

[NOAA Air Resources Laboratory](#)

Quarterly Activity Report

FY2015 Quarter 1

(October – December, 2014)

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DISPERSION AND BOUNDARY LAYER

1. HYSPLIT Model

Roland Draxler and Glenn Rolph attended the Nuclear Regulatory Commission's (NRC) workshop on Atmospheric Transport and Dispersion Modeling in Regulatory and Consequence Analysis on October 22 and 23 at their main offices in Rockville, Maryland. Roland Draxler presented an overview of the HYSPLIT model and how it can be applied for radionuclide and dose applications. Two presentations by Sandia National Laboratory described how the NRC plans to replace the current Gaussian plume model component in their MELCOR Accident Consequence Code System (MACCS) with HYSPLIT. MACCS is an NRC tool to evaluate the offsite consequences of hypothetical radioactive releases into the atmosphere for probabilistic risk assessment applications. After the conference, NRC and ARL agreed to start work on an MOU that will allow the two offices to work together on related research topics and activities. glenn.rolph@noaa.gov

Ariel Stein incorporated a new capability into HYSPLIT to process model ensembles created by running simulations with varying physical and meteorological parameterizations. The new capability discards redundant model information by grouping simulations that produce similar results reducing the number of runs and producing results that are statistically comparable to the complete ensemble, yet require less computing time. This technique has been evaluated using tracer experiments but it potentially can be applied to emergency response or volcanic ash simulations. ariel.stein@noaa.gov

2. Convective Initiation Project

The Atmospheric Turbulence and Diffusion Division (ATDD) acquired a small unmanned aerial system (sUAS), a DJI S-1000 octocopter capable of lifting approximately 10 pounds of payload to an altitude of up to 1000 feet above ground level (AGL) for approximately 15 minutes on a single battery charge. The payload will include a small downward-looking FLIR Tau 2 infrared camera, a GoPro Hero 3 visible camera, and a Graw radiosonde package to measure air temperature and relative humidity. The first mission for the sUAS will be to measure the spatial variability of both the thermal infrared and visible wavelengths reflected from the Earth's surface surrounding the flux towers in the 2015 portion of the Convective Initiation (CI) experiment near Venus, FL, tentatively scheduled to run from March to September 2015. ATDD made progress in applying for approval to fly the sUAS from both the NOAA/Aircraft Operations Center and the Federal Aviation Administration (FAA). The sUAS will be flown first at the Knox County Radio Control (KCRC) society's model flying field near Oak Ridge, TN for the purposes of instrument checkout and maintaining pilot currency, and later in Venus, FL, as part of the CI study. Operations will conform to all local operator requirements following expected approvals in early 2015. ed.dumas@noaa.gov, B. Baker

Dr. Shuyan Liu started work at FRD as a postdoctoral associate for a two-year term through the University of Maryland's Earth System Science Interdisciplinary Center (ESSIC). The position is to improve numerical forecasts of convective initiation by

comparing model outputs with observations from two project field studies. The first field study took place near Huntsville, Alabama in the summer of 2014. A second is planned for Florida in 2015. Dr. Liu conducted a literature investigation of previous convection studies relevant to the current project, and she also was developing code on the NOAA Zeus computer to support the project. Unfortunately, Dr. Liu will have to depart the project in early January for personal reasons. ARL will re-advertise the position again through ESSIC. richard.eckman@noaa.gov

