

# Dr. Christopher C. Weiss

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## **EDUCATION:**

Ph.D., University of Oklahoma, Department of Meteorology, 2004  
Dissertation Title: *Variational Pseudo Multiple-Doppler Analyses of a Dryline Utilizing Very-High Resolution Mobile Doppler Radar Data*  
Advisor: Dr. Howard Bluestein

M.S., University of Oklahoma, Department of Meteorology, 2000  
Thesis: *Airborne Doppler Analysis of a Dryline-Outflow Boundary Intersection and Subsequent Convection*  
Advisor: Dr. Howard Bluestein

B.S., *summa cum laude*, University of Michigan (Ann Arbor), Dept. of Atmospheric, Oceanic and Space Sciences, 1997.  
Advisor: Dr. Peter Sousounis

## **PROFESSIONAL EXPERIENCE:**

August 2004 – present: Assistant Professor of Atmospheric Science, Texas Tech University Department of Geosciences (tenure-track).

## **GRANT ACTIVITY:**

Principal Investigator, “Project VORTEX2: Investigation of storm-scale baroclinity using fine-scale observations and numerical models”, National Science Foundation, 2008, \$645,097

Principal Investigator, “Pilot Study: Pioneering Measurements of Tornadogenesis and Tornado Vortex Structure Using Emerging Observational Technologies at TTU”, Texas Tech VPR Research Enrichment Fund, 2008, \$35,000

Co-principal investigator, “Innovative Technologies to Investigate Fine-Scale Atmospheric Motions and Their Impact”, Texas Tech Vice President of Research, 2006-2009, total: \$1,000,000

Co-investigator, “IGERT: Multidisciplinary Program in Wind Science and Engineering”, National Science Foundation, 2003-2008, total: \$2,200,000

Co-investigator, “Cooperative Agreement for a Wind Mitigation Initiative”, National Institute of Standards and Technology, 1998-2005, total: \$1,880,000

### **AWARDS AND HONORS:**

2008 Outstanding Professor nomination by Phi Beta Kappa

2007 Graduating senior nomination for Outstanding Faculty

2003 David James Shellberg Memorial Scholarship (Oklahoma Climatological Survey) –  
“in recognition of exemplary research by a student using geophysical data”

2002 Yoshi Sasaki Award (University of Oklahoma) –  
“for best M.S. student publication”

2000 Best Oral Student Presentation (American Meteorological Society) –  
20<sup>th</sup> Conf. On Severe Local Storms

1997 Andrew Kucher Award (University of Michigan) –  
“for outstanding contributions to engineering research while at the College of Engineering”

1994 - 1997 - Dean’s List, University of Michigan, Ann Arbor.

### **INVITED PRESENTATIONS:**

2/2007 – University of Michigan, Ann Arbor, MI, Dept. of Atmospheric, Oceanic, and Space Sciences

9/2007 – Stout Lecture, University of Nebraska, Lincoln, NE, Dept. of Geosciences

4/2009 – Invited lecture for Pacific Northwest Association of College Physics

### **TEACHING EXPERIENCE:**

Responsible for the following courses:

Graduate Level

ATMO 5316 – *Dynamics of Severe Storms* (Fall 2005, Fall 2007)  
ATMO 5327 – *Radar Meteorology* (Spring 2006, Spring 2008)  
ATMO 5101 – *Atmospheric Science Seminar* (Spring 2007)  
GPH 5324 – *Radiative Transfer and Remote Sensing* (Spring 2005, Fall 2006, Fall 2008)

#### Undergraduate Level

ATMO 1300 – *Introduction to Atmospheric Science* (Spring 2005, Fall 2006, Fall 2007)  
ATMO 2316 – *Severe and Hazardous Weather* (Fall 2004, Spring 2007, Spring 2008, Fall 2008)

Prior to Texas Tech University:

Fall 2003 – (OU) Designed and instructed *METR 2603 – Severe and Unusual Weather* (50 students)

Fall 2000 – Fall 2003 – (OU) Guest lectures in:

*METR 6413 – Topics in Advanced Mesoscale Meteorology*

*METR 5423 – Advanced Topics in Synoptic Meteorology*

*METR 3113 – Atmospheric Dynamics I*

Spring 1997 – (MICH) Teaching assistant for Dr. Peter Sousounis

#### **RESEARCH INTERESTS:**

Dryline Dynamics, Convection Initiation, Severe Thunderstorm Dynamics, Tornadogenesis, Tornado Structure, Radar Observations of Clear-Air Boundaries and Deep Convection, Variational Doppler Retrieval Techniques, Mesoscale Modeling, Data Assimilation

#### **RESEARCH EXPERIENCE:**

2009 – PI and StickNet Coordinator in the Verification of the Origin of Rotation in Tornadoes Experiment 2 (VORTEX2) Project.

