18 Supercell, 12 ordinary cell) and collected ~1200 minutes of data
- SRs collected ~550 Dual-Doppler Volume Scans
- 4 Best Days: June 5 (long-lived tornado, June 7,9,11 (short-lived tornadoes)

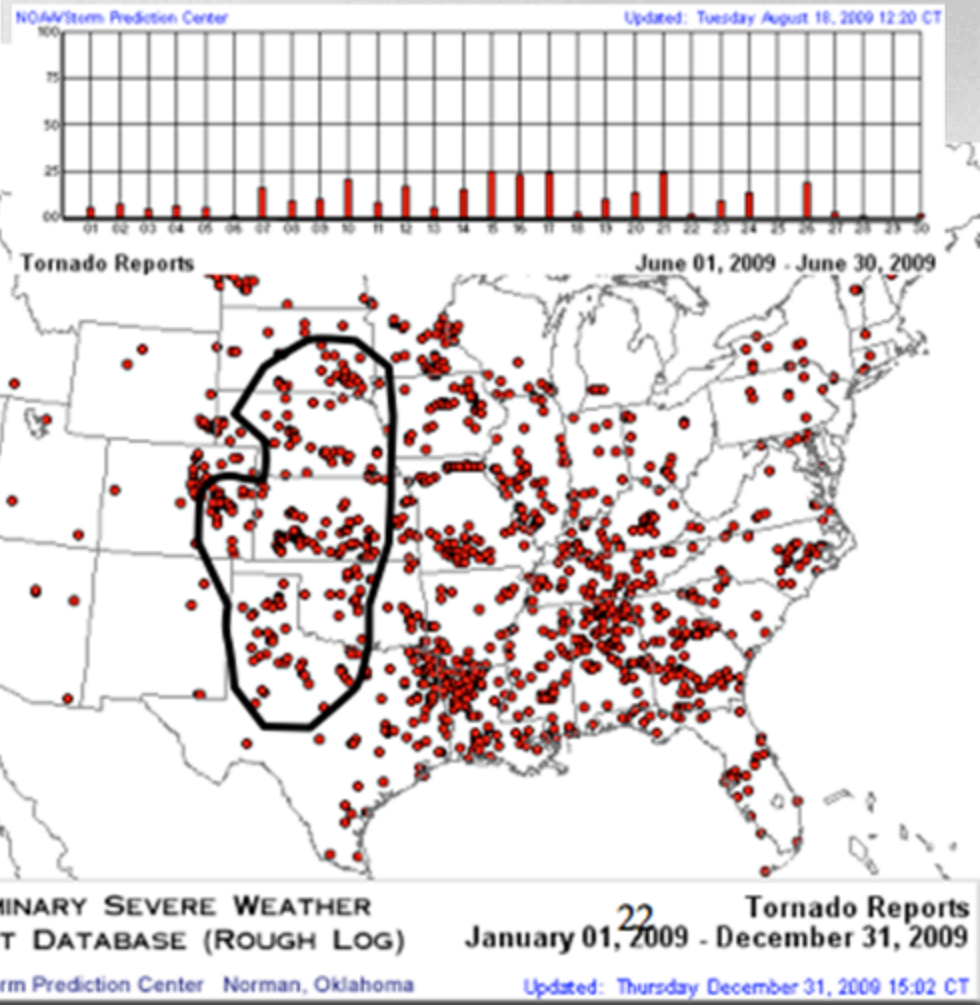


VORTEX2 2009

V2 domain: 7 tornado reports from 10 May to 13 June
V2 can verify 3 of those tornadoes - only 1 > EF1?

SPC reports: Only one top ten tornado day during V2-2009: May 13th, 2nd day of Ops.





