QUARTERLY NEWS FROM THE ATMOSPHERIC SCIENCES

Pacific Northwest National Laboratory **Issue 3, No. 1, January-March 2004**

MIRAGE Steering Committee Meeting

Jerome Fast attended the MIRAGE Steering Committee Meeting on January 5 and 6 that was hosted by Mario and Luisa Molina at the Massachusetts Institute of Technology in Cambridge, Massachusetts. The committee discussed details of the upcoming Mexico City field experiment planned for 2006 and finished the white paper that has been submitted to the National Science Foundation for approval.

AMS's 84th Annual Meeting

Carl Berkowitz, Jerome Fast, Ruby Leung, Mikhail Ovtchinnikov, and Dave Whiteman attended the American Meteorological Society's 84th Annual Meeting in Seattle, Washington, from January 11-15. Carl gave an oral presentation describing the results of a modeling study of hydrocarbon chemistry based on observations made in a large urban area. Ruby gave an invited presentation at the Session on "Scale Issues in Weather and Climate Modeling, Including Downscaling and Validation" at the 18th Conference on Hydrology. Mikhail gave an oral presentation at the 15th Symposium on Global Change and Climate Variations. The presentation, which was listed as one of the "Hot Topics" in the Daily BAMS during the conference, reported on the results from the LDRD project "Framework for Climate Modeling using Super Parameterization Technique" led by Tom Ackerman. During the AMS meeting, Jerome also participated in the WRF-Chem Working Group meeting on January 11 to discuss activities of various groups that are implementing chemistry into the Weather Research and Forecasting (WRF) model.

To those of you who are receiving a hard copy of this newsletter: If you would prefer to receive the newsletter via e-mail, please e-mail me at ruth.keefe@pnl.gov with your e-mail address.

Newsletters Online

The Atmospheric Sciences Newsletters are now online (present and past issues)! Visit the Atmospheric Sciences web page at http://www.pnl.gov/ atmos_sciences/.

ETV

Check out the latest edition of the Quarterly Newsletter of the ETV Advanced Monitoring Systems (AMS) Center, *The Monitor*, for additional information about EPA's Environmental Technology Verification Program and all six of its centers on the World Wide Web at http://www.epa.gov/etv or you can go directly to the AMS pilot's information at http://www.epa.gov/etv/07/07_main.htm.

TCEQ's Science Coordination Committee

Carl Berkowitz traveled to Austin, Texas, the week of February 2 to participate in the Texas Commission on Environmental Quality's Science Coordination Committee, where he participated in planning meetings for the proposed Texas 2006 Air Quality Study. The focus of this study will include investigations designed to develop additional scientific understanding of the formation and build-up of fine particulate matter at both urban and regional scales.

USWRP Cool Season QPF Workshop

Ruby Leung was invited to attend the U.S. Weather Research Program (USWRP) Cool Season Quantitative Precipitation Forecasting (QPF) Workshop, February 2-4, 2004, in Boulder, Colorado, to identify challenges in cool-season QPF, including snow, and to explore how research can improve cool-season QPF. Ruby participated in working group discussions to develop research priorities for the USWRP QPF plan.

MeteoSwiss's Post-Experiment Workshop

Chuck Long traveled to Payerne, Switzerland, from February 9-17 to participate in a post-experiment workshop for an International Comparison Campaign for Temperature, Humidity and Cloud profiling at the Payerne Aerological Station, sponsored by MeteoSwiss (see http://www.meteoswiss.ch/en/Science/Research/IndexResearch.shtml). The primary purpose of the field experiment was to test ground-based temperature and humidity profiling and passive and active ground-based cloud detection systems. Chuck fielded an infrared thermometer system for cloud detection and cloud base temperature retrievals during the campaign. While in Payerne, he delivered a talk titled "Using an Infrared Thermometer for Cloud Base Temperature and Height Estimation."

News from the Atmospheric Sciences is published quarterly for parties interested in the work of atmospheric scientists at Pacific Northwest National Laboratory, which is operated for the U.S. Department of Energy by Battelle Memorial Institute. For more information contact:

W. Richard Barchet – Editor – (509) 372-6158 – Fax: (509) 372-6168 – e-mail: rich.barchet@pnl.gov

Pacific Northwest National Laboratory - P.O. Box 999, K9-30, Richland, WA 99352.

