NOAA ARL Monthly Activity Report

June 2003

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Contents

Highlights

1. Air Quality Forecasting Modules Delivered to NCEP. A preprocessor for CMAQ, called PREMAQ, is now running operationally at NOAA's National Center for Environmental Prediction (NCEP). PREMAQ is a combined meteorological pre-processor and meteorologically-dependent emissions processing system. During June, several adjustments were made to PREMAQ's emissions processor. Carbon monoxide mobile source emissions were adjusted to reduce large anomalous values obtained in certain grid cells near coastlines, and a restart feature was added to allow use of the previous day's rainfall data to calculate soil nitric oxide emissions. The operational PREMAQ emission results are now being analyzed on a daily basis. Emission input files for the entire summer test period (June 15- September 30, 2003) have been generated and provided to NCEP. (George Pouliot, 919 541 5475)

2. DCNet in New York. The DCNet demonstration project is slowly gaining momentum, but as yet without financial assistance from external sources. We now have self-standing computer systems in place, to provide a real time access to plume dispersion forecasts, with assimilation of data from DCNet sensors planned. Demonstration systems are in place at Silver Spring, at the Washington DC Emergency Operations Center, at Oak Ridge, and at Research Triangle Park. At this time, two systems are ready for deployment to the National Centers for Environmental Prediction and the Sterling Weather Forecast Office. It is our hope that these offices will join us as we develop a system that will satisfy the needs for rapid access to highly accurate urban forecasts.

There are now many DCNet towers distributed around downtown DC. The focus in DC is on so-called skimming flow. A parallel study is being planned for New York, where the focus will be on street canyon factors. These two programs are working closely together. To strengthen the linkages, several DCNet towers are soon to be deployed in Manhattan. One is already operational.

To avoid confusion in the future, we are now starting to talk in terms of "UrbaNet" as the wider extension of what we are demonstrating in the Washington area. (Bruce.hicks@noaa.gov, pendergrass@atdd.noaa.gov)

3. Joint Urban 2003. In late June the majority of the FRD (Idaho Falls) staff arrived in Oklahoma City for the field deployment portion of the Joint Urban 2003 campaign. It was no small feat in getting there. First, 67 new bag samplers and 325 new plastic cartridges of a completely new design were conceived, fabricated, and built entirely with FRD ingenuity. The existing 140 bag samplers and 650 paper cartridges were also readied for deployment. This effort alone resulted in the installation and cleaning of more than 11,000 sample bags! All of the samplers and cartridges, together with four newly built FRD gas chromatographs, ten realtime SF_6 analyzers, and an SF_6 release mechanism were packed into two moving vans and one passenger van for the trip. Two of the vans also towed a sodar and components. All of this equipment was then driven 1500 miles across the Rocky Mountains and the Great Plains to Oklahoma City.

After our arrival, we had six days to completely unpack the vans, install the ten realtime analyzers in ten rental vans, and entirely recreate our SF_6 analysis laboratory in a new location. We also had to prepare the release mechanism and install more than 225 sampler hangers at three meters above the ground on light and signal poles. (These hangers provide a secure place to install the bag samplers where the curious aren't able to tamper with them.) All of these tasks had to be accomplished with nearly all of the staff being completely unfamiliar with Oklahoma City. As it turned out, we completed the tasks in only four days with only eight people, leaving us a buffer of two days to tweak and tune instruments!

FRD is not alone in Oklahoma City, although we have received the lion's share of the $6.5 million budget allocated for this project. ARL's Atmospheric Turbulence and Diffusion Division is also represented, as well as Argonne National Laboratory, Pacific Northwest National Laboratory, Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, Los Alamos National Laboratory, U.S. Army Dugway Proving Ground, Aberdeen Proving Ground, Army Research Laboratory, the University of Oklahoma, the University of Utah, and Arizona State University, and so forth. This list is not all-inclusive, but gives some flavor of the magnitude of the project and its visibility.

