



NOAA ARL Monthly Activity Report



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Highlights.

1. *ARL responds to the Tokaimura, Japan nuclear accident.* On September 30, ARL responded to a request from EPA Headquarters asking for a briefing early the next morning on the possible transport of radioactive material from the Tokaimura, Japan, nuclear accident. ARL ran the HYSPLIT model and prepared a statement for the EPA-led interagency conference call on November 1. ARL also ran the model twice each day throughout the weekend and provided the results to the EPA, the Nuclear Regulatory Commission (NRC), and the U.S. Army, through a password-protected READY web page. Forecasts indicated that any material released was expected to be rained out within about 3 to 4 days from the initial time of release, off the coast of Japan due to a strong low pressure system in the vicinity of the plume. The accident reportedly became the world's third-worst nuclear accident, after Chernobyl and Three Mile Island. (glenn.rolph@noaa.gov, Barbara Stunder, and Jeff McQueen)

2. *Haze and forest fire smoke in south east Asia.* ARL has embarked on a major program to improve the capability to forecast smoke and haze downwind of forest fires. The program is focused on southeast Asia, where large-scale clearing of forests in Indonesia has generated a recurring air pollution problem in surrounding countries as well as within Indonesia itself. This is the PARTS program, for the Programme to Address Regional Transboundary Smoke. PARTS is a formal program set up by the ASEAN community (the Association of South East Asian Nations) and WMO, with funding provided by the USA (State Department) and Australia. The Australian involvement remains nebulous, however a plan for the US involvement has been completed. The essence of the program is to assimilate satellite observations of aerosol optical depth into HYSPLIT predictions tailored to the region, driven by forecast meteorology from the (probably) Japanese model. A small number of surface optical depth stations will be set up to provide local ground truth for the satellite observations. NESDIS is also involved, with a main focus on the early detection of fires. As soon as possible, steps will be taken to explore the level of Australian involvement, to coordinate US activity with the Australian, and to discuss the integrated program plans with authorities within the involved countries – primarily Indonesia, Malaysia, Singapore, Thailand, and Brunei. For the immediate future, Bruce Hicks is handling the Australian, Brunei and Thailand contacts. Pai Yei Whung is looking after Indonesia and Malaysia. The key player is Singapore, where the developed capability will be housed, within the Asian Specialized Meteorology Center set up by the WMO; several ARL staff are in contact with the ASRC in Singapore. Formal international aspects of the PARTS program are in the hands of Bill Bolhofer of the National Weather Service. The ARL group working on PARTS is currently Oak Ridge and Silver Spring. Boulder will join the activity soon. (bruce.hicks@noaa.gov)

3. *Mercury speciation study to begin in January.* ARL and EPA researchers will team up in January to measure elemental and reactive mercury compounds, using the NOAA Twin Otter. The pilot study is designed to assess the importance of long- versus short-range transport of mercury to the Florida peninsula, and flights will be conducted over the Western Atlantic Ocean, South Florida, and the Gulf of Mexico (specific flight tracks will depend on wind direction aloft). The Otter will carry the most modern instrumentation available for semi-continuous determination of elemental mercury, as well as thermal denuders for the collection of reactive gaseous mercury (RGM). The thermal denuders will be exposed on the Twin

Otter and analyzed in a ground-based laboratory. ARL will provide flight and engineering support, as well as measurements of trace gases and aerosols (O₃, CO, SO₂, NO/NO_x/NO_y, CN) to assist in the interpretation of results. (winston.luke@noaa.gov)

Silver Spring

4. IPCC report. Two figures were prepared for inclusion in Chapter 12 (Detection of Climate Change and Attribution of Causes) of the Intergovernmental Panel on Climate Change Third Assessment Report, showing results from the recently published paper, "Global Warming in the Context of the Little Ice Age." The work shown compares energy-balance model simulations of temperature effects of volcanic eruptions and solar output variations with reconstructed temperatures for the past 400 years. The results suggest that the sun and volcanoes may have played significant roles in the past, but that solar variability is unlikely to account for the rise in temperatures in the past 50 years. (melissa.free@noaa.gov)