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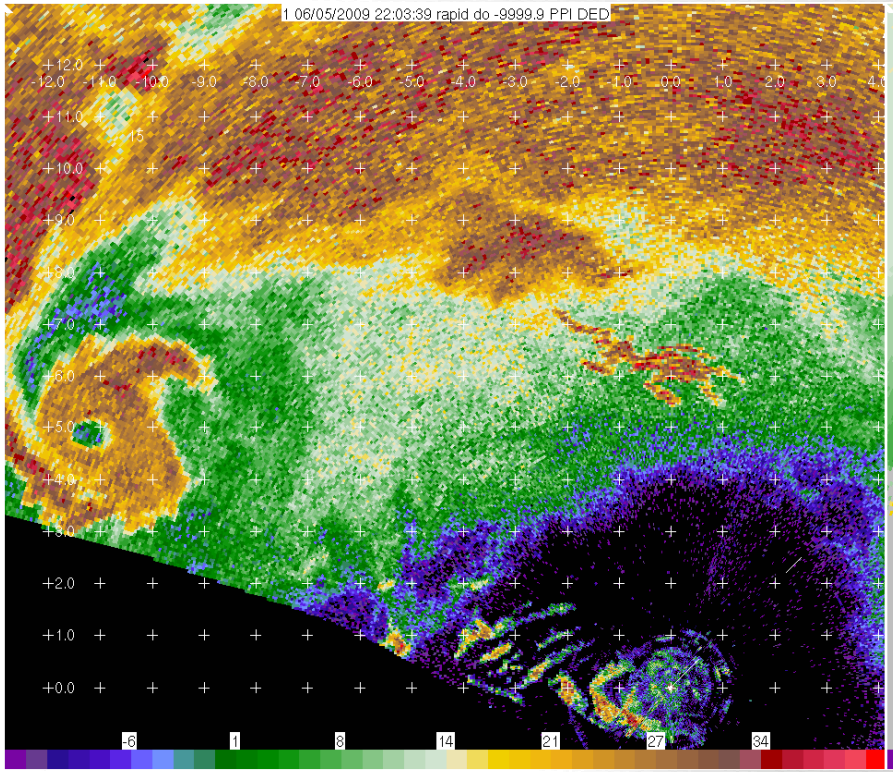
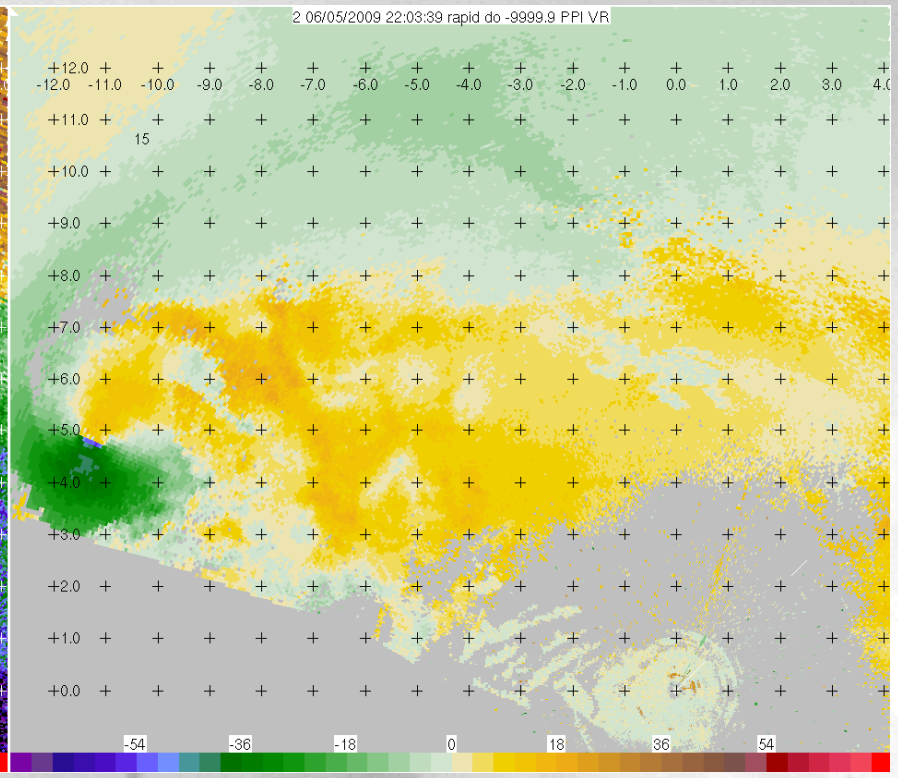
June 5, 2009 Radar Loops

