

## **MATTHEW D. SHUPE**

Research Scientist

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### **EDUCATION:**

University of Colorado, Ph.D 2007, M.S. 2006

Astrophysical, Planetary, and Atmospheric Sciences

University of Puget Sound, B.S. Summa Cum Laude 1997,

Chemistry with atmospheric sciences focus, second major Mathematics

### **PROFESSIONAL APPOINTMENTS:**

Cooperative Institute for Research in Environmental Sciences, University of Colorado and  
NOAA/ERSL; research scientist II, 2008-present

Cooperative Institute for Research in Environmental Sciences, University of Colorado and  
NOAA/ERSL; associate scientist II/III, 2004-2008

Science and Technology Corporation and NOAA-Environmental Technology Laboratory,  
research scientist; 1998 – 2004

Battelle Corporation and Pacific Northwest National Laboratory, Research Assistant; June –  
August, 1996

### **RESEARCH AREAS:**

Cloud microphysical, radiative, and dynamical properties and processes, cloud property  
retrievals and validation, assessment of cloud model parameterizations, cloud type  
classification, Arctic meteorology and climate.

### **FIELD EXPERIENCE:**

August-Sept 2008: Arctic Summer Cloud Ocean Study (ASCOS), Arctic Ocean

August 2007: SEARCH project deployment and maintenance, Eureka, Canada

May 2006: SEARCH project deployment and maintenance in Eureka, Canada

July 2005: SEARCH project deployment in Eureka, Canada

October 2004: Mixed-Phase Arctic Clouds Experiment in Barrow, Alaska

July 2002: NASA-FIRE CRYSTAL- Florida Area Cirrus Experiment (South Florida)

Jan. 2000-Feb. 2000: High Altitude Weather Characterization Experiment (Boston)

March 1999: NOAA/ETL depolarization lidar (DABUL) in Barrow, Alaska.

Nov. 1997 – Oct. 1998: Surface Heat Budget of the Arctic Program (Arctic Ocean)

### **SPECIAL SKILLS:**

Knowledgeable of Linux, Unix, and PC computer systems.

Proficient in IDL with a working knowledge of Matlab, Unix shell scripts, Perl, C.

### **HONORS AND AWARDS:**

## University of Puget Sound

Graduated Summa Cum Laude 1997  
Graduated with Honors in Mathematics 1997  
Campus Leadership Award 1997  
Dean's List 1992, 1994-1997  
Trustee Scholarship 1992-1997 (for academic performance)  
Hearst Writing Award 1996 (for a mathematical modeling paper)  
Fehlandt Scholarship Award 1996 (for outstanding Chemistry Student)  
Hunter Memorial Scholarship: 1994-1996 (Highest GPA in Fraternity)  
Goman Scholarship 1995 - 1996 (for outstanding Mathematics student)  
Chemistry Dept. Scholarship 1995 (for outstanding Chemistry student)  
Merck Index Award 1995 (for outstanding Organic Chemistry student)  
Murdock Research Grant 1995

## Other

NOAA-ETL Employee of the Month, June 2005  
NASA Group Achievement Award, 2002

## **GRANTS FUNDED**

“Using Radar, Lidar, and Radiometer Data from NSA and SHEBA to Quantify Cloud Property Effects on the Arctic Surface Heat Budget,” Janet Intrieri (PI) and Matthew Shupe (Co-PI), Department of Energy, Atmospheric Radiation Measurement Program, 2002-2004, \$209,400.

“An Investigation of the Microphysical, Radiative, and Dynamical Properties of Mixed-Phase Clouds,” Matthew Shupe (PI) and Pavlos Kollias (Co-PI), Department of Energy, Atmospheric Radiation Measurement Program, 2005-2007, \$100,800.

“IPY: Cloud properties across the Arctic Basin from surface and satellite measurements – An existing Arctic Observing network,” Von Walden (PI) and Matthew Shupe (PI), National Science Foundation, 2007-2009, \$184,340.

“Investigations of the Microphysical, Radiative, and Dynamical Properties of Mixed-Phase Clouds,” Matthew Shupe (PI), Department of Energy, Atmospheric Radiation Measurement program, 2008-2010, \$308,479.

## **SCIENCE COMMITTEES AND ASSOCIATIONS:**

ARM Science Team member, 2002 - present  
ARM Sunset Committee member, 2006 – present  
ARM Cloud Properties Working Group, Mixed-phase cloud subgroup chair, 2006 – present  
ARM Cloud Properties Working Group, Steering committee, 2006 - present  
Member American Geophysical Union  
Member American Meteorological Society  
AMS Polar Meteorology and Oceanography Committee, 2006 – present  
NSF Facilities Assessment, Surface-based remote sensing subcommittee, 2007 - present

## **SERVICE**

NOAA-ESRL Workplace Advisory Committee, 2006-2007  
NOAA-ESRL Computer Users Advisory Committee, 2007 – present  
Research Advisor – NOAA Hollings Scholar Program, Gregory Seroka, 2007

Reviewer: Journal of Geophysical Research, Geophysical Research Letters, Radio Science, Journal of Applied Meteorology, Bulletin of the American Meteorological Society, Journal of Climate, Journal of Applied Meteorology and Climatology, Atmospheric Research, Quarterly Journal of the Royal Meteorology Society, National Science Foundation, Natural Sciences and Engineering Research Council of Canada, National Environmental Research Council (U.K.)