5. AGU Fall Meeting, San Francisco. The agenda for a special session of the upcoming AGU Fall Meeting entitled "Volcanic Eruptions and Climate," co-sponsored by Melissa Free with Alan Robock and Gera Stenchikov of Rutgers University, was determined this month. Among the 13 planned oral presentations at the meeting in December will be a talk by Melissa Free on the role of volcanic and solar forcings in decade to century-scale climate change. In related work, the effects of the eruptions of Mount Pinatubo, El Chichon, and Agung on the radiosonde temperature record have been examined. One conclusion is that these eruptions have noticeable effects on trends calculated for the time period 1979 to 1993 but negligible effects for longer periods such as 1979-1998. (melissa.free@noaa.gov)

6. Tropospheric temperature trend studies. The apparent discrepancy in atmospheric temperature trends since 1979 between satellite-borne Microwave Sounding Unit (MSU) data (which show little or no trend in lower-tropospheric temperature) and surface observations (which show marked warming) continues to be investigated. Until now, most investigations of the discrepancy have focused on potential problems with either the satellite or surface observing system and resulting trend estimates. Two papers have recently been prepared. One (Santer *et al.*) paper shows that some, but not all, of the trend differential can be explained in terms of the different spatial coverage of the surface and satellite observing systems. The remaining differential is too large to be explained by natural variability of the climate system, or by climate change due to increases in greenhouse gases, as simulated by state-of-the-art climate models. The results suggest that the differential may be due to a combination of anthropogenic and natural climate forcings operating during the past twenty years.

A second paper (Gaffen *et al.*) uses radiosonde data in the tropics to obtain independent estimates of both surface and lower-tropospheric temperature change. The trends are consistent with the satellite and surface results since 1979. The radiosonde data also show a significant change in the lapse rate (a measure of static stability) of the tropical atmosphere, which is even stronger evidence of the differential temperature trend, because lapse rate trends have less uncertainty than temperature trends. The observed lapse rate trends are larger than would be expected from natural climate variability, as was found for the temperature trend differentials in the Santer *et al.* manuscript. Examining the radiosonde data back to 1960 yields trends in lower-tropospheric temperature, lapse rate, and freezing level of opposite sign from the trends during the MSU data period, which highlights the difficulty of assessing trends in climate using a short data record. (dian.gaffen@noaa.gov)

7. 2nd AGU Chapman Conference on Water Vapor in the Climate System. The Chapman Conference, held Oct. 12-15, 1999, in Potomac, Maryland, was a venue not only for the planned scientific program but also for a series of more informal discussions on related topics. The scientific program highlights were outlined in last month's activities report. The additional activities included a "Town Meeting" to discuss potential U.S. participation in the Global Water Vapor Project (GVaP), of the World Climate Research Program. A recently issued National Research Council (NRC) report on GVaP was the starting point for this exchange between agency program managers, the NRC panel, and scientists.

At the Conference, 28 participants expressed interest in contributing manuscripts to a special section of JGR-Atmospheres devoted to this topic. Because of the high level of interest, the conference conveners are moving forward with this. Becky Ross is the special section coordinator and has been working with the Editorial Staff of JGR-Atmospheres on the arrangements for a special section. (rebecca.ross@noaa.gov)

Boulder

8. SURFRAD. The interpolation software to produce soundings relevant for SURFRAD sites was tested using ARM SGP Central Facility soundings. For 1998 interpolations were made to the Central Facility as well as the SURFRAD stations. Actual soundings taken at the Central Facility were compared to the interpolated soundings. Comparisons show that most of the temperatures in the interpolated soundings are within $\pm 2\text{C}$, and dew point temperatures are within $\pm 5\text{C}$, of the measurements at all levels. This first application of the interpolation scheme was conservative. In future tests, the parameters of the scheme will be refined.