2006-2008 – Field Coordinator for the Multiple Observations of Boundaries in the Local Storm Environment (MOBILE) Project.

2005-2006 – Designed and participated in the Simultaneous Observations of the Near-Dryline Environment (SONDE) Project

2005 – Participated in the Wheeled Investigation of RFD Lifecycle (WIRL) Project

2004 – Participation in the Hurricanes at Landfall Experiment (HALE).  
\* Operated S-band SMART-R in the intercept of Hurricane Frances (Titusville, FL).

1997-2004 – Graduate Research Assistant, University of Oklahoma

1998-2004 – University of Massachusetts W-band (95 GHz) radar project  
\* Lead radar operator (2000-2004)  
\* Backup radar operator (1998-1999)

2002 – International H<sub>2</sub>O Project (IHOP)  
\* Organized a strategy for high-resolution radar data collection in the vicinity of drylines.  
\* Collected UMass W-band data on various drylines and frontal boundaries through the course of the project. Coordinated intercomparison efforts with other ground-based and airborne-based measurement platforms.

1998 – Doppler on Wheels (DOW) project (under Dr. Joshua Wurman)  
\* Primarily responsible for navigation.

1998 – Sub-VORTEX project (under Dr. Erik Rasmussen)  
\* Responsible for driving mobile mesonet probes, navigation and data collection.

### **STUDENTS ADVISED:**

2005-present	Jeff Beck (Ph.D. candidate, Geosciences)
2009-present	Brad Charboneau (M.S. candidate, ATMO)
2007-present	Joel Dreessen (M.S. candidate, ATMO)
2004-2006	Michael Griesinger (M.S., ATMO)
2006-present	Kate Horgan (M.S. candidate, ATMO)
2009-present	Ryan Metzger (M.S. candidate, ATMO)
2009-present	Anthony Reinhart (Ph.D. candidate, Geosciences)
2006-2007	Jaret Rogers (M.S., ATMO)
2006-2009	Patrick Skinner (M.S., ATMO)
2004-2007	Kevin Walter (Ph.D., IGERT)

### **DISSERTATION/THESIS COMMITTEES SERVED:**

Jeff Beck, Ph. D. (2005-present) (chair)  
Trevor Boucher, M.S. (2009-present)  
Candace Cyrek, M.S. (2008-present)  
Joel Dreessen, M.S. (2007-present) (chair)  
Mike Griesinger, M. S. (2004-2006) (chair)  
Suraj Harshan, M.S. (2007-present)

Brian Hirth, Ph. D. (2008-present)  
Brian Hirth, M. S. (2004-2005)  
Kate Horgan, M.S. (2006-present) (chair)  
Steve Latimer, M. S. (2004-2005)  
Ryan Opperman, M. S. (2005-2007)  
Jaret Rogers, M.S. (2005-2007) (chair)  
Archimedes Ruiz, Ph. D. (2006-present)  
Matt Schmidt, M. S. (2008-present)  
Patrick Skinner, M.S. (2006-present) (chair)  
Brandon Storm, Ph. D. (2006-2008)  
Rolando Vega, Ph. D. (2006-2008)  
Kevin Walter, Ph. D. (2004-2008) (chair)

### **ORGANIZATIONS AND SERVICE:**

Associate Editor, *Monthly Weather Review*, 2008

Program Co-Chairman for the 25<sup>th</sup> Conference on Severe Local Storms, 2010

American Meteorological Society (AMS) – student member (1998-2005)  
member (2006-present)

AMS Scientific and Technological Activities Commission: Member of Radar Meteorology Committee (2007-2010)

American Association for Wind Engineering (2005-present)

Collegiate Weather Forecasting Challenge (“WxChallenge”)  
Local Manager, member of Advisory Board (2005-present)

Texas Tech Lutheran Student Fellowship: Faculty Advisor (2005-present)

National Collegiate Weather Forecast Contest

Manager (U of Michigan 1995-1997)

Manager (U of Oklahoma 1998-2003)

\* Led University of Oklahoma to 4 national titles

\* Launched undergraduate discussion writing program to enhance and expand forecasting skills for inexperienced forecasters

Oklahoma Weather Lab (OWL) – shift leader (1999-2001)

\* Led groups of undergraduates in semi-weekly preparation of forecasts for the state of Oklahoma, which were disseminated to newspapers.