#### **REFEREED PUBLICATIONS:**

- Shupe, M.D., T. Uttal, S.Y. Matrosov, and A.S. Frisch, 2001: Cloud water contents and hydrometeor sizes during the FIRE-Arctic Clouds Experiment. *J. Geophys. Res.*, **106**, 15,015-15,028.
- Hobbs, P.V., A.L. Rangno, M.D. Shupe, and T. Uttal, 2001: Airborne studies of cloud structures over the Arctic Ocean and comparisons with deductions from ship-based 35 GHz radar measurements. *J. Geophys. Res.*, **106**, 15 029-15 044.
- Minnis, P., D.R. Doelling, V. Chakrapani, D.A. Spangenberg, L. Nguyen, R. Palikonda, T. Uttal, R.F. Arduini, and M. Shupe, 2001: Cloud coverage during FIRE ACE derived from AVHRR data. *J. Geophys. Res.*, **106**, 15,215-15,232.
- Khvorostyanov, V.I., J.A. Curry, J.O. Pinto, M.D. Shupe, B.A. Baker, and K. Sassen, 2001: Modeling with explicit spectral water and ice microphysics of a two-layer cloud system of altostratus and cirrus observed during the FIRE Arctic Clouds Experiment. *J. Geophys. Res.*, **106**, 15,099-15,112.
- Westwater, E.R., Y. Han, M. D. Shupe, and S. Y. Matrosov, 2001: Analysis of integrated cloud liquid and precipitable water vapor retrievals from microwave radiometers during SHEBA. *J. Geophys. Res.*, **106**, 32,019-32,030.
- Uttal, T., J.A. Curry, M.G. McPhee, D.K. Perovich, R.E. Moritz, J.A. Maslanik, P.S. Guest, H.L. Stern, J.A. Moore, R. Turenne, A. Heiberg, M.C. Serreze, D.P. Wylie, O.G. Persson, C.A. Paulson, C. Halle, J.H. Morison, P.A. Wheeler, A. Makstas, H. Welch, M.D. Shupe, J.M. Intrieri, K. Stamnes, R.W. Lindsey, R. Pinkel, W.S. Pegau, T.P. Stanton, and T.C. Grenfeld, 2002: Surface Heat Budget of the Arctic Ocean. *Bull. Amer. Meteor. Soc.*, **83**, 255-276.
- Rathke, C., J. Fischer, S. Neshyba, and M.D. Shupe, 2002: Improving IR cloud phase determination with 20 microns spectral observations. *Geophys. Res. Let.*, **29**, 50.1-50.4.
- Frisch, A.S., M.D. Shupe, I. Djalalova, G. Feingold, and M. Poellot, 2002: The retrieval of stratus cloud droplet effective radius with cloud radars. *J. Atmos. Ocean. Tech.*, **19**, 835-842.
- Intrieri, J.M., M.D. Shupe, T. Uttal, and B.J. McCarty, 2002: Annual Cycle of Arctic Cloud Geometry and Phase from Radar and lidar at SHEBA. *J. Geophys. Res.*, **107** (C10), 10.1029/2000JC000423.
- Intrieri, J.M., C.F. Fairall, M.D. Shupe, O.G.P. Persson, E.L. Andreas, P. Guest, and R.M. Moritz, 2002: Annual cycle of cloud forcing over the Arctic. *J. Geophys. Res.*, **107** (C10), 10.1029/2000JC000439.
- Schweiger, A., R. Lindsay, J. Francis, J. Key, J. Intrieri, and M. Shupe, 2002: Validation of TOVS Path-P data during SHEBA. *J. Geophys. Res.*, **107**(C10), 10.1029/2000JC000453.

