



# NOAA ARL Monthly Activity Report



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## Contents

1. *Highlight - Tropical Tropopause Study*
2. *Highlight - EPA Gold Medal Award*
3. *Highlight - SAIL 2000 Conference*
4. *Successful Small Business Innovative Research Proposal*
5. *Hysplit Modifications*
6. *Preliminary Results from Florida Speciated Mercury Study*
7. *SURFRAD*
8. *European Geophysical Society Annual Meeting*
9. *TCCR*
10. *CASES-99 -- the Cooperative Air Surface Exchange Study*
11. *Dynamical/Photochemical Modeling*
12. *East Tennessee Ozone Study (ETOS)*
13. *Urban Dispersion*
14. *Hyperspectral Tram System at Barrow*
15. *Mercury in the Arctic*
16. *Program to Address ASEAN Regional Transboundary Smoke (PARTS)*
17. *Participation in the Southern Appalachian Science Fair*
18. *National Air Toxics Assessment*
19. *Java Version of the Models-3 Framework*
20. *Platform Independence of CMAQ Model*
21. *Field Campaign at the Chihuahuan Desert--Jornada del Muerto*
22. *Central California Ozone Study (CCOS)*
23. *VTMX-CBNP 2000*
24. *INEEL Mesoscale Meteorological Network*
25. *INEEL Mesoscale Modeling*
26. *NOAA Cooperative Institute for Atmospheric and Terrestrial Applications (CIASTA)*
27. *SORD Web Page*
28. *AWIPS Enhancements*
29. *Program/Product Enhancements for the Nevada Test Site*

## Highlights

**1. Tropical Tropopause Study.** A report on "Climatological Characteristics of the Tropical Tropopause as Revealed by Radiosondes" by D.J. Gaffen, R.J. Ross, J.K. Angell, and G.C. Reid (Aeronomy Lab/CIRES)

has been prepared. The paper puts forward a more comprehensive analysis of the climatology and variability of the tropopause than ever before attempted using radiosonde data. The analysis addresses each of the three levels commonly used to characterize the tropopause: the conventional tropopause (defined on the basis of lapse-rate); the cold-point (defined as the level of minimum temperature); and the 100 hPa level (a convenient mandatory reporting level often used as a surrogate for the tropical tropopause). Substantial differences are found among these three levels, suggesting that, for some purposes, they are not interchangeable. The variability of the tropopause is complex; its height is highly associated with the temperature of the underlying troposphere, whereas its temperature correlates well with both the tropospheric and lower stratospheric temperatures and shows evidence of a quasi-biennial oscillation and response to major volcanic eruptions. Although changes in instrumentation hinder analysis of long-term trends, evidence is found for the following trends in the tropopause in the deep tropics during 1978-97: an increase in height, a decrease in pressure, temperature and saturation mixing ratio, and little change in potential temperature. ([dian.gaffen@noaa.gov](mailto:dian.gaffen@noaa.gov))

**2. EPA Gold Medal Award.** In a ceremony at EPA headquarters on April 25, Marc Pitchford of the ARL Las Vegas contingent was among 16 individuals recognized “for outstanding and successful dedication and performance in implementing the Fine Particulate Monitoring Program.” He received an EPA Gold Medal for Exceptional Service, and was the only non-EPA person recognized. Dr. Pitchford’s contributions over the last few years include the design, supervision, and reporting on the first series of field studies of the then prototype Federal Reference Method PM-2.5 sampler; the design and implementation of the expansion of the IMPROVE network from 30 to 110 sites and its integration into the national PM monitoring program; and the design and implementation of the PM-2.5 Super Sites Program of which he is one of two Technical Managers.