9. Solar trackers in the western Pacific. Chris Cornwall is working on solving a problem with the solar trackers used in the tropical western Pacific by the Department of Energy's Atmospheric Radiation Measurement (ARM) program. Y2K tracker firmware updates seem to have caused hardware errors in the field units. (Chris Cornwall, 303 497 7316)

10. Radiation intercomparison. SRRB's Absolute Cavity Radiometer attended the annual inter-comparison and calibration activity at the National Renewable Energy Laboratory (NREL) in Golden, Colorado. NOAA's instrument was one of five that had been calibrated in the 1995 International Pyrheliometer Comparison (IPC) in Davos, Switzerland. The local intercomparison allows other laboratories to run their absolute cavity radiometers against standard units to obtain traceability to the World Radiation Reference. (Chris Cornwall, 303 497 7316)

11. Investigating the Umkehr ozone profile record. A final report was written in support of DOE's interagency agreement "Investigating the Umkehr Ozone Profile Record: Performance Evaluation of the New Profile Retrieval Algorithm and Analysis for Trends, Including Stratospheric Aerosol Interference." The project was dedicated to the improvement of the long-term Umkehr data record, including providing new ancillary information on errors caused by aerosols, and to provide the well-documented climatology of the past and current state of stratospheric aerosol and ozone profiles. To account for highly variability of aerosols both in spatial distribution and optical properties, our aerosol research included analysis of the natural physical and optical property bounds dictated by atmospheric processes. In addition, we assessed the uncertainties of the Umkehr inversion method to improve the ozone retrieval information. It is well known that occasional shifts in Umkehr ozone profiles are found in the records of all stations. A step further was taken to examine the Umkehr record N-value measurements for shifts with the intention to

correct the shifts and perform trend analysis on the N-value record. (Irina Petropavlovskikh, 303 497 6279 and John DeLuisi, 303 497 6824)

Oak Ridge

12. Terrestrial carbon program. A study was conducted within the Walker Branch Watershed to evaluate the spatial variability of forest floor energy and carbon fluxes and to assess the representativeness of flux measurements from a single point. Three eddy correlation systems were deployed to address these objectives. Initially, the three systems were collocated at 1 m above the ground, then at 3 m. The systems were then separated vertically at the same location with placements at 1 m, 2 m and 4 m. Next the systems were separated spatially about 30 apart. Results from these studies are now being analyzed. (meyers@atdd.noaa.gov, Wilson)

13. Arctic data for a K-6th grade ecology program. A video system and housing for true color and infrared video were delivered to Barrow, AK. The system will capture, archive, and transmit in real time over the web, images of the ATLAS flux tower site at Barrow used by ATDD in collaboration with San Diego State University for air-surface exchange studies. The images will be used to assess surface cover and radiation properties. They will also be incorporated into an Internet-based interactive ecology program for K-6th grade. This curriculum development project is headed by the San Diego State University Foundation. (brooks@atdd.noaa.gov)

14. Canaan Valley. Arrangements have been made to construct a NOAA AIRMoN site within the Canaan Valley National Wildlife Refuge. We are currently installing underground power, an underground shelter, and a measurement tower at the site. Instrumentation and equipment needed for the site is being assembled both in Oak Ridge, TN and Canaan Valley, WV. (Vogel)

15. CASES-99. The privately-owned Long-EZ aircraft participated in the CASES-99 experiment in southeastern Kansas from 29 September to 24 October. The goal was to study the structure of the nocturnal boundary layer under clear skies. Fortunately, the weather in Kansas was highly cooperative; the field measurements were frequently limited more by personnel fatigue than by bad weather. This was the first time that the Long-EZ has been extensively used for nighttime measurements. Initially, the nighttime operations created some difficulties, but adjustments were made to account for them. Overall, the Long-EZ participation in CASES-99 was highly successful, and about 50 hours of data were collected. The data set includes a number of cases in which isolated layers of turbulence were detected, caused either by shear instability or possibly gravity-wave activity. (eckman@atdd.noaa.gov, Dumas)

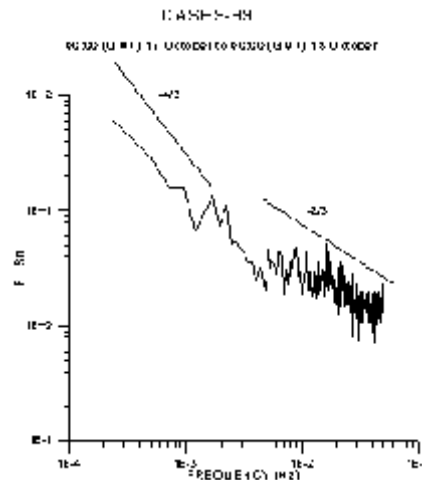


Figure 3 Power spectrum for 17-18 October, 1999 at CASES-99.

