NOAA ARL Monthly Activity Report

January 2000

Bruce B. Hicks, Director
Air Resources Laboratory

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Highlights

1. Congressional Visit to the CUCF, Boulder. January was very interesting for NOAA's Central UV Calibration Facility. The USDA organized a visit by Congressman Mark Udall (D-Colorado) to the CUCF. The CUCF is responsible for the calibration and characterization of the USDA's UV monitoring network. The tour was part of an ongoing effort by CSU to promote the USDA's UV Monitoring Program. Congressman Udall was welcomed to the David Skaggs Research Center by SRRB's Chief, John DeLuisi. Jim Slusser, the director of the USDA's monitoring effort, gave a short presentation on the USDA's UV Monitoring program, the significance of UV radiation, and the importance of the CUCF to the nation's monitoring network. Specifically, our presentations stressed the significance of the CUCF's calibration and characterization efforts to provide high quality data for the USDA monitoring program and the significance of a central calibration facility for providing data intercomparability between U.S. monitoring programs that consist of several national agencies. Congressman Udall was shown the USDA and CUCF web sites and then given a tour of the CUCF laboratory. (Kathleen Lantz, 303 497 7280 and Patrick Disterhoft 303 497 6355)

2. Initial Mercury Speciation Study Concluded. An exploratory aircraft study has been completed, in conjunction with EPA's National Exposure Research Laboratory (NERL), of the concentrations and speciation of mercury compounds in the lower and middle troposphere. The NOAA Twin Otter was used to assess the relative importance of long- versus short-range transport of elemental mercury and reactive gaseous mercury (RGM) to the Florida peninsula. Flights were conducted over the Western Atlantic Ocean, the Eastern Gulf of Mexico, and the Florida Everglades.

The Twin Otter carried duplicate real time (5 min response) analyzers for elemental mercury, duplicate denuder systems for the capture of RGM, and filter pack systems for the collection of particulate mercury compounds and other fine particles. The denuder and filter pack systems sampled air from a specially-designed, shrouded isokinetic inlet constructed for the Twin Otter. The aircraft also measured standard meteorological and aircraft parameters (position, velocity, altitude, WS, WD, dew point, pressures, etc.), and carried ARL trace gas and particle instrumentation (pptv level detection of NO, NO_X, and NO_Y; SO_2, CO, O_3, and condensation nuclei) to provide ancillary measurements of primary and secondary pollutants and to thus aid in assessing the chemical history of the sampled air masses.

Typical deployments called for two 90-minute constant-altitude flight legs per flight, typically in the boundary layer and free troposphere. Data analysis is underway, and a meeting is scheduled in March to discuss preliminary results. The experiment will be repeated in June to contrast summer and winter conditions. winston.luke@noaa.gov, gunter@atdd.noaa.gov.

3. Call for Papers - Symposium on Meteorological Observations and Instrumentation (SMOI). The 11th Symposium on Meteorological Observations and Instrumentation, sponsored by the American Meteorological Society and organized by the AMS Committee on Measurements, will be held January 14-19, 2001 as part of the 81st AMS Annual Meeting in Albuquerque, New Mexico. A preliminary program,

registration, hotel and general information will be posted on the AMS Web site (http://www.ametsoc.org/AMS) in late September 2000. Presentations are solicited on all aspects of atmospheric measurements (in situ and remote), observations, quality assurance and quality control, instrumentation technologies, sensor performance, network design, and sampling strategies. Both research and operational instrumentation and measurement techniques are welcome.

Papers are solicited in the following areas, but are not limited to:

1. new and evolving sensor technologies,
2. airborne measurement platforms,
3. sonic anemometers,
4. meteorological measurements in harsh environments (e.g., over the ocean, in polar environments, mountainous terrain),
5. long-term flux measurements,
6. quality-assurance and quality control issues on the acquisition of data from in situ and ground-based remote sensors,
7. air-sea interface measurements,
8. ground-truth measurement systems in conjunction with satellite remote sensors.