3. Best Aircraft Turbulence (BAT) Probe

The results of Flux Observation of Carbon from an Airborne Laboratory (FOCAL) from the 2013 expedition to Alaska were presented at AGU's fall meeting. The FOCAL study is the result of a collaboration incorporating Harvard's isotopologue-sensing spectrometer, ATDD's BAT probe, and Aurora Corporation's aeronautical engineering and aircraft. Fluxes of water vapor and methane have now been analyzed for five of the 14 flights. These five flights cover a region 250 km by 70 km on the North Slope over three separate days with flights in midmorning, midafternoon, and evening. The North Slope is marked by many small lakes (~1 km) for which dis-aggregation capabilities of the Flux-Fragment Method, first applied in Illinois, were useful. Lakes generally had much lower methane emissions, but much greater scatter than intervening tundra. Overall, despite the warming arctic and the large carbon reservoir on the North Slope, the emissions of methane in 2013 were not overly strong relative to other parts of the world. This is consistent with the findings of NASA's Carbon in Arctic Reservoirs Vulnerability Experiment. ron.dobosy@noaa.gov

4. Project Sagebrush

The comprehensive data report for Phase 1 of Project Sagebrush (PSB1) is presently in the process of internal revision and editing. It will provide a detailed description covering all aspects of experimental design, instrumentation, measurements, quality control procedures, and the final database for the project.

A manuscript for journal publication tentatively titled 'Revisiting the value of the horizontal plume spread parameter σ_y : Part I' has been drafted that covers some of the key findings of PSB1. It is presently in internal FRD review. A companion paper (Part II) that addresses some of the questions regarding the magnitudes of σ_y and σ_θ raised in the first paper has also been drafted and is in internal FRD review. This complementary analysis is focused on possible site differences that could be contributing to the differences in σ_y and σ_θ observed during PSB1 compared to those utilized in many existing modeling schemes.

The Washington State University (WSU) instrumentation was removed from the Grid 3 tower on November 10. The combination of Grid 3 tall tower measurements provided by WSU and FRD over the period of September, 2013 to November, 2014 will provide a very detailed look at the vertical profiles of turbulence over a broad range of conditions. Bruce Hicks visited the INL test site in November and has begun analysis of Grid 3 tower data provided by FRD and WSU. He is presently utilizing these data sets to assist with investigations of the stable boundary layer. Receipt of the complete WSU data set

is pending. dennis.finn@noaa.gov, Rick Eckman, FRD staff

FRD is planning to conduct Phase 2 of Project Sagebrush in the summer and fall of calendar year 2015. The focus of this phase will be dispersion in light wind conditions. A 1974 study conducted by FRD is still widely cited as virtually the only tracer data set representing the light wind case. Because of the unpredictable wind direction, the tracer samplers will need to be placed in full 360° circles around the source in Phase 2.

Releases will likely take place both in stable and unstable conditions.

kirk.clawson@noaa.gov, Rick Eckman, FRD staff

5. Birch Creek Valley Wind Flow Study

The draft manuscript “Diurnal Late Spring and Summertime Wind Patterns on the Snake River Plain and the Influence of Complex Terrain Factors” will be expanded to examine spatial and temporal variability in σ_θ as an extension of the Project Sagebrush research based on NOAA/INL mesonet information. Follow up work on another phase of analysis has begun but further progress is stalled pending availability of data from the U.S. Forest Service Fire Sciences Laboratory.

dennis.finn@noaa.gov

6. Wind Forecast Improvement Project 2 (WFIP2)

Plans to deploy instruments at the wind farms near the ARL Field Research Division (FRD) in Idaho Falls, ID were halted due to new information regarding the second phase of the Department of Energy (DOE) Wind Forecast Improvement Project (WFIP2). Originally, FRD had planned to deploy its mobile systems in Idaho for a year or so and then move them to the WFIP2 study area when required. This was based on the understanding that the WFIP2 deployments were not going to start until fiscal year 2016. However, the winning proposal of the DOE WFIP2 Funding Opportunity will be focusing on wind farms near the Columbia River Gorge along the Oregon-Washington border; with a proposed start date for deployments in July 2015. Because of the earlier start date, FRD will focus on the WFIP2 study area almost immediately.