National Weather Service Forecast Office: White Lake, MI - student intern (1996-1997)

\* Recorded NOAA Weather Radio broadcasts

- \* Performed radiosonde launches
- \* Assisted in preparation of forecast products
- \* Assisted in spotter training

### **REFEREED PUBLICATIONS:**

- Biggerstaff, M. I., L. J. Wicker, J. Guynes, C. Ziegler, J. M. Straka, E. N. Rasmussen, A. Doggett IV, L. D. Carey, J. L. Schroeder, and C. C. Weiss, 2005: The Shared Mobile Atmospheric Research and Teaching (SMART) Radar: A collaboration to enhance research and teaching., *Bull. Amer. Meteor. Soc.*, **86**, 1263-1274.
- Bluestein, H. B., C. C. Weiss, and A. L. Pazmany, 2003: Mobile Doppler radar observations of a tornado in a supercell near Bassett, Nebraska, on 5 June 1999. Part I: Tornadogenesis., *Mon. Wea. Rev.*, **131**, 2954-2967.
- Bluestein, H. B., W.-C. Lee, M. Bell, C. C. Weiss, and A. L. Pazmany, 2003: Mobile Doppler radar observations of a tornado in a supercell near Bassett, Nebraska, on 5 June 1999. Part II: Tornado-vortex structure., *Mon. Wea. Rev.*, **131**, 2968-2984.
- Bluestein, H. B., C. C. Weiss, and A. L. Pazmany, 2004: Doppler radar observations of dust devils in Texas. *Mon. Wea. Rev.*, **132**, 209-224.
- Bluestein, H. B., C. C. Weiss, and A. L. Pazmany, 2004: The vertical structure of a tornado near Happy, Texas, on 5 May 2002: High-resolution, mobile, W-band, Doppler radar observations., *Mon. Wea. Rev.*, **132**, 2325-2337.
- Bluestein, H. B., C. C. Weiss, M. M. French, E. M. Holthaus, R. L. Tanamachi, S. Frasier, and A. L. Pazmany, 2007: The structure of tornadoes near Attica, Kansas on 12 May 2004: High-resolution, mobile, Doppler-radar observations., *Mon. Wea. Rev.*, **135**, 475-506.
- Hirth, B. D., J. L. Schroeder, and C. C. Weiss, 2008: Surface Analysis of the Rear-Flank Downdraft Outflow in Two Tornadic Supercells., *Mon. Wea. Rev.*, **136**, 2344-2363.
- Rogers, J. W., and C. C. Weiss, 2009: The association of cell mergers with tornado occurrence., *Wea. Forecasting* (submitted)
- Schroeder, J. L., and C. C. Weiss, 2008: Integrating research and education through measurement and analysis., *Bull. Amer. Meteor.*

Soc., **89**, 793-798.