**3. SAIL 2000 Conference.** Evelyn Poole-Kober of ASMD hosted the SAIL 2000 Conference during April in Research Triangle Park. SAIL represents the Southeast Affiliate of the International Association of Aquatic and Marine Science Libraries and Information Centers. The theme of the conference was Harness the Power of Information, and the twenty regional attendees included NOAA librarians from AOML and from the Beaufort and Panama City marine fisheries labs. Five of the invited speakers were faculty members from the University of North Carolina School of Law and the School of Information and Library Science. They addressed topics including harnessing the power of information, competencies for special librarians, the digital millennium copyright act, and ethics at the (virtual) reference desk. Two invited scientists gave presentations on the short-term impacts of hurricanes on water quality and fisheries habitat in Pamlico Sound, and on atmospheric deposition of nutrients to coastal waters of the east and Gulf coasts. Other presentations were made by SAIL members and publishers and vendors. (Evelyn Poole-Kober, 919 541 4536)

## **Silver Spring**

**4. Successful Small Business Innovative Research Proposal.** The National Atmospheric Deposition Program (NADP, of which AIRMoN-wet is a research subset) operates with precipitation chemistry gauges that are rapidly becoming obsolete. Reliability is a growing problem and modernization is necessary. Several programs are in place to address the situation including a successful NOAA SBIR grant to develop a modern precipitation chemistry gauge. The proposed gauge should be a modular design capable of accommodating up to four separate sets of analytes. For more information, contact [richard.artz@noaa.gov](mailto:richard.artz@noaa.gov).

**5. Hysplit Modifications.** A modified version of the Hysplit code was provided to the Laboratoire de Detection et de Geophysique of the French “Commissariat a l’Energie Atomique”. They are interested in developing “backtracking” techniques to identify pollutant sources using measured air concentration data, in support of their activities related to participation in the CTBT (Comprehensive Test Ban Treaty). Prior to sending them the code, it was modified and tested to permit “backward” dispersion calculations. Although the model always had that capability, it was never tested. Several “time sensitive” algorithms had to be modified to account for decreasing clock time of emissions and sampling windows relative to increases in model simulation time. ([roland.draxler@noaa.gov](mailto:roland.draxler@noaa.gov))

**6. Preliminary Results from Florida Speciated Mercury Study.** A recent meeting at Research Triangle Park some first results from the January aircraft intensive of the Speciated Atmospheric Mercury (SPAM) experiment were discussed. Presentations were given outlining the capabilities of the NOAA Twin Otter, as well as a first look at some of the results from the winter intensive. Early results indicated a wide variety of measured reactive gaseous mercury (RGM) concentrations, with some of the largest gas-phase concentrations seen at altitudes of 8,000 and 11,500 feet above mean sea level (MSL), coincident with very low NO<sub>y</sub> concentrations and CN counts. In the polluted urban PBL, RGM seems to be preferentially bound in the particulate phase. The meeting was attended by EPA and ARL personnel, as well as Jerry Keeler (U Mich) and Cathy Banic (Canada/AES). Useful discussions were conducted, and input was solicited to improve upon the execution of future research flights. Instrument modifications and improvements continue, in preparation for the summer aircraft intensive, May 24 to June 30. ([winston.luke@noaa.gov](mailto:winston.luke@noaa.gov))

## **Boulder**

**7. SURFRAD.** In early April, the first instrumentation exchange of 2000 was conducted, at the Goodwin Creek SURFRAD site. The primary change this year at all instrument exchanges will be to move the downwelling infrared radiometer from the main platform to the solar tracker, in response to recommendations from the international radiation measurement community.

While at Goodwin Creek, the ARL team met Dr. Steve Burges, a professor in the Department of Civil and Environmental Engineering at the University of Washington. He was installing a network of 16 state-of-the-art rain gauges throughout the experimental watershed. He has enormous respect for the SURFRAD network, and looks forward to the installation of the flux system there. With that, together with the hydrology measurements that are made there, he said that the Goodwin Creek site would be one of the most valuable in the nation. (John Augustine, 303 497 6415)