DOW 5 (Rapid DOW), 2202Z-2227Z





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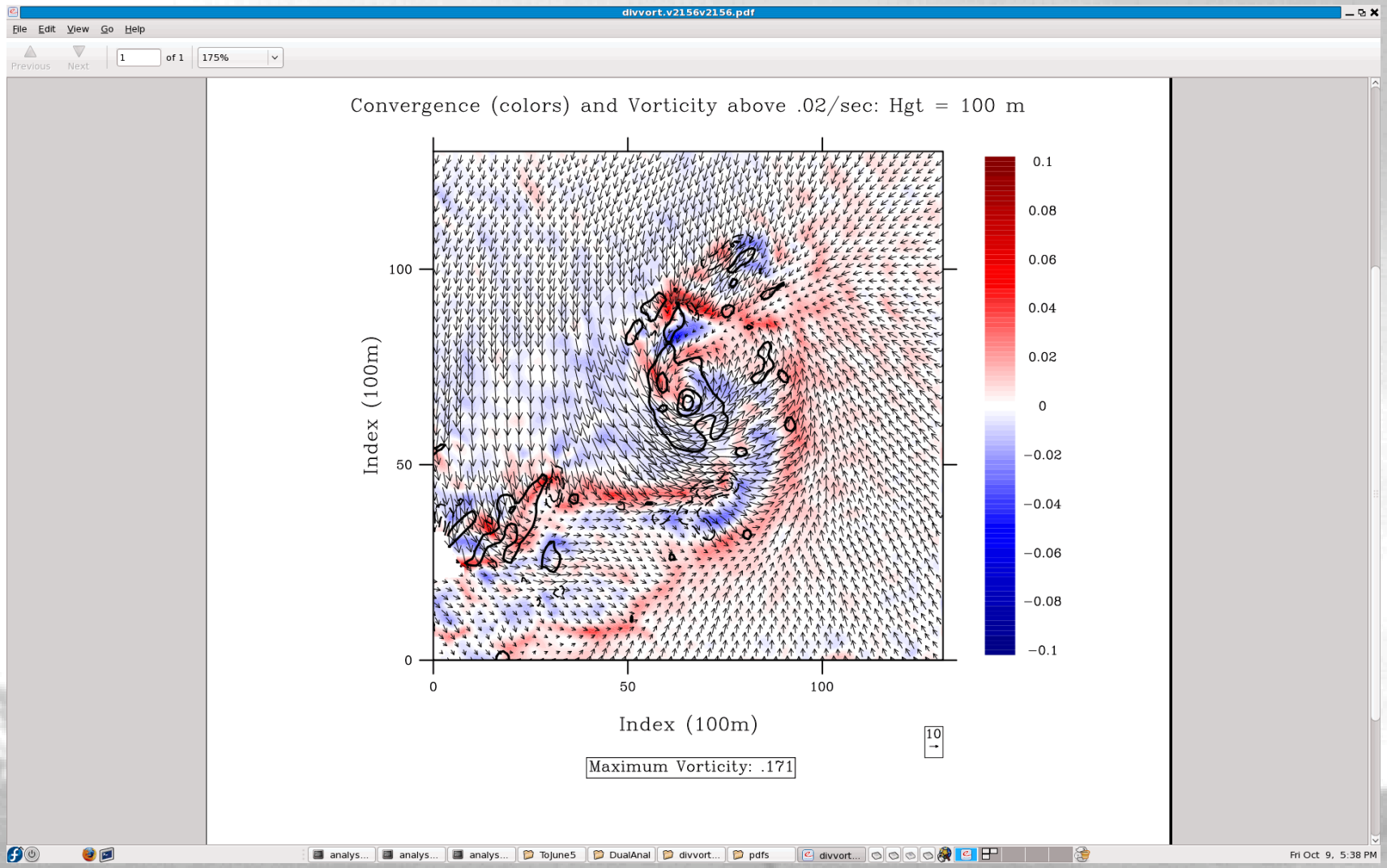
June 5, 2009 Radar Loops

