

## THOMAS PETER ACKERMAN

### EDUCATION

| <b>Degree</b>              | <b>Institution and Location</b>         | <b>Year Granted</b> |
|----------------------------|---|---------------------|
| B.A., Physics              | Calvin College<br>Grand Rapids, MI      | 1970                |
| M.S., Physics              | University of Washington<br>Seattle, WA | 1971                |
| Ph.D., Atmospheric Science | University of Washington<br>Seattle, WA | 1976                |

### EXPERIENCE

- 2007-present    Director, Joint Institute for the Study of the Atmosphere and Ocean, and  
Professor of Atmospheric Sciences, U. of Washington, Seattle, Washington
- 2005-2006      Joint appointment  
Professor of Atmospheric Sciences, U. of Washington, Seattle, Washington  
Battelle Fellow, Pacific Northwest National Laboratory, Richland, WA
- 1999-2005      Battelle Fellow and Chief Scientist, Atmospheric Radiation Measurement  
Program  
Pacific Northwest National Laboratory  
Richland, Washington
- 2002-2004      Affiliate Professor  
Department of Atmospheric Sciences  
University of Washington  
Seattle, Washington
- 1995-1999      Professor, Department of Meteorology  
Associate Director, Earth System Science Center  
The Pennsylvania State University  
University Park, Pennsylvania
- 1988-1995      Associate Professor, Department of Meteorology  
Associate Director, Earth System Science Center  
The Pennsylvania State University University Park, Pennsylvania
- 1982-1987      Research Scientist

NASA Ames Research Center  
Moffett Field, California

1981-1982      Research Associate  
NASA Ames Research Center, Moffett Field, California  
San Jose State University Foundation, San Jose, California

1979-1981      Post-doctoral Research Associate  
NASA Ames Research Center, Moffett Field, California  
National Research Council, Washington, DC

1979-1980      Scientific Consultant  
Systems and Applications, Inc.  
San Rafael, California

1976-1979      Research Scientist  
Australian Numerical Meteorology Research Center  
Melbourne, Australia

#### **MEMBERSHIPS ON COMMITTEES AND ADVISORY GROUPS**

1. Panel member, Study Session on the Potential Climatic Effects of Nuclear Explosions, Board of Atmospheric Sciences and Climate, Climate Research Committee, National Academy of Sciences, 1984.
2. Panel member, The Nuclear Winter: Scientific Assessment in the Canadian Context, Eighteenth Annual Congress of the Canadian Meteorological and Oceanographic Society, 1984.
3. Working member, Environmental Consequences of Nuclear War Project, Scientific Committee on Problems of the Environment (SCOPE-ENUWAR), International Council of Scientific Unions, 1984 to 1987.
4. Member, DNA Advisory Committee on Field Experiments, 1985 to 1988.
5. Member, EOS Review Group, NASA, 1988.
6. Member, Science Team, First International Satellite Cloud Climatology Project Regional Experiment (FIRE), 1985 to 1998.
7. Member, Advisory Panel for ISCCP, Climate Research Committee, Board on Atmospheric Sciences and Climate, National Research Council, 1988 to 1992.

8. Member, NASA Instrument Team, Multi-angle Interferometer Radiometer Spectrometer (MISR), 1989 to present.
9. Member, Science Team, Atmospheric Radiation Measurement (ARM) Program, Department of Energy, 1990 to 1999.
10. Member, Science Team Executive Committee, ARM Program, Department of Energy, 1992 to 1999.
11. Member, Environmental Task Force, United States of America, 1992 to 1993.
12. Associate Editor, *Journal of Quantitative Spectroscopy Radiative Transfer*, Pergamon Press Ltd., 1992 to present.
13. Member, MEDEA Scientific Consulting Panel, 1993 to present.
14. Member, NOAA Panel on Climate and Global Change, 1993 to 1999.
15. Member, United States Clivar Panel, 1997 to 1999.
16. Member, NASA Instrument Team, CloudSat, 1998 to present.
17. Member, International GEWEX Science Steering Group (SSG), 2001 to 2008.
18. Member, National Academy Panel on the Naval Use of Environmental Data, 2001 to 2002.
19. Vice-Chair, International GEWEX Science Steering Group (SSG), 2008
20. Chair, International GEWEX Science Steering Group (SSG) 2009 –