**8. European Geophysical Society Annual Meeting.** At the European Geophysical Society's annual meeting held at Nice, France, an ARL comparison was presented of ground-based broadband UV observations with the NASA Goddard Total Ozone Mapping Satellite (TOMS) satellite determinations of surface UV. Comparisons under all-sky conditions showed a range of systematic differences on the order of 15-20% with standard deviations on the order of 25%. Under cloud-free sky conditions station-to-station systematic differences ranged from 17% to 18% with a standard deviation of 4%. The audience was also introduced to the new Total Sky Imaging (TSI) device that was recently developed at SRRB and is now commercially available. This device caught the attention of the audience; several questions were asked regarding its availability. (John DeLuisi, 303 497 6824)

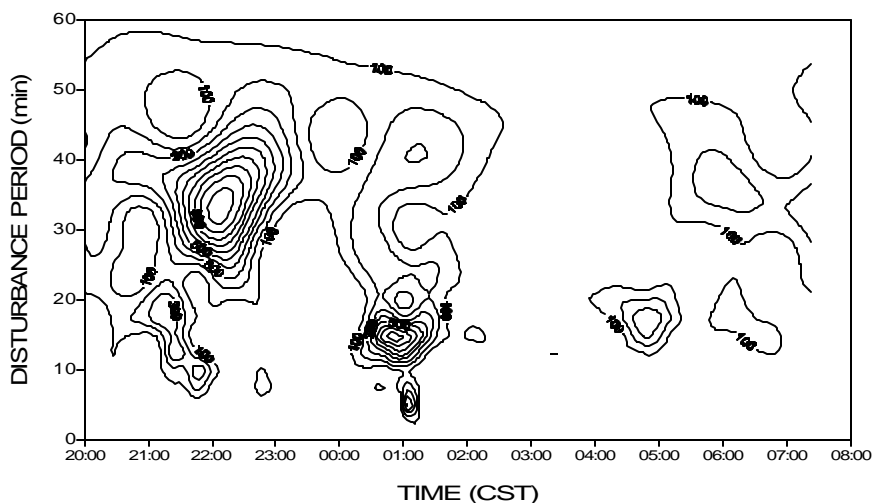
**9. TCCR.** Stan Wilkison planned (as the outgoing TCCR Chairperson) and attended the semi-annual Technical Committee on Computing Resources (TCCR) meeting hosted by the Aeronomy Laboratory April 25-27. Roger Baker, the Dept. of Commerce Chief Information Officer (CIO) attended the morning session of the TCCR meeting and discussed his vision for NOAA Research (OAR). He met with the local Boulder area lab directors for lunch and then toured several of the local laboratories to see the varying ways that we use IT in NOAA Research.

Issues discussed at the TCCR meeting included IDL site licensing; restructuring of NOAA Research for Information Technology; Security (with Diane Davidowicz of NOAA Security office) including security plans and Web server registration; Census PCs distribution; FDMS/CAMS/SMIS administrative systems; IT Architecture documents for NOAA and NOAA Research. (Stan Wilkison, 303 497 6500)

## Oak Ridge

**10. CASES-99 -- the Cooperative Air Surface Exchange Study.** Surface pressure data from the array of 6 ATDD differential microbarographs have been analyzed for five nighttime periods during CASES-99.

The analyses include band-pass filtering of the time series to isolate frequency ranges; wavelet analyses using the Morlet wavelet to identify periods of wave-like activity, and beam-steering of the filtered time series to determine propagation vectors of the disturbances. Figure 1 shows the wavelet energy density for Intensive Operation Period 2, 5-6 October, 1999. The first half of the period is marked by intense disturbances with periods ranging from 10 to 50 minutes. The second half of the period is relatively calm. Of special interest is the short-duration event with period of about 5 minutes that occurs soon after 01:00 (CST). At this time, we believe this event is the result of a Kelvin-Helmholtz instability. ([nappo@atdd.noaa.gov](mailto:nappo@atdd.noaa.gov))