The first Intensive Observation Period (IOP) was conducted during the day on 29 June. FRD's bag samplers were deployed on building tops, in the underground tunnel system similar to that of Crystal City, as well as on power and light poles. Nine of FRD's SF_6 analyzers were deployed in stationary positions in the downtown area between the tall buildings to measure instantaneous concentrations in the street canyons. One SF_6 analyzer was used in a mobile mode to provide realtime updates of the SF_6 plume position and concentration. Preliminary results show a substantial amount of the tracer material being lifted to at least building-top. Nine more IOPs are scheduled to occur in the month of July before the crew can pack up and leave for home.

Silver Spring

4. The Effect of Future Mercury Emissions on Sensitive Ecosystems. Work has begun on two closely related projects dealing with scenarios for future mercury emissions. In one project, the deposition of mercury to approximately 15 selected receptors throughout the U.S. under different emissions scenarios is being examined. In a closely related project for the Commission for Environmental Cooperation, future Canadian emissions scenarios – primarily for the electricity generating sector – will be modeled to determine their potential deposition onto a number of sensitive ecosystems in Canada. mark.cohen@noaa.gov

5. HYSPLIT Source Attribution Sensitivity Study. As a first step in evaluating the use of "backward dispersion" calculations to determine pollutant source locations, six-day backward HYSPLIT simulations were made daily for three months for each of the 75 ANATEX sampler locations. The next step will be to select subsets of the sampling network to determine the sensitivity of the source location estimate the to sampling network density. See the discussion by Al Taylor on the inversion of the source-receptor matrix. roland.draxler@noaa.gov

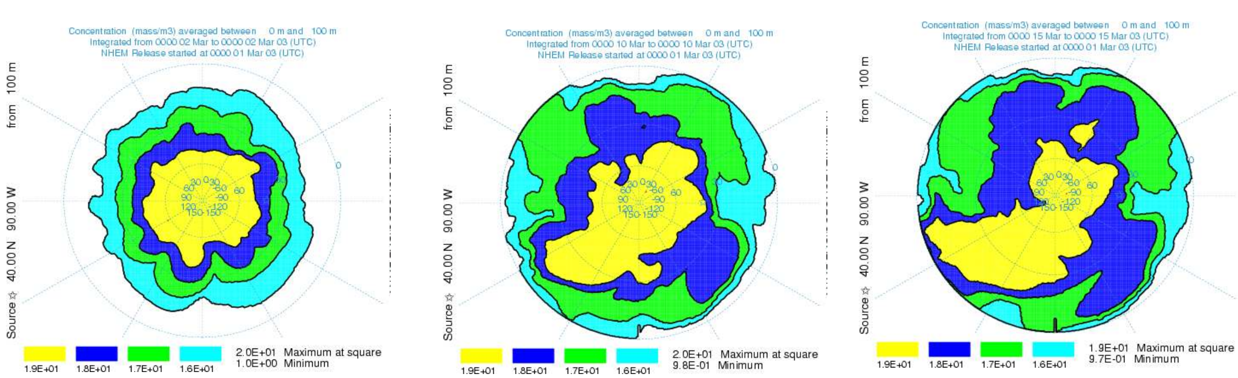
Using HYSPLIT, a series of back trajectories can be taken from each of a sequence of measurement times from a network of stations, to map out a domain of influence for these measurements. The goal is to analyze this domain and the measurements to provide an estimate of the distribution of sources. Hindcast HYSPLIT results provide a linear relation of source distributions to measurements in the form of a large matrix. Attempting to simply invert the matrix to find a source distribution that "explains" the measurements results in a severely over-determined system There are many patterns of sources that will optimally, or entirely, explain the observations.

