



FRD ACTIVITIES REPORT

January - March 2010



RESEARCH PROGRAMS

ET Probe

Funding for the 2010 ET probe activities continued to be uncertain until late in the second quarter. ARL will be receiving a little less than the 2009 funding level. As a result, the planned deployments for this hurricane season have been scaled back commensurately. One of the primary activities this quarter has been to address issues that arose during last year's field deployments. One problem was that the data computer unexpectedly restarted on occasion. This was traced to problems with the SD card used for data storage. The manufacturer upgraded a computer component under warranty that may have been part of the problem. Other modifications, such as bird spikes to deter birds from perching on the probes, are also being installed.

FRD intends to deploy four probes this hurricane season, one at Duck, NC and the others along the Florida Keys. This will require the construction of new probes. The deployments along the Keys will be the most difficult because the sites must be reached by boat. In addition, the structures on which the probes are to be mounted are all rather large navigation-light structures that have considerable flow distortion. FRD is collaborating with a person from the University of South Florida who services the existing meteorological instruments at the Keys sites. (Richard.Eckman@noaa.gov, Roger Carter, Tom Strong, Shane Beard, Randy Johnson)

WISDOM/Cheaperclipper

The use of balloons to measure the low altitude atmospheric characteristics in tropical cyclones over the ocean has been difficult and expensive. The French Aeroclipper experiment (BAMS, Jan09, pp63-71) in the Indian Ocean showed that it is possible to deploy a lighter-than-air balloon tethered to a watercraft near a tropical cyclone and have it drawn to the center and track the tropical cyclone for more than a week. This arrangement would provide a platform for continuously monitoring hurricane central pressure, an important element of hurricane forecasting. However, on the negative side, the Aeroclipper is expensive and difficult to launch.

FRD is working with ESRL on a proposal to make an easy to use and inexpensive platform that is referred to as the Cheaperclipper. We propose incorporating available technology in combination with testing that will allow us to deploy a low altitude measurement platform in a very short period of time. Experiments will be done at our facility to test and characterize balloons, ballast platforms, and electronic subsystems that will allow us deploy an operational Cheaper Clipper in just a few months. (Randy.Johnson@noaa.gov)

U.S. Historical Climatological Network – Modernization

FRD continues to assist ATDD in the daily quality control of the Historical Climate Network – Modernization (HCN-M) program. The HCN-M is an offshoot of the U.S. Climate Reference Network, but focused solely on temperature and precipitation. The number of stations has increased to 37 with locations across Alabama and the Southwest United States.

New products have been developed that are helping in the daily quality control. These products include a map of the daily flags and then maps of each individual flag. These maps provide a visual representation of possible instrument malfunctions at each station and are used to help plan maintenance visits. The flags maps as well as precipitation and temperature contour maps are emailed daily to the ATDD Supervisory Engineer for review so any instrument malfunctions identified with these techniques can be quickly repaired. A summary of instrumentation problems are submitted monthly. All of these products are also located on the FRD HCN-M website at <http://www.noaa.inel.gov/crn/crn.htm>. Overall, the stations continue to perform rather well.

(Jason.rich@noaa.gov and Neil Hukari)

HCN-M AMV Training

Tom Strong, Shane Beard and Randy Johnson joining Mark Hall and Kyle Johnson from ATDD on January 25 through the 29th to receive training on the annual maintenance visits (AMV's) for the HCN-M climate stations. This training took place at five of the existing stations in Southern Alabama. FRD personnel are now ready to perform AMV's for the HCN-M in the southwestern United States during 2010. (Randy.Johnson@noaa.gov, Tom Strong, Shane Beard)

EPA Roadside Sound Barrier Tracer Study

The paper 'Tracer studies to characterize the effects of roadside noise barriers on near-road pollutant dispersion under varying atmospheric stability conditions' continued to generate media and public interest during the first quarter of calendar 2010. These included The Urban Transportation Monitor, J.R. Souken Information Systems in Japan, and Environmental Health Perspectives.

(Dennis.Finn@noaa.gov)

JU03 Urban Plume Dispersion

Review comments were received from the journal Boundary Layer Meteorology for the paper 'Analysis of urban atmosphere plume concentration fluctuations'. Revisions were made in response to the comments and the paper was re-submitted to the journal along with responses to reviewer comments. (Dennis.Finn@noaa.gov)

Miscellaneous

The United States Patent and Trademark Office (PTO) issued a "Notice of Allowance and Fee(s) Due" for the Stepped Electric Field Detector patent application. The actual patent should be issued "soon." However, "soon" in PTO terms may still be awhile. (R. Carter)

FRD has continued to actively participate in an effort to improve wind forecasts for wind-energy applications. The work is a partnership between NOAA and the Department of Energy. The plan is to deploy enhanced instrumentation in a limited region for one year and assimilate the resulting data into a

high-resolution prognostic model [the ESRL High Resolution Rapid Refresh (HRRR) is the leading candidate]. The model forecasts will be evaluated to see if the added observations significantly improve short-range wind forecasts. FRD is planning to contribute a 915 MHz profiler and a couple of sodars to the study. (Richard.Eckman@noaa.gov, Kirk Clawson)