**Figure 1.** Wavelet energy density for 05-06 October, 1999.

**11. Dynamical/Photochemical Modeling.** New coupled modeling research was initiated to extend the large-eddy simulation with chemistry (LESchem) model. To study the convective boundary layer at times other than midday, a sunrise-to-sunset (14-hr, or 16,800 time step) LES with one passive, surface-released tracer was completed during April. This simulation required enabling the surface radiation and soil models within the RAMS portion of LESchem, instead of specifying a constant surface layer temperature gradient as was done in previous simulations. Initial graphical examination of the 14-hr output revealed somewhat excessive growth of the boundary layer, signaling too much surface heating. An analysis of the modeled surface energy budget will be necessary to determine the cause. In addition, Version 4 of the Tropospheric Ultraviolet-Visible (TUV) radiation model from NCAR was ported to a personal computer and several tests

were run. This code may be integrated into the LESchem model at a later date to provide time-dependent 3-D photolysis rate coefficients (*i.e.*,  $J$  values). ([herwehe@atdd.noaa.gov](mailto:herwehe@atdd.noaa.gov))

**12. East Tennessee Ozone Study (ETOS).** A significant upgrade to the airborne data acquisition software for ETOS 2000 was made this month. Real-time data acquisition software which previously used the MS-DOS operating system was re-written to use the Linux operating system. This software allows use of a PCMCIA multiple-port serial card to acquire aircraft position and velocity data from a handheld GPS system, while simultaneously acquiring O<sub>3</sub> concentration, air temperature, IR skin temperature, and relative humidity from a Campbell 21X data logger. Conversion of the tower-based flux data acquisition software and the Mobile Flux Platform software to Linux is expected in the coming months. ([dumas@atdd.noaa.gov](mailto:dumas@atdd.noaa.gov), Meyers)

Repair of numerous ETOS sites began, including sites at Jamestown and Spencer on the Cumberland Plateau, sites at Cove Mountain, English Mountain, and Clingman's Dome in the Great Smoky Mountains, and various sites within the Great Valley. Several ozone analyzers were installed as well. ([birdwell@atdd.noaa.gov](mailto:birdwell@atdd.noaa.gov))

**13. Urban Dispersion.** A comparative study of original and new papers on turbulent diffusion behind vehicles, wake formulations, turbulence and diffusion scaling from wind tunnel studies, was completed. The main program, atmospheric boundary layer subprogram, and wake subroutine in the ROADWAY-2 model were carefully checked. The K<sub>x</sub> and K<sub>z</sub> eddy diffusivity definitions were adjusted by limiting the mixing length and varying the constant. The height of the initial mixing volume was varied from 1.5 m to 6.0 m, as a function of the mean wind speed at 1 m height. This formulation led to improvement of model results for low wind speeds (< 1 m/s). The program was patiently debugged to successfully run when the wind is parallel to the highway. The finalized program was used to run four perpendicular wind cases, four parallel wind cases, and four oblique wind cases. All wind direction cases consist of unstable and stable conditions in equal proportions. Several runs have low winds, while the rest have moderate winds (1 to 2.5 m/s). This ensures that the model is tested under most meteorological conditions likely to be encountered in practice. The predicted concentrations for each run were entered on a separate sheet along with corresponding observed concentrations, taken from the report by Cadle et al. (1976). These data pairs were manually entered in a worksheet file and plotted using Grapher v2.0 software. The model runs were repeated several times to improve the results by adjusting key parameters. The oblique wind cases were under-predicted, but no attempt was made to optimize the model, pending its further testing with additional data. ([rao@atdd.noaa.gov](mailto:rao@atdd.noaa.gov))

A program (STATRW2) to calculate model evaluation statistics was developed. The data base consisting of observed and predicted concentrations (for four test cases) was used to calculate the statistics for each wind direction, as well as the overall model performance measures using all 12 tests. The results showed small values for fractional bias (except for oblique wind) and normalized mean squared error, and high values (0.77 to 0.88) for correlation coefficient. The cumulative frequency distribution plot showed that over 80% of predictions were within a factor of two of observations. These preliminary evaluation results for ROADWAY-2 are quite satisfactory and promising. ([rao@atdd.noaa.gov](mailto:rao@atdd.noaa.gov))