The first cut at finding the best distribution is the decomposition of the matrix by the "singular value decomposition" method. This decomposes the matrix into orthonormal systems of vectors in the measurements and matching vectors in the source distributions, and associates eigenvalues with the vectors. Using those eigenvalues that are non-zero, a source distribution can be found which best fits the measurements in the least squares sense. If there are as many non-zero eigenvalues as observations, the fit is exact. Code has been written to implement the above for a set of measurements surrounding a known source. A graphical display of the resulting hindcast source distribution shows pronounced high values in the vicinity of the actual source.
albion.taylor@noaa.gov

6. Updated Global Dispersion Code. Because most of the world's population and industry is located in the northern hemisphere, inert pollutants (those that have no sinks and will accumulate in the atmosphere) will tend to show a weak latitudinal gradient with much stronger gradients across air mass boundaries. This situation may make it difficult to determine the added effect of a small local or a larger long-distance pollutant source on the measurements taken at a specific sampler location. An Eulerian global transport and dispersion model was originally developed in 1990 to simulate the global distribution of pollutants. For this numerical experiment, the model was modified from its original 8-layer 380-km resolution configuration to a 12-layer 190-km resolution using the current ARL meteorological data archive. In this application, the model is initialized with an ambient background concentration gradient and a short-term simulation will be used to estimate time varying concentrations due to changing meteorological conditions.

The three maps below illustrate the northern hemispheric concentration field (arbitrary pollutant; yellow - 19, blue - 18, green - 17, cyan - 16) after one day, ten days, and 14 days. Even after one day, the initial uniform latitudinal gradient (one unit per ten degrees) already shows significant perturbations due to regional meteorological variations. After 10 days, lower concentrations from the southern latitudes are penetrating north at around 90W, while higher concentrations from then north are penetrating south at around 120E. Day 14 is very similar to day 10, but the patterns are shifted slightly to the east in response to the mid-latitude westerly winds and to the west in the equatorial regions due to the easterly trades.

After 1 day **After 10 days** **After 14 days**



The model appears to provide very robust results with temporal concentration variations responding in a manner consistent with changing meteorological conditions. The model was only initialized once at the beginning of the simulation and produced reasonable results out to at least 14 days simulation time before the spatial gradients dissipated. The results suggest that the model can be applied to more realistic simulations, in which it can simply be re-initialized and nudged toward background concentration observations when and where they might be available. roland.draxler@noaa.gov

7. Participation in Atmospheric Observing Panel for Climate Meeting. The WMO Global Climate Observing System (GCOS) Atmospheric Observing Panel for Climate (AOPC) met in June in Asheville. Dian Seidel briefed the group on a proposed investigation of design options for a global upper-air network dedicated to long-term climate monitoring. The AOPC was supportive of the idea. If the study goes forward, it would be done in coordination with AOPC and other relevant observing system oversight groups. dian.seidel@noaa.gov

Boulder

8. SURFRAD/ISIS. All equipment, support structures, and electronics for the new SURFRAD station was assembled and readied for the installation. The new station will be installed on the grounds of the EROS Data Center near Sioux Falls, SD. Two vans filled with equipment will leave on June 3. The installation will take about eight days. The USGS, which operates EROS, is helping to cover the travel costs.

9. Ultraviolet Radiation. The Central UV Calibration Facility hosted its 5th UV spectroradiometer intercomparison at the Table Mountain Test Facility, North of Boulder, CO. The past four intercomparisons, held from 1994-1997 consisted of participants from North America only. This intercomparison was also comprised of international participants. The two international participants were from IMUK in Germany and New Zealand's National Institute of Water and Air (NIWA). The international attendees were Gunther Seckmeyer and Sigrid Wuttke from Germany and Paul Johnston representing NIWA with Mike O'Neill from NOAA's CMDL lab collaborating. The other participants included members of Colorado States NREL program representing the USDA UV monitoring network, three from the University of Georgia representing the EPA/National Park Service's UV monitoring network, three from Biospherical Instruments Inc of San Diego, CA which operates the National Science Foundations polar UV monitoring program, and two from the State University of New York's (SUNY) Atmospheric Science Research Center (ASRC). Additionally, there were three participating instruments from the Smithsonian's Environmental Research Center (SERC), which were operated remotely from the SERC facility in Edgewater, MD. All together, there were 12 instruments of various designs participating in the formal intercomparison. (Patrick Disterhoft 303 497 6355 Kathleen Lantz 303 497 7280)