NOAA/IDAHO NATIONAL LABORATORY (INL) METEOROLOGICAL RESEARCH PARTNERSHIP

Emergency Operations Center (EOC)

In a repeat of an incident from last year, the INL computer operations shut down all computer networks without adequately informing FRD or operators at one of the nuclear facilities on the INL. This left the facility without the required meteorological measurements on the morning of Friday, March 26, 2010. Although verbal communications over the telephone were quickly established with FRD, a hurried effort to troubleshoot existing, non-Internet based data distribution systems had to be initiated so that data would be available over the weekend without having to keep someone on staff at the FRD office. The system was operational by noon. FRD is now working with INL to make sure that a system is in place for notification of future Internet outages. (R. Carter, B. Reese)

A representative from FRD attended the INL Quarterly Assessment Specialists Drill in February. The discussion mainly consisted of the INL's responsibilities for Emergency Support Services of the Advanced Mixed Waste Treatment Project (AMWTP) inside the INL at the RWMC facility. The characteristics of several possible incidents at the facility were presented. It is the responsibility of FRD to provide dose and plume trajectory calculations during such events. (Neil.Hukari@noaa.gov)

EOC drills have started again for the 2010 calendar year. Each team is required to attend a drill in order to retain certification to work in the EOC. Team A participated in a drill on 13 January. The drill involved a car accident in which a box marked with a radiological sticker was damaged and leaking near an in-town facility. Team A provided weather support during the drill. (Jason.Rich@noaa.gov and Brad Reese)

Team B participated an EOC drill on 16 February. The drill scenario involved a traffic accident between a car and a FedEx truck resulting in a leak of radioactive liquid (I-131) from a package being carried by the truck. The accident was on a busy street in the city of Idaho Falls. The amount of leakage was small and there were no requests for plume models until just before the drill was terminated. (Dennis.Finn@noaa.gov, Kirk Clawson)

Team D participated in a drill at the EOC on 2 March. The scenario was related to a transportation accident. The hazardous material involved was only a threat very close to the source, so there was no reason to run FRD's long-range dispersion model. (Richard.Eckman@noaa.gov, Randy Johnson)

Team A participated in an EOC drill on 23 March. The drill was centered on a vehicle accident at the Central Facilities Area. Flammable liquids were aboard one of the vehicles in the accident and were leaking. Weather during the drill was simulated, which limited the participation of the FRD team. The team still ran MDIFF and ALOHA during the drill to help maintain proficiency. (Jason.Rich@noaa.gov and Brad Reese)

INL Hazardous Weather Alert System

An uneventful winter kept FRD from issuing many severe weather alerts during the last quarter. Only two alerts were issued both of which occurred during the last week of March as the weather became more active. The local Pocatello NWSFO did issue a wind advisory on the second alert after FRD meteorologists issued a wind statement for the INL. (Jason.Rich@noaa.gov and Neil Hukari)

Transport and Dispersion Modeling

Significant progress on the implementation of HYSPLIT for radiological plume modeling using INL mesonet observations was made in the quarter. This included development of the final prototype versions of the necessary programs, development of the means to create temporally variable emissions files, extensive testing and comparison with the existing MDIFF model, and development of the links between the graphical user interface and text control files that the model uses internally. Much of the work during the quarter focused on the parts of the model that generate HYSPLIT meteorology files from FRD's tower network and that compute and display radiological doses.

The initial user interface that will be deployed for INL applications will mainly focus on preconfigured radiological release scenarios from specific sites on the INL. These preconfigured scenarios are being supplied to us by our INL clients and involve up to 14 radioisotopes released at variable rates over extended time periods. The ability to create highly customized releases from any location will be added later. Initially, the ability to customize release information from arbitrary locations will be limited (e.g., one generic isotope with one release rate).

Extensive testing was done comparing HYSPLIT to the older MDIFF model using identical release parameters. In brief, the comparison between HYSPLIT and MDIFF was generally favorable with respect to plume morphology, orientation, and concentrations. There was some tendency for HYSPLIT to generate plumes that were a little broader and more diffuse with somewhat lower concentrations but the differences were generally not significant and often very small (Dennis.Finn@noaa.gov, Roger Carter, Brad Reese, Rick Eckman)

Work continued on the development of a graphical interface for displaying model output from Hysplit runs using Google Maps. This work is primarily focused on the output generated by ARL Headquarters version of Hysplit. This development work is in addition to the work for the INL cited above. Eventually this development effort will be combined with the INL effort to provide a generic interface for all model output. (Brad.Reese@noaa.gov)

NOAA INL Mesoscale Meteorological Network (Mesonet)