**SOCIETY MEMBERSHIPS AND PARTICIPATION:**

1. Member of American Meteorological Society, 1972 to 1990 (student member to 1976, then regular member)
2. Member, Committee on Radiation Energy, American Meteorological Society, 1983 to 1989.
3. Organizing Committee, Fifth Conference on Atmospheric Radiation, sponsored by American Meteorological Society, 1983.
4. Organizing Committee, Sixth Conference on Atmospheric Radiation, sponsored by American Meteorological Society, 1986.
5. Chairman, Organizing Committee, Seventh Conference on Atmospheric Radiation, sponsored by American Meteorological Society, 1990.

6. Member, Committee on Climate Variations, sponsored by American Meteorological Society, 1990 to 1993.
7. Member, CO-MEAS '95 Organizing Committee, IEEE Lasers and Electro-Optical Society.
8. Office of the American Association for the Advancement of Science (AAAS) Section on Atmospheric and Hydrospheric Sciences (W), 2006 – 2009.

## HONORS

1. 2003: Elected to the rank of Fellow in the American Association for the Advancement of Science “for pioneering studies of radiative properties of aerosols, for developing millimeter-wave radar for measuring cloud properties, and for technical leadership of the nation’s principle radiation monitoring research program.”
2. 2002: NASA’s Distinguished Public Service Medal – the highest honor NASA awards to anyone who was not a government employee when the service was performed. The award is granted only to individuals whose distinguished accomplishments contributed substantially to the NASA mission.
3. 2000: Professor Dr. Vilho Vaisala Award in recognition of paper entitled “Ground-based Remote Sensor Observations during PROBE in the Tropical Western Pacific” (awarded by the World Meteorological Organization).
4. 1985: Leo Szilard Award for Science in the Public Interest (awarded by the American Physical Society).
5. 1983: H. J. Allen Award for the outstanding research paper written by a staff member (awarded by NASA Ames Research Center).

**STUDENTS SUPERVISED**

| <b>STUDENTS RECEIVING A DOCTOR OF PHILOSOPHY DEGREE:</b> |      |  |
|--|------|--|
| Mace, Gerald G.  | 1994 | Development of Large-scale Diagnostic Analysis Techniques Applicable to Regional Arrays of Wind Profilers and Radiosondes                      |
| Vogelmann, Andrew M.                                     | 1994 | Cirrus Cloud Radiative Forcing   |
| Long, Charles N.   | 1996 | Surface Radiative Energy Budget and Cloud Forcing: Results from TOGA COARE and Techniques for Identifying and Calculating Clear Sky Irradiance |
| Dong, Xiquan   | 1996 | Microphysical and Radiative Properties of Stratiform Clouds Deduced from Ground-based Measurements   |
| Lin, Ruei-Fong   | 1997 | A Numerical Study of the Evolution of Nocturnal Cirrus by a Two-dimensional Model with Explicit Microphysics                                   |
| Kato, Seiji  | 1998 | Uncertainties in Modeled and Measured Surface Shortwave Irradiance   |
| Jensen, Michael P.                                       | 2000 | Lifecycles and Radiative Impacts of Anvil Cirrus Outflow During the Maritime Continent Thunderstorm Experiment                                 |
| Sengupta, Manajit  | 2002 | Radiative Impact of Continental Stratus at the Southern Great Plains: A Climatological Perspective   |
| Hinkelman, Laura M. *                                    | 2003 | The Effect of Cumulus Cloud Anisotropy on Solar Radiative Fluxes and Atmospheric Heating Rates   |