kirk.clawson@noaa.gov, Rick Eckman

7. HYRad (HYSPLIT Radiological)

Kirk Clawson and Jason Rich participated in the Idaho National Laboratory's (INL) first evaluated Beyond Design Basis emergency exercise as the NOAA dispersion experts, using HYRad. Beyond Design Basis is an engineering term that describes conditions, or a significant event, in which a system, structure or component was not designed or intended to safely operate. Nearly every INL on-site institution participated, and off-site participants included the Idaho Department of Environmental Quality and the Idaho Bureau of Homeland Security. The exercise scenario centered around an earthquake that affected six different facilities on the INL. Multiple hazards were created at the various facilities that required the simultaneous use of HYRad on two separate computers. Simulated personnel evacuations by the INL and road blocks by the Idaho State Police were determined based on HYRad output. The HYRad system performed flawlessly. Short term weather forecasts and nowcasts were also provided.

kirk.clawson@noaa.gov

It was reported last quarter that it was necessary to replace the Google Maps API with a no-cost Flash-based API from MapQuest due to the deprecation of the Google Maps Flash API. During the current quarter, MapQuest announced that the no-cost API just barely adopted for HYRad would require an expensive license beginning in January. An alternate free version, still available from MapQuest, was subsequently adopted. However, this API required additional rewriting of portions of HYRad.

brad.reese@noaa.gov

A prototype user interface for creating multiple simultaneous source releases for HYRad was developed. Work on the architecture of the CONTROL and EMITIMEs files that are necessary to implement the multiple source scenarios is in progress.

brad.reese@noaa.gov, D. Finn

8. NOAA/INL Mesonet

A problem was discovered with the ingest of the NOAA/INL Mesonet weather data into the NOAA MADIS database. It appears that the data are occasionally inserted in the MADIS database at incorrect times. The extent of the problem is not known, but it may happen as often as 10 times every month. MADIS has been notified and they are attempting to determine the cause of the problem. roger.carter@noaa.gov

About one year ago, FRD purchased a VHF radio modem; model RF500M, from Campbell Scientific. We were planning to use it in the Campbell Scientific radio network that collects measurements from the NOAA/INL Mesonet. Unfortunately, it did not work. After nine months of testing and retesting, Campbell Scientific was eventually convinced that there was a bug in the RF500M firmware. In December 2014, approximately one year after purchase, we received a firmware upgrade from Campbell Scientific that should fix the problem. We will test it as soon as weather conditions are appropriate.

roger.carter@noaa.gov, S. Beard, T. Strong, B. Reese

9. Consequence Assessment for the Nevada National Security Site

Rick Lantrip, James Wood, and Kip Smith participated in three emergency response drills and exercises as the Consequence Assessment Team for the National Nuclear Security Administration (NNSA) Nevada Field Office (NFO). The exercise was conducted on the Nevada National Security Site (NNSS). In this exercise, Kip, James, and Ricky provided exercise specific weather data and weather forecasts, and generated dispersion products based on the worst case event scenario information provided for the facility involved. The drills/exercises consisted of a security event, an earthquake, and a spill. A Consequence Assessment model was run for the worst case scenario and group leaders were briefed on the results. This exercise involved the DOE/NNSA/NFO Emergency Response Organization. Walt Schalk participated in the exercise as the Drill Facilitator and the Exercise Controller/Evaluator for the Consequence Assessment Team. kip.smith@noaa.gov, Rick Lantrip, James Wood, Walter Schalk

10. Upgrades: Mesonet, SODAR, and Lightning Detection System

SORD needs to purchase 3D sonic anemometers before proceeding to the installation

phase of the mesonet upgrade. Time period for the purchase is around Quarter 3 FY 2015. The SODAR has been placed at its new location and has been prepared for installation. NNSS Communications has moved the fiber optic cable and power is readily available. An equipment stand has been completed to shade the electronics from the direct sun. All obstructions have been removed. Once power is restored to the Desert Rock Weather Observatory, installation will be completed. The NNSS Lightning Detection System upgrade continues to perform well. NNSS and facility specific lightning climatology reports have been completed, and the results have been posted to the SORD Website. The graphics generated include lightning strike density plots, seasonal histograms, and diurnal histograms. walter.w.schalk@noaa.gov, Kip Smith, James Wood, Phil Abbott, Bobby Gates