FRD is making an effort to locate, document, and make available historical meteorological data from the INL. Meteorological data in some form has been recorded at the INL since about 1950. It has been recorded in a variety of formats at different times. One record from the Central Facilities Area that extends back to the start of operations at the INL site continues to be maintained and is readily accessible. However, other sets of computerized data have been allowed to remain untouched on storage shelves for many years. Motivated by the imminent retirement of one of the few remaining staff members which might remember the makeup of some of these data sets, FRD is now recovering and examining some of these old data sets. The file formats are being documented and together with information about the data. The data sets are then saved on CD's or DVD's so they will be available for future use. Six sets have been recovered so far with work proceeding on several more. (R. Carter)

Continuous improvements are being made on the operations of the INL meteorological mesonet. The data loggers at the towers are being upgraded to use a new communications protocol. This was tested over the winter at a few stations and allows communications to be restored more quickly after system restarts. Calibration and maintenance procedures have been upgraded and the system documentation is being updated. (R. Carter, Kirk, Randy, Brad, Shane, Tom, etc.)

Miscellaneous

In March a team from Department of Energy Headquarters performed an independent assessment of environmental monitoring at INL. FRD was asked to provide a point of contact for the assessment and to have the contact person give a brief presentation on FRD's partnership with INL. The presentation was given on 9 March. (Richard.Eckman@noaa.gov)

FRD will soon be starting a project to perform a series of dispersion model runs using 5 years of data from the INL Mesonet. The MDIFF model will be used for the modeling effort. Concentration statistics will then be derived from the output. This work is part of a relicensing effort for the INL Advanced Test Reactor. (Richard.Eckman@noaa.gov, Neil Hukari, Jason Rich)

FRD is preparing for the DOE Meteorological Coordinating Council (DMCC) assist visit coming in April. Prior to the visit the DMCC suggests conducting a self-appraisal of the consequence assessment system and meteorological monitoring program prior to the visit. In addition to the self appraisal, FRD is updating its Quality Assurance Plan (QAP). The FRD QAP follows the ASME NQA-1 2008 quality assurance requirements. Other guidelines satisfied are the DOE/EH 0173T, DOE Order 151.1c, ANSI/ANS-3.11, and ANSI/ANS 3.2. As part of the assurance plan, FRD is updating all of the weekly and semi-annual maintenance procedures and data backup and archival procedures. (Kirk.Clawson@noaa.gov, Jason Rich, Randy Johnson, Neil Hukari, and Roger Carter)

OTHER ACTIVITIES

Papers

Finn, D., K.L. Clawson, R.G. Carter, J.D. Rich, R.M. Eckman, S.G. Perry, V. Isakov, and D.K. Heist, 2009: Tracer studies to characterize the effects of roadside noise barriers on near-road pollutant dispersion under varying atmospheric stability conditions. (Published online in November, 2009; in print Atmospheric Environment (2010), vol. 44, p. 204-214)

Finn, D, K.L. Clawson, R.G. Carter, J.D. Rich, M. Leach, and C. Biltoft, 2009: Analysis of urban atmosphere plume concentration fluctuations. (Revised draft to submitted to Boundary Layer Meteorology)

Safety

ARL's safety team published the 1st ARL's Health and Safety Newsletter.

Jason Rich gave a presentation on Snow Recreation Safety at the January staff meeting.

A fun crossword puzzle on Chemical Safety at Home was completed by the employees at the February staff meeting.

At the March staff meeting the employees viewed "Hand & Power Tool Safety) by Digital 2000, Inc.

Training

All employees completed the 2010 NOAA Employees Safety & Environmental Awareness course.

Hazard Communication training was conducted for the FRD staff on Jan. 13, 2010 (R. Carter)

Travel

Kirk Clawson, to Atlanta, GA, January 17-21, to attend AMS Annual Meeting and Renewable Energy Symposium/Town Hall Meeting.

Randy Johnson, Shane Beard and Tom Strong, to Atlanta, GA and various surrounding areas in AL and GA, January 25-30, to be trained on performing annual maintenance visits on HCN-M climate stations.

Kirk Clawson and Tom Strong, to Las Vegas, NV, February 1-2, to remove EPA equipment.

Kirk Clawson, to Boulder, CO, March 8-12, to attend the ESRL PSD and GMD review and the ARL Division Director's Meeting.

Miscellaneous

FRD staff answered several questions coming from the Ask a Scientist program sponsored by the newspaper in Idaho Falls. The questions and answers appear in a midweek edition of the paper. This time around the questions were related to climate change and the effect of solar elevation on heating at the surface. A local student interested in meteorology also had a series of questions on careers in meteorology. (Richard.Eckman@noaa.gov, Jason Rich, Dennis Finn)

Review, comment, and suggestions were provided to Maggie Kerchner to assist her with preparing an OAR Spotlight article on the ARL dispersion program. (Dennis.Finn@noaa.gov)

Administrative Officer Donna R. Harris received approval from the courts to change her name to Donna R. Davis (maiden name).