Deadline for abstracts is July 1, 2000; these can be submitted electronically. AMS will provide instructions to authors of accepted papers. Camera-ready manuscripts (page length to be determined), including photos and diagrams, must be submitted by October 1, 2000 to AMS Headquarters. Page charges will be assessed to defray printing costs. Registrants will receive a preprint volume at the conference. For further information contact Jerry H. Crescenti. jerry.crescenti@noaa.gov

Silver Spring

4. A Cooler 1999 than 1998. With the transition from a strong El Nino in 1997-1998 to a relatively strong La Nina in 1999, global tropospheric temperatures decreased by about 0.6 K. and global surface temperatures by nearly 0.2 K, in both cases the temperature anomalies returning almost to their 1997 values. The year 1999 continues the tendency, interrupted by El Nino, for the global surface temperature anomaly to be more positive than the tropospheric temperature anomaly, resulting in more warming of the surface than the troposphere since about 1980. The El Nino, however, had little impact on low-stratospheric global temperatures; these temperatures have been almost invariant during the last several years. (Jim Angell, 301 713-0295, x127)

5. Dispersion of Dust from Dust Storms. Further sensitivity tests of the Hysplit- PM10 emission module were conducted. It was found that there was substantial sensitivity to the spatial structure of the emissions inventory file due to the small spatial extent of the region of strong winds that would induce PM10 emissions. The net effect was that it was necessary to reformat the resolution of the emissions inventory file to be comparable the resolution of the meteorological data. Although the emissions from a single soil type (e.g. active sand sheet) could be characterized over a very large area by a single cell, the large gradients in wind speed over that cell required more detail in the emissions characterization. The new format required 586 emission cells rather than 139 with a corresponding increase in computational time to complete a simulation. Also ECMWF meteorological data for the period of August through December of 1990 were obtained and

converted for input to Hysplit for eventual PM10 exposure calculations. roland.draxler@noaa.gov (and Dale Gillette, Jeff McQueen)

6. Tropical Tropopause Study. Work has resumed on the analysis of the climatological characteristics of the tropical tropopause based on a 30-year radiosonde dataset. This month, climatological means and other statistics were computed from daily sounding data. This work is motivated, in part, by the increase in stratospheric water vapor observed by S. Oltmans and D. Hofmann, NOAA/CMDL. Because the increase is too large to be explained by increases in stratospheric methane (which oxidizes to water vapor), it has been suggested that changes in the transport of water vapor across the tropical tropopause may be the cause. However, the nature and causes of changes in the tropopause are not currently well understood. Furthermore, it is unclear what, if any, long-term changes can be deduced from radiosonde data, given the quality of the observations. dian.gaffen@noaa.gov

Boulder

7. SURFRAD Review. A review of the SURFRAD program was conducted by Dr. Ehrhard Raschke, from the Max Planck Institute, on January 7. His overall impression of the program was that SURFRAD is a very good network, it should be continued, and ways to continue funding should be found. His main concern was that he believed that point measurements are not useful for validating satellites, and that we should attempt to coordinate SURFRAD with other regional networks in North America (U.S., Canada and Mexico), with SURFRAD serving as the standard. To do that, he said that we would need a few more stations to fill holes in our coverage. His reasoning is that SURFRAD (and ISIS) will be the reference for the lesser quality networks; and combined, these networks would be more useful for satellite and model validation. To respond to this, a survey was conducted of other networks and found that SURFRAD and ARM SGP are the only surface radiation budget networks in the U.S., and that there were only a few other networks that concentrate on measuring solar radiation with quality equipment. Besides ISIS, the CONFRRM network in the southern U.S. and a small network in Oregon were the only high-quality surface radiation networks that were found.

Dr. Raschke criticized the looks of our building at Table Mountain. His point was that if this facility is used for collaborative work with international and other U.S. scientists, it should look more presentable. Dr. Raschke's report is available upon request.

