



## **Air Resources Laboratory Publications – 2008**



Altieri, K.E., S.P. Seitzinger, **A.G. Carlton**, B.J. Turpin, G.C. Klein, and A.G. Marshall. Oligomers formed through in-cloud methylglyoxal reactions: Chemical composition, properties, and mechanisms investigated by ultra-high resolution FTICR mass spectrometry. *Atmospheric Environment* 42(7):1476-1490 (2008).

**Appel, K.W., P.V. Bhave, A.B. Gilliland**, G. Sarwar, and **S.J. Roselle**. Evaluation of the Community Multiscale Air Quality (CMAQ) Model Version 4.5: Sensitivities impacting model performance: Part II - Particulate matter. *Atmospheric Environment* 42(24):6057-6066 (2008).

Baklanov, A., **J. Ching**, C.S.B. Grimmond, and A. Martilli. Chapter 5. Model urbanization strategy: Summaries, recommendations and requirements. Report of COST Action 728, Urbanization of meteorological and air quality models. Workshop on Model Urbanization Strategy, UK Met Office, Exeter, UK, 3-4 May, 2007, [PDF](#), 15 May. (2008).

Baldauf, R., E. Thoma, M. Hays, R. Shores, J. Kinsey, B. Gullett, S. Kimbrough, **V. Isakov**, T. Long, R. Snow, A. Khlystov, J. Weinstein, F. Chen, R. Seila, D. Olson, I. Gilmour, S. Cho, N. Watkins, R. Rowley, and J. Bang. Traffic and meteorological impacts on near-road air quality: Summary of methods and trends from the Raleigh near-road study. *Journal of the Air & Waste Management Association* 58:865-878 (2008).

Baldauf, R., E. Thoma, A. Khlystov, **V. Isakov**, G. Bowker, T. Long, and R. Snow. Impacts of noise barriers on near road air quality. *Atmospheric Environment*, 41:7502-7507, (2008).

Boersma, K.F., D.J. Jacob, H.J. Eskes, **R.W. Pinder**, J. Wang, and R.J. van der A. Intercomparison of SCIAMACHY and OMI tropospheric NO<sub>2</sub> columns: Observing the diurnal evolution of chemistry and emissions from space. *Journal of Geophysical Research*, Vol. 113, D16S26, doi:10.1029/2007JD008816, 1-14 (2008).

Bowker, G.E., **D.A. Gillette**, G. Bergametti, B. Marticorena, and **D.K. Heist**. Fine-scale simulations of Aeolian sediment dispersion in a small area in the northern Chihuahuan Desert. *Journal of Geophysical Research*, Vol. 113, F02S11, doi:10.1029/2007JF000748 (2008).

Brooks, S., R. Arimoto, S. Lindberg, and G. Southworth. Antarctic polar plateau snow surface conversion of deposited oxidized mercury to gaseous elemental mercury

with fractional long-term burial. *Atmospheric Environment* 42(12):2877-2884 (2008).

**Brooks, S.**, S. Lindberg, G. Southworth, and R. Arimoto. Springtime atmospheric mercury speciation in the McMurdo, Antarctica coastal region. *Atmospheric Environment* 42(12):2885-2893 (2008).

**Bullock, R.** The effect of lateral boundary values on atmospheric mercury simulations with the CMAQ Model. Chapter 2, Carlos Borrego; Ana Isabel Miranda (ed.), *Air Pollution Modeling and its Application XIX*. Springer, New York, NY, (Series C):173-181 (2008).

**Bullock, R., D. Atkinson,** T. Braverman, K. Civerolo, A. Dastoor, D. Davignon, J. Ku, K. Lohman, T.C. Meyer, R.J. Park, C. Seigneur, N.E. Selin, G. Sistla, and K. Vijayaraghavan. The North American Mercury Model Intercomparison Study (NAMMIS). Study description and model-to-model comparison. *Journal of Geophysical Research* 113(D17310):1-17 (2008).

Butler, T.J., **M.D. Cohen,** F.M. Vermeylen, G.E. Likens, D. Schmeltz, and **R.S. Artz.** Regional precipitation mercury trends in the eastern USA, 1998-2005: Declines in the Northeast and Midwest, no trend in the Southeast. *Atmospheric Environment* 42:1582-1592 (2008).