AAAS Annual Conference

Ruby Leung gave invited presentations at the American Association for the Advancement of Science Annual Conference, February 11-16, 2004, in Seattle, Washington, and the Third Workshop on Regional Climate Modeling, February 17-18, 2004, in Honolulu, Hawaii. In Honolulu, Ruby also attended the International Asian Monsoon Symposium and the Seventh Workshop on East Asian Climate, which were held during the same week with the Workshop on Regional Climate Modeling at the International Pacific Research Center, University of Hawaii.

NCAR Atmosphere Model Working Group Meeting

Steve Ghan and Tom Ackerman attended an NCAR Atmosphere Model Working Group meeting March 9 and 10 in Boulder, Colorado. Steve delivered two presentations: "Prediction of Cloud Droplet Number in CAM" and "Application of a Subgrid Orography Scheme to CAM and CLM2."

Inland Northwest Symposium on Research Needs in Support of Homeland Security

Larry Berg attended the Inland Northwest Symposium on Research Needs in Support of Homeland Security in Moscow, Idaho, on March 24 and 25. The symposium was designed to foster collaboration between WSU, University of Idaho, and PNNL in research areas of interest to the Department of Homeland Security.

2004 ARM Science Team Meeting

Many PNNL staff (approximately 25) attended, participated in and were involved with the organization and leadership of the annual ARM Science Team meeting that was held in Albuquerque, New Mexico, from March 22-26. See http://www.arm.gov/docs/research/stmeeting.html for details about presentations and posters.

Regional-Scale Climate Modeling Workshop, Lund, Sweden

Ruby Leung attended the Regional-Scale Climate Modeling Workshop held in Lund, Sweden, from March 29 to April 2, 2004. The workshop was sponsored by the World Climate Research Programme (WCRP) and organized into three sessions: 1) the merits and limitations; 2) applications and impacts; and 3) results from the EU Prediction of Regional Scenarios and Uncertainties for Defining EuropeaN Climate Change Risks and Effects (PRUDENCE). Ruby gave an oral presentation on the application of regional climate models to examine aerosol effects on regional climate and hydrological cycle in Asia.

TERC Research Team

Carl Berkowitz was asked to be a member of the Texas Environmental Research Consortium (TERC) Research Team and provide input to studies needed to improve air quality science and modeling in support of helping Texas cities meet federal air quality standards. He is joined by scientists from the University of Texas, Rice University, Texas A&M, the University of North Carolina, and the University of Alabama.

AMS Committee for Laser Atmospheric Studies

Dave Turner was nominated and has accepted joining the AMS Committee for Laser Atmospheric Studies. He will serve on this committee until at least January 2007.

Presentations/Publications

Abdul-Razzak, H., and S. J. Ghan
"Parameterization of the Influence of Organic Compounds Surfactants on Aerosol Activation." *Journal of Geophysical Research* 109(D3):D03205, doi: 10.1029/2003JD004043.

Barnard, J. C., and C. N. Long
"A Simple Empirical Equation to Calculate Cloud Optical Thickness Using Shortwave Broadband Measurements." *J. Appl. Meteor.* (in press).

Berg, L. K., and R. B. Stull
"Parameterization of Joint Frequency Distributions of Potential Temperature and Water Vapor Mixing Ratio in the Daytime Convective Boundary Layer." *Journal of the Atmospheric Sciences* 61(7):813-828.

Berkowitz, C. M., C. W. Spicer, and P. V. Doskey
"Photochemical Production Rates in Western Houston." Presented at the Symposium on Atmospheric Chemistry, American Meteorological Society's 84th Annual Meeting, January 11-16, 2004, Seattle, Washington.

De Wekker, S.F.J., D. G. Steyn , J. D. Fast, M. W. Rotach, and S. Zhong
"The Performance of RAMS in Representing the Convective Boundary Layer Structure in a Very Steep Valley." *Environmental Fluid Mechanics* (in press).

De Wekker, S.F.J., D. G. Steyn, and S. Nyeki
"A Comparison of Aerosol Layer- and Convective Boundary Layer Structure Over a Mountain Range During STAAARTE '97." *Boundary-Layer Meteorology* (in press).

De Wekker, S.F.J.
"Structure and Morphology of the Convective Boundary Layer in Mountainous Terrain." Presented at the National Center for Atmospheric Research, February 6, 2004, Boulder, Colorado.

