Contents

ROLE OF ATMOSPHERIC MODELS IN AIR POLLUTION POLICY AND ABATEMENT STRATEGIES

1. A Photochemical Screening Tool Based on a Scale Analysis of Ozone Photochemistry 3
   B. Ainslie and D. G. Steyn

2. Modeling and Analysis of Ozone and Nitrogen Oxides in the Southeast United States National Parks 13
   V. P. Aneja, Q. Tong, D. Kang, and J. D. Ray

3. An Investigation of Local Anthropogenic Effects on Photochemical Air Pollution in Istanbul with Model Study 20
   U. Anteplioglu, S. Incecik, and S. Topcu

4. Forecasting Urban Meteorology, Air Pollution and Population Exposure (European FUMAPEX Project) 29
   A. Baklanov, N. Bjergene, B. Fay, S. Finardi, A. Gross, M. Jantunen, J. Kukkonen, A. Rasmussen, A. Skouloudis, L. H. Slørdal, and R. S. Sokhi

5. Models-3/CMAQ Simulations to Estimate Transboundary Influences on Ozone and Particulate Matter Concentrations Over Ontario in Spring–Summer 1998 41
   An. Chtcherbakov, R. Bloxam, D. Yap, D. Fraser, N. Reid, and S. Wong

6. Cost-Optimized Air Pollution Control Using High-Order Sensitivity Analysis 48
   D. S. Cohan and A. G. Russell

7. Seasonal Evaluation of EU Road Traffic Emission Abatement Strategies on Photochemical Pollution in Northern Italy 59
   G. Finzi, V. Gabusi, and M. Volta

8. Risk Based Approaches to Assessing the Environmental Burden of Acid Gas Emissions 68
   B. Fisher

9. Assessment of Different Land Use Development Scenarios in Terms of Traffic Flows and Associated Air Quality 77
F. Lefebre, K. De Ridder, S. Adriaensen, L. Janssen, L. Int Panis, S. Vermoote, J. Dufek, A. Wania, J. Hirsch, C. Weber, and A. Thierry

10. Concentrations of Toxic Air Pollutants in the U.S. Simulated by an Air Quality Model 87
D. J. Luecken and W. T. Hutzell

11. A Numerical Study of Recirculation Processes in the Lower Fraser Valley (British Columbia, Canada)..... 97
A. Martilli and D. G. Steyn

12. A Preliminary Estimate of the Total Impact of Ozone and PM2.5 Air Pollution on Premature Mortalities in the United States 102
D. L. Mauzerall and Q. Tong

13. Application of a Comprehensive Acid Deposition Model in Support of Acid Rain Abatement in Canada 109
M. D. Moran

14. Modeling Source-Receptor Relationships and Health Impacts of Air Pollution in the United States..... 119
Q. Tong, D. Mauzerall, and R. Mendelsohn

INTEGRATED REGIONAL MODELING

15. Evaluation of Local Ozone Production of Chamonix Valley (France) During a Regional Smog Episode 129
E. Chaxel, G. Brulfert, C. Chemel, and J.-P. Chollet

16. Alternative Approaches to Diagnosing Ozone Production Regime..... 140
D. S. Cohan, Y. Hu, and A. G. Russell

17. Analysis of Seasonal Changes of Atmospheric Aerosols on Different Scales in Europe Using Sequentially Nested Simulations..... 149
A. Ebel, M. Memmesheimer, E. Friese, H. J. Jakobs, H. Feldmann, C. Kessler, and G. Piekorz

18. Interaction Between Meteorological and Dispersion Models at Different Scales 158
E. Genikhovich, M. Sofiev, and I. Gracheva

19. Modeling Photochemical Pollution in the Northeastern Iberian Peninsula..... 167
P. Jiménez, O. Jorba, R. Parra, C. Pérez, and J. M. Baldasano

20. Modeling the Weekend Effect in the Northeastern Iberian Peninsula 177
P. Jiménez, R. Parra, S. Gassó, and J. M. Baldasano

21. Transport and Deposition Patterns of Ozone and Aerosols in the Mediterranean Region 187
G. Kallos, M. Astitha, F. Gofa, M. O'Connor, N. Mihalopoulos, and Z. Zlatev

22. On the Formulation and Implementation of Urban Boundary Conditions for Regional Models 197
C. Mensink

23. Computational Model for Transient Pollutants Dispersion in City Intersection and Comparison with Measurements 207
J. Pospisil and M. Jicha

