



Air Resources Laboratory



Publications – FY 2003

Allwine, K.J., M.J. Leach, L.W. Stockham, J.S. Shinn, **R.P. Hosker**, J.F. Bowers, and J.C. Pace. Overview of the Joint Urban 2003 – An atmospheric dispersion study in Oklahoma City. Preprints, Symposium on Planning, Nowcasting, and Forecasting in the Urban Zone, January 11-15. (2003).

Angell, J.K. Effect of exclusion of anomalous tropical stations on temperature trends from a 63-station radiosonde network, and comparison with other analyses. *Journal of Climate* 16:2288-2295 (2003).

Arnold, J.R., **R.L. Dennis**, and G.S. Tonnesen. Diagnostic evaluation of numerical air quality models with specialized ambient observations: Testing the Community Multiscale Air Quality modeling system (CMAQ) at selected SOS 95 ground sites. *Atmospheric Environment* 37:1185-1198 (2003).

Arnold, J.R., **W.T. Luke**, and **T.B. Watson**. Nitrate aerosol partitioning aloft in the 2003 Bay Regional Atmospheric Chemistry Experiment (BRACE), American Geophysical Union 2003 Fall Meeting, Dec 8-12, San Francisco, CA (2003).

Athanassiadis, G., and **S.T. Rao**. Spatial and temporal variations in the trace elemental data over the northeastern United States. *Environmental Pollution* 123:439-449 (2003)

Athanassiadis, G.A., **S.T. Rao**, J-Y. Ku, and R.D. Clark. Boundary layer evolution and its influence on ground-level ozone concentrations. *Environmental Fluid Mechanics* 2:339-357 (2002).

Augustine, J.A., C.R. Cornwall, G.B. Hodges, C.N. Long, C.I. Medina, and J.J. DeLuisi. An automated method of MFRSR calibration for aerosol optical depth analysis with application to an Asian dust outbreak over the United States. *Journal of Applied Meteorology* 42:266-278 (2003).

Baldocchi, D.D., K.B. Wilson, and L. Gu. How the environment, canopy structure and canopy physiological functioning influence carbon, water and energy fluxes of a temperate broad-leaved deciduous forest - an assessment with the biophysical model CANOAK. *Tree Physiology* 22:1065-1077 (2002).

Binkowski, F.S., and **S.J. Roselle**. Models-3 Community Multiscale Air Quality (CMAQ) model aerosol component - 1. Model description. *Journal of Geophysical Research* 108(D6), 4183, doi:10.1029/2001JD001409, (2003).

- Brankov, E., R.F. Henry, K.L. Civerolo, W. Hao, **S.T. Rao**, P.K. Misra, R. Bloxam, and N. Reid. Assessing the effects of transboundary ozone pollution between Ontario, Canada and New York, USA. *Environmental Pollution* 123:403-411 (2003).
- Brooks, S., S. Lindberg, J. Pacyna, J. Christensen, A. Gusev, K. Puckett, O. Travnikov, S. Wilson, V. Gordeev, R. Macdonald, and S. Marcy. *Chapter 3: Transport Pathways and Processes Leading to Environmental Exposure*. In *AMAP Heavy Metal Assessment 2003*, Suzanne Marcy, Ed. (2003).
- Butler, T.J., G.E. Likens, F.M. Vermeylen, and **B.J.B. Stunder**. The relation between NOx emissions and precipitation NO₃⁻ in the eastern USA. *Atmospheric Environment* 37:2093-2104 (2003).
- Civerolo, K.L. H. Mao, and **S.T. Rao**. The airshed for ozone and fine particulate pollution in the eastern United States. *Pure and Applied Geophysics* 160:81-105 (2003).
- Civerolo, K., E. Brankov. **S.T. Rao**, K. Roy, P. Lewis, and P. Galvin. Analysis of ambient, precipitation-weighted, and lake sulfate concentrations in the Adirondack region of New York. *Environmental Pollution* 123:337-345 (2003).
- Cooter, E.J.**, W.T. Hutzell, W.T. Foreman, and M.S. Majewski. A regional atmospheric fate and transport model for atrazine. 2. Evaluation. *Environmental Science & Technology* 36:4593-4599 (2002).
- Crescenti, Gennaro H.** In memory of Dr. Timothy L. Crawford, NOAA Air Resources Laboratory Field Research Division, Idaho Falls, Idaho. Preprint, Twelfth Symposium on Meteorological Observations and Instrumentation, Long Beach California, February 9-13, 2003, American Meteorological Society, Paper KS1.1 (2003).
- Crescenti, G. H.**, and E. J. Dumas. Obituary - Timothy L. Crawford. *Bulletin of the American Meteorological Society*, 83:1680-1682 (2002).
- Curtis, P.S., P.J. Hanson, P. Bolstad, C. Barford, J.C. Randolph, H.P. Schmid, and K.B. Wilson. Biometric and eddy-covariance based estimates of annual carbon storage in five eastern North American deciduous forests *Agricultural and Forest Meteorology* 113:3-19 (2002).
- DeLuisi, J., D. Theisen, J. Augustine, P. Disterhoff, K. Lantz, E. Weatherhead, G. Hodges, C. Cornwall, I. Petropavlovskikh, A. Stevermer, D. Wellman, and J. Barnett. On the correspondence between surface UV observations and TOMS determinations of surface UV: a potential method for quality evaluating world surface UV observations. *Annals of Geophysics* 46:295-308 (2003).