\* Joint supervision with Dr. Eugene Clothiaux, The Pennsylvania State University

| <b>STUDENTS RECEIVING A MASTER OF SCIENCE DEGREE:</b> |      |   |
|---|------|---|
| Heffernan, Catherine M.                               | 1990 | The Effect of Cirrus Clouds on Radiative Heating Rates in the Tropical Monsoon Environment  |
| Guimond, Philip W.                                    | 1994 | Effects of Sulfate Aerosol on the Central Pennsylvania Surface Shortwave Radiation Budget   |
| George, Adrian T.                                     | 1995 | The Surface Radiative Budget at Kavieng, PNG, During the TOGA COARE Period  |
| Spangenberg, Douglas A.                               | 1995 | Verification of Upper-tropospheric Humidity Forecasts in a Mesoscale Numerical Weather Prediction Model Using 6.7 Micron Satellite Observations |
| Sovchik, Derek A.                                     | 1997 | Validation of Cirrus Cloud Parameterizations Using Observations   |
| Fineran, Kimberly A.                                  | 1999 | A Comparison of One Year of Collocated Whole Sky Imager and Observer Cloud Fractional Coverage Data   |
| Hinkelman, Laura M.                                   | 1999 | An Evaluation of NCEP ETA Model Predictions of Surface Energy Budget and Cloud Properties by Comparison to Measured ARM Data                    |
| Jambor, Urszula J.                                    | 2000 | Case Evaluations of NWP Model Ice Clouds by Comparison to Retrieved Ice Cloud Properties Using ARM Data   |
| Liu, Zheng #  | 2008 | Millimeter Wavelength Cloud Radar Observations in the Tropical Western Pacific  |

# University of Washington (all others at the Pennsylvania State University)

## PUBLICATIONS

- Leavy, C.B., and T.P. Ackerman. 1973. "Evidence for high-frequency synoptic disturbances near the stratopause." *J. Atmos. Sci.*, **30**, 940-942.
- Ackerman, T.P., K.N. Liou, and C.B. Leovy. 1976. "Infrared radiative transfer in polluted atmospheres." *J. Appl. Meteor.*, **15**, 28-35.
- Ackerman, T.P., and M.B. Baker. 1977. "Shortwave radiative effects of unactivated aerosol particles in clouds." *J. Appl. Meteor.*, **16**, 63-69.
- Ackerman, T.P. 1977. "A model of the effect of aerosols on urban climates with particular applications to the Los Angeles Basin." *J. Atmos. Sci.*, **34**, 531-547.
- Ackerman, T.P. 1979. "On the effect of CO<sub>2</sub> on atmospheric heating rates." *Tellus*, **31**, 115-123.
- Bergstrom, R.W., T.P. Ackerman, and L.W. Richards. 1980. "The optical properties of particulate elemental carbon." In *Proceedings of the General Motors Research Laboratory International Symposium on Particulate Carbon: Atmospheric Life Cycle*.
- Bergstrom, R.D., T.P. Ackerman, and B.L. Babson. 1981. "Calculation of multiply scattered radiation in clean atmospheres." *Atmos. Environ.*, **15**, 1821-1826.
- Toon, O.B., and T.P. Ackerman. 1981. "Algorithms for the calculation of scattering by stratified spheres." *Appl. Optics*, **20**, 3657-3660.
- Ackerman, T.P., and O.B. Toon. 1981. "The absorption of visible radiation in atmospheres containing mixtures of absorbing and non-absorbing particles." *Appl. Optics*, **20**, 3661-3668.
- Cuzzi, J.N., T.P. Ackerman, and L.C. Helmle. 1982. "The delta-four-stream approximation for radiative flux transfer." *J. Atmos. Sci.*, **39**, 917-925.
- Toon, O.B., J.B. Pollack, T.P. Ackerman, R.P. Turco, C.P. McKay, and M.S. Liu. 1982. "Evolution of an impact generated dust cloud and its effects on the atmosphere." Geological Society of America Special Paper 190, *Geological Implications of Large Asteroids and Comets on Earth*, 187-201.
- Pollack, J.B., O.B. Toon, T.P. Ackerman, C.P. McKay, and R.P. Turco. 1983. "Environmental effects of an impact-generated dust cloud: Implications for the Cretaceous-Tertiary extinctions." *Science*, **219**, 287-289.
- Cardelli, J.A., and T.P. Ackerman. 1983. "Analysis of Mount St. Helens ash from optical photo-electric photometry." *Pub. Astron. Soc. Pac.*, **95**, 451-456.
- Pollack, J.B., and T.P. Ackerman. 1983. "Possible effects of the El Chichon volcanic cloud on the radiation budget of the northern tropics." *Geophys. Res. Lett.*, **10**, 1057-1060.
- Valera, F.P.J., T.P. Ackerman, and W.J.Y. Gore. 1983. "Radiative effects of arctic haze." *Geophys. Res. Lett.*, **10**, 1184-1187.
- Turco, R.P., O.B. Toon, T.P. Ackerman, J.B. Pollack, and C. Sagan. 1983. "Nuclear winter: Global consequences of multiple nuclear explosions." *Science*, **222**, 1283-1292.
- Kasting, J.F., J.B. Pollack, and T.P. Ackerman. 1984. "Response of Earth's atmosphere to increases in solar flux and implications for loss of water from Venus." *Icarus*, **57**, 335-355.
- Valero, F.P.J., T.P. Ackerman, and W.J.Y. Gore. 1984. "The absorption of solar radiation by the arctic haze during the haze season and its effects on the radiation budget." *Geophys. Res. Lett.*, **11**, 485-468.