Six ATDD microbarographs were operated during the CASES-99 field program. Two arrays were established, an inner array of three units spaced 120E apart and 300 m from the 55 m central tower, and an outer array of three units also spaced 120E apart but 900 m from the central tower. Sampling was at 1Hz, and 10 s averages were formed and stored. An example power spectrum for the 24 hr period

beginning at 00:00 (GMT) on 17 October is shown in Figure 1. The expected slopes of $-4/3$ and $-2/3$ for the high and low frequencies are in agreement with theoretical results and with previous findings. Initial examination of these data indicate continuous pressure perturbation activity and complex wave-like structures. (nappo@atdd.noaa.gov, Auble, White)

16. East Tennessee Ozone Study (ETOS). Several briefings were held for both the State of Tennessee Environmental Protection Department and regional Air Pollution Control Boards. The current uncertainty regarding the EPA's implementation of the new ozone standard has refocused attention on ozone levels in the East Tennessee Valley. While the Great Smoky Mountains National Park reported its 52nd unhealthy ozone day for the 1999 season, renewed interest in the one-hour exceedances reported in the Valley has redirected attention to the rather large background ozone concentrations observed during the ETOS '99 aircraft operations. (pendergrass@atdd.noaa.gov)

A significant event in October was the participation of ATDD at the Great Smoky Mountains Congressional Caucus. Will Pendergrass presented testimony relevant to the ozone problem and potential sources throughout the East Tennessee region, including the Great Smoky Mountains. During his testimony, Mr. Pendergrass attributed the high ozone levels in East Tennessee to sources of NO_x in the Ohio Valley and transported via upper-level winds into the East Tennessee Valley. This view has been supported by results from ETOS-99. (birdwell@noaa.gov)

17. GEWEX/GCIP. Preparations were made for installation of the NOAA sponsored energy/carbon balance flux system to be deployed at the Fort Peck Indian Reservation in Northeastern Montana, adjacent to the NOAA SURFRAD facility. Identical measurements to those made at the Champaign, Illinois and Little Washita, Oklahoma site will be made. The site should be fully operational by November 3. The tower will be erected by Atmospheric Science Department of the South Dakota School of Mines in Rapid City, South Dakota. (Note that a parallel installation is being initiated at Idaho Falls, see below.) (meyers@atdd.noaa.gov)

18. SURFRAD and ISIS. Work is being completed on upgrading solar trackers to avoid Y2K problems. During October, visits were made to the ISIS Level 1 sites at Sterling, VA and Madison, WI. SCI-TEC solar trackers were installed at both sites, along with diffuse sensors. Plans are underway to visit the remaining Level 1 sites to complete solar tracker replacement before the end of the calendar year. During each site visit, PAR sensors are compared to the ATDD shelf-reference set. Multiplexing capabilities were added to the data logger at Madison to address needs of the Solar Energy Laboratory, College on Engineering (SEL), University of Wisconsin. SEL hosts the ISIS site in Madison. (matt@atdd.noaa.gov)

19. Urban Dispersion. ATDD is participating in the design and possibly in the execution of an urban dispersion study program. The first meeting of the working group was held in Salt Lake City, under Defense Threat Reduction Agency (DTRA) auspices. Washington, D.C. was identified as a candidate study site. Scientists from the U.S., Canada, and England are collaborating in this effort. (hosker@atdd.noaa.gov)

Research Triangle Park

20. Sand drift study. Dale Gillette of the Fluid Modeling Facility completed analysis on almost three years of sand drift data at a "supply limited" source area for aeolian sand. The site was a vegetation-free