AIR QUALITY

11. Atmospheric Mercury Modeling

HYSPLIT mercury model simulations were carried out using a new 2005 global anthropogenic mercury emissions inventory, replacing the 2000 inventory used previously. Simulations were also carried out with different global emissions inventory components individually (e.g., biomass, volcanic, oceanic, soil, etc.) to investigate the consequences of scaling (i.e., adjusting) one or more of the components. Some of the components, e.g., oceanic emissions, are particularly uncertain, and so the ability to examine the impact of emissions variations on model results is important.

Model performance metrics were developed that quantified agreement of the model results with measured mercury concentrations and wet deposition in the Great Lakes region and elsewhere. Another metric was developed to represent the overall balance between emissions and deposition in the simulation. An exact match between emissions and deposition for any given year would not be expected for a number of reasons, e.g., the deposition in a given year includes mercury that was emitted before the year started. But, since global atmospheric mercury concentrations are not changing dramatically from year to year, emissions and deposition are expected to be roughly equivalent. A large number of simulations were carried out using the above methodologies, with different model configurations (e.g., different chemical reaction rates and mechanisms, different deposition parameters, different emissions scaling and speciation) and the configurations with the best overall performance for 2005 were determined. This work was greatly aided by the use of a new dedicated Linux server, expanding the computational resources available by more than a factor of 5.

Summaries of this and earlier mercury modeling work were presented to the NOAA Great Lakes Restoration Initiative working group and the Air Quality Research Subcommittee of the White House Office of Science and Technology Policy.

A tentative agreement was reached to present a day-long, pre-conference back-trajectory modeling workshop, requested by the organizers of the upcoming International Conference on Mercury as a Global Pollutant (June 2015, South Korea). The day-long workshop will provide hands-on instruction to participants on the use of the NOAA ARL HYSPLIT modeling suite as a tool to interpret atmospheric

measurements of mercury and other pollutants. mark.cohen@noaa.gov

12. Memorandum of Agreement

OAR/ARL and the National Institute of Environmental Research of the Republic of South Korea have written and signed a Memorandum of Agreement to share scientific knowledge in air quality forecasting and analysis. The MOA emphasizes timely exchange of data from field campaigns and pollution emission inventories. pius.lee@noaa.gov

13. Interagency Monitoring of Protected Visual Environments

As the current NOAA representative, Rick Saylor participated in the 2014 Steering Committee meeting of the Interagency Monitoring of Protected Visual Environments (IMPROVE) network at the Cape Romain National Wildlife Refuge in Awendaw, South Carolina. The IMPROVE program is a cooperative measurement effort between the U.S. EPA, federal land management agencies, and state agencies to monitor, evaluate and assess progress toward national visibility goals on protected federal lands, such as National Parks and Wilderness Areas. The IMPROVE Steering Committee meets annually to review network operations and advise on future directions of the program. rick.saylor@noaa.gov

14. National Institute for Computational Sciences

Rick Saylor was granted 250,000 CPU hours at the University of Tennessee, Knoxville National Institute for Computational Sciences (NICS) for a pilot project entitled "Advanced Atmospheric Chemistry Simulation and Analysis." NICS is one of the leading high-performance computing centers for excellence in the United States. It's co-located with the University of Tennessee and the Oak Ridge National Laboratory. According to the NICS website: "The center's missions are to expand the boundaries of human understanding while ensuring the United States' continued leadership in science, technology, engineering, and mathematics." The long-term goal of the project is to advance the state-of-the-science of three-dimensional air quality models through investigations to improve the parameterization of important chemical and physical atmospheric processes included in these models, and improve numerical or computational techniques to allow more realistic simulation of the chemical state and evolution of the atmosphere. Improving the simulation and predictive capabilities of these models should result in more accurate evaluations of the health impacts of adverse air quality, more accurate air quality forecasts, and more reliable simulations of global and regional climate change.