Software to collect hourly hemispheric sky images from the SURFRAD stations is being tested. When completed, hourly sky images for the previous two weeks from each station will be available on the SRRB web site. (John Augustine, 303 497 6415)

8. Central UV Calibration Facility. After the CUCF moved from its previous location on the East Campus of the University of Colorado to its new location in the David Skaggs Research Center, several anomalies were noted in laboratory instruments. Throughput and wavelength drifts were noted in two of the main characterization systems in the CUCF laboratories. These drifts were not noticeable in the old building. After considerable testing it was determined that the new labs had more air flow than the rooms in the old building and this was causing temperature gradients in the labs. Small excursions from the mean temperature can wreak havoc on the optical alignment of the sensitive instruments. This results in shifts in wavelength registration and large reductions in throughput. Many options were discussed to overcome this problem and a reasonable solution, both cost and time considered, was agreed upon. The first of the characterization systems was outfitted with a temperature control enclosure and the initial testing is promising. (Kathleen Lantz, 303 497 7280 and Patrick Disterhoft 303 497 6355)

9. Umkehr Ozone Profile Research. The effect of *a priori* ozone information on the retrieval of ozone profiles using the Umkehr method is being investigated. Building on initial discussion by Mateer and DeLuisi (1992), recent studies have shown that the trend derived from the Umkehr retrieved ozone data below 20 km are biased to the trend contained in the *a priori* ozone information used in the Umkehr statistical retrieval. The *a priori* ozone profile is based on regressing ozonesonde profiles to the total ozone. Therefore, since there is little ozone profile information below 20 km in the Umkehr measurement and likewise for the SBUV method, the a priori trend is directly related to the trend in the observed total ozone. The *a priori* first-guess approach, used by the Umkehr and SBUV, is also the reason why their annual cycles in the lower layers agree so well. At the Toronto Umkehr Meeting last October, modifying the Umkehr algorithm was recommended, to reduce the effect of *a priori* Umkehr derived ozone trends. A new *a priori* ozone climatology has been tested in our recent work. In this test the *a priori* ozone profile first-guess is no longer based on the total ozone. However, the profiles are still made to vary with latitude and season. The total ozone information is now treated as a measurement in the retrieval scheme. The new methods are a deviation from the traditional methods that had been applied for several decades. The current investigations are aimed at improving the retrieval of ozone profile information in the UV remote sensing method which should improve the comparisons between the Umkehr, SBUV, and the SAGE ozone profiles. (Irina Petropavlovskikh, 303 497 6279 and John DeLuisi, 303 497 6824)

10. SRRB Web Page. The SRRB web page has been spruced up over the past month. New pictures have been added, the page was given a new background in commemoration of NOAA's 30th anniversary, and the sunrise/sunset/solar noon calculator was improved.. We discovered that one of NOAA's main web pages <http://www.websites.noaa.gov/> links to our calculator. A new picture was placed on the first SURFRAD page depicting the new and improved station at Desert Rock. A new page has been added to provide links to other U.S. surface radiation networks. (John Augustine, 303 497 6415)

Oak Ridge

11. New Forest Research Site Selected. A forested site NW of the western end of Oak Ridge National Laboratory has been identified as a suitable location for a replicate flux research tower to conduct research that would otherwise be impacted by the new Spallation Neutron Source near ATDD's Walker Branch Watershed site. The site selection was presented to and approved by the ORNL Land Use Committee. hosker@atdd.noaa.gov (Meyers, Wilson)

12. Vertical Mixing in the Stable PBL (VTMX). ATDD scientists began formulating plans for the field program in Salt Lake City in October 2000. ATDD's experimental plan calls for Long EZ flights, sonic anemometers installed on a tower, and a horizontal array of 6 microbarographs. One of the goals of ATDD's program is to investigate the effects of sporadic PBL breakdowns on the turbulence kinetic energy budget. nappo@atdd.noaa.gov

