NOAA Air Resources Laboratory
Quarterly Activity Report
FY2011 Quarter 4
(July-September, 2011)

Contents

DISPERSION AND BOUNDARY LAYER

1. Collaboration between ARL and NOS OR&R

For the past year ARL and the National Ocean Service's Office of Response & Restoration (OR&R) have been working to combine the chemical source term of the ALOHA (Areal Locations of Hazardous Atmospheres) model with the HYSPLIT dispersion model with the goal of having a unified NOAA emergency response capability for chemical releases to the atmosphere. During this quarter the focus was on providing a common "look and feel" to the HYSPLIT web-based input screens to seamlessly merge with the ALOHA input screens. Planning has begun to make the experimental web site available to National Weather Service forecasters around the first of the year so that feedback can be obtained to further improve the interface.
(glenn.rolph@noaa.gov, roland.draxler@noaa.gov)

2. HYSPLIT Upgrades Delivered

A HYSPLIT upgrade package on radiological, volcanic ash, and other species transport and dispersion emergency response forecasting was delivered to the National Center for Environmental Prediction (NCEP) Environmental Modeling Center for transfer to NCEP operations. The package updates all HYSPLIT dispersion, trajectory, plotting, and associated programs at NCEP to the current version (August, 2011). The other HYSPLIT-formatted meteorology files created by NCEP are added as options to the NCEP emergency response capability, including some 1-hourly North American Mesoscale (NAM) and fine-scale "nest" files. The upgrade fulfills requirements of the World Meteorological Organization's Regional Specialized Meteorological Centers (RSMC) for radiological forecasting.
Barbara.Stunder@noaa.gov

3. HYSPLIT Forecast Trajectories Available to Fire and Emergency Managers

Effective September 19, 2011 through the end of December, the NWS Fire Weather program will test and evaluate requests made through their website from NWS forecasters and customers, such as fire and emergency managers, for HYSPLIT forecast trajectories to aide fire weather response/management. When a request is submitted through the NWS web site, it will be emailed to the ARL server. There the HYSPLIT trajectory will be automatically calculated and the results (in text, GIF, and Google Earth formats) will be emailed to the requester. Although the ARL server is not maintained in an operational setting, this level of service is acceptable to the NWS for this application. Barbara.Stunder@noaa.gov

4. BAT Probe Collaboration with Harvard

Work on the Best Aircraft Turbulence (BAT) probe for the ARL - Harvard collaboration continues. A journal paper was prepared and submitted for internal ARL review. Additionally, an abstract for the AMS conference in New Orleans in January 2012 was accepted and the presentation is being prepared. ed.dumas@noaa.gov

5. Texas Radiosonde Study

The Atmospheric Turbulence and Diffusion Division's (ATDD) field team successfully completed five days of high resolution radiosonde profiles at the Ocotillo Field Research site near Big Spring, Texas. During the study, radiosonde launches were conducted throughout day and night periods at two-hour increments. The goal of the study is to investigate the day and nighttime

planetary boundary layer (PBL) heights, and the formation and persistence of the low-level nocturnal jet. Scaling parameters associated with both phenomena are thought to be important for modeling vertical wind profiles. Analyses have revealed a persistent (in time) nocturnal jet with the maximum velocity at the base of the nighttime surface based inversion. While surface velocities are on the order of 3 m/s, the maximum velocity for the jet reaches near 20 m/s. This maximum in the nocturnal jet consistently peaks at 400 m above the local surface. Evidence of the persistence of the nocturnal jet is apparent in the radiosonde profiles acquired three hours after sunrise. will.pendergrass@noaa.gov, C. Vogel, R. White, E. Dumas, and D.L. Senn

Ed Dumas (left) and Randy White (right), with ARL's Atmospheric Turbulence and Diffusion Division, inflate a weather balloon as part of the Texas radiosonde study.

