FRD Activities Report
December 2004

Research Program

ET Probe

All of the data collected during the Hurricane Frances deployment have now been passed through a set of quality assurance procedures and stored in NetCDF format. Overall, the wind data appear to be of high quality, with only a few brief time periods when rain spikes were a significant issue. The temperature data have more problems, mainly because the "mushroom" housing for the temperature sensors is not sufficiently waterproof in the current ET probe design. The probe deployed at Vero Beach, FL suffered a few half-hour time periods when the data files became garbled and the data were lost. The notebook computer used for data acquisition at Vero Beach has a somewhat different version of Windows than the computer used at Sebastian, and the Vero Beach computer appears to be more unstable. Fortunately, the data holes occurred early in the deployment when the hurricane was well offshore and the winds were still light. (Richard Eckman, 208-526-2740)

Smart Balloon

Significant changes have been made to the cut-down diaphragm and mounting flange to increase the reliability and to simplify fabrication of the flange and diaphragm unit. Our first flange and diaphragm cut-down was made from optical filter adaptors. This approach was soon abandoned because it was too difficult to press the two adaptors together without damaging the diaphragm and at the same time grip the diaphragm well enough to keep it from slipping out of the flange. The new diaphragm and mounting flange are made of .062" aluminum stock and look like bolt washers with eight holes drilled in them. The diaphragm is mounted between two aluminum flanges with a .032" silicone rubber gasket on each side of the diaphragm to provide a seal and help protect the diaphragm from being damaged by the metal flange. The new diaphragm and flange design has been tested dozens of times to find the best diaphragm materials and to determine the reliability of the mounting flange. As part of the testing the diaphragm is pressurized in a small test chamber up to 5 psi for days at a time to check for failure of the diaphragm under pressure and to check operation of the hot wire diaphragm destruct mechanism. All aspects of the new diaphragm and flange cut-down mechanism seem to work very well. (Randy Johnson 208-526-2129, Shane Beard, Vance Hawley)

Flange with cut-down diaphragm.

Tracer Analysis Facility (TAF)

This month has been spent gathering information and ordering parts and consumables to begin work on analyzing perfluorocarbon tracers (PFTs). This new analysis calls for a change from packed column to capillary column gas chromatography. The oven temperatures will need to be increased significantly, the carrier gas will be changed from nitrogen to helium, and argon/5%methane will be added as a make-up gas. Significant software changes will need to be made if more than one PFT will be analyzed at the same time. The effects of the potential new tracers on the samplers and the effects of sample holding times will need to be studied. Some gas chromatograph valving changes may need to be made also. (Debbie Lacroix, 208 526-9997)

A control charting program has been added to the automated tracer gas analysis systems (ATGAS) to track laboratory and field control results. This important program will provide a graphical means to demonstrate statistical control, document measurement uncertainty, and diagnose measurement problems. The control limits as well as the mean will be established prior to commencement of a project by the analysis of at least 20 data points. Measurements made during the project will be graphed using these established limits. (Debbie Lacroix, 208 526-9997, Roger Carter, 208 526-2745)

PIGS Upgrade

The software upgrades for the Programmable Integrating Gas Samplers (PIGS) and the hand-held downloaders used to program them have been completed. This software upgrade allows the PIGS to sample for different times on different bags and pause for specified times between bags. Bench testing of the software has been completed and all features have been verified to work correctly. Work is now proceeding on modifying the analysis system software to support these changes. More testing will be conducted when these changes are complete. (Roger Carter 208 526-2745)

Cooperative Research with INEEL

Emergency Operations Center (EOC)

On December 16th, an EOC assessment specialist meeting was attended by Neil Hukari. Together the team participated in a table-top drill to foster cooperation among the various subject matter experts in the EOC. The table-top scenario was centered around a flooded building after a water canal near the building ruptured. FRD provided meteorological support for the drill.

INEEL Support

On December 2nd, a presentation on the current status of the Mesonet was given to the INEEL Monitoring and Surveillance Committee. This included a discussion of the switch to narrow-band radios and some of the issues related to the upgrade of the data acquisition software. Part of the talk was also used to inform the committee about other FRD work that is not related to INEEL. In addition, the committee was shown some examples of the enhanced dispersion

forecasting capabilities that are possible by combining the local MM5 modeling with the HYSPLIT dispersion model. (Richard Eckman, 208-526-2740)

INEEL Climatology

FRD is currently working on an update to the 1989 climatography for the INEEL. A new subsection was added to the wind climatography based on some relatively recent research on wind channeling mechanisms in valleys. There are several different physical mechanisms that can produce channeling in valleys, including pressure-driven channeling and thermally driven flows. Several of these mechanisms appear to be relevant to the Snake River Plain. Much of the work on these mechanisms appeared in the literature after 1989, and it therefore warrants some discussion in the updated climatography. (Richard Eckman, 208-526-2740)

INEEL Drill Data

At the request of the emergency planning organization, two sets of artificial or "canned" weather data have been generated for use in emergency response drills during upcoming months. These data sets show weather conditions needed to support the scenario chosen for the drill. During the drill, they are displayed just as real weather conditions are normally displayed, allowing participants to respond to weather conditions as they would in a real emergency. (Roger Carter 208 526-2745)

INEEL Mesonet Narrow Band Upgrade

With the transition to the new mesonet hardware and software completed, December was spent debugging and improving the data collection, storage and display routines. (Brad Reese)

Other Activities

Papers

Clawson, K.L., R.G. Carter, D.J. Lacroix, T.K. Grimmett, J.D. Rich, N.F. Hukari, R. Eckman, B.R. Reese, J.F. French, R.C. Johnson, T.L. Crawford. 2004. Urban 2000 SF_6 Atmospheric Tracer Field Tests. NOAA Technical Memorandum OAR ARL-253, Air Resources Laboratory, Idaho Falls, Idaho, 155 pp.

Safety

The NOAA video “Holiday Safety” was shown at the monthly staff meeting. (Debbie Lacroix, 208 526-9997)

A safety walk through was performed throughout the office, lab and warehouse areas. There were a few safety issues found but most comments were the result of housekeeping and box storage issues. (Kirk Clawson, 208 526-2741, Debbie Lacroix, 208 526-9997)

The DOC/NOAA FY2004 Annual Resource Conservation and Recovery Act (RCRA) Survey was completed for the NOAA-ARLFRD facility and sent to Will Freeman in the Environmental Compliance and Safety Office**.** (Debbie Lacroix, 208 526-9997)

The Idaho Hazardous Waste Generator Annual Report was completed with the help of Mark George of the Environmental Compliance and Safety Division and sent to the Department of Environmental Quality in Boise. Mark also requested deactivation of our EPA generator identification number due to the one-time cleanup activity earlier this year. The generator report was required since the removal of the smoke grenades and other hazardous materials placed our facility in a one-time large quantity hazardous waste generator category. The Idaho Hazardous Waste Management Act (HWMA) requires all large and small quantity generators to submit an annual report. (Debbie Lacroix, 208 526-9997)

A copy of the smoke grenade disposal final report prepared by Tetra Tech EM Inc. was received and reviewed. The report contained a full explanation of the disposal of the smoke grenades, mercury barometer and laboratory wastes that occurred in October. It also contained copies of all manifests, certificates of destruction, waste profiles, and a photographic log of the disposal. (Debbie Lacroix, 208 526-9997)

Personnel

Joyce G. Silvester started her federal career a little over 20 years ago at ARL Field Research Division. Joyce retired from federal service on 12/31/04.