The month of monitoring of urban winds and turbulence at selected locations in downtown Washington, D.C. ended in early April, and the equipment was removed about April 5. The sonic anemometer site on the Navy Memorial mast near Pennsylvania Avenue operated continuously and very successfully; similar technology could be reliably used in future studies. A sonic anemometer on a mast in the bed of a pickup truck was used successfully for spatial variability assessment over the course of a week. A long-range sodar was operated at two sites, both of which turned out to be too noisy for this particular device. Only limited sodar data were obtained. However the system resumed reliable continuous operation once it was returned to its quiet hilltop



location near the Walker Branch Watershed in Oak Ridge. If this instrument (REMTECH PA1-LR) is used in the Washington (or any urban) area again, it should be located only at quiet outlying sites; it is too sensitive for use within the usual urban bedlam. ([hosker@atdd.noaa.gov](mailto:hosker@atdd.noaa.gov), Meyers, Pendergrass, White, Mayhew, Gunter)

**14. *Hyperspectral Tram System at Barrow.*** A tram system was prepared and sent to California State University, Los Angeles, for integration with a new dual-head hyperspectral sensor. In June this tram will be moved to the NOAA/CMDL property in Barrow where hyperspectral reflectance along a 15m tram transect will be monitored throughout the snow-free growing season. This collaborative effort will provide arctic vegetation phenology and a scaling link to future hyperspectral satellite instrumentation. ([brooks@atdd.noaa.gov](mailto:brooks@atdd.noaa.gov), Gamon - Cal. St. Univ. Los Angeles)

**15. *Mercury in the Arctic.*** Elemental mercury (Hgo) and Reactive Gaseous Mercury (RGM) continued to be monitored at Barrow. In April both species showed a strong diurnal cycle, with RGM correlated and Hgo anticorrelated with incoming UV-B radiation. RGM was also anticorrelated with wind speed. Snow samples collected throughout this spring have shown near-zero mercury concentration in January before polar sunrise, an average of 14 ng/l mercury in early March, and an average of 53 ng/l in late April. ([brooks@atdd.noaa.gov](mailto:brooks@atdd.noaa.gov), Meyers, Lindberg - ORNL)

**16. *Program to Address ASEAN Regional Transboundary Smoke (PARTS).*** An intense literature search and study was undertaken during March to understand the requirements for characterizing the particulate emissions from biomass burns in SE Asia. An algorithm which requires information on fire location, fire size, land cover and vegetation type, among other things, was developed for this purpose. The fire location and size will be obtained from AVHRR and DMSP satellite data (GOES operates only over the western hemisphere). Land cover and vegetation data for Southeast Asia, especially for the major Indonesian islands, need to be obtained for developing the emissions data base.

Several excellent web sites on biomass burning and climate change were located and a lot of useful information was obtained. However, it was found that land cover and vegetation information for Southeast Asia is scarce. Extensive correspondence was carried out with scientists around the world. Enquiries sent to European global programs and sites such as BIBEX (Univ. of Freiburg), and FFPCP (JRC/Italy) were not fruitful. Requests made to relevant agencies in Indonesia (LAPAN) and Singapore (CRISP) also did not produce results. The NRL (including a phone call to Dr. D. Westphal), NASA, NOAA, USDA, and USGS sites were informative, but not particularly useful for obtaining the required data. An account was set up to use CRISP's satellite data archives online. ([rao@atdd.noaa.gov](mailto:rao@atdd.noaa.gov))

**17. *Participation in the Southern Appalachian Science Fair.*** ATDD provided a lead judge and an award for the best project related to the atmospheric or oceanic sciences at the 48<sup>th</sup> Southern Appalachian Science and Engineering Fair at the University of Tennessee in Knoxville, April 3-6. The winner of the NOAA award was Ms. Meredith A. Jagger for her work on the accuracy of five-day forecasts. A plaque and a \$50 savings bond were provided. ([hosker@atdd.noaa.gov](mailto:hosker@atdd.noaa.gov))