6. NOAA/DOE Wind Forecast Improvement Project

In mid July, the Field Research Division (FRD) team, Kirk Clawson, Shane Beard, Tom Strong, and Dennis Finn, deployed meteorological equipment at three sites in Texas for the Wind Forecast Improvement Project. FRD deployed a radar wind profiler, a fully instrumented meteorological tower, a minisodar, and a sonic anemometer at the Brady airport. A minisodar and sonic anemometer were deployed at the Colorado City airport where FRD is also providing the communications link for a radar wind profiler provided by STI. At the Jayton National Profiler Network site, which is an existing permanent NOAA 400 MHz radar profiler installation, FRD deployed a minisodar and sonic anemometer. Roger Carter and Brad Reese provided support from FRD for establishing remote communications with each site. The stations are expected to operate for one year and data are to be assimilated into high resolution forecast models, including the NOAA High Resolution Rapid Refresh (HRRR) model. FRD will perform general maintenance as part of planned site visits every 6-7 weeks during the course of the project.

All of the data are being quality checked on a routine daily and weekly basis. These checks indicate no apparent problems with the data. Sodar data recovery has been good at all sites except for a period of low relative humidity where recovery was diminished. There have been no identified problems with the sonic measurements at any of the sites.
Dennis.Finn@noaa.gov, Kirk Clawson, Shane Beard, Tom Strong, Brad Reese, Roger Carter, and Jason Rich

7. Extreme Turbulence (ET) Probe

Due to delayed FY11 funding, FRD was limited in its development work with the ET probe. The serial data line between the probe and the data acquisition computer was replaced by a fiber-optic cable to reduce the chances of voltage surges due to lightning traveling along the cable. Surge suppressors were also added to the power cable. Minor improvements were made to the data acquisition software. One ET probe was then deployed to Tennessee Reef in the Florida Keys during the last week of August. This is the same offshore navigation light FRD has used in the past. Unfortunately, the probe sustained some damage during a vulnerable time in the deployment. Much of the damage was repaired, but there was still some damage that was not repairable in the field. Although the probe currently is not fully functional, it has been running since August, and it appears that useful turbulence data is still being obtained from the system. Richard.Eckman@noaa.gov, Tom Strong, Roger Carter, Shane Beard, Randy Johnson

8. High Resolution Rapid Refresh (HRRR) Comparisons

Comparisons were made between the HRRR model forecasts and observations collected from the NOAA/Idaho National Laboratory Mesonet. The model still consistently under-predicts the near-surface wind speed in the Snake River Plain of Southeast Idaho. Preliminary reports from ARL Atmospheric Turbulence and Diffusion Division indicate that the model has no such bias at their wind-energy field site in Texas. This suggests the bias may be associated with the complex terrain in Idaho. Richard.Eckman@noaa.gov

9. Dust Transport/Tracer Dispersion Project

FRD participated in the second phase of the dust transport research project (19-22 September) being conducted by the Pacific Northwest National Laboratory and the Desert Research Institute on the Hanford Reservation in central Washington. The design of the experiment pairs collocated dust and tracer measurements, with the source for both species being dust generated by a vehicle driven on a dirt road while simultaneously releasing an inert non-depositing tracer. The first day was devoted to the initial setup and testing of the dust sampling equipment. Simultaneous tracer measurements were made using FRD's fast response tracer gas analyzers to identify the optimum tracer release rates. In the days following setup, periods for making measurements were often limited by unfavorable wind directions and wind speeds. This caused the second phase of the project to be terminated earlier than planned. The QC of the tracer data and preparation of the tracer database for the second phase of measurements was in progress at the end of the quarter. A third phase may occur in spring 2012.
Dennis.Finn@noaa.gov, Roger Carter

10. Collaboration with Boise State University on High Performance Computing

Initial work was started for the proposed acceleration of the HYSPLIT dispersion model execution times using Graphical Processing Unit (GPU) computing. FRD is collaborating with Dr. Inanc Senocak, Boise State University. Dr. Senocak is an expert in GPU code development and serves as the university lead for the project. Two Microway Xeon Whisperstation workstations, each with 2 NVIDIA Tesla C2070 6 gb GPU processors and necessary peripherals, were acquired by FRD. One of these will be installed for the duration of the project at Boise State University, where the primary research will be conducted. The other will be installed at FRD to enable FRD staff to review progress and test new developments generated by the research. Arrangements were made for the Boise State team to acquire the necessary HYSPLIT documentation and