- Schultz, D. M., C. C. Weiss, and P. M. Hoffman, 2007: The synoptic regulation of dryline intensity., *Mon. Wea. Rev.*, **135**, 1699-1709.
- Walter, K., C. C. Weiss, A. H. P. Swift, J. Chapman, N. D. Kelley, 2008: Speed and direction shear in the stable nocturnal boundary layer, *J. Solar Energy Engineering*, **131**, 11013-1 – 11013-7.
- Weiss, C. C., and P. J. Sousounis, 1999: A climatology of collective lake disturbances., *Mon. Wea. Rev.*, **127**, 565-574.
- Weiss, C. C., and H. B. Bluestein, 2002: Airborne pseudo-dual Doppler analysis of a dryline-outflow boundary intersection., *Mon. Wea. Rev.*, **130**, 1207-1226.
- Weiss, C. C., and J. L. Schroeder, 2008: StickNet: A New Portable, Rapidly-Deployable Surface Observation System, *Bull. Amer. Meteor. Soc.*, **89**, 1502-1503.
- Weiss, C. C., H. B. Bluestein, and A. L. Pazmany, 2006: Fine-scale radar observations of the 22 May 2002 dryline during the International H<sub>2</sub>O Project (IHOP). *Mon. Wea. Rev.*, **134**, 273-293.
- Weiss, C. C., H. B. Bluestein, R. Conzemius, and E. Fedorovich, 2007: Variational pseudo-multiple Doppler-wind retrieval in the vertical plane for ground-based mobile-radar data. *J. Atmos. Oceanic Technol.*, **24**, 1165-1185.
- Weiss, C. C., H. B. Bluestein, and A. L. Pazmany, 2008: Fine-scale radar observations of a dryline during the International H<sub>2</sub>O Project (IHOP). *American Meteorological Society, Sanders Symposium Monograph*, No. 55, 440 pp.
- M. Yeary, T.-Y. Yu, R. Palmer, H. Monroy, I. Ruin, G. Zhang, P. Chilson, M. Biggerstaff, C. Weiss, K. Mitchell, and L.D. Fink, "Working together for better student learning: A multi-university, multi-federal partner program for asynchronous learning module development for radar based remote sensing systems," *IEEE Transactions on Education*, accepted and to appear, 2009.

#### **CONFERENCE PROCEEDINGS:**

Beck, J., and C. C. Weiss, 2006: The role of environmental and

computational parameters in the development and impact of the forward-flank gust front in supercell thunderstorms. *Preprints, 23<sup>rd</sup> Conference on Severe Local Storms*, St. Louis, MO, paper P11.6

Beck, J., and C. C. Weiss, 2008: The effects of thermodynamic variability on low-level baroclinity and vorticity within numerically simulated supercell thunderstorms. *Preprints, 24<sup>th</sup> Conference on Severe Local Storms*, Savannah, GA, paper 15.4

Bluestein, H. B., C. C. Weiss, A. L. Pazmany, 2001: Observations in supercells with a mobile, 3-mm-wavelength Doppler radar. *Preprints, 30<sup>th</sup> Conference on Radar Meteorology*, Munich, Germany, paper 5A.2

Bluestein, H. B., C. C. Weiss, A. L. Pazmany, W.-C. Lee, and M. Bell, 2002: Tornadogenesis and tornado-vortex structure in a supercell. *Preprints, 21<sup>st</sup> Conference on Severe Local Storms*, San Antonio, TX, paper 12.1

Bluestein, H. B., C. C. Weiss, and A. L. Pazmany, 2003: Doppler-radar observations of dust devils in Texas. *Preprints, 31<sup>st</sup> Conference on Radar Meteorology*, Seattle, WA, paper P4A.2

Bluestein, H. B., C. C. Weiss, and A. L. Pazmany, 2003: The vertical structure of the Happy, Texas tornado of 5 May 2002: Mobile, W-band, Doppler-radar observations. *Preprints, 31<sup>st</sup> Conference on Radar Meteorology*, Seattle, WA, paper 8A.1

Bluestein, H. B., C. C. Weiss, and A. L. Pazmany, 2004: The vertical structure of a tornado: High-resolution, W-band, Doppler-radar observations near Happy, Texas on 5 May 2002. *Preprints, 22<sup>nd</sup> Conference on Severe Local Storms*, Hyannis, MA, paper 15.2

Bluestein, H. B., E. Holthaus, C. C. Weiss, S. Frasier, and A. L. Pazmany, 2005: High-resolution, mobile, W-band Doppler radar observations of the vertical structure of a tornado near Attica, Kansas on 12 May 2004. *Preprints, 32<sup>nd</sup> Conference on Radar Meteorology*, Albuquerque, NM, paper P15R.2

Bluestein, H. B., C. C. Weiss, M. M. French, E. M. Holthaus, R. L. Tanamachi, S. Frasier, and A. L. Pazmany, 2006: High-resolution structure of tornadoes in south-central Kansas on 12 May 2004: Analysis of mobile Doppler radar data. *Preprints, 23<sup>rd</sup> Conference on Severe Local Storms*, St. Louis, MO, paper 15.3