## **Research Triangle Park**

**18. *National Air Toxics Assessment.*** The first phase of the National Air Toxics Assessment (NATA) was completed for the EPA Office of Air Quality Planning and Standards (OAQPS). This effort used the 1996 National Toxics Inventory (NTI) and the Assessment System for Population Exposure Nationwide (ASPEN) dispersion model to predict nationwide ambient concentrations of toxic air pollutants. The NTI was reviewed

and modified to correct erroneous data and to add stack parameters. Individual hazardous air pollutant (HAP) species (e.g., metals) were grouped so that pollutants with similar dispersion, deposition, and reactivity characteristics were applied in the ASPEN model. Meteorological data from 350 National Weather Stations were processed and summarized for model input.

Finally, concentrations at about 62,000 census tract centroids were calculated. Model results are being sent to EPA regional offices and State and local agencies to preview before any public release. Corrections in the emissions identified in this preview will be noted and the ASPEN model will be re-run using the new emissions data. The model results will be used in an exposure model to estimate nationwide exposure to the air toxics. Various emission control strategies will also be examined. Results from these tests will help regulatory agencies determine which pollutants or sources of emissions to target for future emission reductions. (Joe Touma, 919 541 5381)

**19. Java Version of the Models-3 Framework.** A new Models-3 framework prototype is being developed using Java 1.2 for the Windows NT and Sun-UNIX platforms. This prototype has been successful in duplicating much of the Models-3 functionality, while using a simpler and more compacted Java graphical user interface. It is currently being tested and evaluated and may be included in future Models-3 releases. (Steve Howard, 919 541 3660)

**20. Platform Independence of CMAQ Model.** The Community Multiscale Air Quality model (CMAQ) was tested on a Dell PC with a Pentium II 400MHz processor running Windows NT. Results were compared with identical simulations on a Sun Ultra 30 workstation with a 250MHz processor. CPU times were comparable between these platforms; in this test the model ran faster on the PC by more than 10%. Given the availability of faster processors (currently at 1GHz), the feasibility of running CMAQ on PCs will become even more attractive. Model results for key pollutants were compared and showed reasonable agreement. This effort demonstrates the ability of running CMAQ on a common PC, thereby making the model more accessible to the general public. (Shawn J. Roselle, 919 541 7699)

**21. Field Campaign at the Chihuahuan Desert–Jornada del Muerto.** Dale Gillette of the ASMD Fluid Modeling Facility participated in a field campaign at the Jornada Experimental Range near Las Cruces, NM. Ann Pitchford of the EPA Las Vegas Laboratory worked with him. There were three objectives for the campaign:

1. To collect airborne particles during dust storms using 4X4 arrays of collectors spaced 10 meters apart having five heights above ground at three desert sites. These sites correspond to differing stages of mesquite coppice-dune development. Additional samples were collected at a fourth site with three sets of collectors at five heights. This site has no vegetation at all but has roughly the same soil as the three mesquite dune sites. It represents a zero-point comparison of vegetation protection of the soil.
2. To make visual observations of patterns of erosion and instrumental measurements of  $PM_{10}$  at several locations within the three mesquite coppice-dune arrays during dust storms.
3. To determine size distributions for selected samples collected in objective 1.

For the period of April 7-23, Gillette and Pitchford observed three dust storms and collected samples for two storms. Pitchford also set up a line of Dust Trak samplers at two heights upwind of a mesquite dune, on the dune, and downwind of the dune. Gillette used a Grimm particle analyzer to obtain size distributions and concentrations of aerosols at various locations around the mesquite dune during two dust storms. Objectives

(1) and (2) were met and samples for objective (3) will be analyzed this summer. Two additional measurements were also made: (1) PM<sub>10</sub> size distributions upwind of the mesquite dune lands of the Jornada Experimental Range and (2) aerosol size distributions during dust storms at a site where future visibility measurements are planned. (Dale Gillette, 919 541 1883)

