



# NOAA ARL Monthly Activity Report



July 2002

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**Air Resources Laboratory**

## Contents

1. ***HIGHLIGHT – READY/HYSPLIT Registration Reaches 1000.***
2. ***HIGHLIGHT – AirVenture 2002.***
3. ***HIGHLIGHT – 2003 UV Spectroradiometer Intercomparison.***
4. ***HIGHLIGHT – Global Climate and Air Quality Assessment.***
5. ***HYSPLIT Update***
6. ***HYSPLIT Dispersion Assessment Program***
7. ***Modeling the Atmospheric Fate and Transport of Air Toxics***
8. ***SURFRAD/ISIS***
9. ***Central UV Calibration Facility (CUCF)***
10. ***TCCR Activities***
11. ***Climate Reference Network***
12. ***Coupled Dynamical/Photochemical Modeling***
13. ***Air Toxics Program***
14. ***Airborne Mercury***
15. ***CMAQ – The Community Multiscale Air Quality Modeling System***
16. ***Community Modeling and Analysis System (CMAS) Center***
17. ***Surface Exchange Vegetation Database***
18. ***Plume Rise Updates in SMOKE Point Source Emissions Processor***
19. ***CMAQ Model for Dioxins***
20. ***Fugitive Dust Modeling***
21. ***Improvements in Emissions Modeling***
22. ***Analysis of NADP/NTN and AIRMoN Data***
23. ***Multimedia Integrated Modeling***
24. ***CEQ/OSTP Working Group on Methylmercury.***
25. ***AGU Special Session on Air Toxics***
26. ***P-3 Installation of BAT Probe***
27. ***CBLAST-Low***
28. ***Refractive Turbulence***
29. ***ET Probe***
30. ***IMS Development Project***
31. ***Hurricane Balloon***
32. ***INEEL Support***
33. ***INEEL Wildfire Modeling***
34. ***INEEL Mesoscale Modeling***
35. ***WATUSI***
36. ***CIASTA Projects Approved***
37. ***Hottest Day on Record***

## Highlights

**1. HIGHLIGHT – READY/HYSPLIT Registration Reaches 1000.** Since 24 September 2001, ARL has been requiring all users except those with **.noaa.gov** computer domains to register before being permitted to run the HYSPLIT transport and dispersion model on the ARL READY (<http://www.arl.noaa.gov/ready.html>) website. On July 23 our 1000<sup>th</sup> registrant, Dr. Deug-Soo Kim of the North Carolina State University, was given access and provided with a letter of appreciation and a NOAA pin. [glenn.rolph@noaa.gov](mailto:glenn.rolph@noaa.gov)

**2. AirVenture 2002.** Tim Crawford showcased the LongEZ research aircraft at AirVenture 2002 in Oshkosh, Wisconsin, July 23-29, 2002. This was the Experimental Aircraft Association's 50<sup>th</sup> airshow, and about 750,000 people observed the many exhibits and the 2500 show planes and aerial shows. New technologies and aircraft were showcased during the seven day event.. NOAA had an exhibit in the Federal Pavilion featuring the LongEZ and its capabilities as a Small Experimental Research Aircraft (SERA). Among the popular handouts were the NOAA OAR/UCAR/JOSS booklet titled "Reports to the Nation, Our Changing Climate, and a paper fold up model of the LongEZ. Tim Crawford, Ed Dumas and Chris Schamper participated in the NOAA educational display. The OAR Outreach Committee were gracious enough to pay travel expenses for Tim Crawford, Ed Dumas and Chris Schamper. [tim.crawford@noaa.gov](mailto:tim.crawford@noaa.gov), Jerry Crescenti and staff



Tim Crawford, Chris Schamper and Ed Dumas at the NOAA Exhibit for AirVenture 2002.