- Ackerman, T.P., and F.P.J. Valero. 1984. "The vertical structure of arctic haze as determined from airborne net-flux radiometer measurements." *Geophys. Res. Lett.*, **11**, 469-472.
- Haberle, R.M., T.P. Ackerman, O.B. Toon, and J.L. Hollingsworth. 1985. "Global transport of atmospheric smoke following a major nuclear exchange." *Geophys. Res. Lett.*, **12**, 405-408.
- Kasting, J.F., and T.P. Ackerman. 1985. "High NO<sub>x</sub> steady states and the chemical consequences of the impact of asteroid or comet." *J. Atmos. Chem.*, **3**, 321-340.
- Valero, F.P.J., T.P. Ackerman, and W.L. Starr. 1985. "Radiative effects of the El Chichon volcanic cloud." *Current Problems in Atmospheric Radiation*, G. Flocco (ed.), A. Deepak Publishing, pp.144-147.
- Pittock, A.B., T.P. Ackerman, P.J. Crutzen, M.C. MacCracken, C.S. Shapiro, and R.P. Turco. 1986. *Environmental Consequences of Nuclear War. Volume 1, Physical and Atmospheric Effects*. John Wiley & Sons, Chichester, 342 pp.
- Richards, L.W., R.W. Bergstrom, and T.P. Ackerman. 1986. "The optical effects of fine-particle carbon on urban atmospheres." *Atmos. Env.*, **20**, 387-396.
- Ackerman, T.P., J.M. Stenback, and F.P.J. Valero. 1985. "The importance of arctic haze for the energy budget of the Arctic." In *Arctic Air Pollution*, B. Stonehouse (ed.), Cambridge University Press, Cambridge, pp. 151-158.
- Valero, F.P.J., and T.P. Ackerman. 1986. "Arctic haze and the radiation budget." In *Arctic Air Pollution*, B. Stonehouse (ed.), Cambridge University Press, Cambridge, pp. 121-134.
- Ackerman, T.P., G. Zhishi, and R.M. Kamens. 1986. "Equilibrium temperatures of aerosol particles in outdoor exposure chambers." *Atmos. Env.*, **20**, 2473-2475.
- Kasting, J.F., and T.P. Ackerman. 1986. "Climatic consequences of very high CO<sub>2</sub> levels in Earth's early atmosphere." *Science*, **234**, 1383-1385.
- Ackerman, T.P., K.N. Liou, F.P.J. Valero, and L. Pfister. 1988. "Heating rates in tropical anvils." *J. Atmos. Sci.*, **45**, 1606-1623.
- Ackerman, T.P., and W.P. Cropper, Jr. 1988. "Scaling global climate projections to local biological assessments." *Environment*, **30**, 31-34.
- Ackerman, T.P. 1988. "Aerosols in climate modeling. Aerosols and Climate." In *Proceedings of the IAMAP Symposium on Aerosols and Climate*, XIX General Assembly of the IUGG, A. Deepak Publishing, Hampton, VA, pp. 335-348.
- Ackerman, T.P., R.P. Turco, and O.B. Toon. 1988. "Persistent effects of residual smoke layers. Aerosols and Climate." In *Proceedings of the IAMAP Symposium on Aerosols and Climate*, XIX General Assembly of the IUGG. A. Deepak Publishing, Hampton, VA, pp. 443-458.
- Toon, O.B., C.P. McKay, R. Courtin, and T.P. Ackerman. 1988. "Methane rain on Titan." *Icarus*, **75**, 255-284.
- Pueschel, R.F., J.M. Livingston, P.B. Russell, D.A. Colburn, T.P. Ackerman, D.A. Allen, B.D. Zak, and W. Einfeld. 1988. "Smoke optical depths: Magnitude, variability, and wavelength dependence." *J. Geophys. Res.*, **93**, 8388-8402.
- Liou, K.N., Q. Fu, and T.P. Ackerman. 1988. "A simple formulation of the delta-four-stream approximation for radiative transfer parameterizations." *J. Atmos. Sci.*, **45**, 1940-1947.
- Valero, F.P.J., T.P. Ackerman, and W.J.Y. Gore. 1989. "The effects of the arctic haze as determined from airborne radiometric measurements during AGASP II." *Atmos. Chem.*, **9**, 225-244.