13. Canaan Valley. Construction of the NOAA AIRMoN site at Canaan Valley, WV is progressing. An underground shelter to house instrumentation and equipment arrived and has been positioned for installation. The electrical infrastructure to run power to the site has passed inspection. When winter conditions abate sufficiently, the shelter will be interred, and a local power company will install service. In the meantime, equipment and instrumentation are being collected and readied for shipment to the site. vogel@atdd.noaa.gov

14. CASES-99. Most of the CASES-99 effort in January was directed towards putting together an interim progress report. Data from a couple of the Long-EZ flights were used to provide examples of what the aircraft observed. A flight in the early morning of 12 October 1999 was particularly interesting, because the

surface winds stayed somewhat higher on this night. On most other observation nights during CASES-99, the nocturnal boundary layer had a temperature inversion extending right down to near the surface. On 12 October, however, there was enough wind to create a 100 m deep well-mixed layer near the ground, capped by an inversion. A second layer of near-neutral stratification extended from the top of this inversion to about 1000 m AGL. This represents the residual of the previous day's convective boundary layer. ekman@atdd.noaa.gov

The pressure data from the 6 ATDD microbarographs have been transmitted to the CASES-99 data archive. The data extend from 3 to 31 October, 1999. ATDD will work with scientists from the Instituto Nacional de Meteorologia, Spain, and Georgia Institute of Technology, Atlanta, on reducing and analyzing the data. An early result is that almost all nights experienced gravity wave activity. nappo@atdd.noaa.gov

15. East Tennessee Ozone Study (ETOS). Preparations continued toward the upcoming ETOS 2000 study. Most permissions were received for existing and new sites. A number of repair missions were conducted as well. birdwell@atdd.noaa.gov

A number of discussions were held with regional research organizations to determine various levels of participation in ETOS 2000. The regional National Forest Service has joined ATDD as a member of the science advisory team. Oak Ridge National Laboratory's environmental group expressed interest in coupling current particle (nano-particle) measurement capabilities with ATDD's summer program. Representatives of SAMI (Southern Appalachian Mountain Initiative) also expressed interest in working with NOAA to explore various regional objectives (inflow transport of ozone) but current reporting time lines may prevent cooperation at this time. Representatives from DOE's Oak Ridge Operations were also briefed on findings from ETOS 1999 and potential implications of this research and the new EPA ozone standards on efforts to re-industrialize Oak Ridge weapons production facilities.

ATDD participated in the Tennessee Clean Air Forum sponsored by Tennessee Representative Ford. Tilden Meyers and Will Pendergrass answered questions regarding air pollution in East Tennessee and potential sources of the high ozone levels. pendergrass@atdd.noaa.gov

16. GEWEX/GCIP. A visit was made to the NOAA/GEWEX site in the Little Washita Watershed in Oklahoma. Several new tower systems and buildings (including gravel roads) were recently installed in the flux footprint of the NOAA system. Recommendations were made to the NOAA Office of Global Programs to move the equipment to another location within the watershed or to another location altogether. Several sites are currently under consideration with a decision to be made sometime in March. meyers@atdd.noaa.gov

17. The MARS Lander – INSRP (Interagency Nuclear Safety Review Panel). Meetings were held at Cocoa Beach to discuss the draft Safety Analysis Report prepared by DOE for the 2001 Mars Lander mission (MARS'01). The rover requires small heating units (LWRHU's) powered by small amounts of Pu238. Initial studies conducted by INSRP tend to confirm the program's assessment of little risk associated with potential on-site or re-entry accidents for the MARS'01 spacecraft. pendergrass@atdd.noaa.gov