## Idaho Falls

**22. Central California Ozone Study (CCOS).** Preparations continue for deployment of eight meteorological towers and a ground-based remote profiling system for the upcoming Central California Ozone Study (CCOS). This four-month field study will begin on June 1, 2000 and end on September 30, 2000. These sites were surveyed by Tom Strong in a recent trip to California. The final locations of the eight meteorological towers are:

| Station         | ID  | Lat (N)    | Lon (W)     | Elev (m) |
|-----------------|-----|------------|-------------|----------|
| Carrizo Plain   | CAR | 35E 23.75' | 120E 05.12' | 658      |
| Piedras Blancas | PBL | 35E 39.88' | 121E 17.08' | 5        |
| McKittrick      | MKT | 35E 18.16' | 119E 37.30' | 390      |
| Kettleman City  | KET | 36E 05.70' | 119E 57.02' | 103      |
| Granite Bay     | GRN | 38E 44.23' | 121E 12.01' | 227      |
| Suisun City     | SUI | 38E 13.21' | 121E 50.81' | 145      |
| Point Reyes     | REY | 38E 05.74' | 122E 56.89' | 38       |
| Shasta Lake     | SHA | 40E 41.37' | 122E 24.14' | 361      |
| Bella Vista     | BEL | 40E 37.13' | 122E 17.84' | 190      |

Measurements from these towers include wind speed and wind direction, air temperature, and relative humidity. These data will be recorded as 5-min averages and will be transmitted back to FRD several times per day via phone lines for quality control (QC) screening and distribution to CCOS principle investigators. The 915-MHZ radar wind profiler, radio acoustic sounding system (RASS), and Radian 600PA phased-array Doppler sodar will be deployed on the Carrizo Plain located in the California Valley. Wind profiles acquired by the radar and sodar will be acquired as one-hour averages while temperature profiles obtained from the RASS will be reported once per hour as 5-min averages. These data will also be transmitted to FRD for QC screening and availability to the CCOS community. The CCOS team will depart Idaho Falls on Monday, May 15 to begin deploying these measurement systems. ([jerry.crescenti@noaa.gov](mailto:jerry.crescenti@noaa.gov), Randy Johnson, Tom Strong, Shane Beard)

**23. VTMX-CBNP 2000.** Preparations have begun for the Vertical Transport and Mixing Experiment-Chemical and Biological Nonproliferation Program (VTMX-CBNP 2000). The study will be conducted in Salt Lake City UT, in October 2000. Participants include several DOE national laboratories and a handful of universities. The VTMX portion of the experiment will concentrate on regional scales of transport and mixing. This is the portion that ATDD will be participating in (see next paragraph). The CBNP portion of the study is leveraging equipment and tracers already dedicated to VTMX, but will concentrate on building



to urban scales of transport and mixing. It is in the CBNP portion of the study that FRD will participate. Plans call for FRD to provide: 1) a radar profiler, RASS and Doppler sodar, 2) 60 whole air samplers for SF<sub>6</sub> sampling, 3) 40 modified whole air samplers to accommodate perfluorocarbon and SF<sub>6</sub> tracer sampling, 4) analysis of SF<sub>6</sub> samples (approximately 9400), 5) 2 sonic anemometers, 6) 6 mobile realtime SF<sub>6</sub> analyzers. Nearly the entire FRD staff will be needed to support the field deployment. ([kirk.clawson@noaa.gov](mailto:kirk.clawson@noaa.gov) and staff)

Some discussions have taken place with ATDD regarding FRD's participation in the VTMX experiment, which is scheduled for Salt Lake City this coming October. ATDD has received funding from DOE to participate in the experiment. FRD may provide assistance in flight planning, since the nighttime operations that will be required during VTMX are similar to what was done last year during the CASES-99 experiment. ([richard.eckman@noaa.gov](mailto:richard.eckman@noaa.gov), Tim Crawford)