area located in the Chihuahuan desert. Gillette presented a seminar at the Duke University Geology Department entitled "Particle Production and Aeolian Sediment Transport from a 'Supply Limited' Source Area at the Jornada (New Mexico) Long-Term Ecological Research site." The seminar was largely concerned with comparison of the total amount of airborne material from a "supply unlimited" source (for example a thick layer of sediment composed of fine material) and a "supply limited" source. Depletion of particles affected the quantity of sand transported in the air. Interpretation of the data by a rough model of sand transport showed that the source of sand was abrasion of the surface crust, dominated by very high wind episodes. Following the abrasion episodes, loose sediment produced was transported mostly to the northeast by the wind. A deposition area having about the same area as the source is presently an almost vegetation-free area to the northeast of the source area formed in an eight-year period. Removal of loose sediment following its production by abrasion takes about a month. When loose material is plentiful following crust abrasion, the transport is "supply unlimited." When the loose material is depleted the transport becomes increasingly "supply limited." Size distributions of sediments are consistent with this interpretation. (Dale Gillette, 919 541 1883)

21. Models-3/CMAQ help desk. A Help Desk for Models-3/CMAQ users has been established. Users calling the Help Desk can receive assistance on installation and model setup, as well as answers to questions on operating Models-3 and CMAQ. Problems and fixes identified through the Help Desk will be compiled and distributed to users in the form of model update messages. Models-3/CMAQ developers will also have access to this information in real time. In fact, many Help Desk questions will be addressed by the Models-3/ CMAQ developers themselves. Information on the Models-3 is available at <http://www.epa.gov/asmdnerl/models3/index.html>.

This web site also contains access to a public forum on Models-3/CMAQ, maintained at the EPA's Support Center for Regulatory Air Models web site. The Models-3/CMAQ Help Desk can be reached at 919-541-0157. (Mark Evangelista, 919 541 2803)

22. Participation in Sixth International Conference on Harmonization. The Sixth International Conference on Harmonization within Atmospheric Dispersion Modeling for Regulatory Purposes was held in Rouen, France, in October. The conference was attended by about 185 attendees. The title of John Irwin's presentation was "Effects of Concentration Fluctuations on Statistical Evaluations of Centerline Concentration Estimates by Atmospheric Dispersion Models." Since 1996, Irwin has been working to draft a Standard Guide within the American Society for Testing and Materials (ASTM) Air Quality Committee's Meteorology Subcommittee (D22.11), that would outline concerns to be addressed in performing statistical performance evaluations of local-scale dispersion models. An initial draft standard was circulated in summer 1997 and new drafts have been offered each summer since. The guide promotes the philosophy that one should define a testable hypothesis such as, which of several possible models is "closest on average" to an observed average result. Defining the testable hypothesis requires one to realize that most air quality models predict the average condition to be expected, not the fluctuations about the average. Once one has defined the model that is closest on average, then a test is made as to whether the differences seen in the performance of the other models are statistically significant in light of the inherent uncertainties. Coming to a final conclusion on statistical significance on differences seen is considered fundamental to promoting better model performance. During the second day of the conference, workshops were held on special topics, with one devoted to the draft ASTM guide and the draft evaluation procedures. The next conference is tentatively planned for June 2001 in northern Italy. (John Irwin, 919 541 5682)

23. CALPUFF Modeling System Training. A three-day intensive training course was conducted for a meteorological processor CALMET and for a puff dispersion model CALPUFF. The training was provided to six scientists from environmental agencies in Krakow, Poland, one from the Czech Hydrometeorological Institute, and one from Santiago, Chile. The Polish scientists are being trained in air quality modeling as part of an EPA program to promote cleaner air quality in Poland. The student from the Czech Republic is working with EPA ORD to develop tools for assessing air quality in the Czech Republic. The student from Santiago, Chile, has been developing visualization software for the CALPUFF modeling system and provided an introduction to the latest visualization products. The training course was sponsored as part of the OIA program of training specialists in Krakow, Poland. (John Irwin, 919 541 5682)

24. Air & Waste Management Association (AWMA) Emission Inventory Training. Six scientists from environmental agencies in Krakow attended a one-day course: Basic Emission Inventory Training. The scientists also attended an AWMA conference where papers were presented on various aspects associated with development and testing of emission inventories for urban and regional modeling assessments. This course was meant to provide the Polish scientists with an overview of the issues involved in development of emission inventories, so that they might be better able to cope with these issues as they occur in conducting modeling assessments of air quality impacts in cities within Poland. (John Irwin, 919 541 5682)