**Carlton, A.G.,** B.J. Turpin, K.E. Altieri, S.P. Seitzinger, **R. Mathur, S.J. Roselle,** and R.J. Weber. CMAQ model performance enhanced when in-cloud secondary organic aerosol is included: Comparisons of organic carbon predictions with measurements. *Environmental Science & Technology* 42:8798-8802 (2008).

Cook, R., **V. Isakov, J. S. Touma, W. Benjey,** J. Thurman, E. Kinnee, and D. Ensley. Resolving local scale emissions for near roads modeling assessments. *Journal of the Air & Waste Management Association* 58(3):451-461 (2008).

Davidson, P., **K.L. Schere, R. Draxler,** S. Kondragunta, R. Wayland, J. F. Meagher, and **R. Mathur.** Toward a US national air quality forecast capability: Current and planned capabilities. Chapter 2, Carlos Borrego, Ana Isabel Miranda (ed.), *Air Pollution Modeling and its Application XIX*. Springer, New York, NY, 226-234 (2008).

Davis, J.M., **P.V. Bhave,** and K.M. Foley. Parameterization of N<sub>2</sub>O<sub>5</sub> reaction probabilities on the surface of particles containing ammonium, sulfate, and nitrate. *Atmospheric Chemistry and Physics*, 8, 5295-5311 (2008).

**Dennis, R.L., P.V. Bhave,** and **R.W. Pinder.** Observable Indicators of the sensitivity of PM<sub>2.5</sub> nitrate to emission reductions, Part II: Sensitivity to errors in total ammonia

and total nitrate of the CMAQ-predicted nonlinear effect of SO<sub>2</sub> emission reductions. *Atmospheric Environment* 42:1287-1300 (2008).

Dommergue, A, C.P. Ferrari, M. Amyot, S. Brooks, F. Sprovieri, and A. Steffen. Spatial coverage and temporal trends of atmospheric mercury measurements in polar regions. Chapter 10, UNEP Report "Mercury Fate and Transport in the Global Atmosphere: Measurements, Models and Policy Implications," Nicola Pirrone and Robert Mason (Eds), 220-242 (2009).

**Eckman, R.M.** Comment on "Dynamical Implications of Block Averaging" by G. Treviño and E.L. Andreas. *Boundary-Layer Meteorology* 127:345-351 (2008).

**Eckman, R.M.** Comment on the Reply of G. Treviño and E.L. Andreas. *Boundary Layer Meteorology* 127:357-358 (2008).

Eisele, F., D.D. Davis, D. Helmig, S.J. Oltmans, W. Neff, G. Huey, D. Tanner, G. Chen, J. Crawford, R. Arimoto, M. Buhr, L. Mauldin, M. Hutterli, J. Dibb, D. Blake, S.B. Brooks, B. Johnson, J.M. Roberts, Y. Wang, D. Tan, and F. Flocke. Antarctic Tropospheric Chemistry Investigation (ANTCI) 2003 overview. *Atmospheric Environment* 42(12):2749-2761 (2008).

Ervens, B., **A. G. Carlton**, B.J. Turpin, K.E. Altieri, S. M. Kreidenwies, and G. Feingold. Secondary organic aerosol yields from cloud-processing of isoprene oxidation products. *Journal of Geophysical Research Letters*.35 L02816 (2008).

**Finn, D., K.L. Clawson, R.G. Carter, J.D. Rich**, and K.J. Allwine. Plume Dispersion Anomalies in a Nocturnal Urban Boundary Layer in Complex Terrain. *Journal of Applied Meteorology and Climatology* 47(11): 2857-2878, doi:10.1175/2008JAMC1864.1 (2008)

**Garcia, V.**, N. Fann, R. Haeuber, and P. Lorang. Assessing the public health impact of regional-scale air quality regulations. *Journal of the Air & Waste Management Association*, EM, 29-34 (2008).