Research Triangle Park

10. Multi-Media Modeling. Dr. Steven Fine is coordinating the development of the Multimedia Integration Modeling System (MIMS). MIMS provides software tools that support composing, applying, and evaluating complex systems of models, such as models of cross-media issues. A draft design for the prototype model evaluation toolkit has been developed, which will provide specialized tools that could be used by multiple projects to evaluate model performance relative to observations. (Steven Fine, 919 541 0757)

The Multimedia Integrated Modeling System (MIMS) framework remains under development. Recent work has consisted of fixing software bugs and adding new features, including a GUI for looping over sets of values and a cut/paste feature for parameter values. These features give the framework more capabilities and provides more support for modeling applications. In addition to the work on MIMS, Steve updated and organized the libraries required for CMAQ on each of the supported platforms. (Steve Howard, 919 541-3660)

11. Community Multiscale Air Quality Model. A "pre-release" version of the updated Community Multiscale Air Quality (CMAQ) model has been delivered for testing in expectation of an August 2003 public release. This version included: (1) revisions for correcting a nitrate over-prediction problem; (2) an update to the secondary organic aerosol treatment; and (3) scripts for running CMAQ on Linux workstations for both serial and parallel applications. (Shawn J. Roselle, 919 541 7699; Gerald Gipson, 919 541 4181)

A new version of the CMAQ Meteorology-Chemistry Interface Processor (MCIP) was prepared and released to the CMAQ community. This version of MCIP focuses on scientific updates to the dry deposition schemes with an emphasis on wintertime simulations. In particular, the dry deposition routine has significant updates. The effects of snow cover are now considered, and there are also three new dry deposition species: N_2O_5, NO_3, and aldehydes. These changes to the dry deposition routines will be included in the forthcoming CMAQ release. In addition, the volume of output from MCIP has been reduced significantly.

An investigation was performed to identify any significant differences between the CMAQ model for mercury as developed and applied by ASMD and the Regulatory Modeling System for Aerosols and Deposition (REMSAD) modeling of Clear Skies Initiative (CSI) mercury controls as performed by EPA's Office of Air and

Radiation (OAR). This investigation showed that the two models are quite similar in terms of the chemical reactions of mercury in air and in cloud water simulated and the rate constants used for each reaction. The CMAQ model includes two additional gas-phase oxidation reactions involving molecular chlorine gas and hydroxyl radical, each of which might be significant depending on the reactant concentration, and one additional aqueous reaction for the photo-reduction of mercuric hydroxide, which does not appear to be significant due to its slow rate. The investigation did show that the boundary concentration assumed for reactive gaseous mercury (RGM) in the REMSAD modeling was significantly higher than that assumed in CMAQ modeling to date. This difference would certainly produce modeling results from REMSAD showing a larger contribution from foreign sources to the overall mercury deposition over the United States versus the results that would be obtained from the CMAQ model. Various other model differences related to spatial resolution and the definition of cloud microphysical properties were identified, but the importance of these differences cannot be determined without a comprehensive model intercomparison study. (O. Russell Bullock, 919 541 1349)

A two-pronged effort to improve organic aerosol predictions of the CMAQ model was initiated. This effort is intended to address both primary and secondary components of organic aerosols. To study the primary contributions, the CMAQ model is being modified to separately track particulate organic material originating from each major emission source category. The new model results will provide source-apportioned predictions of primary organic aerosol, which in turn can be compared with source-apportioned measurements obtained from the Chemical Mass Balance (CMB) method. To address the secondary organic aerosol (SOA) components, the existing SOA module in CMAQ was reviewed in detail and a number of minor errors were identified. Correction of these errors will likely result in a slight decrease in the CMAQ SOA predictions. (Prakash Bhave, 919 541 2194)