18. Mercury in the Arctic. Gaseous mercury speciation equipment ha s been permanently installed at Barrow, Alaska. January's atmospheric concentration of elemental gaseous mercury averaged 1.84 ng/m^3 while the concentration of reactive compounds (gaseous mercuric chloride and bromide) averaged 3.2 pg/m^3. Polar sunrise occurred at Barrow on 23 January, initiating photochemical conversion from elemental mercury to reactive compounds. Their increased concentration is expected to appear sometime in February. Snow

samples were collected and sent to the University of Manitoba for analysis of mercury content. brooks@atdd.noaa.gov (Meyers, Lindberg--ORNL)

19. Land-Surface Hydrology. A moisture budget for the growing mixed layer was computed from airborne turbulence measurements of 12 July 1997, during the NASA Southern Great Plains Experiment. The Long-EZ from ATDD and the Twin Otter from the National Research Council of Canada flew at two levels near the top and bottom of the growing mixed layer, as well as in vertical profiles. The mixed layer gained moisture throughout the period, since moisture from the surface generally remained within the layer. Per unit volume, however, the moisture content decreased due to downward entrainment of dry air into the rapidly-deepening layer. These results will be compared with extensive measurements of moisture content by differential-absorption lidar (LASE). The combined measurements are to be used to study entrainment in the penetrative convection at the top of the mixed layer. dobosy@atdd.noaa.gov

20. NSF Multi-User Environmental Research Aircraft. Work continues on upgrades to the Mobile Flux Platform system for incorporation in three Sky Arrow aircraft, constructed in Italy. Several changes to the current system are being made, including repackaging the auxiliary components in a box separate from the main computer, upgrading the main processor, and updating the interface cards to use the PCI bus. dumas@atdd.noaa.gov (Auble, Brooks)

21. SURFRAD and ISIS Data. The standard operations of the ISIS network continued. The regular processing of January ISIS Level 1 and Level 2 data is complete. Fifteen minute and hourly averaged data, flagged by QA/QC procedure, will be transmitted to NCDC and placed on the Internet. Regular processing of the SURFRAD data to match the GEWEX time records of energy- balance systems installed at Ft. Peck, MT and Bondville, IL also continued. These data are provided on the Internet. Yearly files for all ISIS Level 1 sites were generated and archived on CDs. Work has resumed on the reprocessing of all data to account for the changes in Solar Light instruments, including the UVB reference set and all field instruments. matt@atdd.noaa.gov

22. U. S. Air Force Rocket Exhaust Dispersion Study. Over 100 MB (3,690 images, ZIP-compressed) of SF_6 puff release data for 21 May and 23 May 1997 from the MVP Session 4 experiment at Vandenberg AFB were organized, documented, and added to the MVP Data Archive in January. A PDF-formatted color briefing on these images entitled “Imagery-Derived Tracer Puff Dispersion at Vandenberg Air Force Base: Model Validation Program Deployment #4 in May 1997" has been added to the MVP archive. herwehe@atdd.noaa.gov

A large effort went into setting up software to extract and display data from the RAMS mesoscale simulations of the Cape Canaveral area. The RAMS output comes in an 18-bit packed binary format that must be converted to another format before it can be easily manipulated or displayed. Most of the software is now in place. The focus right now is on Cape simulations that used three nested grids having horizontal grid spacings of 60, 15, and 3 km. These simulations include water vapor as a prognostic variable, but not liquid water or ice. eckman@atdd.noaa.gov

Research Triangle Park

23. Multi-physics Workshop. During January 2000, an ASMD scientist attended a multi-physics workshop hosted by the US Army Engineer Research and Development Center (ERDC). The purpose of the workshop was technology transfer of environmental modeling and scalable parallel programming tools being developed as part of the Department of Defense Programming Environment and Training (PET) initiative. Specific

applications in subsurface modeling, ocean modeling, and water quality modeling were presented by researchers from several universities and ERDC. Attending the workshop provided an opportunity to discuss the ASMD Multimedia Integrated Modeling System (MIMS) with others in the research community and to identify issues that MIMS and the PET projects share in common. (Alice Gilliland, 919 541 0347).