- Diner, D.J., C.J. Bruegge, J.V. Martonchik, T.P. Ackerman, R. Davies, S.A.W. Gerstl, H.R. Gordon, P.J. Sellers, J. Clark, J.A. Daniels, E.D. Danielson, V.G. Duval, K.P. Klaasen, G.W. Lillenthal, D.I. Nakamoto, R. Pagano, and T.H. Reilly. 1989. "MISR: A multi-angle imaging spectroradiometer for geophysical and climatological research from EOS." *IEEE Transactions on Geoscience and Remote Sensing*, **27**, 200-214.
- Ackerman, T.P., L. Pfister, F.P.J. Valero, and P. Hammer. 1989. "The radiative budget of tropical clouds: A case study." In *Symposium on the Role of Clouds in Atmospheric Chemistry and Global Climate*, Anaheim, CA, American Meteorological Society, January 30-February 3, 1989, pp. 45-49.
- Ackerman, T.P. 1989. "The effects of aerosols on clouds" (invited review paper). *Fifth Scientific Assembly of the International Association of Meteorology and Atmospheric Physics*, Review Papers and Abstracts, Volume AC8-12.
- Toon, O.B., C.P. McKay, T.P. Ackerman, and K. Santhanam. 1989. "Rapid calculation of radiative heating rates and photodissociation rates in inhomogeneous multiple scattering atmospheres." *J. Geophys. Res.*, **94**, 16,287-16,301.
- Turco, R.P., O.B. Toon, T.P. Ackerman, J.B. Pollack, and C. Sagan. 1990. "Climate and smoke: An appraisal of nuclear winter." *Science*, **247**, 166-176.
- Liou, K.N., S.C. Ou, Y. Takano, F.P.J. Valero, and T.P. Ackerman. 1990. "Remote sounding of the tropical cirrus cloud temperature and optical depth using 6.5 and 10.5  $\mu\text{m}$  radiometers during STEP." *J. Atmos. Sci.*, **29**, 716-726.
- Francis, J.A., T.P. Ackerman, K.S. Katsaros, R. Lind, and K.L. Davidson. 1991. "A comparison of radiation budgets in the Fram Strait summer marginal ice zone." *J. Climate*, **4**, 218-235.
- Turco, P.R., O.B. Toon, T.P. Ackerman, J.B. Pollack, and C. Sagan. 1991. "Nuclear Winter: Physics and physical mechanisms." In *Annual Review of Earth and Planetary Sciences*, **19**, G.W. Wetherill (ed.), Annual Reviews, Inc., Palo Alto, CA, pp. 383-422.
- Ackerman, T.P. 1992. "A tutorial on global atmospheric energetics and the greenhouse effect." *Global Warming: Physics and Facts*, American Institute of Physics Conf. Proc., 247. American Institute of Physics, Washington, DC, 1991.
- Kinne, S., T.P. Ackerman, A.J. Heymsfield, F.P.J. Valero, K. Sassen, and J.D. Spinhirne. 1992. "Cirrus microphysics and radiative transfer: Cloud field study on October 28, 1986." *Mon. Wea. Rev.*, **120**, No. 5, 661-684.
- Ackerman, T.P. 1992. "The physics of the greenhouse effect." *Global Climate Change: Implications, Challenges, and Mitigation*, S.K. Majumdar (ed.), Pennsylvania Academy of Science, Easton, PA, pp. 63-80.
- Vogelmann, A.M., T.P. Ackerman, and R.P. Turco. 1992. "Enhancements in biologically effective ultraviolet radiation following volcanic eruptions." *Nature*, **359**, 47-49.
- Emery, C.A., R.M. Haberle, and T.P. Ackerman. 1992. "A One-dimensional Modeling Study of Carbonaceous Haze Effects on the Springtime Arctic Environment." *J. Geophys. Res.*, **97**, 20,599-20,613.
- Robock, A., R.P. Turco, M.A. Harwell, T.P. Ackerman, R. Andressen, H.-S. Chang, and M.V.K. Sivakumar. 1993. "Use of General Circulation Model Output in the Creation of Climate Change Scenarios for Impact Analysis." *Climatic Change*, **23**, 293-335.
- Wilson, L.D., J.A. Curry, and T.P. Ackerman. 1993. "Satellite retrieval of lower-tropospheric ice crystal clouds in polar regions." *J. Climate*, **6**, 1467-1472.