- Dreessen, J. A., and C. C. Weiss, 2008: Kinematic and thermodynamic variability in the supercell environment observed using StickNet. *Preprints, 24<sup>th</sup> Conference on Severe Local Storms*, Savannah, GA, paper P13.3
- Griesinger, M. P., and C. C. Weiss, 2005: Dryline convergence and the initiation of deep moist convection. *Preprints, 11<sup>th</sup> Conference on Mesoscale Processes*, Albuquerque, NM, paper JP3J.16
- Griesinger, M. P., and C. C. Weiss, 2006: Statistical analysis of variables associated with convective initiation along the southern Plains dryline. *Preprints, 23<sup>rd</sup> Conference on Severe Local Storms*, St. Louis, MO, paper 1.5
- Hirth, B. D., J. L. Schroeder, and C. C. Weiss, 2006: Surface analysis of the rear-flank downdraft in two tornadic supercells. *Preprints, 23<sup>rd</sup> Conference on Severe Local Storms*, St. Louis, MO, paper 14.5
- Houser, J. B., H. B. Bluestein, C. C. Weiss, M. R. Kramar, J. D. Tuttle, and A. Pazmany, 2006: Observations of tornadogenesis from high-resolution reflectivity data using a W-band mobile radar: The Cordell storm of 5 May 2001. *Preprints, 23<sup>rd</sup> Conference on Severe Local Storms*, St. Louis, MO, paper P9.4
- Horgan, K. L., and C. C. Weiss, 2008: The initiation and maintenance of convection along synoptically-quiet drylines. *Seventh Annual AMS Student Conference*, New Orleans, LA.
- Illston, B. G., J. B. Basara, M. Voss, and C. C. Weiss, 2009: An overview of the WxChallenge forecasting competition and its use as an educational tool. *Preprints, 18<sup>th</sup> Symposium on Education*, Phoenix, AZ, paper 4.4.
- Junyent, F., A. L. Pazmany, H. B. Bluestein, M. R. Kramar, M. M. French, C. C. Weiss, and S. Frasier, 2004: Dual-polarization, X-band, mobile Doppler radar observations of hook echoes in supercells. *Preprints, 22<sup>nd</sup> Conference on Severe Local Storms*, Hyannis, MA, paper P11.7.
- Rogers, J. W., and C. C. Weiss, 2006: Fine-scale mobile mesonet and stick-net observations of a non-tornadic HP supercell near Scottsbluff, NE. *Preprints, 23<sup>rd</sup> Conference on Severe Local Storms*, St. Louis, MO, paper P9.8

- Rogers, J. W., and C. C. Weiss, 2008: The association of cell mergers with tornado occurrence. *Preprints, 24<sup>th</sup> Conference on Severe Local Storms*, Savannah, GA, paper P3.23.
- Schroeder, J. L., S. Lorsolo, J. Beck, and C. Weiss, 2005: Using Mobile Research Radar to Extract Hurricane Boundary Layer Wind Information, *Proceedings, 10th Americas Conference on Wind Engineering*, Baton Rouge, Louisiana.
- Schultz, D. M., and C. C. Weiss, 2007: Synoptic and Mesoscale Regulation of Dryline Intensity and Associated Convection. *22<sup>nd</sup> Conference on Weather Analysis and Forecasting*, Park City, UT, paper 7A.7
- Skinner, P. S., and C. C. Weiss, 2008: Observations of storm scale boundary evolution within the 23 May 2007 Perryton, TX supercell. *24<sup>th</sup> Conference on Severe Local Storms*, Savannah, GA, paper 4.3
- Tanamachi, R. L., H. B. Bluestein, C. C. Weiss, M. Bell, W.-C. Lee, and A. Pazmany, 2004: The structure of a tornado: Ground-based velocity track display (GBVTD) analysis of mobile, W-band, Doppler radar data on 15 May 1999 near Stockton, Kansas. *Preprints, 22<sup>nd</sup> Conference on Severe Local Storms*, Hyannis, MA, paper P11.5
- Tanamachi, R. L., H. B. Bluestein, M. Bell, W.-C. Lee, A. L. Pazmany, and C. C. Weiss, 2005: The evolution of a tornado: Ground-based velocity track display (GBVTD) analysis of mobile, W-band Doppler radar data on 15 May 1999 near Stockton, Kansas. *Preprints, 32<sup>nd</sup> Conference on Radar Meteorology*, Albuquerque, NM, paper P15R.3
- Walter, K. R., C. C. Weiss, and A. H. Swift, 2005: The moisture route of Palo Duro Canyon. *Preprints, 11<sup>th</sup> Conference on Mesoscale Processes*, Albuquerque, NM, paper JP3J.7
- Walter, K. R., C. C. Weiss, J. Chapman, and N. D. Kelley, 2007: Tall Tower Wind Shear Observations in the Stable Nocturnal Boundary Layer. *Proceedings of the 45<sup>th</sup> American Institute of Aeronautics and Astronautics (AIAA) Aerospace Sciences Meeting*, Reno, NV, paper AIAA-2007-1224
- Walter, K., Weiss, C.C., Swift, A.H.P., Chapman, J., and N. Kelley, 2007. "Observations of Extreme Speed and Directional Wind Shear in the US Great Plains" *Proceedings of the 2007 European Wind Energy Conference and Exhibition*, Milan, Italy, 7-10 May, 2007, European Wind Energy Association, Brussels, Belgium.