25. CMAQ Model Expanded to Include Gas and Aqueous Mercury Chemistry. The Community Multi-Scale Air Quality (CMAQ) model, the primary air pollution model in the comprehensive Models-3 atmospheric modeling system, has been expanded to simulate the emission, transport and diffusion, chemical transformation, and wet and dry deposition of atmospheric mercury and mercury compounds. The simulation of atmospheric mercury poses a particularly difficult problem in relation to other heavy metals in that mercury exists in the atmosphere mostly as a gas in elemental form, but can also be emitted as, or transformed to, oxidized forms that exist as gases and/or particulate aerosols which are much more readily scavenged from the atmosphere. These oxidized forms of mercury are known from laboratory study to be reduced to elemental mercury by certain other chemical reactions in water and by photochemical reactions from sunlight. A preliminary set of chemical reactions involving elemental mercury, mercuric oxide, mercuric chloride, mercuric hydroxide and mercuric sulfite, along with other reactants already simulated by the CMAQ model, have been added to the original software. Preliminary testing of this special form of CMAQ is now underway to determine the optimum aqueous chemistry time step length. It appears that a much smaller time step of around one second is required versus the typical time step of around one minute for the original CMAQ aqueous chemistry mechanism. However, the computation time for the entire CMAQ simulation is increased by less than 20% by the addition of mercury chemistry. Lack of information about the chemical forms of actual mercury emissions and wet and dry depositions does not allow comprehensive model process testing at this time. An evaluation of model performance in regard to total mercury wet deposition using estimates of chemical speciation of mercury emissions is planned during the next year. Future comprehensive field programs for atmospheric mercury could eventually provide the data necessary to demonstrate that the CMAQ chemical mechanisms for mercury are accurate representations of true mercury chemistry in air and cloud water. (Russ Bullock, 919 541 1349)

26. Ammonia and Nitric Oxide emissions from agriculture and lightning. During October, a Division scientist gave two presentations on the emissions of ammonia and nitric oxides from agricultural sources and lightning. A presentation at the Global Climate and Hydrology Center in Huntsville, Alabama,

highlighted the possible importance of lightning-produced nitric oxide for regional air quality modeling. A simulation with the Regional Acid Deposition Model indicates that lightning may contribute ~10% of total nitrogen oxide (NO_x) emissions during the summer in the eastern United States. This finding could be important because lightning NO_x is not explicitly included in most regional model simulations. The second presentation, on ammonia and nitric oxide emissions from agriculture, was given at the AWMA Emission Inventory Conference in Raleigh, NC. This talk recommended improved temporal characterization of ammonia emissions from fertilizer and livestock, and nitric oxide emissions from fertilized soils. Ammonia emissions from agricultural sources comprise ~85% of the total ammonia inventory in the United States, and better temporal resolution is needed for modeling aerosol formation and nitrogen deposition. Slides from both presentations may be viewed at the following Web address: <http://www.epa.gov/asmdnerl/biogen.html> (Tom Pierce, 919 541 1375)

Idaho Falls

27. Hurricane balloons. The development of version three of the FRD smart balloon continues. NOAA funding is being used to develop smart balloons that will monitor conditions inside hurricanes. To control the altitude on a smart balloon, it is necessary to use a valve to release ballast air from a pressurized air ballast bladder. Since it takes a large volume of air to make a change in the balloon weight, it is important to have an efficient valve to release the air. In the past, a modified screw-operated hose clamp with a low speed motor/gearbox was used to open and close the air flow in a rubber hose. This has worked well but is not as rugged as desired. A new valve has been developed, which is more rugged but still consumes only 10 to 20 mA at 5 volts. The smart balloons use a lot of battery power to operate the GPS receiver, ballast pumps, micro controller and valves; every effort is made to minimize battery drain. A new battery pack has been developed, using rechargeable lithium ion cells designed for use in notebook computers.