programs to assist them in getting started. Dennis.Finn@noaa.gov, Rick Eckman

11. Wild Fires Support

The Special Operations Research Division (SORD) team, James Wood, Kip Smith, and Walt Schalk, worked in the NNSA/Nevada Operations Office Emergency Operations Center as the Consequence Assessment Team (CAT) in support of multiple wild fires events occurring on the Nevada National Security Site (NNSS). SORD provided a continuous weather surveillance on the NNSS monitoring wind speeds and direction, temperatures, and severe weather conditions (thunderstorms threatened and occurred on the site every day), and providing specific area and regional forecasting that supported fire-fighting efforts both on the ground and in the air. One set of events began Tuesday, 5 July and concluded on Monday, 11 July. The other set of events began Tuesday, 12 July and concluded Thursday, 14 July. A couple of other events occurred but did not require the CAT to stand up. kip.smith@noaa.gov, walter.w.schalk@noaa.gov

12. DOE Meteorological Coordinating Council

SORD Director, Walt Schalk, met with Tom Traceski (Director, DOE Office of Environmental Policy and Assistance, HS-22) and Ed Regnier (Chief, Radiation Protection Section of the DOE Office of Environmental Policy and Assistance, HS-22) to discuss how current DOE Meteorological Coordinating Council (DMCC) activities and products could be used for technical assistance in aiding the implementation of the new DOE O 458.1, Radiation Protection of the Public and the Environment. DOE O 458.1 is the first DOE Order to specifically require sites to operate and maintain a meteorological monitoring program. In addition, discussions related to future synergies between HS-22 and the DMCC were discussed, as well as potential future DMCC products that could benefit both programs. One of the first steps will be the DMCC involvement in the update to the meteorological portion, Chapter 5, of Guide DOE/EH-0173T, Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (walter.w.schalk@noaa.gov)

13. Completion of Mesonet Reduction Project

SORD technicians (Paul Rogers, Rick Lantrip, and James Wood) shut down the last group of MEDA (SORD/NNSS Mesonet) stations to complete the SORD Mesonet Reduction Project. The goal of the project was to identify the current needs of the NNSS facilities and users in terms of consequence assessment, compliance, rain gauge network consolidation, and general weather surveillance. Before the project started there were 32 MEDA stations in the mesonet. The new mesonet has 21 stations, which includes one test tower located near the SORD Electronics Shop. Test tower data will not be displayed to NNSS users. raymond.dennis@noaa.gov

14. Weather Support for NNSS Experiments

SORD received kudos from Ping Lee, Director of the National Center for Nuclear Security, National Security Technologies (NSTec) for the weather support provided to experiments carried out over the summer (walter.w.schalk@noaa.gov)

> On behalf of NSTec and especially the National Center for Nuclear Security, I am acknowledging the outstanding and cost-effective meteorological support provided by ARL/SORD during the execution of SPE-I and Peles. ARL/SORD's professional conduct and end-to-end weather support provided essential meteorological data and

information to test controllers and shot scientists for the safe and successful execution of these projects. We look forward to working with ARL/SORD in FY12 – starting with upcoming SPE-II in October.

AIR QUALITY

15. Great Lakes Research Initiative (GLRI)

ARL worked on a modeling project funded through GLRI, an initiative funded by the Environmental Protection Agency (EPA) that is attempting to estimate the amount and source-attribution for mercury deposition to the Great Lakes and their watersheds. ARL conducted the following work:

- Performed hundreds of simulations with the HYSPLIT-Hg model to support the overall analysis.
- Wrote and tested post-processing programs that combine the HYSPLIT-Hg simulations with mercury emissions inventories to estimate deposition for each source in the inventory to each receptor in the analysis, e.g., each Great Lake and their watersheds.
- Assembled anthropogenic and natural mercury emissions inventories for the U.S., Canada, and the rest of the world for use with the above post-processing programs
- Made a preliminary comparison of model predictions with ambient wet deposition measurements in the Great Lakes region

The degree of consistency between the measurements and the modeled wet deposition was very encouraging. The final set of simulations will be finished in the upcoming quarter, and a final report on this first year's work will be prepared and submitted to EPA. Funding for the 2nd year of the project was secured from the EPA. Mark.Cohen@noaa.gov