24. AMS/A&WMA Joint Conference on Applications of Air Pollution Meteorology. At the International Standards Organization Technical Committee 146/5 meetings and American Society for Testing and Materials D22.11 committee meetings, we reviewed the status of standards in development, including my draft Standard Guide on Statistical Evaluation of Air Pollution Models. At the meeting of the AMS Committee on Meteorological Aspects of Air Pollution, we decided to approach the AMS Atmospheric Boundary Layer and Turbulence Committee for a potential joint conference in Spring 2002, and we considered developing a policy statement regarding the accuracy and precision of air pollution models. There were several interesting concentration fluctuation papers at the Joint Conference, but only one of the evaluation papers tested whether differences seen in performance were statistically significant. (John Irwin, 919 541 5682)

25. Mathematical Characterization of Indoor Combustion Sources of Particulate Matter. Ambient particulate matter (PM) has been correlated with adverse health effects and is a regulated pollutant under the Clean Air Act. Indoor sources of PM are of concern because people spend in excess of 80% of their lives indoors. Combustion processes generate fine particulate matter - having aerodynamic diameter less than 2.5 μm. Model simulation of indoor concentrations requires that the particulate source be mathematically defined with respect to its rate of mass emission. A computer simulation model was developed to simulate emission profiles of several combustion processes occurring indoors - including cooking. The model development considered combustion reaction dynamics and mass conservation in its design. Lognormal distribution of aerosol particles was incorporated, and particle count was calculated assuming a particle density and shape. User-specified parameters include geometric mean particle size and standard deviation, combustion rate constants, total available mass, and air exchange rate. A test data set for sauteing and oven cooking was used for parameter estimation. With present uncertainty surrounding the appropriate metric to apply in calculating inhalation dose, this simulation model anticipates that particle mass, count, and size may all potentially be important. A model simulation of speciated particle mass emitted during sauteing and oven cooking was performed, with concentrations estimated using a 1-box compartmental model. The analysis of physical process presented here enabled identification of critical parameters, and provided guidance for software design. The source model provides a template for simulating essential features of indoor combustion particulate matter. (John Streicher, 919 541 3251)

26. Plume-in-Grid Submodel. Enhancements to the Plume-in-Grid (PinG) submodel in the CMAQ Chemistry Transport Model (CTM) have been completed. The PinG model allows for a sub-grid scale treatment of major elevated point source emissions starting from the release of plumes until their final growth to the size of the grid cell. Without PinG, large point source emissions are effectively mixed throughout the grid cell containing the point source, and they are effectively mixed at the instance the emissions are released, precluding the in-plume chemistry processes from being modeled more realistically.

The previous release of the CMAQ CTM contained a PinG module, but could do only a one day simulation. Multiple-day simulations required re-initializing the plume model and could not correctly simulate plumes that carry over from day to day. The new enhancements allow a correct multi-day simulation, as well as the capability of restarting from a previous run. The main challenge in this latest development was to implement these enhancements for the distributed memory parallel architecture (Cray T3E), in which plumes must be tracked across processors as they are transported about by the winds. (Jeffrey Young, 919 541 3929)

27. New Land-Surface Model in MM5 and Models-3/CMAQ. We are currently working with NCAR's Mesoscale and Microscale Meteorology Division to incorporate our new Land-Surface Model (LSM) (Pleim and Xiu, 1995) into the official NCAR release of the Fifth Generation Penn State/NCAR Mesoscale Model (MM5). This will allow access by the entire MM5 community and also assure that the LSM is available with each new release of MM5. The Pleim-Xiu LSM has been developed, evaluated, and applied in-house for many years and provides a more advanced option for treatment of land-surface, PBL, and dry deposition processes in the Models-3/CMAQ system. The PX-LSM includes explicit simulation of soil moisture and temperature in two layers and three pathways for surface evaporation, including vegetative evapotranspiration. It also features an indirect soil moisture nudging scheme based on prediction errors of surface temperature and humidity. When applied to the M3/CMAQ system, a new dry deposition model, which uses the same aerodynamic and bulk stomatal resistances from the LSM, can be used as an option. The effects of using MM5 with PX-LSM and the related dry deposition model on air quality simulations are being investigated via a series of sensitivity experiments to be presented at the Millennium NATO/CCMS meeting in May 2000. Incorporation of the new LSM into the NCAR release of MM5 is a critical step toward release of this option in M3/CMAQ system. (Jonathan Pleim, 919 541 1336)