A new smart balloon microcomputer has been tested.. All of the digital and analog input/output functions have been tested and interface software for the hardware interfaces developed. Programming has proven to be simpler than expected. Development of the actual balloon controller application will begin next month. (randy.johnson@noaa.gov, Roger Carter)

28. Final preparations for SHOWEX. Final preparations were completed for the participation of the LongEZ in SHOWEX. Major work focused on continuing tests and calibrations to assure proper operation of the instruments and data acquisition system. In addition, the data acquisition and post-processing software packages that are to be used for this experiment were updated to provide a more robust system than in previous field campaigns. FRD scientists continue to work closely with ATDD scientists Ed Dumas and Rick Eckman as the flux-measuring system continues to evolve. The LongEZ will be flown out of First Flight Airport in Kill Devil Hills from November 10 to December 10. (jerry.crescenti@noaa.gov, Jeff French, Tim Crawford)

29. Counter-terrorism studies. The successful completion of the 1999 AFTAC project has led to a request by the AFTAC program manager to conduct a similar project next year. This particular work is concerned with non-proliferation and anti-terrorism programs. (kirk.clawson@noaa.gov)

30. Jackson Hole, WY, residents protest permitting of AMWTF. An open house at the Jackson High School was held on Saturday, October 23. The open house was sponsored by DOE to help inform the public of the risks associated with the Advanced Mixed Waste Treatment Facility (AMWTF). AMWTF

has been selected by the DOE to be the process for minimizing and disposing of mixed waste stored at the INEEL. The mixed waste contains both toxic chemicals and radioactive materials primarily from the Rocky Flats arsenal near Denver, CO. AMWTF will consist of both a compressing facility and an incinerator. Some influential Jackson Hole residents have expressed concern that the burning of radioactive waste will bring harmful radiation doses to their valley. However, radioactive releases from the facility are planned to be only a small part of the total INEEL annual emissions. In addition, Jackson is located some 100 miles to the east of the proposed facility and is separated from it by a 13,000 ft. mountain barrier.

DOE-Idaho invited a representative of FRD to attend the open house to discuss INEEL meteorology. The FRD display consisted of a Microsoft Powerpoint presentation and posters describing the FRD mission for DOE-ID, the local surface wind fields, and modeling efforts using MDIFF. Copies of the INEEL Climatology (an FRD publication) were distributed.

About 80 people attended the seven-hour open house. For the most part, the attendees were friendly and open-minded. Several interesting discussions ensued. Contacts were also made with local Forest Service personnel and an invitation was extended to have FRD become a part of the Greater Yellowstone Area Clean Air Partnership. A meeting of the GYA-CAP will be held next month and FRD was invited to give a presentation at that meeting. In addition, a followup meeting was held with the DOE-ID manager to discuss the Jackson issue and the results of the open house. This gave FRD the opportunity to meet the manager and discuss meteorological issues of concern and to propose a tracer study to quantify diffusion into Jackson Hole. (kirk.clawson@noaa.gov)

31. Automatic MDIFF dispersion forecast in demand at INEEL. Progress on the development of a short term dispersion forecast for the INEEL has been included in several monthly reports. The forecast is provided by an historical pattern matching computer code that runs every 30 minutes in the FRD office. Researchers at the INEEL are now closely monitoring mercury effluent and quantifying the dispersion characteristics. They plan to use the dispersion forecast to measure mercury in downwind areas identified by the forecast immediately before and after storm passage this winter. Although the forecast is still in the developmental stages, it will likely prove to be a useful tool for purposes other than radiological effluent modeling. (kirk.clawson@noaa.gov, Roger Carter, Jerry Sagendorf)

32. Collaborative Sagebrush Steppe ecosystem carbon balance measurements. A year-round eddy correlation water vapor and carbon dioxide flux site is being established at the INEEL. Scientists from the USDA Agriculture Research Service are collaborating with FRD in a year-long measurement of the carbon balance of the local sagebrush steppe ecosystem. The ARS scientists this month installed a Bowen Ratio system to simultaneously measure water vapor and carbon dioxide along with the FRD eddy correlation system. The system will augment the stations operated by Oak Ridge as an eddy-flux addendum to SURFRAD, and will be a component of the USDA network of Bowen Ratio systems extending from Texas to Montana. (kirk.clawson@noaa.gov)