16. Evaluation of the National Air Quality Forecasting Capability (NAQFC) project

Pius Lee, ARL Headquarters, provided an overview talk on the upcoming changes and areas for improvement for the National Air Quality Forecasting Capability (NAQFC) project at the annual NAQFC project evaluation in September (ARL leads the scientific development of the forecasting under the NAQFC project). Each year a select group of volunteer state forecasters assembles to present their evaluation of the performance of NAQFC. The NAQFC project provides numerical modeling output in graphical and text forms to local and state forecasters so that air quality-related events and potential hazards can be broadcast to constituents. Timeliness and accuracy are the main criteria of a successful forecast. The NAQFC project's near term goal is to address daily maximum surface ozone concentrations, and the more distant goal is to address atmospheric fine particulate matter (particles smaller than 2.5 micrometers in diameter). The evaluation of the 2011 ozone season indicated that there were rather frequent occurrences of high surface ozone concentrations across the country. NAQFC tended to forecast with high bias in the Northeastern U.S. but slightly low bias in the Pacific Coast region. Temporal and spatial characteristics of these biases and other statistical measures have been considered to derive the proposed upcoming changes aimed to improve fidelity of the forecast. Pius.Lee@noaa.gov

17. Integrated Monitoring Plan for the Alberta, Canada Oil Sands

Rick Artz was one of four external peer reviewers of the Air Quality Component of An Integrated Oil Sands Environment Monitoring Plan. The Air Quality Component document focuses on the monitoring needs required to understand air pollutant emissions, their chemical

transformation in the atmosphere, long-range transport and subsequent deposition to the local and regional environment. The plan reflects a science-based approach that will ensure delivery of timely, high quality, publicly available data, and scientifically interpreted and peer-reviewed results. Air quality is addressed in a comprehensive way, from monitoring at the point of emission through to ambient air and atmospheric deposition monitoring that will enable the evaluation of potential ecosystem and human health impacts. The geographic scope includes the immediate oil sands region, as well as upwind and downwind areas in Alberta, the Northwest Territories, Saskatchewan, and Manitoba reflecting the transboundary nature of air pollution, and the predicted geographical extent of potential ecosystem and human health impacts. Oil production from the Oil Sands region presently is just over 1.5 million barrels per day. Production is projected to double to around 3 million barrels per day by 2020, and continue increasing thereafter, out to 2030 and beyond. The value of this production is estimated to be almost $60 billion in 2012, and is expected to average $86 billion per year from 2013 to 2020. Richard.Artz@noaa.gov For a copy of the Air Quality Component see: http://www.ec.gc.ca/pollution/EACB8951-1ED0-4CBB-A6C9-84EE3467B211/Air%20Monitoring%20Plan_low_e.pdf

18. Collaboration with NASA's Goddard Space Flight Center

ARL scientists Winston Luke and Paul Kelley collaborated with Gordon Labow and colleagues from NASA's Goddard Space Flight Center to measure ozone concentrations in situ from automobiles in the Washington, D.C. metropolitan area. This study was part of NASA's larger Discover AQ program. For the program, the NASA P-3 was used to conduct flights in the D.C. area to compare airborne remote sensing instrumentation with in situ air pollution monitors. The work is an effort to improve satellite measurements of air quality indicators from space.

19. Collaboration with University of Maryland

ARL scientists Xinrong Ren , Winston Luke and Paul Kelley collaborated with colleagues from the University of Maryland to compare NO_2 measurements made using accepted chemiluminescence techniques (ARL's techniques) with those made with a prototype commercial cavity ring down spectrometer from the University of Maryland. The comparison took place at the Beltsville, MD CASTNet site.

20. Interagency Monitoring of Protected Visual Environments (IMPROVE)

Marc Pitchford completed work on the fifth IMPROVE report titled "Spatial and Seasonal Patterns and Temporal Variability of Haze and its Constituents in the United States: Report V" is now available on the IMPROVE web site (http://vista.cira.colostate.edu/improve/Publications/Reports/2011/2011.htm).