- Dobosy, R.J. Where will it go: atmospheric dispersion modeling out to 30 km to guide responders during accidental or hostile release of hazardous materials. NOAA Technical Memorandum OAR ARL-251, 36 pp. (2003).
- Draxler, R.R.** Evaluation of an ensemble dispersion calculation. *Journal of Applied Meteorology* 42:308-317 (2003).
- Eckman, R.M.** A statistical investigation of atmospheric dispersion at the Idaho National Engineering and Environmental Laboratory (INEEL). NOAA Technical Memorandum OAR ARL-246, Silver Spring, MD, 31 pp. (2003).
- Etyemezian, V., H. Kuhns, J. Gillies, M. Green, **M. Pitchford**, and J. Watson. Vehicle-based road dust emissions measurement (I): Methods and calibration. *Atmospheric Environment* 36:4559-4571 (2003).
- Etyemezian, V., H. Kuhns, J. Gillies, J. Chow, K. Hendrickson, M. McGown, and **M. Pitchford**. Vehicle based road dust emissions measurement (III): Effect of speed, traffic volume, location, and season on PM10 road dust emissions. *Atmospheric Environment* 36:4583-4593 (2002).
- Falge, E., J. Tenhunen, D. Baldocchi, M. Aubinet, P. Bakwin, P. Bergigier, C. Bernhofer, G. Burba, R. Clement, K.J. Davis, J.A. Elbers, A.H. Goldstein, A. Greele, A. Grainer, J. Guomundsson, D. Hollinger, A.S. Kowalski, G. Katul, B.E. Law, Y. Malhi, **T. Meyers**, R.K. Monson, J.W. Munger, W. Oechel, K. Paw U, K. Pilegaard, U. Rannik, C. Rebmann, A. Suyker, R. Valentini, K. Wilson, and S. Wofsy. Seasonality of ecosystem respiration and gross primary production as derived from FLUXNET measurements. *Agricultural and Forest Meteorology* 113:53-74 (2002).
- Falge, E., J. Tenhunen, D. Baldocchi, M. Aubinet, P. Bakwin, P. Bergigier, C. Bernhofer, J. Bonnefond, G. Burba, R. Clement, K.J. Davis, J.A. Elbers, M. Falk, A.H. Goldstein, A. Greele, A. Grainer, T. Grunwald, J. Guomundsson, D. Hollinger, I.A. Janssens, P. Keronen, A.S. Kowalski, G. Katul, B.E. Law, Y. Malhi, **T. Meyers**, R.K. Monson, E. Moors, J.W. Munger, W. Oechel, K. Paw U, K. Pilegaard, U. Rannik, C. Rebmann, A. Suyker, H. Thorgeirsson, G. Tirone, A. Turnipseed, K. Wilson, and S. Wofsy. Phase and amplitude of ecosystem carbon release and uptake potentials as derived from FLUXNET measurements. *Agricultural and Forest Meteorology* 113:75-95 (2002).
- Fan, L., J. Li, Z. Wei, W. Dong, and **J. Wang**. Annual variations of the Arctic oscillation and the Antarctic oscillation. *Chinese Journal of Atmospheric Sciences* 27(3):419-424 (2003).