15. National Earth Observation Assessment

Rick Saylor began serving as one of the NOAA representatives on the Human Health Societal Benefit Area Team for the second National Earth Observation Assessment (EOA 2016), which began its work in December 2014. The EOA 2016 is a project led by the White House Office of Science and Technology Policy and organized under the U. S. Group on Earth Observations to evaluate national Earth observing systems based on their impact on a variety of Societal Benefit Areas. The Team will assess impacts pertaining to air quality and climate change, as well as water quality and infectious

diseases. The EOA 2016 final report is scheduled to be completed by summer 2016. rick.saylor@noaa.gov

16. Ammonia Air-Surface Exchange

Preliminary analysis of data from the field study at the University of Illinois, Urbana-Champaign (UIUC) Energy Biosciences Institute continues with initial comparisons between data from the ATDD flux-gradient system and the University of Illinois (UIUC) relaxed eddy accumulation system. Simone Klemenz completed ion chromatography analysis of the first batch of Teflon filters for ammonium (NH_4^+), and results were provided to UIUC collaborators. latoya.myles@noaa.gov

An article entitled "Recent Trends in Gas-Phase Ammonia and $\text{PM}_{2.5}$ Ammonium in the Southeast United States" by Rick Saylor, LaToya Myles, Daryl Sibble, Jason Caldwell and Jia Xing was accepted for publication in the Journal of the Air & Waste Management Association. In this paper, collocated measurements of gaseous ammonia and $\text{PM}_{2.5}$ ammonium from the Southeastern Aerosol Research and Characterization (SEARCH) network are analyzed for the period 2004-2012. Total ammonia (gaseous ammonia + $\text{PM}_{2.5}$ ammonium) declined at a rate of 1-4 %/yr over the nine-year period, consistent with U. S. EPA emissions estimates for the Southeast U. S., but the fraction of ammonia in the gas phase has risen steadily (+1-3 %/yr). Declining emissions of sulfur dioxide and nitrogen oxides over the region has led to decreased strong acid atmospheric concentrations and consequently less ammonia being partitioned to the particle phase. Future work will explore how the changing partitioning of ammonia between gas and particle phases may be affecting the amount, overall pattern and environmental impacts of ammonia deposition in the U. S.

CLIMATE

17. GCOS Reference Upper Air Network (GRUAN)

Dian Seidel and Shanna Pitter participated in a half-day NOAA workshop and follow-up team meetings to enumerate and evaluate NOAA's contributions to the Global Climate Observing System Reference Upper Air Network (GRUAN) and lay the groundwork for development of a consensus on near- and long-term plans for continued engagement and leadership in GRUAN activities. The team produced a two-page summary that has been approved by NOAA Line Offices: OAR, NESDIS and NWS as the basis for a more detailed plan to follow. The summary will provide a solid context for NOAA engagement with the international GRUAN community at the GRUAN Implementation and Coordination Meeting to be held in late February 2015.

18. Changing Width of Earth's Tropical Belt

The American Geophysical Union made its initial announcement of the July 2015 Chapman Conference on The Width of the Tropics: Climate Variations and Impacts. Changes in the width of the tropics have potentially important repercussions for the global hydrologic and carbon cycles, and impact human societies and ecosystems. Dian Seidel is co-convening this conference with colleagues from ESRL, Colorado State University, and Columbia University.