**3. 2003 UV Spectroradiometer Intercomparison.** Preparations are underway at the Table Mountain Test Facility (TMTF) for the next US UV instrument intercomparison. There are now seven groups planning on participating --:

### Instrument and network

### Operator

U111 USDA spectroradiometer	State University of New York
UVRSS USDA	Colorado State University
Brewer 101 EPA	University of Georgia
Double Brewer NASA	NASA
SUV-150B Biospherical Instruments	NSF
UH Smithsonian	Smithsonian Environmental Research Center
UVL NIWA New Zealand (DSRC)	CMDL

(the NIWA instrument will remain at the David Skaggs Building during the intercomparison)

- There is a possibility that SUNY will bring a UV spectrograph, but has not been decided at this time.
- The EPA/UGA Brewer 146, located at Niwot Ridge may also be included in the data set for future analysis.

(Patrick Disterhoft, 303 497 6355)

**4. Global Climate and Air Quality Assessment.** In collaboration with the EPA Global Change Research Program, a work plan has been developed for regional climate modeling that will be performed at the Department of Energy's Pacific Northwest Laboratory. The meteorology output will be used to drive CMAQ

for the air quality assessment. A kick-off meeting is planned for September 10-11, 2002, in Research Triangle Park, North Carolina. (Alice Gilliland, 919 541 0347)

## **Silver Spring**

**5. HYSPLIT Update.** Major modifications were made to the Hysplit plotting programs to improve the automated map domain selection procedure. A variety of other changes were also introduced, two also applying to the READY application of HYSPLIT. Firstly, an option was added to allow the output of relative humidity along the hysplit trajectory(ies), which is an addition to the following other variables already available: potential temperature, ambient temperature, rainfall and mixed layer depth. The results are listed in the trajectory endpoints file that is available at the end of each HYSPLIT trajectory run. Secondly, information about the HYSPLIT run is now plotted at the bottom of each output map. In addition to information on the model simulation produced, the Job identification number is also plotted so that users can return to the simulation on the website using the this number. Having the ID number on each plot can facilitate accessing the plots when many simulations are produced. [roland.draxler@noaa.gov](mailto:roland.draxler@noaa.gov), [glenn.rolph@noaa.gov](mailto:glenn.rolph@noaa.gov)

**6. HYSPLIT Dispersion Assessment Program.** Computer programs were set up to automatically run HYSPLIT daily to build a set of model output for assessment. Specifically dispersion runs are done from three sites using both forecast and archived meteorology. Forecast trajectories are also calculated and will be used for meteorological classification. The goal is to provide the dispersion forecaster information on the quality of the forecast. [barbara.stunder@noaa.gov](mailto:barbara.stunder@noaa.gov)

**7. Modeling the Atmospheric Fate and Transport of Air Toxics.** Work has continued on a mercury modeling intercomparison project being organized by the Meteorological Synthesizing Center East of EMEP. In carrying out the model testing for the EMEP project, it was observed that the fate and transport of mercury is particularly sensitive to the concentration of SO<sub>2</sub>. In the initial simulations for mercury transport to the Great Lakes conducted earlier this year, a constant value of SO<sub>2</sub> of 100 ppb was assumed throughout the modeling domain. This value is probably at least 10 times too high – except in concentrated plumes. The consequence of using this too-high value of SO<sub>2</sub> in the earlier runs was that much less Hg<sup>+2</sup> was present in the simulations (SO<sub>2</sub> reduces Hg<sup>+2</sup> to Hg<sup>0</sup>). This may explain the significant underprediction bias in precipitation Hg fluxes observed in earlier modeling. New simulations with more appropriate SO<sub>2</sub> concentrations will be now conducted. Instead of using a constant SO<sub>2</sub> concentration, ambient measurement data will be used to estimate levels throughout the modeling domain for the simulation periods of interest. [mark.cohen@noaa.gov](mailto:mark.cohen@noaa.gov)

## **Boulder**

**8. SURFRAD/ISIS.** The SURFRAD processing, reprocessing, averaging, and modification code was improved to use the component sum (direct plus diffuse) as the basic measurement of total solar irradiance, and to use the global measurement as a secondary measurement. This improves the net solar and total net radiation calculations that are disseminated with SURFRAD data. The entire SURFRAD data set was successfully processed with the new code. All files in the FTP archive have been replaced with updated files. This change has been documented on the SURFRAD web site under the "Problems" link, and with a message at the top of the SURFRAD page.