Rick Saylor from ATDD was selected to be the new NOAA representative to the IMPROVE Steering Committee. Marc announced his intent to retire on October 31 after 36 years of federal service (over 30 years at ARL). Marc accepted a position as the Executive Director of the Division of Atmospheric Science at Desert Research Institute in Reno, NV. marc.pitchford@noaa.gov

Marc, as Chair of the IMPROVE Steering Committee proposed, and the IMPROVE Steering Committee approved, the creation of an International Associate Steering Committee

Membership category. Subsequently, the Korea Ministry of Environment and Environment Canada were invited to participate in the IMPROVE Program in that capacity. The terms of membership are that they sponsor at least one monitoring site that would be operated using identical equipment, standard operating procedures and sample analysis contractors; and that they participate in periodic network reviews. Data generated at these foreign sites will be treated identically to those from domestic IMPROVE sites. (marc.pitchford@noaa.gov).

CLIMATE

21. Companion Studies of the Climatology of the Boundary Layer in Polar Regions

As part of ARL's continuing research on the climatology of the global planetary boundary layer, a pair of related papers on surface-based inversions in the Arctic and Antarctic were completed. Results of these studies will be presented at the upcoming World Climate Research Programme's Open Science Conference (Denver, 24-28 October 2011) and at the AMS Conference on Climate Variability and Change (New Orleans, 23-27 January 2012). These two studies build on our earlier study of methods for estimating climatological planetary boundary layer heights from radiosonde observations. They are the result of collaboration with Dr. Yehui Zhang during her NRC Postdoctoral Associateship at ARL. Dr. Zhang's contributions to NOAA were recognized with the August 2011 NOAA Team Member of the Month Award. This research effort is continuing with analysis of boundary layer mixing heights over mid-latitude continental regions. Dian.Seidel@noaa.gov

22. U.S. Climate Reference Network

ATDD upgraded the US Climate Reference Network (USCRN) stations with relative humidity (RH) sensors and new state-of-the-art dataloggers. The stations are measuring soil moisture and soil temperature in support of the National Drought Information System. bruce.baker@noaa.gov

FRD added more graphs of meteorological variables to the U.S. Climate Reference Network and the Regional Climate Reference Network quality control webpage. An additional 42 daily plots are now being generated. Although funding for FRD's efforts has ended, FRD will still continue to support these efforts when possible. Grant Goodge with ATTD acknowledged that the new maps have been a big boost to his quality control efforts, and he is pleased to see the data displayed in a map format. Jason.Rich@noaa.gov

23. U.S. Regional Climate Reference Network

ATDD completed the installation of the climate stations in the southwest region (Arizona, Colorado, New Mexico and Utah), for a total of 74 new stations. The United States Regional Climate Reference Network (USRCRN) stations are being installed by NOAA on a geographical grid to ensure proper spatial representation throughout each of the nine U.S. Climate Regions. The southwest region was the first to be completed. ATDD leads the installation, calibration, and maintenance of the new, automated stations that collect and transmit temperature and precipitation data every 5 minutes. The stations also have been established in such a way as to allow for any future measurements, including soil temperature, soil moisture, snowfall, and snow depth.

24. World Meteorological Organization's Solid Precipitation Inter-Comparison Experiment

Bruce Baker, Tilden Meyers, and John Kochendorfer with ATDD were nominated to participate in the World Meteorological Organization's Solid Precipitation Inter-Comparison Experiment (SPICE). The USCRN precipitation testbed in Marshall, CO will be the focus of the U.S. effort for evaluating a new standard for measuring solid precipitation. The goals for the study are to assess the methods of measurement and observation of solid precipitation, snowfall, and snow depth at automatic, unattended stations used in cold climates (e.g., polar and alpine). Beginning in the fall, 2011 and running through 2012, the NOAA precipitation test bed will establish the field reference for the automated measurement of solid precipitation that will be used by all other participants starting in 2013. Other participants include sites from Norway, China, Canada, Italy, Japan, Switzerland, Finland and New Zealand. While solid precipitation measurements have been the subject of many studies, there have been only a limited number of coordinated assessments on the accuracy, reliability, and repeatability of automatic precipitation measurements. The outcome of this inter-comparison will provide the scientific community with a better understanding of the accuracy and precision of gauges and the ability to accurately report solid precipitation, evaluate new and emerging technology for the measurement of solid precipitation (e.g. non-catchment), and their potential for use in operational applications. Bruce.Baker@noaa.gov