Work continued on incorporating the reversible equilibrium algorithm and secondary organic aerosol (SOA) precursor emission adjustment factors and linking them to the gas-phase chemistry in CMAQ. The emission adjustment factors are being implemented to calculate more accurately the amount of semi-volatile gases produced from alkanes and alkenes with high carbon numbers. Thus far, work has been completed for the SAPRC99 mechanism, and additional tests are planned to assess the amount of SOA produced from these two classes of compounds. The results of these tests will then be used to determine the appropriate linkages to be developed for the Carbon Bond IV chemical mechanism. These revisions will be included in a new update of the CMAQ system scheduled for release in August. (Gerald Gipson, 919 541 4181)

Research continues to adapt CMAQ for air toxics to run on the target computing platform planned for the National Air Toxics Assessment runs. Current results fail to match calculations on Linux-based workstations. Efforts are attempting to isolate and remove the problem. Further adaptations are concurrently being explored and attempts are being made to optimize model performance based on the number and design of vertical layers. (William T. Hutzell, 919 541 3425)

12. Deposition Modeling for CASTNet. Work continued on a version of the Mutilayer Biochemical (MLBC) model to be put into the Multimedia Integrated Modeling System (MIMS) framework and to be used for modeling of the Clean Air Status and Trends Network (CASTNet) program. The model has been upgraded to consider up to 50 plant species (the original design depicted the forest canopy simply as a combination of two species). This upgrade, which required substantial modifications to the original model, will more realistically simulate area-weighted deposition velocities at the CASTNet sites. (Donna Schwede, 919-541-3255).

13. Climate Impacts on Regional Air Quality (CIRAQ). The Climate Impacts on Regional Air Quality (CIRAQ) team has begun to establish analysis plans for the regional climate simulations currently underway at Pacific Northwest National Laboratory. Simulations will include a current and future (2050) 10-yr simulation of MM5 that uses initial and boundary conditions from a global climate model. These MM5 simulations will be used for the CIRAQ CMAQ simulations under current and climate change conditions; therefore, it is important for the team to identify key meteorological variations that could impact the air quality simulations. It has been decided that the regional climate simulations will be analyzed using three approaches: (1) a standard evaluation of the current simulations against observational data and re-analyzed wind fields, (2) a cluster analysis to identify key modes of variability or meteorological regimes, (3) and time-series analyses to examine meteorological variability on synoptic, seasonal, and interannual time scales. (Alice Gilliland, 919 541 0347)

Progress has been made on several computer programs designed to manage a sizable (Tb) Regional Climate Model (based on MM5) data set that is expected to arrive over the next several months. During May, the initial version of the quality control code was successfully tested on a 1-month MCIP data set. Several Gridded Analysis and Display System (GrADS) routines (Empirical Orthogonal Functions (EOF), Cumulative

Distribution Function (CDF), Histogram plots) were adapted to perform statistical analysis on specified "air-quality indicators." Further refinements to the programs and additional statistical modules are planned for July. (Robert Gilliam, 919 541 4593)

14. Collaboration with Global Modeling at Harvard University. As part of the Climate Impacts on Regional Air Quality (CIRAQ) project, collaborations have been established with the global atmospheric modeling group (PI: Daniel Jacob) at Harvard University. Output from the Harvard global-scale chemical transport model GEOS-CHEM will be used as chemical boundary conditions for the Community Multiscale Air Quality (CMAQ). The linkage will require conversion between the GEOS-CHEM chemical families and the SAPRC chemical mechanism for CMAQ. During a GEOS-CHEM workshop on June 2-4, 2003, at Harvard University, Alice Gilliland gave an invited presentation on these plans to link GEOS-CHEM output with CMAQ. Once the approach has been established, it is hoped that it can serve as a future option for CMAQ boundary conditions. (Alice Gilliland, 919 541 0347)