The SRRB web site has a new look. Along with this change, the site has also been updated. Old information was removed, and newer information added. The UV part of the site has also been updated. A new web page has been created for the ISIS network and is now available on the SRRB web site. It parallels the SURFRAD page with file downloading and data plotting capabilities. Only files from the time SRRB took over the ISIS network (Feb. 1, 2002) are available. The new page can be found at <http://www.srrb.noaa.gov/isis/index.html>.  
John Augustine, 303 497 6415)

**9. Central UV Calibration Facility (CUCF).** Patrick Neale from the Smithsonian Environmental Research Center (SERC) and Jay Hermann from NASA co-chaired the first U.S. interagency meeting on UV monitoring in over two years. It was held at the United States Global Change Research Program's office in Washington D.C. Patrick Disterhoft of the CUCF attended the meeting as a panel member. For the first meeting each panel member gave a brief talk on the current status of their group's scope of research. (Patrick Disterhoft, 303 497 6355)

As stated in the last monthly report, the CUCF, working with New Zealand's UV5 Spectroradiometer, which is located on top of the David Skaggs Research Center, made measurements to independently verify its horizontal irradiance scale. The independent verification is necessary since the CUCF's horizontal irradiance scale is a derived standard from the NIST irradiance scale, the candela. The measurements were taken on July 17, 2002, but the data have not yet been returned to the CUCF by the New Zealand group. Final analysis of the data should be completed by September. (Patrick Disterhoft, 303 497 6355)

**10. TCCR Activities.** At a July 17 meeting of the TCCR, it was suggested that OAR HQ task the TCCR with analyzing recent hacks and generating technical recommendations. To this end, TCCR will form a security subcommittee, to meet in Boulder the week of August 5, in conjunction with the OAR WebShop. The security subcommittee will be given access to incident reports from all OAR security incidents in 2001 and 2002. These data will be kept confidential, but will be used to recommend technical actions that can be taken to prevent future incidents. It was also suggested that field offices let OAR HQ know what steps are already being taken toward IT security, and where funding is being taken away from science to pay for these efforts. (Chris Cornwall 303 497 7316)

## **Oak Ridge**

**11. Climate Reference Network.** A teleconference in Asheville with NESDIS/OSD staff and NCDC USCRN scientists on July 1 was followed by a full day mini-review of USCRN progress on July 2. OSD has been asked by NESDIS to facilitate the deployment and documentation of the USCRN because of their experience with deploying large systems such as satellites. It seemed clear from the teleconference that OSD's vision of the network is quite different from that originally planned. Additional meetings will be needed to resolve these differences to everyone's satisfaction. A memo was prepared for Tom Karl, Director of NCDC, outlining ATDD's impressions of the teleconference and the questions that arose. A meeting with NCDC and OSD principals in Silver Spring on July 26 resolved a number of these issues, although practical aspects are still being ironed out. The mini-review showed that considerable progress has been made by the USCRN in the last several months, especially in network density design, site selections and approvals, and web site documentation. [hosker@atdd.noaa.gov](mailto:hosker@atdd.noaa.gov), Meyers

**12. Coupled Dynamical/Photochemical Modeling.** Results from the 4-h midday (11:00-15:00 LST) coupled LES-photochemical simulations of the high-NO/low-ETH point source and the "no plume" control case were completely postprocessed by mid-July. As mentioned last month, these two simulations, along with the high-NO/high-ETH point source simulation, utilized the corrected photolysis rates for the CB4 photochemical mechanism. By writing scripts for automation, a plethora of profile plots were produced, showing mixing ratio statistics for 38 trace gases and intensity of segregation ( $I_s$ ) for 57 reactant pairs for all three 4-h coupled simulations. A sequence of profile plots of  $I_s(\text{HO}_2, \text{NO})$  over the  $15 (4 \text{ km})^2$  averaging squares were animated to clearly show the spatial and temporal evolution of the  $\text{HO}_2$  and NO segregation, which changes sign, during the 4-h high-NO/high-ETH plume simulation. All of these plots and animations were sent to collaborators Drs. Dick McNider and Arastoo Biazar at the University of Alabama in Huntsville for comment.