- Gego., E., C. Hogrefe, **S.T. Rao**, and P.S. Porter. Probabilistic assessment of regional scale ozone pollution in the eastern United States. *Air Pollution Processes in Regional Scale*, D. Melas and D. Syrakov (eds.), Kluwer Academic Publishers, 87-96 (2003).
- Gettelman, A., **D.J. Seidel**, M.C. Wheeler, and **R.J. Ross**. Multidecadal trends in tropical convective available potential energy. *Journal of Geophysical Research* 107(D21), 4606, doi:10.1029/2001JD001082 (2002).
- Gilliland, A.B.**, T.J. Butler, and G.E. Likens. Monthly and annual bias in weekly (NADP/NTN) versus daily (AIRMoN) precipitation chemistry data in the Eastern USA. *Atmospheric Environment* 36:5197-5206 (2002).
- Gilliland, A.B.**, **R.L. Dennis**, **S.J. Roselle**, and **T.E. Pierce**. Seasonal NH₃ emission estimates for the eastern United States based on ammonium wet concentrations and an inverse modeling method. *Journal of Geophysical Research* Vol. 108, No. D15, 4477, doi:10.1029/2002JD003063 (2003).
- Gilmanov, T.G., S.B. Verma, P.L. Sims, **T.P. Meyers**, J.A. Bradford, G.G. Burba, and A.E. Suyker. Gross primary production and light response parameters of four Southern Plains ecosystems estimated using long-term CO₂-flux tower measurements. *Global Biogeochemical Cycles* 17(2):1071, doi:10.1029/2002GB002023, 40-1 - 40-16 (2003).
- Green, M., H. Kuhns, **M. Pitchford**, R. Dietz, L. Ashbaugh, and **T. Watson**. Application of the Tracer-Aerosol Gradient Interpretive Technique (TAGIT) to sulfur attribution for the Big Bend Regional Aerosol and Visibility Observational (BRAVO) Study. *Air and Waste Management Association* 53(5):586-595 (2003).
- Grimmett, T.K. Combining conditioned laser altimeter data and GPS altitude data to obtain accurate aircraft sensor height measurements. NOAA Technical Memorandum OAR ARL-248, Silver Spring, MD, 43 pp. (2003).
- Grimmett, T.K., **G.H. Crescenti**, **T.L. Crawford**, and D. C. Vandemark. Study of drag coefficient as a function of atmospheric turbulence and ocean wave state. Preprints, Twelfth Symposium on Meteorological Observations and Instrumentation, Long Beach, CA, February 9-13, 2003, American Meteorological Society, Paper KS1.1 (2003).
- Helfert, M., R.R. Heim, **R.P. Hosker, Jr.**, et. al. The U.S. Climate Reference Network: Vision and Status. Preprints, 3rd International Conference in Experiences with Automated Weather Stations, Malagra, Spain, (2003).