33. AMS Nominations. The AMS Measurements Committee, chaired by Jerry Crescenti, has submitted nominations for the Remote Sensing Lecturer and the Walter Orr Roberts Lecturer in Interdisciplinary Sciences. The Measurements Committee has nominated Dr. William D. Neff of NOAA's Environmental Technology Laboratory for the Remote Sensing Lecturer and Dr. Robert A. Weller of the Woods Hole Oceanographic Institution for the Walter Orr Roberts Lecturer in Interdisciplinary Sciences. The Remote Sensing Lecturer is selected in recognition of sustained, outstanding contributions to passive and active

remote sensing of the atmosphere or oceans. The lecture is presented at one of the following conferences: Radar, Satellite, Laser, Atmospheric Radiation, and/or Measurements depending on the Lecturer and topic. The Walter Orr Roberts Lecturer in Interdisciplinary Sciences is selected in recognition of significant contributions to the understanding of atmospheric processes derived from multi-disciplinary research activities. The purpose of the lectureship is to foster interchange of knowledge between atmospheric scientists and persons in other disciplines. The lecture is presented at the AMS Annual Meeting or an appropriate specialized conference. Both lectures are published in the Bulletin of the AMS. (jerry.crescenti@noaa.gov)

Las Vegas

34. *Cloud-to-Ground (CG) lightning project.* Analysis of thunderstorm events from September continued into October. Precipitation totals and peak surface winds for those days in September with intense lightning activity were reviewed. The data show that significant precipitation occurred near some of the areas of large flash density. In particular, on September 17, between 1600 and 1700 PDT, 32.8 mm of precipitation fell in Area 20 during a thunderstorm that produced a flash density of 4.0 fl/km². In another heavy thunderstorm, of comparable flash density, in the extreme northeast corner of Area 18, a total of 26.3 mm of precipitation was measured in a rain gauge located approximately 6.5 miles southwest of the area of peak flash density. This storm moved or developed southwestward, toward the rain gauge site. An anomaly occurred in Area 25 where 24.1 mm of rain fell in an area of little cloud-to-ground lightning activity. This event was probably associated with a dissipating thunderstorm. No unusually strong outflow winds were detected by the SORD mesoscale Nevada Test Site (NTS) wind tower network. (Darryl Randerson, 702 295 1231)

35. *Interagency Monitoring of PROtected Visual Environment (IMPROVE) site selection for the Breton Island Wilderness.* Most monitoring locations for the 80 new IMPROVE particulate sampling sites have been known for many months. However a suitable site to represent the Breton Island Wilderness, a chain of islands in the Gulf of Mexico south of Mississippi, has been more challenging than most, since there is no power or personnel on any of the islands. Air quality staffs from the states of Mississippi and Louisiana, and Minerals Management Service joined IMPROVE Steering Committee representatives from the National Fish and Wildlife Service, the National Park Service, the Environmental Protection Agency and NOAA in a site selection trip to the region on October 13th and 14th. Two areas were visited: Ship Island, a NPS national historic site near the north end of the Breton Wilderness, and the Mississippi Delta, closer to the southern end of the wilderness. The location selected is near the headquarters for the Pass A Loutre Wildlife Management Area, which is a remote wildlife management field training site staffed full time by the state of Louisiana and less than 10 miles from Breton Island. (Marc Pitchford, 702-895-0432)

36. *Nevada climate trends.* Work progressed on investigating temperature trends in Southern Nevada. The temperature data for Las Vegas McCarran Airport for the period 1949 through 1998 were obtained from the Western Region Climate Center (WRCC) in Reno, NV. The data show an upward trend of about 2.8°F for the average annual values, 0.3°F for the annual average maximum temperatures, and 5.3°F for the annual average minimum temperatures. The initial conclusion was that the large increase in minimum temperatures was probably due to the “urban heat island” effect. To help confirm this conclusion, other locations in Southern Nevada were chosen to investigate their temperature trends. The first location chosen was Searchlight, NV, which is a small community about 50 miles southeast of Las Vegas. The results showed about one-half as much increase in annual average temperatures as was

found for by Las Vegas. Both the maximum and minimum temperatures showed an upward trend with the minimum being the slightly larger of the two. Other locations in Nevada were also investigated for temperature trends during the same period. All stations investigated showed some upward trend in temperature with Reno, NV, exhibiting a similar trend to Las Vegas with a large increase in the minimum temperatures. (Doug Soule', 702 295 1266)