Based on these recent coupled plume runs, a PowerPoint talk with animations, titled "Initial application of a coupled LES-photochemical model to examine near-source ozone production from industrial emissions", was prepared and presented at the American Meteorological Society's 15<sup>th</sup> Symposium on Boundary Layers and

Turbulence held in Wageningen, The Netherlands, on July 15-19. The talk generated additional interest in ATDD's coupled modeling research and led to many fruitful discussions with potential for future collaborations. A revised manuscript containing updated figures was also prepared and sent to the AMS for posting on their symposium Web site. [herwehe@atdd.noaa.gov](mailto:herwehe@atdd.noaa.gov)

**13. Air Toxics Program.** The output from the latest 3-h (11:00-14:00 LST) idealized highway emissions coupled LES-photochemical simulation was completely postprocessed in July. Recall that this was an idealized simulation of four north-south highway continuous line sources of formaldehyde (FORM), acetaldehyde (ALD2), nitric oxide (NO), nitrogen dioxide (NO<sub>2</sub>), and carbon monoxide (CO) specified at  $x = 2, 3, 4,$  and  $5$  km on a  $20 \text{ km} \times 10 \text{ km} \times 4 \text{ km}$  domain with a mean westerly wind of  $1 \text{ m s}^{-1}$ . Profile plots of trace gas mixing ratio statistics over  $4 \text{ km} \times 10 \text{ km}$  averaging bands were produced, along with animations of the temporal variation of mean mixing ratio profiles and the NO<sub>2</sub> statistics. [herwehe@atdd.noaa.gov](mailto:herwehe@atdd.noaa.gov)

**14. Airborne Mercury.** Mercury speciation sensors (Tekran models 2537a/1130/1135 for gaseous elemental mercury (GEM), reactive gaseous mercury (RGM) and particulate mercury (PM) ) were installed on a tower above the forest canopy at the peak of Cove Mountain (4077 ft.) inside the Great Smokey Mountains National Park. Preliminary data show GEM varying between  $1.8 \text{ ng m}^{-3}$  (northern hemisphere background is  $\sim 1.7$ ) and  $14.0 \text{ ng m}^{-3}$ , with clear daily minima and maxima around 8am and 6pm (local), respectively. RGM has varied between the detection limit ( $\sim 1 \text{ pg m}^{-3}$ ) and  $58.0 \text{ pg m}^{-3}$ . PM has also varied between the detection limit ( $\sim 1 \text{ pg m}^{-3}$ ) and  $22.0 \text{ pg m}^{-3}$ . Both RGM and PM are significantly correlated to GEM. [brooks@atdd.noaa.gov](mailto:brooks@atdd.noaa.gov)

#### **Research Triangle Park**

**15. CMAQ – The Community Multiscale Air Quality Modeling System.** A Sun script version of CMAQ was released on July 16, 2002. This release included a tutorial and reference data sets for a two-day 1999 tutorial and for two nested domains (at 32 km and 8 km resolutions). It is anticipated that the EPA's Office of Air Quality Planning and Standards will prepare and provide additional tutorial and user guide documentation to supplement the read me files that were issued with this release. ASMD released an updated "read me" documentation on the Linux and Sun stand-alone versions of CMAQ. In collaboration with the EPA's computational toxicology research initiative, planning started for a site visit to Sandia National Laboratory to pursue possible interaction on improving CMAQ model performance, data access, and scientific visualization. Comparison started on the performance of CMAQ on several Linux platform and Fortran compilers to determine an optimum (cost vs. performance) solution for the Division's near-term development needs. The various code modules within CMAQ were profiled to determine areas that were hampering performance and modifications were started to optimize the code. Work began on developing and debugging versions of the model for the neighborhood scale modeling project. (Jeffrey Young, 919 541 3929; Alfreida Torian, 919 541 4803; Gary Walter, 919 541 0573; William Benjey, 919 541 0821)

**16. Community Modeling and Analysis System (CMAS) Center.** The Community Modeling and Analysis System (CMAS) Center is crucial to formation of a Community Multiscale Air Quality (CMAQ) user community for collaboration in model improvements, training and support. The CMAS concept continues to gather community support. On July 17-18, 2002, Dr. James Sloan of the University of Waterloo, Ontario, Canada, visited the Division and presented a seminar regarding plans for a Models-3/CMAQ applications center for Canada at the University of Waterloo.