- Hicks, B. B.**, and G. Leavesley (Eds.). Overview and Summary. Session 4: Parameter estimation, sensitivity and uncertainty approaches – applications and lessons learned. Proceedings, International Workshop on Uncertainty, Sensitivity, and Parameter Estimation for Multimedia Environmental Modeling, 19-21 August, Rockville, MD, 129-130 (2003).
- Hicks, B.B., R.S. Artz, T.P. Meyers, and R.P. Hosker.** Trends in eastern U.S. sulfur air quality from the Atmospheric Integrated Research Monitoring Network. *Journal of Geophysical Research* 107, No. D12, 10.1029/2000JD000165 (2002).
- Hicks, B.B.** Planning for air quality concerns of the future. Presented at the Brunei Meeting, November 15-18, 1999. Special Edition of *Pure and Applied Geophysics* 160:57-74 (2003).
- Hogrefe, C., S. Vempaty, **S.T. Rao**, and P.S. Porter. A comparison of four techniques for separating different time scales in atmospheric variables. *Atmospheric Environment* 37:313-325 (2003).
- Hollingshead, A.T., S. Businger, **R. Draxler**, J. Porter, and D. Stevens. Dispersion modelling of the Kilauea plume. *Boundary-Layer Meteorology* 108:121-144 (2003).
- Hosker, R.R., K.S. Rao, R.L. Gunter, C.J. Nappo, T.P. Meyers**, K.R. Birdwell, and J.R. White. Issues affecting dispersion near highways: Light winds, intra-urban dispersion, vehicle wakes, and the Roadway-2 Dispersion Model. NOAA Technical Memorandum OAR ARL-247, Silver Spring, MD, 127 pp., plus appendices (2003).
- Irwin, J.S.**, D. Carruthers, J. Paumier, and J. Stocker. Application of ASTM D6589 to evaluate dispersion model performance to simulate average centerline concentration values. Preprints, 8th International Conference on Harmonisation Within Atmospheric Dispersion Modelling for Regulatory Purposes, Sofia, Bulgaria, October 14–17. National Institute of Meteorology and Hydrology in Bulgaria, 53–57 (2002). <http://www.harmo.org/conferences/sofia/8harmo.asp>
- Kuhns, H., V. Etyemezian, M. Green, Karin Hendrickson, Michael McGown, Kevin Barton, and **Marc Pitchford**. Vehicle-based road dust emissions measurement (II): Effect of precipitation, wintertime road sanding, and street sweepers on PM10 fugitive dust emissions from paved and unpaved roads. *Atmospheric Environment* 36:4572-4582 (2003).
- Lanzante, J.R., S.A. Klein, and **D.J. Seidel**. Temporal homogenization of monthly radiosonde temperature data. Part 1: Methodology. *Journal of Climate* 16(2):224-240 (2003).

- Lanzante, J.R., S.A. Klein, and **D.J. Seidel**. Temporal homogenization of monthly radiosonde temperature data. Part II: Trends, sensitivities, and MSU comparison. *Journal of Climate* 16(2):241-262 (2003).
- Law, B.E., E. Falge, L. Gu, D.D. Baldocchi, P. Bakwin, P. Berbigier, K. Davis, A.J. Dolman, M. Falk, J.D. Fuentes, A. Goldstein, A. Grainer, A. Grelle, D. Hollinger, I.A. Janssens, P. Jarvis, N.O. Jensen, G. Katul, Y. Mahli, G. Matteucci, **T. Meyers**, R. Monson, W. Munger, W. Oechel, R. Olson, K. Pilegaard, K.T. Paw U, H. Thorgeirsson, R. Valentini, S. Verma, T. Vesala, K. Wilson, and S. Wofsy. Environmental controls over carbon dioxide and water vapor exchange of terrestrial vegetation. *Agricultural and Forest Meteorology* 113:97-120 (2002).
- Li, J., and **J.X.L. Wang**. A modified zonal index and its physical sense. *Geophysical Research Letters* 30(12):1632, doi:10.1029/2003GL017441. (2003)
- Li, J., and **J.X.L. Wang**. A new North Atlantic oscillation index and its variability. *Advances in Atmospheric Sciences* 20(5):661-676 (2003).
- Liu, G., C. Hogrefe, and **S.T. Rao**. Evaluating the performance of regional-scale meteorological models: effect on clouds simulation on temperature prediction. *Atmospheric Environment* 37:1425-1433 (2003).
- Mathur, R.**, and **R.L. Dennis**. Seasonal and annual modeling of reduced nitrogen compounds over the eastern United States: Emissions, ambient levels, and deposition amounts. *Journal of Geophysical Research* Vol. 108, No. D15, 4481, doi:10.1029/2002JD002794 (2003).
- Mebust, M. R., **B.K. Eder**, **F.S. Binkowski**, and **S.J. Roselle**. Models-3 Community Multiscale Air Quality (CMAQ) model aerosol component - 2. Model evaluation. *Journal of Geophysical Research* 108(D6), 4184, doi:10.1029/2001JD001410, (2003).
- Meloni, D., A. di Sarra, J. DeLuisi, T. Di Iorio, G. Fiocco, W. Junkermann, and G. Pace. Tropospheric aerosols in the Mediterranean: 2. Radiative effects through model simulations and measurements. *Journal of Geophysical Research* 108(D10), 4317, doi:10.1029/2002JD002807 (2003)
- Mihailovic, D.T., **S.T. Rao**, C. Hogrefe, and R.D. Clark. An approach for the aggregation of aerodynamic surface parameters in calculating the turbulent fluxes over heterogeneous surfaces in atmospheric models. *Environmental Fluid Mechanics* 2:315-337 (2002)