Idaho Falls

28. Hurricane Balloons. The successful operation of the smart hurricane balloons depends on having differentially corrected positions from the on-board GPS receiver. This requires that the differential correction information be relayed from the ground control station to the balloon's microprocessor and then passed on to the GPS receiver. This method of providing the differential correction information to the GPS receiver was successfully demonstrated for the first time this month. The entire system worked as planned and no problems are anticipated in the final implementation. roger.carter@noaa.gov (Randy Johnson)

29. Shoaling Waves Experiment (SHOWEX). The SHOWEX (Duck, NC, November 1999) database is starting to take shape. Difax weather maps have been archived. These include surface analysis maps every 3 hours, and twice-daily upper-air maps at 850, 700, and 500 mb. GOES-8 visible and infrared satellite images of southeastern United States is also included. These images have been acquired every 15 min. In addition, numerous digital photos of the LongEZ and its respective sensors are available. Post-calibration and processing of LongEZ data are complete, data are currently being disseminated to PIs outside NOAA/ARL for their continued analysis. In-house data analysis will, in the immediate future, concentrate on quality assurance and momentum and sensible heat fluxes in light wind conditions coupled with sea-state. A final data report in the form of a NOAA technical memorandum is in preparation. In addition, possible ways to improve on measurements are being investigated. Preliminary data analysis suggests that the accuracy of the wind measurements can be improved. Further testing of the sensing elements (bat probe) is required. jeff.french@noaa.gov (Jerry Crescenti, and Tim Crawford)

30. Controversy with the Proposed Advanced Mixed Waste Treatment Facility (AMWTF). The controversy in Jackson, WY continues to heat up over the risk of radionuclides being released from the proposed AMWTF at the INEEL. A lawsuit has been filed by the group "Keep Yellowstone Nuclear Free" to block the construction of the facility. Regulatory model calculations indicate that the residents of Jackson, a city located some 100 miles to the east of the INEEL, will not be significantly impacted. To help educate the residents of Jackson, the INEEL Jackson, WY office manager requested a FRD representative visit the Jackson office and meet with the public. Kirk Clawson subsequently traveled to Jackson and met privately with several area residents and gave a presentation in the city library conference room to an audience of about 40 people on atmospheric stability, transport and diffusion, INEEL surface and aloft wind field patterns, and FRD's modeling efforts for other INEEL facilities. The presentation generated enough excitement that

it was reported by all the area newspapers and by two of the local television stations. kirk.clawson@noaa.gov

31. Mixing Depth Measurements at the INEEL. Data from the INEEL 915 MHZ radar profiler are now being used to calculate the mixing depth or depth of the planetary boundary layer. The calculation runs automatically every 30 minutes and the mixing depth is stored with the profiler's wind measurements in the mesonet database. If this technique proves to be reliable, the mixing depth will be incorporated into transport models used at the INEEL. The calculation is based on a method described by Allen B. White using the signal to noise ratio of the returned radar signal. (Allen B. White, *Mixing Depth Detection Using 915-MHZ Radar Reflectivity Data*, Eighth Symposium on Observations and Instrumentation, Jan. 1993, AMS) roger.carter@noaa.gov