EFFECTS OF CLIMATE CHANGE ON AIR QUALITY

24. Air Quality in Future Decades – Determining the Relative Impacts of Changes in Climate, Emissions, Global Atmospheric Composition, and Regional Land Use 217
C. Hogrefe, B. Lynn, B. Solecki, J. Cox, C. Small, K. Knowlton, J. Rosenthal, R. Goldberg, C. Rosenzweig, K. Civerolo, J.-Y. Ku, S. Gaffin, and P. L. Kinney

25. Calculated Feedback Effects of Climate Change Caused by Anthropogenic Aerosols 227
T. Iversen, J. E. Kristjánsson, A. Kirkevåg, and Ø. Seland

26. Dimethyl Sulphide (DMS) and its Oxidation to Sulphur Dioxide Downwind of an Ocean Iron Fertilization Study, SERIES: A Model for DMS Flux 237
A. L. Norman, and M. A. Wadleigh

AEROSOLS AS ATMOSPHERIC CONTAMINANTS

27. Aerosol Modelling with CAMX4 and PMCAMX: A Comparison Study..... 247
S. Andreani-Aksoyoglu, J. Keller, and A. S. H. Prévôt

28. Source Apportionment of Primary Carbonaceous Aerosol Using the Community Multiscale Air Quality Model 257
P. V. Bhave, G. A. Pouliot, and M. Zheng

29. Urban Population Exposure to Particulate Air Pollution Induced by Road Transport 267
C. Borrego, O. Tchepel, A. M. Costa, H. Martins, and J. Ferreira

30. Numerical Simulation of Air Concentration and Deposition of Particulate Metals Emitted from a Copper Smelter and a Coal Fired Power Plant During the 2000 Field Experiments on Characterization of Anthropogenic Plumes 277
S. M. Daggupaty, C. M. Banic, and P. Cheung

31. Aerosol Production in the Marine Boundary Layer Due to Emissions from DMS: Study Based on Theoretical Scenarios Guided by Field Campaign Data 286
A. Gross and A. Baklanov

32. Modelling the Atmospheric Transport and Environmental Fate of Persistent Organic Pollutants in the Northern Hemisphere using a 3-D Dynamical Model 295
K. M. Hansen, J. H. Christensen, J. Brandt, L. M. Frohn, and C. Geels

33. PM-Measurement Campaign HOVERT: Transport Analysis of Aerosol Components by use of the CTM REM–CALGRID 303
A. Kerschbaumer, M. Beekmann, and E. Reimer

34. Direct Radiative Forcing due to Anthropogenic Aerosols in East Asia During 21-25 April 2001 312
S.-U. Park and L.-S. Chang

35. Modelling Fine Aerosol and Black Carbon over Europe to Address Health and Climate Effects 321
M. Schaap and P. J. H. Builtjes

36. An Approach to Simulation of Long-Range Atmospheric Transport of Natural Allergens: An Example of Birch Pollen 331
P. Siljamo, M. Sofiev, and H. Ranta

37. Cloud Chemistry Modeling: Parcel and 3D Simulations 340
A.-M. Sehili, R. Wolke, J. Helmert, M. Simmel, W. Schröder, and E. Renner

38. A Test of Thermodynamic Equilibrium Models and 3-D Air Quality Models for Predictions of Aerosol NO_3^- 351
S. Yu, R. Dennis, S. Roselle, A. Nenes, J. Walker, B. Eder, K. Schere, J. Swall, and W. Robarge

NEW DEVELOPMENTS

39. Comparison of Aggregated and Measured Turbulent Fluxes in an Urban Area 363
E. Batchvarova, S.-E. Gryning, M. W. Rotach, and A. Christen

40. Ensemble Dispersion Modeling: “All for One, One for All!” 371
S. Galmarini

41. Linking the ETA Model with the Community Multiscale Air Quality (CMAQ) Modeling System: Ozone Boundary Conditions 379
P. C. Lee, J. E. Pleim, R. Mathur, J. T. McQueen, M. Tsidulko, G. DiMego, M. Iredell, T. L. Otte, G. Pouliot, J. O. Young, D. Wong, D. Kang, M. Hart, and K. L. Schere

42. Mixing in Very Stable Conditions 391
L. Mahrt and D. Vickers

43. Air Quality Ensemble Forecast Over the Lower Fraser Valley, British Columbia 399
L. Delle Monache, X. Deng, Y. Zhou, H. Modzelewski, G. Hicks, T. Cannon, R. B. Stull, and C. di Cenzo

44. Developments and Results from a Global Multiscale Air Quality Model (GEM-AQ) 403
L. Neary, J. W. Kaminski, A. Lupu, and J. C. McConnell