- NARSTO.** Particulate Matter Science for Policy Makers—A NARSTO Assessment. Parts 1 and 2. NARSTO Management Office (Envair), Pasco, Washington. <http://www.cgenv.com/Narsto/> (2003).
- Pastor, S.H., J.O. Allen, L.S. Hughes, **P. Bhave**, G.R. Cass, and K.A. Prather. Ambient single particle analysis in Riverside, California, by aerosol time-of-flight mass spectrometry during the SCOS97-NARSTO. *Atmospheric Environment* 37:S239-S258 (2003).
- Poulos, G.S., W. Blumen, D.C. Fritts, J.K. Lundquist, J. Sun, S.P. Burns, **C. Nappo**, R. Banta, R. Newsom, J. Cuxart, E. Terradellas, B. Balsley, and M. Jensen. CASES-99: A comprehensive investigation of the stable nocturnal boundary layer. *Bulletin of the American Meteorological Society*, 555-581 (2002).
- Rao, K.S.** ROADWAY-2: A model for pollutant dispersion near highways. *Water, Air, and Soil Pollution: Focus* 2:261-277 (2002).
- Rao, K.S.** Processing of surface concentration data from tracer releases in MVP sessions 1,2,3, at Cape Canaveral, Florida. NOAA Technical Memorandum OAR ARL-250, Silver Spring, MD, 85 pp. (2003).
- Rao, K.S.** Model Validation Project: Overview, data processing, and some results. Preprints, 7th GMU Workshop on Atmospheric Transport and Dispersion Modeling, June 17-19, Fairfax, VA, (2003).
- Rao, S.T.**, J. Ku, S. Berman, K. Zhang, and H. Mao. Summertime characteristics of the atmospheric boundary layer and relationships to ozone levels over the eastern United States. *Pure and Applied Geophysics* 160:21-55 (2003).
- Seidel, D.J.**, and **M. Free**. Comparison of lower-tropospheric temperature climatologies and trends at low and high elevation radiosonde sites. *Climatic Change* 59:53-74 (2003).
- Seidel, D.J.**, and I. Durre. Comments on "Trends in low and high cloud boundaries and errors in height determination of cloud boundaries" by I.V. Chernykh, O.A. Alduchov, and R.E. Eskridge. *Bulletin American Meteorological Society* 84:237-240. DOI:10.1175/BAMS-84-2-237 (2003).
- Shine, K.P., M.S. Bourqui, P.M.de F. Forster, S.H.E. Hare, U. Langematz, P. Braesicke, V. Grewe, C. Schnadt, C.A. Smith, J.D. Haigh, J. Austin, N. Buchart, D. Shindell, W.J. Randel, T. Nagashima, R.W. Portman, S. Solomon, **D.J. Seidel**, J. Lanzante, S. Klein, V. Ramaswamy, M.D. Schwarzkopf. A comparison of