**Gego, E., A. Gilliland, J. Godowitch, S.T. Rao**, P.S. Porter, and C. Hogrefe. Modeling analyses of the effects of changes in nitrogen oxides emissions from the electric power sector on ozone levels in the eastern United States. *Journal of the Air & Waste Management Association* 58:580-588 (2008).

Gego, E., P.S. Porter, **V. Garcia**, C. Hogrefe, and **S. Rao**. Fusing observations and model results for creation of enhanced ozone spatial fields: Comparison of three techniques. Chapter 3.0, Carlos Borrego and Ana Isabel Miranda (ed.), Air Pollution Modeling and Its Application XIX. Springer, New York, NY, (Series C):339-346 (2008).

- Gilliland, A., J.M. Godowitch**, C. Hogrefe, and **S. Rao**. Evaluating regional-scale air quality models. Chapter 4, Carlos Borrego, Ana Isabel Miranda (ed.), *Air Pollution Modeling and Its Application XIX*. Springer, New York, NY, 412-419 (2008).
- Gilliland, A.B.**, C. Hogrefe, **R.W. Pinder**, J.M. Godowitch, K.L. Foley, and S.T. Rao. Dynamic evaluation of regional air quality models: Assessing changes in O<sub>3</sub> stemming from changes in emissions and meteorology. *Atmospheric Environment* 42:5110-5123 (2008).
- Godowitch, J., A. Gilliland, R. Draxler**, and **S.T. Rao**. Modeling assessment of point source NO<sub>x</sub> emission reductions on ozone air quality in the eastern United States. *Atmospheric Environment* 42(1):87-100 (2008).
- Godowitch, J.M.**, C. Hogrefe, and **S. Rao**. Diagnostic analyses of a regional air quality model: Changes in modeled processes affecting ozone and chemical-transport indicators from NO<sub>x</sub> point source emission reductions. *Journal of Geophysical Research* 113(D19303):1-15 (2008).
- Gu, L., P.M. Hanson, W.M. Post, D.P. Kaiser, B. Yang, R. Nemani, S.G. Pallardy, and **T. Meyers**. The 2007 eastern US spring freeze: Increased cold damage in a warming world? *Bioscience* 58(3):253-262 (2008).
- Hicks, B.B.** On estimating dry deposition rates in complex terrain. *Journal of Applied Meteorology and Climatology* 47:1651-1658 (2008).
- Hogrefe, C., J. Ku, G. Sistla, **A. Gilliland, J. Irwin**, P. S. Porter, E. Gego, P. Kasibhatla, and **S. Rao**. Has the performance of regional-scale photochemical modelling systems changed over the past decade? Chapter 4, *Air Pollution Modeling and Its Application XIX*. Springer, New York, NY, 394-403 (2008).
- Huang, H.-C., J. Lin, Z. Tao, H. Choi, K. Patten, K. Kunkel, M. Xu, J. Zhu, X.-Z. Liang, A. Williams, M. Caughey, D. J. Wuebbles, and **J. Wang**. Impacts of long-range transport of global pollutants and precursor gases on US air quality under future climatic conditions. *Journal of Geophysical Research*, 113, D19307, doi:10.1029/2007JD009469 (2008).
- Irwin, J.S.**, K. Civerolo, C. Hogrefe, W. Appel, K. Foley, and J. Swall. A procedure for inter-comparing the skill of regional-scale air quality model simulations of daily maximum 8-h ozone concentrations. *Atmospheric Environment* 42:5403-5412 (2008).
- Isakov, V.**, and H.A. Ozkaynak. A modeling methodology to support evaluation public health impacts on air pollution reduction programs. Chapter 7, Carlos Borrego, Ana Isabel Miranda (ed.), *Air Pollution Modeling and Its Application XIX*. Springer, New York, NY, 614-622 (2008).

