FRD ACTIVITIES REPORT
October - December 2012

RESEARCH PROGRAMS

NOAA/DOE Wind Forecast Improvement Project

The field deployment portion of WFIP ended in mid-September and the data for the remainder of the project was forwarded to all interested parties by the end of the 4th quarter of FY12. In the first quarter of FY13, the only activity was responding to requests or questions from data recipients. One of these recipients was Will Pendergrass from ATDD who was using the WFIP data to complement his wind energy research effort in a nearby area of Texas. He will be traveling to visit FRD to discuss this research and how to facilitate collaboration on that project early in the second quarter. FRD may still receive a limited amount of WFIP funding in fiscal year 2013 for data analysis. (dennis.finn@noaa.gov, Kirk Clawson, Rick Eckman)

High Performance Computing

Research at Boise State University on the development of a general purpose Lagrangian dispersion kernel ended in the 3rd quarter of FY12. The intent, using HPCC funding, was to develop a kernel that could be used in a future version of HYSPLIT that would be optimized for parallel processing with GPUs. A prototype was created and there was hope that we could secure a second round of HPCC funding to pursue further development and possible implementation. However, the HPCC program did not announce a new round of RFPs and it was unclear if or when that might happen again. (dennis.finn@noaa.gov)

Transport and Dispersion Modeling

A draft Software Quality Assurance (SQA) plan for a radiological application of HYSPLIT was finalized in collaboration with Roland Draxler and Glenn Rolph from ARL headquarters. This radiological application has been designated HYSPLIT Radiological (HYRad). The SQA plan was explicitly written to include all of the following main elements: the core HYSPLIT dispersion code, and the radiological components, the user interface, and the scripts controlling model execution presently being used in the INL EOC application. Other elements include user's guide documentation, verification and validation, version control, and problem reporting and tracking. The change in designation from EOC HYSPLIT (EHY) to HYRad together with some revisions or upgrades, resulted in the release of HYRad version 1.2, replacing EHY version 1.1. A gap analysis, also in collaboration with ARL headquarters, was prepared for the HYRad SQA. The HYRad SQA and gap analysis were submitted to DOE's Subcommittee on Consequence Assessments and Protective Actions (SCAPA) for review and approval of HYRad for inclusion in their consequence assessment toolbox. If HYRad is approved for inclusion in the SCAPA toolbox, this would carry with it approval of HYSPLIT since it has been explicitly included in the HYRad SQA. (dennis.finn@noaa.gov)

Brad Reese, Rick Eckman, and Dennis Finn participated in beta testing of a dispersion modeling system that combines the source-term algorithms of the ALOHA model and the dispersion algorithms of the ARL HYSPLIT model. The system is browser based and is a collaborative effort between the developers of ALOHA (National Ocean Service, Office of Response and Restoration) and ARL. Overall, the system appears to be pretty stable, and the web interface for specifying the source term will be familiar to anyone who has used the Windows version of ALOHA.

Mesoscale Forecast Modeling

A probabilistic point forecast system is under development as part of the WRF modeling at FRD. The system uses a Bayesian statistical approach to estimate both random and systematic errors in the WRF forecasts. Right now the system forecasts statistical distributions for 2 m temperature and 10 m winds. Plots showing both the interquartile range and the range from the 10th percentile to the 90th percentile are generated from these distributions. The probability distributions are updated as new data come in from the NOAA/INL Mesonet. So far, the system has been updated using Mesonet data from December 2012. The plots are not yet posted to the FRD web site, but that should happen in the second quarter. (richard.eckman@noaa.gov)

Project Sagebrush

Preparations for a field study to follow up and expand upon the benchmark dispersion experiment known as Project Prairie Grass (1956) and other subsequent plume dispersion field experiments moved forward. A planning meeting was held and the project was officially given the designation of Project Sagebrush. Horizontal and vertical plume dispersion coefficients and plume concentration fluctuations will be measured. An experimental plan summary was drafted in late December to circulate among prospective expert reviewers and partners who might be interested in participating. It is anticipated that the first phase of field measurements will begin in fall, 2013. (kirk.clawson@noaa.gov, Rick Eckman, Dennis Finn, Roger Carter)

Other preparations included work on leak proofing of the tracer sampling bags and replacing aging tubing in the samplers and sampling bags. Supplies have been ordered. Racks to support the bags during sealing and other needed fixtures are being constructed. Nearly 5000 bags will have to be sealed for the project. (Roger, Shane, Tom)

Birch Creek Valley Study

Upon the end of the WFIP project in mid-September, FRD was seeking research opportunities to utilize the enhanced measurement capabilities that were acquired for that project. The equipment available for this includes one radar wind profiler, 3 mobile sodars, and 3 sonic anemometers. It was decided to do a long term research study on flows in the Birch Creek Valley. Birch Creek Valley is a long NNW-trending valley, bounded by two large ranges with relief up to 5000 feet, that exits onto the Snake River Plain near the north end of the INL. From the available mesonet data gathered over the years, it was already known that this general area was subject to complex flow patterns but the details of that were largely lacking. The primary purpose of the study is to better understand flows in complex terrain including plume dispersion in general, and plume dispersion with regard to the INL, in particular. Secondarily, the study could help in the evaluation of wind energy potential.