25. University of Tennessee Space Institute Collaboration

Additional flights using the University of Tennessee Space Institute's Navajo aircraft were flown over the USCRN site in Crossville, TN on July 7 and August 1 as part of the collaborative effort to measure the Earth's surface temperature. In addition, measurements from the Apogee infrared (IR) temperature sensors, two photosynthetically active radiation (PAR) sensors, and the Kipp & Zonen CNR-1 4-band radiometer on the auxiliary tower at the site were used to complement the aircraft measurements. Data from the tower equipment are downloaded to ATDD every hour utilizing a cell modem attached to a CR3000 data logger. A web site http://dataviewer.atdd.noaa.gov/crossville/ was also created to display real-time data from the site. ed.dumas@noaa.gov

26. GeoEngineering the Climate System

Dian Seidel briefed the NOAA Research Council on the topic of geo-engineering the climate system on August 15, 2011. The Council decided to develop a NOAA State of the Science Fact Sheet on this topic and asked Dian to lead the effort.

ARL 4th Quarter Publications

Published:

The paper "Challenges in estimating trends in Arctic surface-based inversions from radiosonde data" by **Zhang, Y.,** and **D. J. Seidel** (2011) was published in *Geophysical Research Letters*, 38, L17806, doi:10.1029/2011GL048728.

The paper "Global sand and dust storms in 2008: Observation and HYSPLIT model verification" by Wang, Yaqiang, **Ariel F. Stein, Roland R. Draxler**, Jesús D. de la Rosa, Xiaoye Zhang was published On-Line in *Atmospheric Environment*. Hard copy should be available in November.

The paper "Coupling of Important Physical Processes in the Planetary Boundary Layer between Meteorological and Chemistry Models for Regional to Continental Scale Air Quality Forecasting: An Overview" by **Lee, P.** and **Ngan, F.** was published in *Atmosphere*, 2, 464-483. doi:10.3390/atmos2030464

The paper "Chemical Data Assimilation – an Overview" by Sandu, Adrian and **Tianfeng Chai** was published in *Atmosphere*, 2, 426-463; doi:10.3390/atmos2030426

The paper "Urban Turbulence in Space and in Time" by Bruce B. Hicks, W. J. Callahan, **W. R. Pendergrass III,** and **Ronald L. Dobosy** was accepted and published On-Line in the *Journal of Applied Meteorology and Climatology*.

The paper "Observations of hydroxyl and peroxy radicals and the impact of BrO at Summit, Greenland in 2007 and 2008" by Liao, J., Huey, L. G., Tanner, D. J., Brough, N., **Brooks, S.**, Dibb, J. E., Stutz, J., Thomas, J. L., Lefer, B., Haman, C., and Gorham, K. was published in *Atmospheric Chemistry and Physics,* 11, 8577-8591, doi:10.5194/acp-11-8577-2011.

The paper "Temperature and sunlight controls of mercury oxidation and deposition atop the Greenland ice sheet" by **Brooks, S.**, Moore, C., Lew, D., Lefer, B., Huey, G., and Tanner, D. was published in *Atmospheric Chemistry and Physics*, 11, 8295-8306, doi:10.5194/acp-11-8295-2011.

> As part of a large National Science Foundation study atop the Greenland ice sheet, the atmospheric mercury speciation was measured and coring was conducted at Summit Greenland in 2007 and 2008 to assess mercury-halogen oxidation and net deposition rates. The gaseous elemental mercury oxidation was most consistent with bromine chemistry, and was controlled by sunlight (actinic flux) and air temperature, with oxidation and deposition favored under very cold, sunlit conditions. As a net result of this mercury oxidation and deposition, it was estimated that the vast Greenland ice sheet sequesters ~13 metric tons (Hg) per year. This amount is roughly equal to 1/3 of all U.S. coal-fired Hg emissions. The paper can be found at: http://www.atmos-chem-phys.net/11/8295/2011/

The paper "Measurement of Trace Gas Fluxes over an Unfertilized Agricultural Field Using the Flux-gradient Technique" previously published on-line in September 2010, has been published in hard copy (September 2011) in the Agricultural Air Quality special issue of the *Journal of Environmental Quality*. The authors are **L. Myles, J. Kochendorfer, M. W. Heuer,** and **T. P. Meyers.**

Accepted:

The paper "Climatological characteristics of Arctic and Antarctic surface-based inversions" by **Zhang, Y., D. J. Seidel**, J.-C. Golaz, C. Deser, R. A. Tomas was IN PRESS in the *Journal of Climate*, 24, 5167-5186, doi: 10.1175/2011JCLI4004.1. The hard copy should be available in November, 2011.