45. A Variable Time-Step Alogrithm for Air Quality Models 411
M. T. Odman and Yongtao Hu

46. Temporal Signatures of Observations and Model Outputs: Do Time Series Decomposition Methods Capture Relevant Time Scales? 421
P. S. Porter, J. Swall, R. Gillian, E. L. Gego, C. Hogrefe, A. Gilliland, J. S. Irwin, and S. T. Rao

47. Wind Tunnel Study of the Exchange Between a Street Canyon and the External Flow 430
P. Salizzoni, N. Grosjean, P. Méjean, R. J. Perkins, L. Soulhac, and R. Vanliefferinge

48. An Example of Application of Data Assimilation Technique and Adjoint Modelling to an Inverse Dispersion Problem Based on the ETEX Experiment 438
M. Sofiev and E. Atlaskin

49. Micro-Swift-Spray (MSS): A New Modelling System for the Simulation of Dispersion at Microscale. General Description and Validation 449
G. Tinarelli, G. Brusasca, O. Oldrini, D. Anfossi, S. Trini Castelli, and J. Moussafir

50. New Developments on RAMS-Hg Model 459
A. Voudouri and G. Kallos

51. Adaptation of Analytic Diffusivity Formulations to Eulerian Grid Model Layers of Finite Thickness 468
R. J. Yamartino, J. Flemming, and R. M. Stern

52. Particulate Matter Source Apportionment Technology (PSAT) in the CAMx Photochemical Grid Model 478
G. Yarwood, R. E. Morris, and G. M. Wilson

MODEL ASSESSMENT AND VERIFICATION

53. Testing Physics and Chemistry Sensitivities in the U.S. EPA Community Multiscale Air Quality Modeling System (CMAQ) 495
J. R. Arnold and R. L. Dennis

54. Real-Time Regional Air Quality Modelling in Support of the ICARTT 2004 Campaign 505
V. S. Bouchet, S. Ménard, S. Gaudreault, S. Cousineau, R. Moffet, L.-P. Crevier, W. Gong, P. A. Makar, M. D. Moran, and B. Pabla

55. High Time-Resolved Comparisons for In-Depth Probing of CMAQ Fine-Particle and Gas Predictions 515
R. L. Dennis, S. J. Roselle, R. Gilliam, and J. Arnold

56. Sensitivity Analysis of the EUROS Model for the 2003 Summer Smog Episode in Belgium 525
F. Deutsch, S. Adriaensen, F. Lefebre, and C. Mensink

57. A Performance Evaluation of the 2004 Release of Models-3 CMAQ 534
B. K. Eder and S. Yu

58. Objective Reduction of the Space-Time Domain Dimensionality for Evaluating Model Performance 543
E. Gégo, P. S. Porter, C. Hogrefe, R. Gilliam, A. Gilliland, J. Swall, J. Irwin, and S. T. Rao

59. Cloud Processing of Gases and Aerosols in a Regional Air Quality Model (AURAMS): Evaluation Against Aircraft Data 553
W. Gong, V. S. Bouchet, P. A. Makar, M. D. Moran, S. Gong, and W. R. Leaitch

60. Evaluation of an Annual Simulation of Ozone and Fine Particulate Matter over the Continental United States – Which Temporal Features are Captured? 562
C. Hogrefe, J. M. Jones, A. Gilliland, P. S. Porter, E. Gego, R. Gilliam, J. Swall, J. Irwin, and S. T. Rao

61. Evaluation of CMAQ PM Results Using Size-resolved Field Measurement Data: The Particle Diameter Issue and Its Impact on Model Performance Assessment 571
W. Jiang, E. Giroux, H. Roth, and D. Yin

62. The U.K. Met Office's Next-Generation Atmospheric Dispersion Model, NAME III 580
A. Jones, D. Thomson, M. Hort, and B. Devenish

63. An Operational Evaluation of ETA-CMAQ Air Quality Forecast Model 590
D. Kang, B. K. Eder, R. Mathur, S. Yu, and K. L. Schere

64. AURAMS/Pacific2001 Measurement Intensive Comparison 599
P. A. Makar, V. S. Bouchet, W. Gong, M. D. Moran, S. Gong, A. P. Dastoor, K. Hayden, H. Boudries, J. Brook, K. Strawbridge, K. Anlauf, and S. M. Li

65. Analyzing the Validity of Similarity Theories in Complex Topographies..... 608
O. L. L. Moraes, O. Acevedo, C. A. Martins, V. Anabor, G. Degrazia, R. da Silva, and D. Anfossi

66. Siting and Exposure of Meteorological Instruments at Urban Sites..... 615
T. R. Oke

67. The Effect of the Street Canyon Length on the Street Scale Flow Field and Air Quality: A Numerical Study 632
I. Ossanlis, P. Barmpas, and N. Moussiopoulos