An invited feature article appeared in the December 2014 issue of Physics Today, geared toward a general science readership. The article on "The Changing Width of Earth's Tropical Belt," by Thomas Birner (Colorado State University), Sean Davis (NOAA/ESRL/CSD), and Dian Seidel, describes the fundamental physics governing atmospheric circulation patterns that determine the tropical belt and discusses the challenges associated with locating the edges of the belt and determining its changing width. dian.seidel@noaa.gov

19. Cloud Cover

Melissa Free began work with Bomin Sun of NESDIS STAR on an improved dataset of low cloud cover using U.S. weather station data. Low cloud cover was reported in several different ways at different times in the record, creating obstacles to construction of a continuous and homogeneous dataset.

20. Alaska Greenhouse Gas Study

Analysis of 2014 Alaska micrometeorological data was completed. The analysis found that the Arctic ecosystem under observation was a larger sink of carbon in 2013 than in 2014, because there was more photosynthetically-active radiation available in 2013. CH₄ fluxes did not change with water table depth or soil moisture, because the ecosystem was completely saturated throughout the study period in both 2013 and 2014. This work was presented at the American Geophysical Union's Annual Meeting. The title of the presentation was, "Surface-Atmosphere Carbon Exchange from an Arctic Wetland." john.kochendorfer@noaa.gov

21. New Zealand Study

John Kochendorfer began working with New Zealand's National Institute of Water and Atmospheric Research (NIWA) in Christchurch NZ as a Visiting Scientist. He began analyzing two years of high-frequency eddy covariance flux data from a dairy farm and a more traditional rye-seed crop to help quantify the effects of crop evapotranspiration on the local carbon and water balance. In the last decade this important agricultural region has experienced a widespread transition from traditional crops such as rye and wheat to dairy farming. The change has raised national concern in New Zealand regarding the observed degradation of water quality and the decreasing availability of water. John Kochendorfer was invited by colleagues from NIWA to participate in this research due to his expertise in eddy covariance measurements. A publication is in preparation. john.kochendorfer@noaa.gov

ARL 1st Quarter Publications

Rolph, G. D., F. Ngan, R.R. Draxler (2014). Modeling the fallout from stabilized nuclear clouds using the HYSPLIT atmospheric dispersion model. Journal of Environmental Radioactivity 136(0): 41-55.

De Vleeschouwer F, Heleen Vanneste, Dmitri Mauquoy, Natalia Piotrowska, Fernando Torrejo'n, Thomas Roland, **Ariel Stein**, and Gae'l Le Roux (2014) Emissions

from Pre-Hispanic Metallurgy in the South American Atmosphere. PLoS ONE 9(10): e111315. doi:10.1371/journal.pone.0111315

Pan, Li, Daniel Tong, **Pius Lee**, Hyuncheol Kim and Tianfeng Chai (2014). Assessment of NO_x and O₃ forecasting performances in the U.S. National Air Quality Forecasting Capability before and after the 2012 major emissions updates, *Atmospheric Environment*, 95, 610–619, doi:10.1016/j.atmosenv.2014.06.020

Lee, P. and Y. Liu (2014). Preliminary Evaluation of a Regional Atmospheric Chemical Data Assimilation System for Environmental Surveillance. *International Journal of Environmental Research and Public Health*, 11 (12), 12795-12816. doi:10.3390/ijerph111212795

Huang, M., Kevin W. Bowman, Gregory R. Carmichael, Tianfeng Chai, ... and Donald R. Blake (2014), Changes in nitrogen oxides emissions in California during 2005–2010 indicated from top-down and bottom-up emission estimates, *Geophysical Research- Atmospheres*, 119, Issue 22, pages 12,928–12,952, doi:10.1002/2014JD022268.