- Clothiaux, E.E., R.S. Penc, D.W. Thomson, T.P. Ackerman, and S.R. Williams. 1994. "A first-guess, feature-based algorithm for estimating wind speed in clear-air Doppler radar spectra." *J. Tech.*, **11**, 888-908.
- Baum, B.A., T. Uttal, M. Poellet, T.P. Ackerman, J.M. Alvarez, J.M. Intrieri, D. Starr, J. Titlow, A. Tovinkere, E.E. Clothiaux. 1995. "Satellite Remote Sensing of Multiple Cloud Layers." *J. Atmos. Sci.*, Vol. 52, pp. 4210 - 4230.
- Clothiaux, E.E., M.A. Miller, B.A. Albrecht, T.P. Ackerman, J. Verlinde, D.M. Babb, R.M. Peters, and W.J. Syrett. 1995. "An evaluation of a 94-GHz radar for remote sensing of cloud properties." *J. Tech.*, **12**, 201-229.
- Gultepe, I., D.O'C. Starr, A.J. Heymsfield, T. Uttal, T.P. Ackerman, and D.L. Westphal. 1995. "Dynamical Characteristics of Cirrus Clouds from Aircraft and Radar Observations in Micro and Meso-gamma Scales." *J. Atmos. Sci.*, **62**, 4060-4078.
- Long, C.N., and T.P. Ackerman. 1995. "Surface measurements of solar irradiance: A study of the spatial correlation between simultaneous measurements at separated sites." *J. Appl. Met.*, **34**, 1039-1046.
- Mace, G.G., D.O'C. Starr, T.P. Ackerman, and P. Minnis. 1995. "Examination of Coupling between an Upper-tropospheric Cloud System and Synoptic-scale Dynamics Diagnosed from Wind Profiler and Radiosonde Data." *J. Atmos. Sci.*, **52**, 4094-4127.
- Uttal, T., E.E. Clothiaux, T.P. Ackerman, J.M. Intrieri, and W.L. Eberhard. 1995. "Cloud Boundary Statistics during FIRE II." *J. Atmos. Sci.*, **52**, 4276-4284.
- Vogelmann, A.M., and T.P. Ackerman. 1995. "Relating Cirrus Cloud Properties to Observed Fluxes: A Critical Assessment." *J. Atmos. Sci.*, **52**, 4285-4301.
- Bergstrom, R., S. Kinne, I. Sokolik, O.B. Toon, E. Mlawer, S.A. Clough, and T.P. Ackerman. 1996. "3ARM: A Fast Accurate Radiative Transfer Model for Use in Climate Codes." In *International Radiation Symposium (IRS) '96: Current Problems in Atmospheric Radiation*, A. Deepak Publishing, Hampton VA.
- Clothiaux, E.E., T.P. Ackerman, and D.M. Babb. 1996. "Ground-based Remote Sensing of Cloud Properties Using Millimeter-wave Radar." In *Remote Sensing of Processes Governing Energy and Water Cycles in the Climate System*. NATO International Scientific Exchange Programmes, Advanced Study Institute, Plön, Germany.
- Danne, O., G.G. Mace, E.E. Clothiaux, X. Dong, T.P. Ackerman, and M. Quante. 1996. "Observing Structures and Vertical Motions Within Stratiform Clouds Using a Vertical Pointing 94-GHz Cloud Radar." *Contributions Atmos. Phys.*, Vol. 69, pp. 229 - 237.
- Spangenberg, D.A., G.G. Mace, T.P. Ackerman, N.L. Seaman, and B.J. Soden. 1996. "Evaluation of Model Simulated Upper-tropospheric Humidity Using 6.7  $\mu\text{m}$  Satellite Observations." *J. Geophys. Res.*, **102**, 25,737-25,749.
- Dong, X., T.P. Ackerman, E.E. Clothiaux, P. Pilewskie, and Y. Han. 1997. "Microphysical and radiative properties of boundary layer stratiform clouds deduced from ground-based measurements." *J. Geophys. Res.*, **102**, 23,829-23,843.
- Kato, S., T.P. Ackerman, E.E. Clothiaux, J.H. Mather, G.G. Mace, M.L. Wesely, F. Murcray, and J. Michalsky. 1997. "Uncertainties in modeled and measured clear-sky surface shortwave irradiances." *J. Geophys. Res.*, **102**, 25,881-25,898.
- Kinne, S., T.P. Ackerman, M. Shiobara, A. Uchiyama, A.J. Heymsfield, L. Miloshevich, J. Wendell, E. Eloranta, C. Purgold, and R.W. Bergstrom. 1997. "Cirrus Cloud Radiative and Microphysical Properties from Ground Observations and In Situ Measurements during