Disselkamp, R. S., K. M. Judd, T. R. Hart, C.H.F. Peden, G. J. Posakony, and L. J. Bond

"A Comparison Between Conventional and Ultrasound Mediated Heterogeneous Catalysis: Hydrogenation of 3-buten-1-ol Aqueous Solutions." *Journal of Catalysis* 221(2):347-353.

Dutton, E. G., A. Farhadi, R. S. Stone, C. N. Long, and D. W. Nelson

"Long-Term Variations in the Occurrence and Effective Solar Transmission of Clouds as Determined from Surface-Based Total Irradiance Observations." *J. Geophys. Res.* 109(D3):D03204, doi: 10.1029/2003JD003568. (This paper was subsequently selected as an AGU Journal Highlight, which AGU distributes to interested media outlets to help publicize the AGU and contributor research.)

Fast, J. D., and L.S. Darby

"An Evaluation of Mesoscale Model Predictions of Converging Down-Valley and Canyon Flows and Their Consequences Using Extensive Doppler Lidar Measurements During VTMX 2002." *Journal of Applied Meteorology* 43(3):420-436.

Ghan, S. J., and D. R. Collins

"Use of In Situ Data to Test a Raman Lidar-Based Cloud Condensation Nuclei Remote Sensing Method." *J. Atmos. & Ocean. Technol*. 21(2):387-394.

Leung, L. R.

"Changes in Seasonal and Extreme Hydrologic Conditions of the Western U.S. by Mid-Century." Invited presentation at the Technology, Society, and Global Energy Future Symposium, American Association for the Advancement of Science Annual Conference, February 11-16, 2004, Seattle, Washington.

Leung, L. R., and Y. Qian

"Downscaling of Weather and Climate Forecasts in Regions with Complex Orography." Invited presentation at the 18th Conference on Hydrology, 84th American Meteorological Society Annual Meeting, January 11-15, 2004, Seattle, Washington.

Leung, L.R., Y. Qian, X. Bian, W.M. Washington, J. Han, and J.O. Roads. 2004. "Mid-Century Ensemble Regional Climate Change Scenarios For the Western United States." Climatic Change, 62(1-3):75-113.

Leung, L. R., Y. Qian, C. E. Chul, and V. Ramanathan

"Simulating the Regional Climatic Effects of the Atmospheric Brown Cloud." Invited presentation at the Third Workshop on Regional Climate Modeling, February 17-18, 2004, Honolulu, Hawaii.

Leung, L. R., Y. Qian, V. Ramanathan, and C. E. Chung

"Simulating the Regional Climatic Effects of the Atmospheric Brown Cloud." Presented at the Regional-Scale Climate Modeling Workshop, March 29-April 2, 2004, Lund, Sweden.

Ludwig, F. L., J. Horel, and C. D. Whiteman

"Using EOF Analysis to Identify Important Surface Wind Patterns in Mountain Valleys." *J. Appl. Meteor*. (in press).

Ovtchinnikov M., T. Ackerman, R. Marchand, and M. Khairoutdinov

"Testing AGCM-Predicted Cloud and Radiation Properties with ARM Data: The Super-Parameterization Approach." In *Proceedings of the 15th Symposium on Global Change*, January 11-15, 2004, Seattle, Washington.

Sumner, A. L., E. J. Menke, Y. Dubowski, J. T. Newberg, R. M. Penner, J. C. Hemminger, L. M. Wingen, T. Brauers, and B. J. Finlayson-Pitts

"The Nature of Water on Surfaces of Laboratory Systems and Implications for Heterogeneous Chemistry in the Troposphere." *Phys. Chem. Chem. Phys.* 6(3):604-613.

Whiteman, C. D.

"Diurnal Thermally Driven Mountain Wind Systems." Invited presentation at the National Fire Weather Forecasters Training Course S-591, National Interagency Fire Center, National Weather Service, March 9, 2004, Boise, Idaho.

Whiteman, C. D.

"Temperature Inversion Buildup and Breakup in Small Basins in the Eastern Alps." Invited presentation at the NOAA/ERL Seminar Series, February 1, 2004, Boulder, Colorado.

Whiteman, C. D.

"Temperature Inversions in Small Basins of the Eastern Alps." Invited presentation at the Department of Geosciences Seminar Series, University of Houston, February 13, 2004, Houston, Texas.

Whiteman, C. D.