- Kang, D., **R. Mathur**, **S.T. Rao**, and S. Yu. Bias adjustment techniques for improving ozone air quality forecasts. *Journal of Geophysical Research*, Vol. 113, D23308, doi:10.1029/2008JD010151, 17 pp. (2008).
- Kirby, S. R. Dobosy, D. Williamson, and E. Dumas. An aircraft-based data analysis method for discerning individual fluxes in a heterogeneous agricultural landscape *Agricultural and Forest Meteorology*, 148(3):481-489 (2008).
- Lanzante, J.R., and **M. Free**. Comparison of radiosonde and GCM vertical temperature trend profiles: Effects of dataset choice and data homogenization. *Journal of Climate* 21, 5417-35, doi:10.1175/2008JCLI2287.1 (2008).
- Levy, H. II, D.T. Shindell, **A. Gilliland**, M.D. Schwarzkopf, L.W. Horowitz, (eds.) *Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research..* Department of Commerce, NOAA's National Climatic Data Center, Washington, D.C., 100 pp. (2008)
- Liang, X-Z., K.E. Kunkel, G.A. Meehl, R.G. Jones, and **J.L. Wang**. Regional climate models downscaling analysis of general circulation models present climate biases propagation into future change projections. *Geophysical Research Letters*, Vol. 35, L08709, doi:10.1029/2007GL032849 (2008).
- Liao, K-J., E. Tagaris, **S.L. Napelenok**, K. Manomaiphiboon, J-H. Woo, P. Amar, S. He, and A.G. Russel, Current and future linked responses of ozone and PM2.5 to emission controls. *Environmental Science & Technology* 42(13):4670-4675 (2008).
- Mathur, R.** Estimating the impact of the 2004 Alaskan forest fires on episodic particulate matter pollution over the eastern United States through assimilation of satellite-derived aerosol optical depths in a regional air quality model. *Journal of Geophysical Research*, Vol. 113, D17302, doi:10.1029/2007JD009767 (2008).
- Mathur, R.**, S. Yu, D. Kang, and **K.L. Schere**. Assessment of the wintertime performance of developmental particulate matter forecasts with the Eta-CMAQ modeling system. *Journal of Geophysical Research-Atmospheres* 113(D02303) (2008).
- Mathur, R.**, **S. J. Roselle**, **G. Pouliot**, and G. Sarwar. Diagnostic analysis of the three-dimensional sulfur distributions over the eastern United States using the CMAQ Model and measurements from the ICARTT Field Experiment. Chapter 5, *Air Pollution Modeling and its Application XIX*. Springer, New York, NY, 496-504 (2008).

- Napelenok, S.L.**, D.S. Cohan, M.T. Odman, and S. Tonse. Extension and evaluation of sensitivity analysis capabilities in a photochemical model. *Environmental Modelling & Software* 23:994-999 (2008).
- Napelenok, S. L., R. Pinder, A. B. Gilliland**, and R. V. Martin. A method of evaluating spatially-resolved NO<sub>x</sub> emissions using Kalman filter inversion, direct sensitivities, and space-based NO<sub>2</sub> observations. *Atmospheric Chemistry and Physics* 8:6469-6499 (2008).
- Napelenok, S., R.W. Pinder, A. Gilliland**, and R.V. Marin. Developing a method for resolving NO<sub>x</sub> emission inventory biases using discrete Kalman filter inversion, direct sensitivities, and satellite-based columns. Chapter 3, Carlos Borrego, Ana Isabel Miranda (ed.), *Air Pollution Modeling and its Application XIX*. Springer, New York, NY, 322-330 (2008).
- Nolte, C.G., P.V. Bhave**, J.R. Arnold, **R.L. Dennis**, K.M. Zhang, and A.S. Wexler. Modeling urban and regional aerosols—Application of the CMAQ-UCD aerosol model to Tampa, a coastal urban site. *Atmospheric Environment* 42:3179-3191 (2008).
- Nolte, C.G., A. B. Gilliland**, C. Hogrefe, and L.J. Mickley. Linking global to regional models to assess future climate impacts on surface ozone levels in the United States. *Journal of Geophysical Research* 113(D14307):1-14 (2008).
- Nolte, C.G., A. Gilliland**, and C. Hogrefe. Linking Global and Regional Models to Simulate U.S. Air Quality in the Year 2050. Chapter 6, Carlos Borrego, Ana Isabel Miranda (ed.), *Air Pollution Modeling and Its Application XIX*. Springer, New York, NY, 559-567 (2008).
- Otte, T.L.** The impact of nudging in the meteorological model for retrospective air quality simulations. Part I: Evaluation against national observation networks. *Journal of Applied Meteorology and Climatology* 47(7): 1853-1867 (2008).
- Otte, T.L.** The Impact of nudging in the meteorological model for retrospective air quality simulations. Part II: Evaluating collocated meteorological and air quality observations. *Journal of Applied Meteorology and Climatology* 47(7):1868-1887 (2008).
- Ozkaynak, H., T. Palma, **J. Touma**, and J. Thurman. Modeling population exposures to outdoor sources of hazardous air pollutants. *Journal of Exposure and Environmental Epidemiology* 18(1):45-58 (2008).
- Pinder, R.W. R.L. Dennis**, and **P.V. Bhave**. Observable indicators of the sensitivity of PM<sub>2.5</sub> nitrate to emission reductions, Part I: Derivation of the adjusted gas ratio