- model-predicted trends in stratospheric temperatures. *Quarterly Journal Royal Meteorological Society* 129:1565-1588. doi: 10.1256/qj.02.186 (2003).
- Singh, R.B., **A.H. Huber**, and J.N. Braddock. Development of a microscale emission factor model for particulate matter (MicroFacPM) for predicting real-time motor vehicle emissions. *Journal of Air & Waste Management Association* 53:1204-1217 (2003).
- Sistla, G., K. Civerolo, W. Hao, and **S.T. Rao**. An evaluation of the UAM-V predicted concentrations of carbon monoxide and reactive nitrogen compounds over the Eastern United States during summer 1995. *Journal of the Air & Waste Management Association* 52:1324-1332 (2002).
- Stockwell, W.R., **R.S. Artz**, J.F. Meagher, R.A. Petersen, K.L. Schere, G.A. Grell, S.E. Peckham, A.F. Stein, R.V. Pierce, J.M. O'Sullivan, and P-Y. Whung. The scientific basis of NOAA's air quality forecasting program. *EM* 12:20-27 (2002).
- Vogel, C.A., and P. Frenzen. On reasons for the observed variation of the von Karman constant in the atmospheric surface layer. Proceedings, 15th Symposium on Boundary Layers and Turbulence, 15-19 July 2002, Wageningen, The Netherlands. American Meteorological Society, Boston, 422-423 (2002).
- Wilson, K., D. Baldocchi, M. Aubinet, P. Berbigier, C. Bernhofer, H. Dolman, E. Falge, C. Field, A. Goldstein, A. Granier, A. Grelle, T. Halldor, D. Hollinger, G. Katul, B. Law, A. Lindroth, **T. Meyers**, J. Moncrieff, R. Monson, W. Oechel, J. Tenhunen, R. Valentini, S. Verma, T. Vesala, and S. Wofsy. Energy partitioning between latent and sensible heat flux during the warm season at FLUXNET sites. *Water Resources Research* 38(12), 1294, doi:10.1029/2001WR000989 (2002).
- Wilson, K., A. Goldstein, E. Falge, M. Aubinet, D. Baldocchi, P. Berbigier, C. Bernhofer, R. Ceulemans, H. Dolman, C. Field, A. Grelle, A. Ibrom, B. Law, A. Kowalski, **T. Meyers**, J. Moncrieff, R. Monson, W. Oechel, J. Tenhunen, R. Valentini, and S. Verma. Energy balance closure at FLUXNET sites. *Agricultural and Forest Meteorology* 113:223-243 (2002).
- Wilson, K.B., and P.J. Hanson. Deciduous hardwood photosynthesis: Species, differences, temporal patterns, and responses to soil-water deficits. In: *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*, P.J. Hanson and S.D. Wullschlegel, Eds., 35-47 (2003).
- Wroblewski, D., O.R. Cote, J.M. Hacker, **T.L. Crawford**, and **R.J. Dobosy**. Refractive turbulence in the upper troposphere and lower stratosphere: Analysis of aircraft measurements using structure functions. Preprints, 12th Symposium on Meteorological Observations and Instrumentation, February 9-13. (2003).

Wu, Y., B. Brashers, **P.L. Finkelstein**, and **J.E. Pleim**. A multilayer biochemical dry deposition model, 1, Model formulation. *Journal of Geophysical Research* Vol.108, No. D1, 4013, doi:10.1029/2002JD002293, (2003).

Wu, Y., B. Brashers, **P.L. Finkelstein**, and **J.E. Pleim**. A multilayer biochemical dry deposition model, 1, Model evaluation. *Journal of Geophysical Research* Vol.108, No. D1, 4014, doi:10.1029/2002JD002306, (2003).

Yu, S., P.S. Kasibhatla, D.L Wright, S.E. Schwartz, R. McGraw, and A. Deng. Moment-based simulation of microphysical properties of sulfate aerosols in the eastern United States: Model description, evaluation, and regional analysis. *Journal of Geophysical Research* 108, No. D12, 4353, doi:10.1029/2002JDJ002890 (2003).