68. Limitations of Air Pollution Episodes Forecast due to Boundary-Layer Parameterisations Implemented in Mesoscale Meteorological Models..... 641
L. H. Slørdal, S. Finardi, E. Batchvarova, R. S. Sokhi, E. Fragkou, and A. D'Allura

POSTERS
ROLE OF ATMOSPHERIC MODELS IN AIR POLLUTION POLICY AND ABATEMENT STRATEGIES

69. Use of Lagrangian Particle Model Instead of Gaussian Model for Radioactive Risk Assessment in Complex Terrain..... 653
M. Z. Božnar, and P. Mlakar

70. Study of Air Pollutant Transport in Northern and Western Turkey..... 656
T. Kindap, A. Unal, S.-H. Chen, Y. Hu, T. Odman, and M. Karaca

71. Source Term Assessment from Off-Site Gamma Radiation Measurements..... 659
B. Lauritzen and M. Drews

72. Determination of the Impact of Different Emission Sources in the Air Quality Concentrations: The Teap Tool..... 662
R. San José, J. L. Pérez, and R. M. González

73. Advanced Atmospheric Dispersion Modelling and Probabilistic Consequence Analysis for Radiation Protection Purposes in Germany 664
H. Thielen, W. Brücher, R. Martens, and M. Sogalla

INTEGRATED REGIONAL MODELING

74. Comparison of Different Turbulence Models Applied to Modelling of Airflow in Urban Street Canyon and Comparison with Measurements 669
M. Jicha and J. Pospisil

75. Pollutant Dispersion in a Heavily Industrialized Region: Comparison of Different Models 671
M. R. Soler, S. Ortega, C. Soriano, D. Pino, and M. Alarcón

76. Study of Odor Episodes Using Analytical and Modeling Approaches 674
C. Soriano, F. X. Roca, and M. Alarcón

77. Application of Back-Trajectory Techniques to the Characterization of the Regional Transport of Pollutants to Buenos Aires, Argentina 677
A. G. Ulke

EFFECTS OF CLIMATE CHANGE ON AIR QUALITY

78. Application of Source-Receptor Techniques to the Assessment of Potential Source Areas in Western Mediterranean 683
M. Alarcón, A. Avila, X. Querol, and M. Rosa Soler

NEW DEVELOPMENTS

79. Influence of the Autocorrelation Function in the Derivation of Fundamental Relationship $\varepsilon \infty \sigma_v^2/C_0 T_{Lv}$ 689
G. A. Degrazia, O. C. Acevedo, J. C. Carvalho, A. G. Goulart, O. L. L. Moraes, H. F. Campos Velho, and D. M. Moreira

80. A Model for Describing the Evolution of the Energy Density Spectrum in the Convective Boundary Layer Growth..... 692
A. Goulart, H. F. C. Velho, G. Degrazia, D. Anfossi, O. Acevedo, O. L. L. Moraes, D. Moreira, and J. Carvalho

81. Simulation of the Dispersion of Pollutants Considering Nonlocal Effects in the Solution of the Advection-Diffusion Equation 695
D. M. Moreira, C. Costa, M. T. Vilhena, J. C. Carvalho, G. A. Degrazia, and A. Goulart

82. Concentration Fluctuations in Turbulent Flow..... 698
L. Mortarini and E. Ferrero

MODEL ASSESSMENT AND VERIFICATION

83. Skill's Comparison of Three Canadian Regional Air Quality Models Over Eastern North America for the Summer 2003 703
D. Dégardin, V. Bouchet, and L. Neary

84. Region-Based Method for the Verification of Air Quality Forecasts 708
S. Gaudreault, L.-P. Crevier, and M. Jean

85. On the Comparison of Nesting of Lagrangian Air-Pollution Model Smog to Numerical Weather Prediction Model ETA and Eulerian CTM CAMX to NWP Model MM5: Ozone Episode Simulation 711
T. Halenka, K. Eben, J. Brechler, J. Bednar, P. Jurus, M. Belda, and E. Pelikan

86. High Resolution Air Quality Simulations with MC2-AQ and GEM-AQ 714
J. W. Kamiński, L. Neary, A. Lupu, J. C. McConnell, J. Strużewska, M. Zdunek, and L. Łobocki

87. Nonlinear Models to Forecast Ozone Peaks 721
C. Novara, M. Volta, and G. Finzi

88. Evaluation of MC2 Profile Data During the Pacific2001 Field Study 724
B. J. Snyder and X. Qiu

List of Participants.....727