**24. INEEL Mesoscale Meteorological Network.** Three electric field mills have been reinstalled at the INEEL this month. They will be operated throughout the thunderstorm season to help monitor development of thunderstorms around the INEEL. They are stored during the winter months to prevent damage from snow and ice build up. ([roger.carter@noaa.gov](mailto:roger.carter@noaa.gov))

For a year, we have been operating a temporary rainfall monitoring system for the Radioactive Waste Management Complex (RWMC) on the INEEL. The system automatically notifies the stormwater sampling group whenever rain is detected at RWMC. This allows them to sample the stormwater run off from the facility, as required by the EPA. This month, we were requested to make the system permanent. We have now placed current precipitation amounts for INEEL locations on the FRD web page so they can be monitored using home computers to determine when stormwater sampling is necessary. ([roger.carter@noaa.gov](mailto:roger.carter@noaa.gov), Brad Reese)

**25. INEEL Mesoscale Modeling.** Further MM5 simulations were performed in April for the region surrounding INEEL. The current model configuration uses three nested grids having respective spacings of 27, 9, and 3 kilometers. The 27 km grid covers much of the Pacific Northwest, and the 9 km grid covers the Northern Rockies. The 3 km grid covers the Snake River Plain and surrounding mountains; it has sufficient resolution to resolve some of the flows within the tributary valleys that feed into the Snake River Plain. Extensive comparisons with the INEEL tower observations will be required to determine whether the model simulations are realistic. ([richard.eckman@noaa.gov](mailto:richard.eckman@noaa.gov))

## Las Vegas

**26. NOAA Cooperative Institute for Atmospheric and Terrestrial Applications (CIASTA).** The NVRAMS model is now running more efficiently on the University of Nevada-Las Vegas (UNLV) computer. A system utility called the "MISER\_QUEUE" allows SORD to run RAMS using 90% or greater CPU time on 12 processors from 10 p.m. to 6 a.m. This improvement has enabled us to turn on moisture parameters in the model and to extend the model forecasts out to 36 hours. (Jim Sanders, 702 295 2348)

**27. SORD Web Page.** Several new graphics products have been added to the RAMS Model Output Display Page on the SORD Intranet web site. These new graphics include products specific to the city of Las Vegas as well as to several key areas of the Nevada Test Site. The graphical products show, for a 2 km grid size, 0 to 30 hour surface temperatures forecasts, 0 to 30 hour total precipitation accumulation, and 0 to 30 hour 10m wind speed.

The link to the Las Vegas Valley EMPACT Project was added to the SORD web site. The EMPACT program is an initiative of the U.S. Environmental Protection Agency (EPA). The EPA awarded grant funds to the partners in the Las Vegas Valley EMPACT Pilot Project to help explore ways to provide useful, time-relevant environmental information to local communities. (Jim Sanders, 702 295 2348)

**28. *AWIPS Enhancements.*** Several enhancements were added to the SORD AWIPS system. One enhancement allows the duty forecaster and other users to view surface observations produced by numerous mesonets across the Western United States. Data are ingested every 15 minutes by the SORD AWIPS server. To aid in the duty forecaster's ability to stay abreast of any lightning activity near the NTS, several overlay maps have been added to the SORD AWIPS. The NTS areas outlines and a line depicting a 20-mile radius of the NTS lightning alert area have been added to the AWIPS display. The maps can be used in conjunction with data provide by the National Lightning Detection Network. (Jim Sanders, 702 295 2348)

**29. *Program/Product Enhancements for the Nevada Test Site.*** Background maps depicting elevations on and near the NTS have been generated. These maps were generated using the USGS DEM data files that give average elevations every 100 meters. The maps are being utilized for SORD's MEDA products that depict winds, temperatures, and other meteorological parameters. These products are available on both of SORD's Web Servers (internal and external). This technique of producing background elevations will be investigated for use with SORD's Lightning products that are available on SORD'S Web servers. (Doug Soule', 702 295 1266, Rick Holmes, 702 295 1252, and Jim Sanders, 702 295 2348)