Dual-Doppler (DOW6-DOW7), 2156Z-2211Z



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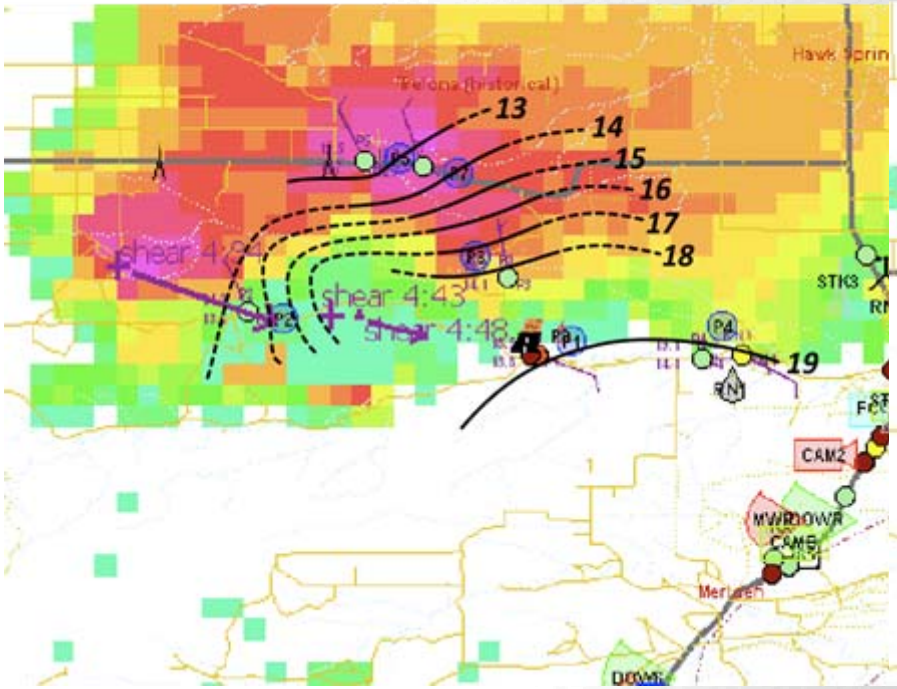
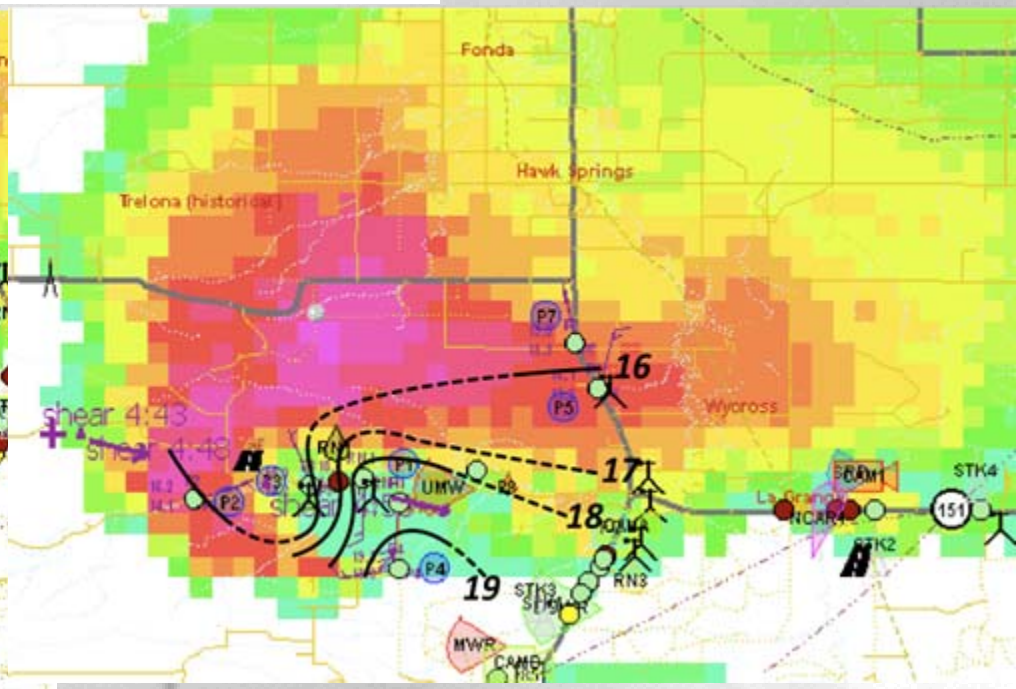
June 5, 2009 MM Data