Collaboration continued with the CMAS staff and the Office of Air Quality Planning and Standards on plans for the Models-3/CMAQ User's Workshop scheduled for October 21-23, 2002, at Research Triangle Park. The User's Workshop will be an annual event as a part of CMAS' outreach function. The Workshop schedule, draft agenda and call for presentations are available for viewing at <http://www.cmascenter.org>. (Bill Benjey, 919 541 0821)

**17. Surface Exchange Vegetation Database.** The Surface Exchange Vegetation (SEVE) database (formerly called BELD3) is now being used to process biogenic emissions within CMAQ. Sensitivity tests are being planned to examine the usefulness of SEVE within MM5 and to ascertain the effect that this database and the National Land Cover Database (NLCD) will have on predictions from CMAQ. (Thomas Pierce, 919 541 1375)

**18. Plume Rise Updates in SMOKE Point Source Emissions Processor.** Revisions were made to the plume rise approach contained in the SMOKE (Sparse Matrix Operator Kernel Emissions) processor, which prepares elevated point-source emissions for the CMAQ Chemical Transport Model. Test simulations with the modified algorithm revealed that certain notable emissions released from short stacks previously inserted into layer 1 are currently found in layer 2, which results in more realistic, lower concentrations in layer 1 at night. The plume rise code was also simplified. Additionally, an alternative initial vertical plume spread method based on stability was incorporated. Initial testing in CMAQ showed few high NO concentration spikes at the surface during the night. Also, peak daytime ozone concentrations declined in areas dominated by large point-source plumes. (Jim Godowitch, 919 541-4802; Jon Pleim, 919 541-1336)

**19. CMAQ Model for Dioxins.** Two versions of CMAQ for dioxins and furans were compared. One version simulated toxic congeners, while the second simulated homologues, groupings of congeners that share the same number of chlorine atoms. Initial analysis shows differences in how dioxins and furans contribute to Toxic Equivalence Quotients (TEQ) in air concentrations and deposition. Domain averages show that the homologue version predicts a larger role for furans, especially Penta and Hepta chlorinated species. Results appear independent of how TEQ is calculated, because calculations used two sets of factors to calculate TEQ. Of the two, only one set accounted for different toxicity between congeners within a homologue. (William Hutzell, 919 541 3425)

**20. Fugitive Dust Modeling.** Work continues on the development of algorithms for modeling windblown and fugitive dust (from on, off roads) from industrial and agricultural tillage practices. In July, the first results were produced of a multi-day simulation of gridded wind-blown coarse- mode particle concentration fields from CMAQ at 36-km resolution based upon the prototype dust emissions algorithms. This prototype incorporates the BELD (Biogenic Emission Land Use) database. Methods continue for the introduction of agriculture tillage practice into the emissions processing. The preliminary results were in qualitative agreement with the comparable measurements obtained from the National Park Service's IMPROVE (Interagency Monitoring of PROtected Visual Environments) network. (Jason Ching, 919 541 4801)

**21. Improvements in Emissions Modeling .** In collaboration with the Air Pollution, Prevention and Control Division (APPCD) of EPA's National Risk Management Laboratory, work continued on an implementation plan for the Mobile-Modal Model (MMM), a precursor of the Multiscale Motor Vehicle and Equipment Emission System (MOVES) model expected from the EPA Office of Transportation and Air Quality in four to five years. The general plan is to implement and test the Mobile-Modal model during FY-2003. However, MOVES will eventually supercede MMM and is expected to be implemented for operation with SMOKE by FY-2006. The implementation plan, which will be part of a Quality Assurance Project Plan, is expected to be completed during September 2002. A management meeting to coordinate the implementation of Mobile-Modal between the ASMD and APPCD were held on August 12, 2002. (Bill Benjey, 919 541 0821)