Morton, D., D. Arnold, P. Webley, G. Wotawa, and **B. Stunder** (2014). Unified model intercomparison for volcanic ash transport modelling, *International Journal of Environment and Pollution*, Vol. 55, Nos. 1/2/3/4, pp. 210–218. doi: 10.1504/IJEP.2014.065926

Birner, T., S. M. Davis and **D. J. Seidel** (2014) The changing width of Earth's tropical belt, *Physics Today* 67(12), 38; doi: [10.1063/PT.3.2620](https://doi.org/10.1063/PT.3.2620)

Lee, DaeGyun, Soontae Kim, Hyuncheol Kim, and Fong Ngan (2014) Retrospective Air Quality Simulations of the TexAQS-II: Focused on Emissions Uncertainty. *Asian Journal of Atmospheric Environment* Vol. 8-4, pp. 212-224. doi: <http://dx.doi.org/10.5572/ajae.2014.8.4.212>.

Hicks, B., **W. R. Pendergrass III**, C. A. Vogel, R. N. Keener Jr., S. M. Leyton (2014). On the Micrometeorology of the Southern Great Plains. 2: Turbulence Statistics. *Boundary-Layer Meteorology*: 1-16. doi:10.1007/s10546-014-9981-8

Julian Wang was invited to write a review paper on the topic of global dust observations. The invitation came from Springer for their inaugural issue of *Journal of Current Pollution Reports*. It is a wide-ranging journal covering significant developments in the field of pollution. It offers in-depth reviews contributed by international experts, emphasizes emerging approaches to a wide range of pollutants and settings, and covers characterization, identification, management, treatment and prevention of pollution and more. The literature search and data collection phases for the review article "Mapping the global dust storm records: Review of dust data sources in supporting modeling/climate study" have been completed and a final draft of the manuscript is nearing completion.

LaToya Myles was a contributing author to a section about NOAA in the *Federal Resource Management and Ecosystem Services Guidebook* called "[Approach of the National Oceanic and Atmospheric Administration](#)." The guidebook was released December 2014.

Conference Presentations & Invited Talks

At the annual American Geophysical Union meeting in December, LaToya Myles gave an oral presentation entitled "NH₃ Emission from Fertilizer Application: A Collaborative Study in the Midwestern US" in the Nitrogen Biogeochemistry session. Co-authors of the presentation were Sotiria Koloutsou-Vakakis, Carl Bernacchi, Christopher Lehmann, Rick Saylor, Mark Heuer, Daryl Sibble, Jason Caldwell, Srinidhi Balasubramanian, Andrew Nelson, and Mark Rood. She also served as co-author on four research posters from the collaborative ammonia (NH₃) study, and she helped organize and lead a science meeting of ATDD and UIUC scientists and students.

LaToya served as co-author on two research posters presented by Darryl Sibble and Jason Caldwell at 2014 NOAA Educational Partnership Program Science and Education Forum at the University of Maryland – Eastern Shore.

Rick Saylor attended the 2014 American Association for Aerosol Research Annual Conference in Orlando, FL, and presented a paper entitled "Response of Total NH₃ to Reductions in Atmospheric Levels of SO₂ and NO_x: An Analysis of Data from SEARCH." The work was done in collaboration with LaToya Myles (ATDD), Daryl Sibble and Jason Caldwell (Florida A&M University), and Eric Edgerton (Atmospheric Research & Analysis, Inc.). The research documents recent trends in ammonia concentrations in the Southeast U.S., and demonstrates that declining SO₂ (sulfur dioxide) and NO_x (nitrogen oxides) concentrations, as a result of air-quality regulations, have significantly impacted the gas-particle partitioning of ammonia.

Outreach

SORD hosted two tours of the Desert Rock Weather Observatory for about 15 scientists each from the DOE National Laboratories. The tours were part of the Federal Expertise Training program hosted by NNSA. A verbal history of the SORD program and support of the testing program was given. SORD's current activities were also presented. The numerous instrumented sites that SORD maintains for NNSS Programs (mesonet and lightning detection network) and hosts for a variety of NOAA Programs (Climate Reference Network, SURFRAD, GPS Water Vapor soundings – ESRL) located in the immediate Desert Rock area were discussed. As a finale, a Pilot Balloon release was demonstrated.