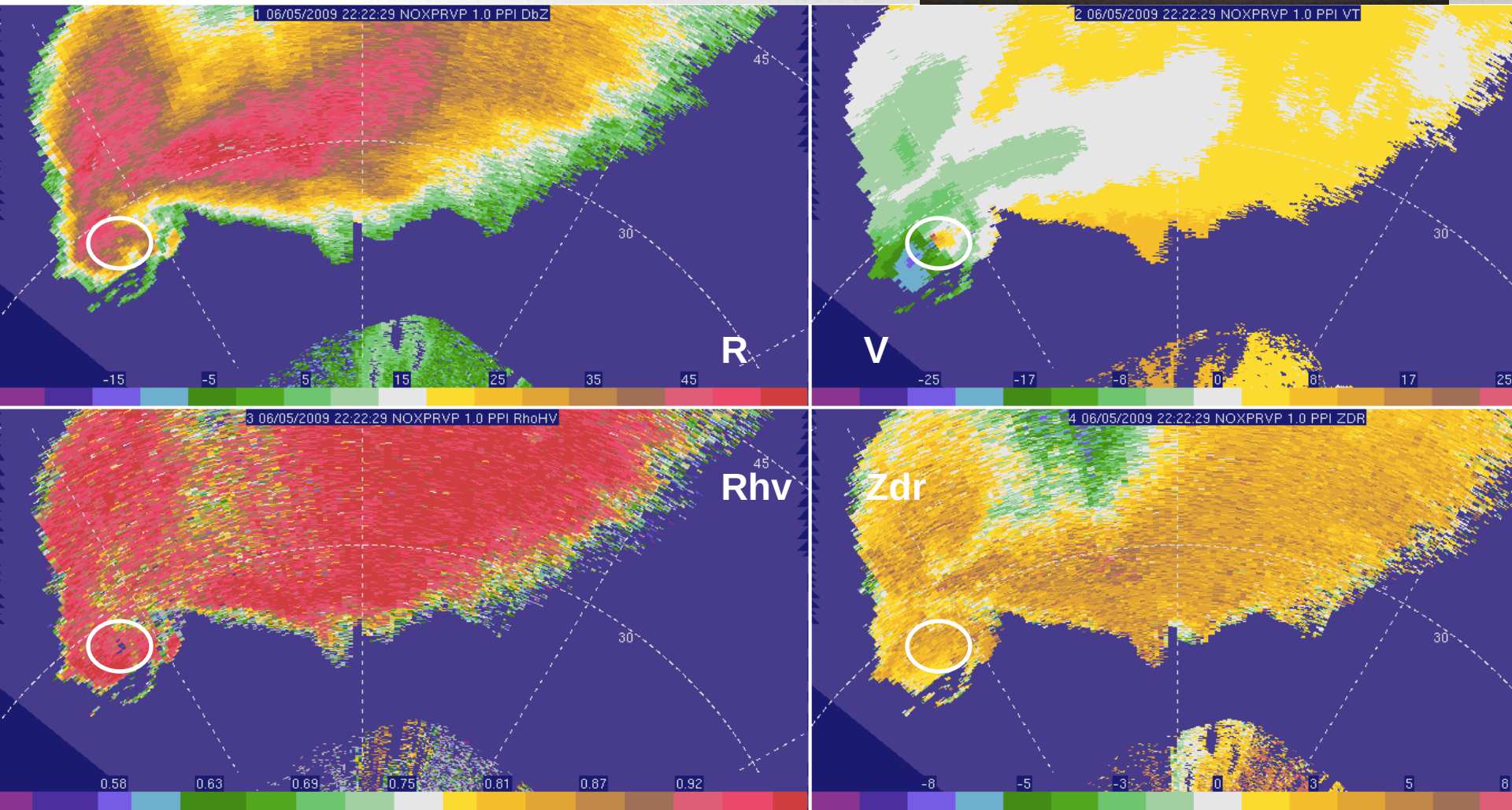
2153Z: Before Tornadogenesis



2204Z: Maturing Tornado



June 5, 2009
Dual-Polarization Radar
NSSL NOXP
Tornado Area Circled



VORTEX2 2010

- Dates: May 1 – June 15
- Same Operations Plan as 2009
- Same Equipment as 2009
  - **UAVs added**
- Same VORTEX2 Operations Center (VOC)
  - VOC ties to SPC and HWT
- Same Interactions with the NWS

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VORTEX2 and the Outside World

- VOC interacts with SPC and Local WFOs
- Media interaction through NOAA Public Affairs
  - Keli Tarp
- Crowding of roads near storms is an issue
  - VORTEX2 asks that, as possible, law enforcement and other chase interests give VORTEX2 crews room to collect their data
  - No VORTEX2 vehicle should ever use excessive speed, block roads, or perform other dangerous acts

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Questions?