- Rathke, C., S. Neshyba, M.D. Shupe, P. Rowe, and A. Rivers, 2002: Radiative and microphysical properties of Arctic stratus clouds from multiangle downwelling infrared radiances, *J. Geophys. Res.*, **107**(D23), 4703, doi: 10.1029/2001JD001545.
- Loehnert, U., G. Feingold, T. Uttal, A.S. Frisch, and M.D. Shupe, 2003: Analysis of two independent methods to for retrieving liquid water profiles in spring and summer Arctic boundary clouds. *J. Geophys. Res.*, **108**(D7), 4219, doi:10.1029/2002JD002861.
- Morrison, H., M. D. Shupe, and J.A. Curry, 2003: Modeling clouds observed at SHEBA using a bulk microphysics parameterization implemented into a single-column model. *J. Geophys. Res.*, **108**(D8), 4255, doi:10.1029/2002JD002229.
- Matrosov, S.Y., M.D. Shupe, A.J. Heymsfield, and P. Zuidema, 2003: Ice cloud optical thickness and extinction estimates from radar measurements. *J. Appl. Meteor.*, **42**, 1584-1597.
- Shupe, M.D. and J.M. Intrieri, 2004: Cloud radiative forcing of the Arctic surface: The influence of cloud properties, surface albedo, and solar zenith angle. *J. Climate*, **17**, 616-628.
- Shupe, M. D., P. Kollias, S. Y. Matrosov, and T. L. Schneider, 2004: Deriving mixed-phase cloud properties from Doppler radar spectra. *J. Atmos. Ocean. Technol.*, **21**, 705-715.
- Intrieri, J.M., and M.D. Shupe, 2004: Characteristics and radiative effects of diamond dust over the Western Arctic Ocean region. *J. Climate*, **17**, 2953-2960.
- Zuidema, P., B. Baker, Y. Han, J. Intrieri, J. Key, P. Lawson, S. Matrosov, M. Shupe, R. Stone, and T. Uttal, 2005: An Arctic springtime mixed-phase cloudy boundary layer observed during SHEBA. *J. Atmos. Sci.*, **62**, 160-176.
- Sassen, K., J.R. Campbell, J. Zhu, P. Kollias, M.D. Shupe, and C. Williams, 2005: Lidar and triple-wavelength Doppler radar measurements of the melting layer: A revised model for dark- and brightband phenomena. *J. Appl. Meteor.*, **44**,301-312.
- Morrison, H., J. A. Curry, M. D. Shupe, and P. Zuidema, 2005: A new double-moment microphysics parameterization, Part 2: Application to Arctic stratiform clouds. *J. Atmos. Sci.*, **62**, 1678-1693.
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- Shupe, M.D., T. Uttal, and S. Y. Matrosov, 2005: Arctic cloud microphysics retrievals from surface-based remote sensors at SHEBA. *J. Appl. Meteor.*, **44**, 1544-1562.
- Shupe, M.D., S.Y. Matrosov, and T. Uttal, 2006: Arctic mixed-phase cloud properties derived from surface-based sensors at SHEBA. *J. Atmos. Sci.*, **63**, 697-711.
- Daniel, J.S., R.W. Portman, H.L. Miller, S. Solomon, A.L. Langford, C.E. Eubank, R. Schofield, D.D. Turner, and M.D. Shupe, 2006: Cloud property estimates from zenith spectral measurements of scattered sunlight between 0.9 and 1.7 um. *J. Geophys. Res.*, **111**, D16208, doi:10.1029/2005JD006641.
- Matrosov, S.Y., P.D. May, and M.D. Shupe, 2006: Rainfall profiling using Atmospheric Radiation Measurement Program's vertically pointing 8-mm wavelength radars. *J. Atmos. Ocean. Tech.* **23**, 1478-1491.

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- Schofield, R., J. S. Daniel, R. W. Portmann, H. L. Miller, S. Solomon, C. S. Eubank, M. L. Melamed, A. O. Langford, and M. D. Shupe, 2007: Retrieval of effective radius and liquid water path from ground-based instruments: A case study at Barrow, Alaska. *J. Geophys. Res.*, 112, D21203, doi:10.1029/2007JD008737.
- Shupe, M.D., 2007: A ground-based multiple remote-sensor cloud phase classifier. *Geophys. Res. Lett.*, 34, L22809, doi:10.1029/2007GL031008.
- Matrosov, S. Y., M. D. Shupe, and I. V. Djalalova, 2008: Snowfall retrievals using millimeter-wavelength cloud radars. *J. Appl. Meteor. Clim.*, 47, 769-777.
- Shupe, M.D., P. Kollias, M. Poellot, and E. Eloranta, 2008: On deriving vertical air motions from cloud radar Doppler spectra. *J. Atmos. Ocean. Techn.*, 25, 547-557.
- Shupe, M. D., P. Kollias, P.O.G. Persson, and G. M. McFarquhar, 2008: Vertical motions in Arctic mixed-phase stratiform clouds. *J. Atmos. Sci.*, 65, 1304-1322.
- Tjernstrom, M., J. Sedlar, and M. D. Shupe, 2008: How well do regional climate models reproduce radiation and clouds in the Arctic? An evaluation of ARCMIP simulations. *J. Appl. Met. Clim.*, 47, 2405-2422.
- Shupe, M.D., J.S. Daniel, G. De Boer, E.W. Eloranta, P. Kollias, E. Luke, C. N. Long, D. D. Turner, and J. Verlinde, 2008: A focus on mixed-phase clouds: The status of ground-based observational methods. *Bull. Amer. Meteor. Soc.*, in press.