15. Baltimore Human Exposure Study. A collaborative study was begun between the U.S. EPA and Johns Hopkins University to characterize factors affecting human exposures to automobile emissions in an urban neighborhood. Johns Hopkins University has been conducting studies of human exposures to mobile sources in a Baltimore, Maryland, neighborhood for several years. The project is in part related to the Baltimore Supersites Program under funding from the U.S. EPA STAR program. This project is now in its last study period during Summer and Fall 2003. EPA has located its Model 2000 SODAR system and portable 10-meter meteorological tower at the Ponca Street PM Supersite. EPA will be using these measurements in addition to routine Baltimore meteorological measurements and modeling to characterize meteorology during the urban exposure study. In addition, EPA is collaborating to use the traffic pattern information and air concentrations being measured by Johns Hopkins University to evaluate the performance of the MicroFac mobile source emissions model for CO and PM. (Alan Huber, 919 541 1338)

16. Air Quality Forecasting. Several debugging issues have arisen since the "release" of the Air Quality Forecasting (AQF) version of Community Multiscale Air Quality (CMAQ). Most of them have been traced to input data errors although a couple of code errors have been found and corrected. In addition, helping the team at NOAA National Center for Environmental Prediction to get "end-to-end" scripts set up and analyzing run outputs have been a major focus this month. Work has begun on porting the optimizations realized in the AQF CMAQ to our local Linux clusters. This should enable better production turnaround for the CMAQ model applications performed at the Atmospheric Sciences Modeling Division.

Work has also begun on preparing the upcoming August 2003 release of CMAQ that incorporates upgrades to nitrate aerosol simulation routines, a new vertical advection scheme, an optimized gas chemistry solver, and other enhancements. Preparation and development of test data sets have been completed and made available for profiling and for the optimization efforts to be undertaken by Sandia National Laboratory. (Jeffrey O. Young, 919 541 3929)

17. Inverse Modeling of Seasonal Ammonia Emissions. The ASMD inverse modeling research to estimate seasonal ammonia (NH_3) emissions will generate a range of seasonal emission factors based on different uncertainty representations withing the current inverse modeling approach. These results will test the sensitivity of the emission adjustments to the uncertainty and will further test the rigor of the seasonal scaling factors estimated in Gilliland *et al.* [2003]. (Alice Gilliland, 919 541 0347)

Idaho Falls

18. CBLAST-High. The BAT instrument package and data system were re-installed on the NOAA P-3 N43 in early June in preparation for the upcoming hurricane season. Included in the install were the BAT probe, an IRGA, and an Everest IR temperature sensor along with the data system computer/display unit. The Everest IR sensor was a new installation as it was a low priority item during last year's hurricane flights. This installation required the fabrication of a new aluminum coupler that is used to attach the BAT probe to the existing nose boom on the P3. Also, the aluminum hemisphere to be used in this year's flights was modified from earlier designs. It is expected to be more robust and is easier/less expensive to reproduce than the proto-type aluminum hemisphere. Ground tests were conducted to assure instruments were operating correctly. Flight tests are scheduled for late July/early August. These tests will include both rain/graupel flights and calibration maneuvers to determine the flow coefficients. (Jeff.French@noaa.gov)

19. CBLAST-Low. Work continues on the analysis of the CBLAST-Low data. A literature search was done for papers based on comparisons between results from the TOGA-COARE algorithm and experimental results. The COARE v3 algorithm was converted to IDL. Comparison plots between the COARE algorithm results without wave effects versus the LongEZ eddy correlation results were generated. Generally the heat fluxes showed good agreement along with u%. However, z_0, C_{dn}. T% and q% did not show as good agreement. Currently work is directed towards computing the wave age so comparisons between the COARE algorithm with wave effects and the LongEZ data can be done. (Tami Grimmett, Jeff French)