FRD was able to immediately deploy a sodar and sonic anemometer at its Blue Dome mesonet site (BLU) in Birch Creek Valley. Continuous measurements there began on November 15. However, it was necessary to draft an experimental plan and have it approved by the appropriate jurisdictions for the

remaining proposed sites on the INL. This includes a sodar and sonic anemometer site near the exit of the valley (EXT) onto the eastern Snake River Plain and another site for a sodar and the radar wind profiler near an existing mesonet site near the north end of the INL (TAN). Approval for the EXT and TAN sites came in late December and instruments were deployed on December 20 and 21, respectively.

This still left us with a paucity of measurements within the valley itself. Therefore, we sought out potential partners who could enhance the existing measurement capabilities. The U.S. Forest Service Fire Science Laboratory and Boise State University have both expressed strong interest in collaborating on this project. It is anticipated that they will bring up to two sodars and up to about 80 anemometers for deployment in the valley. Almost all of the land within the valley is under the jurisdiction of the BLM and it will be necessary to submit an experimental application for their approval. It is anticipated that the experimental plan will be drafted and submitted to the BLM in January. It is hoped that it could be approved within 1-2 months although snow cover could delay the biological and archaeological field surveys necessary for approval. It is hoped to have full project deployment by collaborators by as early as March, weather permitting. Measurements are planned through late summer when the instrumentation will have to be redeployed for Project Sagebrush. (kirk.clawson@noaa.gov, Dennis Finn, Rick Eckman, Roger Carter, Brad Reese)

NOAA/IDAHO NATIONAL LABORATORY (INL) METEOROLOGICAL RESEARCH PARTNERSHIP

Emergency Operations Center (EOC)

NRF held two tabletop drill exercises on November 7 and 28 at the NRF facility. Kirk Clawson participated in both drills. These drills were conducted to improve communications between the M&O contractor with responsibility for INL emergency management, the State of Idaho, and DOE-ID. There was much information exchanged between the groups. NRF personnel also provided attendees with a tour of their new ECC, an exhibit of their emergency response field monitoring capabilities, and they exhibited a rail road shipping container for spent fuel rods.

No other EOC drills or activations took place during the reporting quarter but monthly equipment checks continued to be conducted at the EOC.

INL Hazardous Weather Alert System

Eleven hazardous weather alerts were issued by the NOAA/INL Weather Center during the last quarter. Most of the alerts were issued due to high winds. The one non-high wind alert was issued due to lightning activity that entered the INL. Jason.Rich@noaa.gov

NOAA/INL Mesonet

Work continues on development of a system to monitor the air temperature sensor aspirators in the mesonet. A non-working aspirator can give misleading results about the stability of the atmosphere that is used for running transport and dispersion models. Typically, the data reviewer attempts to identify stations with faulty fans during the daily quality control. However, identifying these periods is very subjective and not highly reliable. The system uses a non-contact Hall effect sensor designed to monitor the rotation of gears by counting the gear teeth. This is mounted over the fan and counts the fan blades passing underneath it. A prototype has been developed and is being tested. A circuit board for the final

version has been designed and one is being assembled for testing. (Roger.Carter@noaa.gov and Shane Beard)

A number of improvements to the NOAA/INL measurement system are in process. A second dedicated telephone line was installed to the radar wind profiler and Sodar site at the Grid 3 facility. This will permit better communications with the Sodar. In addition, FRD is working with Campbell Scientific to improve the software used to gather the data from the Mesonet by testing some beta versions of some pieces of their software. (Roger, Brad, Shane, Tom)

In July the Fort Hall community monitoring station was damaged by a vehicle that ran through the perimeter fence. There was additional collateral damage to electrical boxes and the rain gauge. Repairs of the damaged rain gauge, electrical boxes, and the fence and gate were completed in December.

Other

Rick Eckman completed his one-year term as chair of the INL Monitoring and Surveillance Committee. This committee meets every other month and includes representatives from local organizations that conduct environmental monitoring on and around the INL. This includes federal and state agencies, local tribes, and INL contractors. (richard.eckman@noaa.gov)

OTHER ACTIVITIES

Safety

During October's staff meeting, employees viewed an earthquake prevention and preparedness video. An earthquake exercise drill was also practiced.

In November, employees viewed the video "Chemical Handling: Flammables" during the monthly staff meeting.

Several employees attended the DOE Health Fair at WCB on November 15th.

Scott Grimmett with the Idaho Falls Fire Department completed an annual fire inspection of the facility in November.

During December's staff meeting, the employees viewed a video on equipment log out/tag out.

Training

Rick Eckman attended a Leadership Effectiveness and Advancement Program (LEAP) training session in West Virginia in late October. A final session was scheduled in West Virginia for January 2013 but was canceled over the Christmas holiday due to funding issues. The January training may still take place, perhaps in the Silver Spring, MD area or using video teleconferencing. No final decision had been made by the end of the quarter.

In October all federal employees received EEO training from headquarters via web cam.

All federal employees and contractors completed the required INL training (Counterintelligence) in October.

All federal employees completed the mandatory 2012 No FEAR Act briefing in November.

CPR/First Aid/AED training was provided to the staff on November 27th.

Travel

Rick Eckman traveled to Shepherdstown, WV to attend LEAP training in October.