and applicability at regulatory-relevant time scales. *Atmospheric Environment* 42:1275-1286 (2008).

- Pinder, R.W., A.B. Gilliland, and R.L. Dennis.** Environmental impact of atmospheric NH<sub>3</sub> emissions under present and future conditions in the eastern United States. *Geophysical Research Letters*, Vol. 35, L12808, doi:10.1029/2008GL033732 (2008).
- Pleim, J.A., J.O. Young, D. Wong, R.C. Gilliam, T.L. Otte, and R. Mathur.** Two-way coupled meteorology and air quality modeling. Chapter 2, *Air Pollution Modeling and its Application XIX*, Springer, New York, NY, 235-242 (2008).
- Pongprueksa, P., C-J, Lin, S.E. Lindberg, C. Jang, T. Braverman, **O.R. Bullock, Jr.**, T. C. Ho, and H-W.Chu. Scientific uncertainties in atmospheric mercury models III: Boundary and initial conditions, model grid resolutions, and Hg (II) reduction mechanisms. *Atmospheric Environment* 42(8):1828-1845 (2008).
- Pouliot, G.**, T. Pace, B. Roy, **T. Pierce**, and D. Mobley. Development of a biomass burning emissions inventory by combining satellite and ground-based information. *Journal of Applied Remote Sensing*, Vol. 2, 021501, doi:10.1117/1.2939551 (2008).
- Pullen, J., **J. Ching**, D. Sailor, W. Thompson, B. Bornstein, and D. Koracin. Progress toward meeting the challenges of our coastal urban future. *Bulletin of the American Meteorological Society*, 1727-1731 (2008).
- Queen, A., Y. Zhang, **R. Gilliam**, and **J. Pleim**. Examining the sensitivity of MM5-CMAQ predictions to explicit, microphysics schemes and horizontal grid resolutions, Part I – Database, evaluation protocol and precipitation predictions. *Atmospheric Environment* 42(16):3842-3855 (2008).
- Rao, S.T.** Exposure science and its applications for effective environmental management. *Air & Waste Management Association, EM*, 7 (2008).
- Rao, S., R.L. Dennis, V. Garcia, A. Gilliland, R. Mathur, D. Mobley, T.E. Pierce, and K.L. Schere.** Summary Report of Air Quality Modeling Research Activities for 2006. U.S. Environmental Protection Agency, Washington, D.C., EPA/600/R-07/103 (NTIS PB2008-110094) (2008).
- Rao, S.T.**, C. Hogrefe, T. Holloway, and G. Kallos. Chapter 3. Long-Range Transport of Atmospheric Pollutants and Transboundary Pollution. *World Atlas of Atmospheric Pollution*, R. Sokhi, Editor, Anthem Press, 34-45 (2008).
- Roy, D., **G. Pouliot**, D. Mobley, G. Thompson, **T.E. Pierce**, A.J. Soja, J.J. Szykman, and J. Al-Saadi. Development of fire emissions inventory using satellite data.

Chapter 2, Carlos Borrego, Ana Isabel Miranda (ed.), Air Pollution Modeling and its Application XIX. Springer, New York, NY, 217-225 (2008).