The paper "Simulation of surface ozone pollution in the Central Gulf Coastal region during

summer synoptic condition using WRF/Chem air quality model" by Anjaneyulu Yerramilli, Venkata Srinivas Challa, Venkata Bhaskar, Rao Dodla, **LaToya Myles**, **William R. Pendergrass**, **Christoph A. Vogel**, Francis Tuluri, Julius M. Baham, Robert Hughes, Chuck Patrick, John Young, and Shelton Swanier was accepted for publication in *Atmospheric Pollution Research*.

> The paper describes the use of WRF-Chem to simulate surface ozone levels over the Central Gulf Coast in 2006. The results suggest that horizontal transport and vertical mixing in the atmosphere are important for the development of high ozone. Overall, the model performed well for the prediction of meteorological parameters, ozone and its precursors which is indicated by good correlations and low error metrics. The study also demonstrated the potential of the WRF-Chem model for regional air quality prediction in coastal environments.

The paper "Energy exchange and evapotranspiration over two temperate semi-arid grasslands in North America" by **Praveena Krishnan, Tilden. P. Meyers**, Russell L. Scott, Linda Kennedy, and **Mark Heuer** was accepted and is In Press in Agriculture and Forest Meteorology.

The paper "How Well Do We Measure Snow" by Roy Rasmussen, **Bruce Baker, John Kochendorfer, Tilden Meyers,** Scott Landolt , Alexandre P.Fischer, Jenny Black, Julie Theriault, Paul Kucera, David Gochis, Craig Smith, Rodica Nitu, Mark Hall, Steve Cristanelli, and Ethan Gutmann was accepted for publication by the Bulletin of the American Meteorological Society.

The paper: "Urban turbulence in space and in time," by B.B. Hicks, W.J. Callahan, **W.R. Pendergrass, R.J. Dobosy,** and E. Novakovskaia, has been accepted for publication in the *Journal of Applied Meteorology and Climatology*. The pre-publication version is available on line at http://journals.ametsoc.org/toc/apme/0/0 Relatively dense commercial urban meteorological networks are found useful at least for wind speed and turbulence strength even if individual sites are not "properly" exposed, so long as the data are appropriately aggregated over multiple sites.

The paper "MercNet - A National Monitoring Network to Assess Responses to Changing Mercury Emissions in the United States," by David Schmeltz, David C. Evers, Charles T. Driscoll, **Richard Artz, Mark Cohen**, David Gay, Richard Haeuber, David P. Krabbenhoft, Robert Mason, Kristi Morris, and James G. Wiener was accepted for publication in Ecotoxicology. The paper is expected to be included in the special mercury issue of this journal.

The paper "Daytime HONO vertical gradients during SHARP 2009 in Houston, TX " co-authored by **Winston Luke** and **Xinrong Ren** was accepted for on-line discussion in Atmospheric Chemistry and Physics Discussion. Additional edits will be made based on comments received during the on-line discussion period. The paper is expected to be officially published in Atmospheric Chemistry and Physics later in the year.

Submitted and under journal review:

A paper entitled "A comparison of observed and parameterized SO_2 dry deposition over a grassy clearing in Duke Forest" was submitted to *Atmospheric Environment*. The authors are **L.**

Myles, M.W. Heuer, and **T.P. Meyers** from ATDD and Z.J. Hoyett from Florida A&M University. The paper describes measurements of SO_2 (sulfur dioxide) fluxes over a clearning in Duke Forest and compares deposition velocities derived from observations with those calculated from a multilayer model (MLM) and a big-leaf model.