20. ET Probe. Intercomparisons are now under way between the ET probe data collected on 15 May 2003 and the data from the FRD sonic anemometer at INEEL. The ET probe was set up about 50 m from the sonic during these tests. The first issue that was dealt with was the proper rotation of the sonic and ET probe coordinate systems so that the *x* axes point downwind. Currently, the software used with the sonic anemometer uses a double rotation of the coordinate system. The first rotation forces the mean *v* component to zero, and the second forces the mean *w* component to zero. This double rotation is probably sufficient for the sonic, which was aligned fairly carefully during installation. However, the ET probe was mounted on a truck, so the vertical alignment was not very precise. It was therefore decided to apply a triple rotation to both the ET probe and sonic data. The third rotation forces the covariance of *v* and *w* to zero. Software is being written to apply the triple rotation to both sets of data. There is an alternate approach to aligning sonic data that fits a plane surface to the 3D wind vector, but this requires longer-term data from various wind directions, which are not available with the ET probe.

Another issue important for the ET probe and sonic comparison is the computation of confidence intervals for the turbulence statistics. Differences between the statistics from the two sensors may not be significant if the confidence intervals are wide. The problem here is that standard statistical tests assume all the samples are independent, when this is demonstrably untrue for turbulence data. An alternate approach based on Bayesian statistics called Markov Chain Monte Carlo (MCMC) seems to show some promise in avoiding or reducing these problems. Some tests of the MCMC approach have been conducted with the sonic data from the site. In these tests, an autoregressive model was used for the turbulence time series, so the resulting statistics account the lack of independence between the samples. The MCMC approach also allows one to assume the fluctuations have a skewed distribution rather than the Normal distribution used for most statistical tests. Moreover, the MCMC approach can account for the effects of so-called nuisance parameters, such as the slope and offset of a possible trend in the data. The confidence intervals based on the MCMC modeling are generally wider than those produced by the standard statistical tests. (Richard.Eckman@noaa.gov)

21. Rain in Cumulus over the Ocean (RICO). A proposal was submitted to the National Science Foundation, Physical Meteorology Program to investigate the initiation of precipitation and maintenance of cloud clusters in trade-wind cumuli. This proposal is a joint effort between ARL and the University of Wyoming to gain a better understanding of the role these clouds play in climate and global energy balance. Our proposal is linked to the RICO project which is a multi-institution project bringing together scientists from domestic and foreign universities, private industry, and government agencies to better understand the nature of trade wind cumuli. (Jeff.French@noaa.gov)

22. INEEL Support. Each year around this time there is usually a burst of activity regarding wildfire preparedness, and this year is no exception. The INEEL Fire Marshal and Deputy Fire Marshal visited FRD in June to discuss the use of one or more of the INEEL Mesonet towers for fire-weather support. Specifically, they would like to see the towers included in the Weather Information Management System (WIMS). Data from WIMS is used in the National Fire Danger Rating System (NFDRS) to generate fire-weather maps for the U.S., including the adjective fire danger ratings (low, medium, high, etc.) often seen on roadway signs. Initial contacts with the WIMS support staff indicate that it will not be easy to get the Mesonet towers included. WIMS is primarily set up to use data from the Remote Automated Weather Stations (RAWS) operated by the BLM and other agencies. There does not appear to be any mechanism for ingesting data from other sources, other than manual data entry. This is rather unfortunate, because it appears that many of the data holes seen in the fire-weather maps could be filled by towers from other networks. Investigations into this issue are continuing. (Richard.Eckman@noaa.gov)

A search was also conducted for any new software that has recently become available for wildfire modeling. FRD has a simple program to estimate fire spread and intensity based on user inputs of wind speed and fuel moisture. It uses the same algorithms as in the BEHAVE model that has been around for many years. A new BEHAVE PLUS model is now available, but it is currently just the old BEHAVE algorithms with a Windows graphical interface. The FRD program was upgraded, however, to include some newer fuel models from the