**22. Analysis of NADP/NTN and AIRMoN Data.** An analysis was performed of data from the National Atmospheric Deposition Program (NADP) precipitation chemistry networks National Trends Network (NTN) and Atmospheric Integrated Monitoring Network (AIRMoN). NTN and AIRMoN maintain five collocated monitors that provide wet deposition and concentration data for ammonium, nitrate, sulfate, and four base cations. NTN data are collected weekly, while AIRMoN data are collected daily. A manuscript of the comparative analysis of the AIRMoN and NTN data has been accepted by the *Atmospheric Environment* for publication and is currently in press. (Alice Gilliland, 919 541 0347)



**23. Multimedia Integrated Modeling.** Coordination continued on development of the Multimedia Integration Modeling System (MIMS). The MIMS “framework” is software infrastructure or an environment for constructing, composing, executing, and evaluating cross-media models. Collaborators at ASMD, the Office of Air Quality Planning and Standards, Argonne National Laboratory, MCNC Environmental Modeling Center, and North Carolina State University planned and supported several applications of the framework. The developers worked on addressing issues that arose in applications, designing MIMS distributed execution capabilities (to take advantage of remote computers), and identifying an off-the-shelf plotting application that can be linked with MIMS. Work on the MIMS framework development included the addition of new features and software bug fixes. New features within MIMS include a distributed execution option that gives the framework the ability to execute applications on remote computers and a file viewer feature that allows users to view different types of data files from within the framework. These features expands the framework’s capabilities and provides more support for modeling applications. It is anticipated that the MIMS framework software will be tested with the new version of CMAQ and SMOKE by the end of August, although the MIMS documentation may not be available until October. (Steven Fine, 919 541 0757; Steve Howard, 919 541 3660; Bill Benjey, 919 541 0821)

**24. CEQ/OSTP Working Group on Methylmercury.** The White House Council on Environmental Quality and Office of Science and Technology Policy announced the formation of the Interagency Work Group on Methylmercury in May 2002. The working group will examine and coordinate efforts to advance our understanding of methylmercury in the environment, the potential for human exposure, health effects, and technological solutions to these problems. Russ Bullock was asked to serve based on his experience in the modeling of atmospheric mercury transport, transformation, and deposition. (Russell Bullock, 919 541 1349)

**25. AGU Special Session on Air Toxics.** The American Geophysical Union (AGU) accepted a proposal for a special session on air toxics for the Fall 2002 AGU Meeting. Russ Bullock and Bill Hutzell will serve as the session’s conveners. The meeting takes place in San Francisco during December 2002. Persons interested in giving a presentation or attending the session can find information at <http://agu.org/meetings/fm02top.html>. (William Hutzell, 919 541 3425)

## **Idaho Falls**

**26. P-3 Installation of BAT Probe.** The data system was re-packaged and final testing was completed on the BAT gust probe package to be installed on the NOAA P3 (N43RF) for the upcoming hurricane season. The data system utilizes real-time linux, a significant upgrade to the DOS-based software we have running on other systems. Calibration of the sea-surface temperature sensor revealed the instrument was damaged. Repair work was performed by Everest Interscience Inc., maker of the unit. At the end of July, the entire measurement package was shipped to AOC in Tampa, and is awaiting install and test flights scheduled for early August. [jeff.french@noaa.gov](mailto:jeff.french@noaa.gov) and Tim Crawford

**27. CBLAST-Low.** Final preparations have been made for Coupled Boundary Layers Air-Sea Transfer light wind (CBLAST-Low) field study. Two test flights were conducted with the LongEZ research aircraft on July 15 and 17, 2002. The first flight was dedicated to testing the various *in situ* and remote sensors as well as the data acquisition system. The second flight was reserved for calibration maneuvers to determine the proper coefficients for wind velocity determination. All of the equipment was shipped on July 25, 2002 to Hyannis, Massachusetts where the LongEZ will be based during CBLAST-Low. The first probable flight day for the LongEZ is scheduled for August 1, 2002 with the last day on August 28, 2002. [jerry.crescenti@noaa.gov](mailto:jerry.crescenti@noaa.gov), Jeff French, and Tim Crawford