- FIRE 1991 and Their Application to Exhibit Problems in Cirrus Solar Radiative Transfer Modeling.” *Journal of the Atmospheric Sciences*, Vol. 54, pp. 2320-2344.
- Mace, G.G., and T.P. Ackerman. 1997. “Assessment of Error in Synoptic Scale Diagnostics Derived from Wind Profiler and Radiosonde Network Data,” *Mon. Wea. Rev.*, Vol. 124, pp. 1521 - 1534.
- Mace, G.G., T.P. Ackerman, E.E. Clothiaux, and B.A. Albrecht. 1997. “A study of composite cirrus morphology using data from a 94 GHz radar and its relationship to temperature and large-scale vertical motion.” *J. Geophys. Res.*, **102**, 13,581-13,593.
- Spangenberg, D.A., G.G. Mace, T.P. Ackerman, N.L. Seaman, and B.J. Soden. 1997. “Evaluation of Model Simulated Upper-Tropospheric Humidity Using 7.8 Micron Satellite Observations.” *J. Geophys. Res.*, Vol. 102 , No. D22 , pp. 25,737.
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- Clothiaux, E.E., G.G. Mace, T.P. Ackerman, T.J. Kane, J.D. Spinhirne, and V.S. Scott. 1998. “An Automated Algorithm for Detection of Hydrometeor Returns in Micropulse Lidar Data.” *J. Atmos. and Oceanic Technol.*, Vol. 15, pp. 1035-1042.
- Dong, X., T.P. Ackerman, and E.E. Clothiaux. 1998. “Parameterizations of the Microphysical and Radiative Properties of Boundary Layer Stratus from Ground-based Measurements.” *J. Geophys. Res.*, Vol. 103, pp. 31685-31694.
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- Jensen, M.P., J.H. Mather, and T.P. Ackerman. 1998. “Observations of the 1997 to 1998 warm ENSO event at the Manus Island ARM site.” *Geophys. Res. Let.*, Vol. 25, pp. 4517.
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