NFDRS. It now provides outputs for NFDRS fuel models L (grassland) and T (sagebrush). (Richard.Eckman@noaa.gov)

Las Vegas

23. CIASTA Mesoscale Modeling. NV-RAMS ran to completion on the University of Nevada-Las Vegas (UNLV) computer system 23 of 30 days (a 77% completion factor). The incomplete days were primarily due to unavailable disk space at UNLV from the June files. Data are continuing to be renamed and saved daily, and backed up to CD monthly (3 CDs). (Walt Schalk, 702 295 1262)

The 12z model run has been working well. Near the end of May the run began taking twice as long to run. Problem was due to one user over taxing the system. All graphics for the 2km and 8km grids have been put into production test bed. (Walt Schalk, 702 295 1262)

24. IMPROVE Steering Committee Meeting. ARL/SORD staff chaired the IMPROVE (Interagency Monitoring of Protected Visual Environments) Steering Committee meeting in Tucson, AZ, on July 3rd and 4th. The aerosol monitoring network currently consists of 164 monitoring sites, 110 are the IMPROVE sites represent the visibility-protected federal class I areas. The remainder are IMPROVE Protocol sites including 11 that are tribal sites. In 2002, 18 sites were added, and to date 4 sites have been added to the network in 2003. Sample recovery during 2002 is 94%. The optical monitoring network currently includes 19 transmissometer sites and 30 nephelometer sites. Other topics discussed at the meeting include nitrate trends analysis and data handling issues, special aerosol studies of ion composition, coarse particles, comparability of the IMPROVE and Speciation Trends Network, as well as innovations in digital photography to monitor visual indices and a request for use of the quartz filter archive for carbon speciation studies. (Marc Pitchford, 702 862 5432)

25. Big Bend Regional Aerosol and Visibility Observational (BRAVO) Meeting. ARL/SORD staff chaired the BRAVO Study technical committee meeting held in Ft. Collins, CO, on June 11th and 12th. This, the last scheduled meeting for the BRAVO Study, was intended to present the final modeling and data analysis results from the technical team including federal, state, university, and industry scientists. Only minor additional analyses are anticipated as the study moves fully into final report writing mode. The results from the modeling and data analysis support conclusions that the visibility impairment seen at Big Bend National Park in Southwestern Texas during the July through October 1999 study period is primarily the result of a sulfate aerosol from a combination of source areas in Northern Mexico, Texas and the Eastern United States. During the summer portion of the study period, Mexico and Texas area sources contributed much of the haze. The largest sulfate haze episodes in the fall seem to be from sources in the Eastern United States from the Ohio River area to Eastern Texas. The final report will be drafted during the summer, peer-reviewed during the fall and is expected to be final by the end of the year. (Marc Pitchford, 702 862 5432)

26. Climatology/MEDA Hourly-Averaged Data. SORD has had several requests for hourly averaged MEDA data in the last several months. The requesters generally are utilizing the averaged MEDA data for input into models. SORD decided to create a second MEDA database that contained these hourly averaged values along with the Pasquill/Gifford stability, when available. 15-minute MEDA data was extracted from the MEDA database for each station and time period. These MEDA data were processed to get averaged winds for each hour along with temperatures, pressures, and RH. The peak and minimum winds for the hour were extracted, and the total precipitation was computed for each hour. This new data file for each station was then utilized to extract the winds and merge them with the surface observations from Desert Rock. The merged surface data was used to compute the stability category for each hour. The hourly stability categories were then merged with the hourly MEDA data. All current and previous stations were processed producing the new hourly MEDA data files with stability categories. These hourly data files are initially individual sequential files--they will be included into a new database in the future. (Doug Soule’, 702 295 1266)