**28. Refractive Turbulence.** Upgrades to the electronics package for three BAT spheres to be flown on the Australian Egrett have been performed. Careful calibrations were conducted for the pressure, accelerometer,

and temperature sensors. The spheres are packaged and await shipment to Australia. They will be flown in August and September as part of the high-altitude refractive turbulence study that will be conducted in collaboration with Jörg Hacker (Airborne Research Australia) and Owen Cotè (Air Force Research Laboratory). [tim.crawford@noaa.gov](mailto:tim.crawford@noaa.gov), and Jeff French

**29. ET Probe.** Preparations continue for deployment of three ET probes during this hurricane season, with most of the action now focused at ATDD in Oak Ridge. FRD is planning to send two additional notebook computers to ATDD for use with the second and third probes. A fourth probe has been assembled at FRD for testing purposes. One planned activity with this probe is to set it up on a windy day next to FRD's flux station at INEEL and compare the probe wind and turbulence data with those from the flux station's sonic anemometer. [richard.eckman@noaa.gov](mailto:richard.eckman@noaa.gov), Tom Strong, Ron Dobosy and Dave Auble [ATDD]

**30. IMS Development Project.** During the month of July, the original funding for this project was exhausted and additional funding was received from DTRA. This combined with the holiday break interrupted development efforts for about two weeks. However, we were able to make progress in a couple of areas. First, we were able to finally get the aperture to work correctly, which significantly increased the resolution of the IMS prototype. This enabled us to better identify the contaminate peaks in the ion spectrum. One appears to be associated with the label on the Polonium ionization source. We were able to eliminate most of this peak by covering the label and redesigning the drift cell. This allowed us to see 155 ppb of SF6. [roger.carter@noaa.gov](mailto:roger.carter@noaa.gov), Shane Beard, Debbie Lacroix

**31. Hurricane Balloon.** Three transponders were tested and prepared for packing and ultimate deployment to the path of a hurricane off the west coast of Mexico or to South Point on the island of Hawaii. Permission has not yet been received to operate in Mexico. We hope to receive word on this status in August and to receive permission to deploy to Mexico, in event of a likely hurricane, by the middle of August or early September of 2002. [randy.johnson@noaa.gov](mailto:randy.johnson@noaa.gov), Shane Beard, Roger Carter

**32. INEEL Support.** Momentum appears to be building to upgrade the dispersion modeling that FRD performs to support INEEL operations. The modeling is currently based on the venerable MDIFF puff model, which can provide results quickly but also lacks several features (e.g., deposition, radiological algorithms, terrain adjustments) that would be useful in supporting INEEL. DOE is now beginning to allocate funding for the upgrade process. A small amount of money has been provided in FY 2002, and it is hoped that some additional funding will be provided in the following years. If possible, FRD intends to adapt an existing dispersion model for use at INEEL rather than building a new one from scratch. [richard.eckman@noaa.gov](mailto:richard.eckman@noaa.gov), Kirk Clawson

**33. INEEL Wildfire Modeling.** The current wildfire modeling capabilities at FRD are fairly primitive, and some effort was expended in July on determining how the modeling could be improved. Ideally, FRD would like to provide estimates of current INEEL fire weather conditions based on data from the Mesonet, and also provide forecast fire weather conditions based on the MM5 modeling. Fuel models are available that provide a reasonable representation of the vegetation at INEEL, so the main problem associated with estimating fire weather conditions is in calculating fuel moisture. Measurements of fuel moisture are available at a WIMS (Weather Information Management System) station operated by the Department of Agriculture in Arco, Idaho, but the most recent measurements are from 1400 LST on the previous day. What is needed is an algorithm that can extrapolate the measured fuel moisture forward in time using standard meteorological observations of wind, temperature, etc. [richard.eckman@noaa.gov](mailto:richard.eckman@noaa.gov)

**34. INEEL Mesoscale Modeling.** A dual processor Dell workstation with two Intel Xeon processors was ordered in July as an eventual replacement for the balky Alpha workstation that is currently used for MM5 modeling at FRD. The new computer will run the Linux operating system and use the recently released Intel



FORTTRAN 90/95 compiler to compile the MM5 source code. The intention is to keep the Alpha workstation running (as long as it lasts) as a testbed for alternate configurations of MM5. There are clearly some systematic biases in the current MM5 runs at FRD, particularly in relation to daytime humidity and near-surface wind speeds, and the hope is to mitigate these problems by adjusting the MM5 configuration. [richard.eckman@noaa.gov](mailto:richard.eckman@noaa.gov)