Santer, B.D., P.W. Thorne, L. Haimberger, K.E. Taylor, T.M.L. Wigley, J.R. Lanzante, S. Solomon, **M. Free**, P.J. Gleckler, P.D. Jones, T.R. Karl, S.A. Klein, C. Mears, D. Nychka, G.A. Schmidt, S.C. Sherwood, and F.J. Wentz. Consistency of modelled and observed temperature trends in the tropical troposphere. *International Journal of Climatology* 28, 1703-1722, doi:10.1002/joc.1756 (2008).

Sarwar, G., **S.J. Roselle**, **R. Mathur**, **W. Appel**, **R.L. Dennis**, and B. Vogel. A comparison of CMAQ HONO predictions with observations from the Northeast Oxidant and Particle Study. *Atmospheric Environment* 42:5760-5770 (2008).

Sarwar, G., **R.L. Dennis**, and B. Vogel. The effect of heterogeneous reactions on model performance for nitrous acid. Chapter 4, Air Pollution Modeling and its Application XIX. Springer, New York, NY, 349-357 (2008).

**Seidel, D.J.**, Q. Fu, W.J. Randel and T.J. Reichler. Widening of the tropical belt in a changing climate. *Nature Geoscience*, doi:10.1038/ngeo.2007.38 (2008).

Steffen, A., T. Douglas, M. Amyot, P. Ariya, K. Aspmo, T. Berg, J. Bottenheim, S. Brooks, F. Cobbett, A. Dastoor, A. Dommergue, R. Ebinghaus, C. Ferrari, K. Gardfeldt, M.E. Goodsite, D. Lean, A. Poulain, C. Scherz, H. Skov, J. Sommar, and C. Temme. A synthesis of atmospheric mercury depletion event chemistry in the atmosphere and snow. *Atmospheric Chemistry and Physics*. 8:1445-1482 (2008).

Sullivan, T.J., B.J. Cosby, J.R. Webb, **R.L. Dennis**, A.J. Bulger, and F.A. Deviney. Streamwater acid-base chemistry and critical loads of atmospheric sulfur deposition in Shenandoah National Park, Virginia. *Journal of Environmental Monitoring and Assessment* 137(1-3):85-99 (2008).

Sunderland, E., **M. Cohen**, N. Selin, and G. Chmura. Reconciling models and measurements to assess trends in atmospheric mercury deposition. *Environmental Pollution*, 156, 526-535, doi:10.1016/j.envpol.2008.01.021 (2008).

Thoma, E.D., R.C. Shores, **V. Isakov**, and R.W. Baldauf. Characterization of near-road pollutant gradients using path-integrated optical remote sensing. *Journal of the Air & Waste Management Association* 58:879-890 (2008).

Thompson, A.M., T. Wilson, J.M. Norman, A.L. Gemechu, and A. Roa-Espinosa. Modeling the effect of summertime heating on urban runoff temperature. *Journal of the American Water Resources Association* 44(6): 1-16, doi:10.1111/j.1752-1688.2008.00259.x (2008).



- Watkins, T., S.T. **Rao**, and R. Wyzga. The role of exposure science in air quality management. *Journal of the Air & Waste Management Association*, EM, 24-27 (2008).
- Watkins, T.H., R.W. Williams, A.F. Vette, J.M. Burke, B.J. George, and **V. Isakov**. The importance of exposure in addressing current and emerging air quality issues. Chapter 7, *Air Pollution Modeling and Its Application XIX*. Springer, New York, NY, 640-647, (2008).
- Zeng, M.J., W.S. Lu, X.Z. Liang, and **J.X.L. Wang**. Ensemble forecast experiment on prediction in summer by CWRf Numeric Model. *Plateau Meteorology* 27(6): (in Chinese) (2008).
- Yu S., **R. Mathur**, **K. Schere**, D. Kang, **J. Pleim**, **J. Young**, D. Tong, **G. Pouliot**, S.A. McKeen, and **S.T. Rao**. Evaluation of real-time PM 2.5 forecasts and process analysis for PM 2.5 formation over the eastern United States using the Eta-CMAQ forecast model during the 2004 ICARTT study. *Journal of Geophysical Research*, 113, D06204, doi:10.1029/2007JD009226 (2008).