- Weiss, C.C., 2007: The imperfect relationship between dryline intensity and mesoscale confluence. *12<sup>th</sup> Conference on Mesoscale Processes*, Waterville Valley, NH, paper P2.13
- Weiss, C. C., 2005: High-resolution surface and tower observations of the southern Plains dryline during Project SONDE-2005. *Preprints, 11<sup>th</sup> Conference on Mesoscale Processes*, Albuquerque, NM, paper JP3J.14
- Weiss, C. C., and H. B. Bluestein, 2000: Airborne Doppler analysis of a dryline-outflow boundary intersection and subsequent convection. *Preprints, 20<sup>th</sup> Conference on Severe Local Storms*, Orlando, FL, paper 18.4
- Weiss, C. C., and H. B. Bluestein, 2002: Numerical simulation of a dryline-outflow boundary intersection. *Preprints, 21<sup>st</sup> Conference on Severe Local Storms*, San Antonio, TX, paper 17.2
- Weiss, C. C., and H. B. Bluestein, 2004: Fine-scale radar observations of a dryline during the International H<sub>2</sub>O Project. *Preprints, 84<sup>th</sup> American Meteorological Society Conference, Sanders Symposium*, Seattle, WA, paper P1.18
- Weiss, C. C., and J. L. Schroeder, 2008: StickNet – A new portable, rapidly-deployable, surface observing system. *Preprints, 88<sup>th</sup> Annual Meeting of the American Meteorological Society*, New Orleans, LA, paper 4A.1
- Weiss, C. C., and J. L. Schroeder, 2008: The 2007 and 2008 MOBILE Experiment: Development and testing of the TTU StickNet platforms. *Preprints, 24<sup>th</sup> Conference on Severe Local Storms*, Savannah, GA, paper 5.1
- Weiss, C. C., and D. M. Schultz, 2006: Synoptic and mesoscale influences on west Texas dryline development and associated convection. *Preprints, 23<sup>rd</sup> Conference on Severe Local Storms*, St. Louis, MO, paper 2.6
- Weiss, C. C., and J. Wurman, 2008: Coordinated in-situ and remote sampling of supercell thunderstorms. *24<sup>th</sup> Conference on Severe Local Storms*, Savannah, GA, paper P3.9
- Weiss, C. C., H. B. Bluestein, and A. L. Pazmany, 2003: Fine-scale radar observations of a dryline during the International H<sub>2</sub>O Project. *Preprints, 10<sup>th</sup> Conference on Mesoscale Processes*, Portland, OR, paper 14.1

Weiss, C. C., H. B. Bluestein, and A. L. Pazmany, 2003: Fine-scale radar observations of a dryline during the International H<sub>2</sub>O Project. *Preprints, 31<sup>st</sup> Conference on Radar Meteorology*, Seattle, WA, paper P5A.8

Weiss, C. C., H. B. Bluestein, and A. L. Pazmany, 2004: Fine-scale observations of a dryline during the International H<sub>2</sub>O Project. *Preprints, 22<sup>nd</sup> Conference on Severe Local Storms*, Hyannis, MA, paper 16A.6

Weiss, C. C., H. B. Bluestein, and A. L. Pazmany, 2004: A variational pseudo-multiple Doppler radar analysis technique for mobile, ground-based radars. *Preprints, 22<sup>nd</sup> Conference on Severe Local Storms*, Hyannis, MA, paper P7.2