The MM5 forecasts at FRD are currently being initialized with output from the NCEP Eta model. Up until July, an ftp server maintained by the NWS was being used to download the Eta files necessary for initializing MM5. This server is maintained on a 7/24 basis, and should therefore be reliable. Unfortunately, this is not the case. Required Eta-model files were frequently missing or late to show up on the server, which caused significant delays or failures in the MM5 runs. The required Eta-model files are now being obtained from an NCEP server which is a little slow but significantly more reliable. [richard.eckman@noaa.gov](mailto:richard.eckman@noaa.gov)

## Las Vegas

**35. WATUSI .** SORD research staff and technical support personnel are providing vital support to the WATUSI experiment being planned by Los Alamos National Laboratory (LANL) for the NTS. WATUSI is a large blast-effects experiment. Meteorological support has involved defining the following parameters for the experiment.

**Wind Speed and Direction:** Climatological analysis program to do better bad data checking. Program was run to determine extreme and average values for 31-, 14-, 7-, 5-, and 3-day periods centered on the day of interest. Information was used for dispersion and trajectory estimates, and to understand the area's expected weather conditions.

**Temperature:** A data retrieval and analysis program was written to determine extreme, typical, and average values and to identify erroneous data. Program was executed to get extreme and typical values for 31-, 14-, 7-, 5-, and 3-day periods centered on day of interest. Information was used to understand the area's expected weather.

**Atmospheric Stability:** Using available data, a timeline was developed of typical daily atmospheric stability.

**Dispersion:** An atmospheric stability vs. wind speed study was initiated and completed for the experiment using EPIcode®. It was determined that the methodology was okay, but the puff averaging time was incorrect leading to extremely large errors (80x). Discussions with the code's author verified this fact. Discussed EPIcode® and 95% and 50% meteorology with Carl Mazzola for more information. Performed a stability vs. wind speed study using ALOHA. These results were unable to be verified with hand calculations and NOAA in Seattle was contacted. This issue has not been resolved. Reviewed the two methods used to calculate dispersion for the experiment. The first used the same principles as EPIcode®, and the second used EPA Guidance.

**Trajectories:** Based on the climatic data base, trajectory estimates for hazardous materials were provided to the LANL hazards analysis team for their planning of sensor placement. (Walt Schalk, 702 295 1262)

**36. CIIASTA Projects Approved.** NOAA approved a total of \$269k for three of CIIASTA research projects and one administrative task in July. CIIASTA is an ARL managed NOAA joint institute with the University and Community College System of Nevada. One of the projects is a continuation of a multi-year research effort funded by NWS to improve the algorithms used to assess precipitation from weather radar data in mountainous terrain. Additional funds were also available for the multi-year BRAVO Study, which is an air quality study

of the causes of haze in at the Big Bend National Park in Texas. BRAVO, which is a NOAA collaborative study sponsored by the NPS and EPA and involving research from numerous universities and the private sector, should be completed within about a year. The final study funded in July is an investigation of the atmospheric, soil, and plant community parameters that influence surface water balance for surfaces engineered to cover and isolate waste disposal areas. This is a new project that will investigate the complex relationship between atmospheric, geophysical, and biological systems that jointly influence the connection between precipitation and subsurface water in a local area. (Marc Pitchford, 702 895 0432, Barbara Pierce, 702 295 1233)

**37. Hottest Day on Record.** July 9 was the hottest day on record for the NTS. Eleven locations on the NTS tied or exceeded their previous all time maximum daily temperature measurements. These extreme temperatures occurred over the entire NTS, from DRA to Rainier Mesa. Some of the record temperatures are as follow: (Doug Soule', 702 295 1266, and Jim Sanders, 702 295 2348)

DRA	115°F	equaled all time max at DRA.
Mercury	113°F	exceeded old record by 3°F.
BJY	112°F	exceeded old record by 2°F.
Mid Valley	110°F	exceeded old record by 1°F.
Rainier Mesa	94°F	exceeded old record by 1°F.