"Terrain Forced Mountain Winds." Invited presentation at the National Fire Weather Forecasters Training Course S-591, National Interagency Fire Center, National Weather Service, March 9, 2004, Boise, Idaho.

Whiteman, C. D., B. Pospichal, S. Eisenbach P. Weihs, C. B. Clements, R. Steinacker, E. Mursch-Radlgruber, and M. Dorninger

"Inversion Breakup in Small Rocky Mountain and Alpine Basins." *J. Appl. Meteor*. (in press).

Wood, A. W., L. R. Leung, V. Sridhar, and D. P. Lettenmaier

"Hydrologic Implications of Dynamical and Statistical Approaches to Downscaling Climate Model Outputs." *Climatic Change* 62(1-3):189-216.

The following papers/posters (along with many others from PNNL) were presented at the 2004 ARM Science Team Meeting, March 22-26, 2004, Albuquerque, New Mexico:

Clough, S. A., M. W. Shephard, E. J. Mlawer, J. S. Delamere, M. J. Iacono, K. Cady-Pereira, S. Boukabara, H. E. Revercomb, D. C. Tobin, D. D. Turner, and J. J. Morcrette, "Atmospheric Radiative Transfer Modeling: A Summary of AER Codes."

Comstock, J. M., T. P. Ackerman, and D. D. Turner, "Evidence of High Ice Supersaturation in Cirrus Clouds Using ARM Raman Lidar Measurements."

Comstock, J. M., D. D. Turner, and S. A. McFarlane, "High Clouds Microphysical Retrievals Intercomparison."

Comstock, J. M., T. P. Ackerman, and D. D. Turner, "ARM Raman Lidar Measurements of High Ice Supersaturation in Cirrus Clouds."

DeSlover, D. H., and D. D. Turner, "Cirrus Cloud Optical Properties Derived from AERI Measurements."

Ferrare, R., D. D. Turner, M. Clayton, B. Schmid, J. Redemann, D. Covert, R. Elleman, E. J. Welton, V. Brackett, J. A. Ogren, E. Andrews, and J.E.M. Goldsmith, "SGP CART Raman Lidar Measurements During the May 2003 Aerosol IOP."

Ghan, S., E. Chapman, R. Easter, J. Reid, and C. Justice, "Simulation of the Intercontinental Transport, Aging, and Removal of a Boreal Fire Smoke Plume."

Ghan, S., T. Rissman, R. Elleman, D. Covert, R. Ferrare, D. Turner, and J. Wang, "Testing a CCN Remote Sensing Method."

Ovtchinnikov, M., and S. Ghan, "Comparison of Cloud Resolving Model Simulations Using Size-Resolved and GCM Microphysics Parameterizations."

Schmid, B., W. P. Arnott, A. Bucholtz, P. Colarco, D. Covert, J. Eilers, R. Elleman, R. Ferrare, B. Holben, H. Jonsson, P. Pilewskie, K. Ricci, J. Reid, J. Redemann, J. Seinfeld, A. Strawa, D. D. Turner, J. Wang, and E. J. Welton, "Measurement and Modeling of Vertically Resolved Aerosol Optical Properties and Radiative Fluxes Over the ARM SGP Site During the May 2003 Aerosol IOP."

Sivaraman, C., D. D. Turner, and C. J. Flynn, "Aerosol Best Estimate VAP: An Update."

Tobin, D. C., H. E. Revercomb, R. O. Knuteson, F. A. Best, P. Antonelli, B. Baum, D. D. Turner, S. Ackerman, S. Nasiri, and R. E. Holz, "Scanning High Resolution Interferometer Sounder for M-PACE."

Turner, D. D., and A. Vogelmann, "CLOWD Intercomparison: First Results."

Turner, D. D., and C. N,. Long, "Aerosol Indirect Forcing in the Infrared at the SGP Site."

Turner, D. D., S. A. Clough, K. Cady-Pereira, E. E. Clothiaux, J. C. Liljegren, E. J. Mlawer, and K. L. Gaustad, "Improved PWV and LWP Retrievals from the Microwave Radiometer for ARM."

Turner, D. D., S. A. Clough, K. Cady-Pereira, E. E. Clothiaux, J. C. Liljegren, E. J. Mlawer, and K. L. Gaustad, "Improved PWV and LWP Retrievals from the Microwave Radiometer for ARM."