A paper entitled "Modeling and surface observations of arsenic dispersion from a large Cu-smelter in southwestern Europe" by Bing Chen , **Ariel F. Stein** , Nuria Castell, J.D. de la Rosa, A. M. Sanchez de la Campa, Yolanda Gonzalez-Castanedo, and **Roland R. Draxler** was submitted to *Atmospheric Environment*.

A paper entitled "Identifying the Causes of Differences in Ozone Production from the CB05 and CBMIV Chemical Mechanisms" by **Rick D. Saylor** and **Ariel Stein** was submitted to *Geoscientific Model Development.*

A paper entitled "New Direction column to Atmospheric Environment: on the developlment of a process-based emission forecasting model to improve air quality forecasting" by **Daniel Tong, Pius Lee** and **Rick Saylor** was submitted to *Atmospheric Environment*.

Conference Presentations

Mark Cohen, Xinrong Ren, and Winston Luke presented results of their research related to mercury in the atmosphere at the 10th International Conference on Mercury as a Global Pollutant (ICMGP) in Halifax, Nova Scotia, Canada in July.

> Mark gave a talk on "Evaluating the HYSPLIT-Hg Atmospheric Mercury Model Using Ambient Monitoring Data", on behalf of co-authors: Winston Luke, Paul Kelley, Fantine Ngan, Richard Artz, Steve Brooks, Venkata Bhaskar Rao Dodla, Roland Draxler, Xinrong Ren, David Schmeltz, Timothy Sharac, and Jake Walker. The talk summarized efforts to model a particular episode of high mercury measurements at the Grand Bay National Estuarine Research Reserve on May 4-6, 2008, using high-resolution (4km) meteorological data generated by Fantine Ngan (ARL). The presentation was given in a session entitled: The North American mercury speciation networks: Analysis and modeling results". Mark.Cohen@noaa.gov
>
> Xinrong presented a poster entitled: "Trajectory Frequency and Principal Components Analyses: Mercury Source-Receptor Relationships during the Grand Bay Mercury Intensive." The poster focused on the results of two field intensive experiments at the Grand Bay NERR in 2010 and 2011. Xinrong.Ren@noaa.gov
>
> Winston Luke presented a poster entitled: "Speciated Mercury Measurements at NOAA's Mauna Loa Observatory," which showed preliminary findings of atmospheric mercury measurements at the Mauna Loa Observatory from January to July, 2011. Winston.Luke@noaa.gov

Praveena Krishnan (on behalf of colleagues: Pierre C. Guillevic, J.F. Muratore, J. Kochenforder, B. Martos, E.J. Dumas, B. Coudert, J.L. Privette, T.P. Meyers, S. Corda, and C.B. Baker) gave a

talk entitled, ”Development of a methodology to utilize land surface temperature satellite data for climate studies” at the American Meteorological Society’s 19th Conference on Applied Climatology in Asheville, NC in July. Praveena.Krishnan@noaa.gov

Awards, Honors, Recognition

Dr. Yehui (Ally) Zhang (ARL HQ) was named the NOAA Team Member of the Month in August 2011.

Glenn Rolph (ARL HQ) received a 25 year length of service award and Maggie Kerchner (ARL HQ) received her 15 year length of service award.

Pius Lee (ARL HQ); Richard Eckman (ARL FRD); and Ogie Olanday (ARL SORD) were accepted into the 2011-12 Leadership Effectiveness and Advancement Program (L.E.A.P.). This 1-year program is designed to develop, emphasize, and improve professional and personal leadership qualities within OAR through individual and team building exercises, projects, and experiences.

Outreach

Richard Eckman (FRD) reviewed the final draft of the thesis and signed off on the official paperwork from the University of Wyoming for Thomas Andretta’s Ph.D.

LaToya Myles (ATDD) serves on the Southeast Regional Planning Committee for the National Organization of Black Chemists and Chemical Engineers (NOBCChE). The committee is charged with planning the organization's Southeast-Southwest Regional Meeting at Auburn University in November 2011.

LaToya also continued to serve on the Implementation Team for OAR’s Leadership Effectiveness and Advancement Program (LEAP). The team coordinated marketing, application, and selection for the new class of LEAP participants, who will attend their first training session in late October.