32. Emergency Operations Center Support (EOC). Remodeling of the INEEL Emergency Operations Center (EOC) has been completed. FRD worked with the emergency planning organization to complete installation of the computer equipment required by the meteorologists during EOC activations. A dedicated data link between the FRD office and the EOC was installed. The data link is currently working very well and provides access to complete National Weather Service products through the Marta system and also the capability to access the INEEL mesonet data in a wide variety of formats. These capabilities were not available before the EOC remodeling and will definitely enhance the services that FRD can provide in the EOC. roger.carter@noaa.gov

33. Short Course - Introduction to Meteorological Instrumentation and Observation Techniques. In response to the lack of an instrumentation curriculum at most universities with meteorology programs, the AMS Measurements Committee is organizing a one-day short course on meteorological instrumentation and observation techniques. The focus of the course is on the basics of *in situ* monitoring and will be oriented towards undergraduate and graduate students. This course will be offered on Sunday, January 14, 2001 in conjunction with the 81st Annual Meeting of the American Meteorological Society in Albuquerque, New Mexico. The morning session will include opening remarks, and in-depth discussions on the principles of instruments and observing techniques. One or two scientist (to be determined) will give a brown-bag lunch seminar with "horror stories from the field" on the challenges of making measurements. The afternoon will include a "hands-on" session where class attendees can work with various meteorological instruments. Sensors will be on loan from various manufacturers who will be exhibiting their products at the Annual Meeting. The last hour of the course will be devoted to quality assurance and quality control issues. Thomas Lockhart (Meteorological Standards Institute), Robert Baxter (Parsons Engineering Science), and Scott Richardson (University of Oklahoma) will provide instruction for this course. jerry.crescenti@noaa.gov

34. ARL Booth in AMS Exhibit Hall. An effort is underway to develop an ARL Booth as part of the exhibit hall for next year's 81st Annual Meeting of the American Meteorological Society in Albuquerque, New Mexico to be held January 14-19, 2001. This would be an excellent opportunity to "show off" to the rest of the meteorological community what ARL does. One volunteer from each ARL division as well as ARL Headquarters is being asked to help in the development of this booth.

Next year's Annual Meeting will represent a significant departure from previous annual meetings. The conference and symposium structure has been modified to create a scientific meeting that better serves the broad spectrum of attendees, with fewer conflicts and with opportunities for presentations that cover much of the breadth of the atmospheric and related oceanic and hydrologic sciences. A major emphasis will be placed on societal impacts. An ARL presence would at least keep some focus on air quality and climate issues. It will be important that a "unified theme" be presented by ARL. This will be a challenge since ARL

is quite diverse. One possibility is presentation of our transport and dispersion model capabilities, from microscale through mesoscale through synoptic scale and through global scale. Any suggestions as well as the names of volunteers will be greatly appreciated. jerry.crescenti@noaa.gov

Las Vegas

35. Cloud-to-Ground (CG) Lightning Study. Investigation of the relationship between flash density and topographic elevation is on-going. Detailed plots (1 km^2 resolution) of flash density for ground elevations ranging from 2000 ft above mean sea level (MSL) to near 12000 ft MSL have been completed. The search is under way for a topographic overlay to match the area of analysis. (Darryl Randerson, 702 295 1231)

36. NTS Dispersion Model Development. ArcView is used to determine scales appropriate for presenting trajectory predictions Hazards Assessments and for trajectory prediction information disseminated to EPA/DRI and ES&H during the sub-critical experiments on the NTS. Software was created to extract the trajectory path from the HYSPLIT model output using ETA40km data (READY system) and RAMS 32km, 8km, 2km data (local capability) and installed in an ArcView-ready table for viewing. Software was also written to generate an "ensemble" forecast trajectory path in ArcView-ready format from the HYSPLIT model output using ETA 40km, RAMS 32km, 8km, and 2km metdata. A program was developed to generate two-sigma-y confidence limits for a trajectory path prediction ("ensemble" or individual) based on atmospheric conditions, and an ArcView-ready table was developed for plotting and displaying results. (Walt Schalk, 702 295 1262)