



FRD ACTIVITIES REPORT

April - June 2012



RESEARCH PROGRAMS

NOAA/DOE Wind Forecast Improvement Project

The WFIP sites in Texas maintained by FRD had two regularly scheduled maintenance visits during the quarter, once in the second week of April and the other in the last week of May. Kirk Clawson made the April trip. Upon arrival at the Jayton site it was discovered that the sodar had gone into protection mode a few hours prior to arrival and was not working. This was probably due to an electrical storm. Operation was restored there by recycling the computer. RASS measurements at Colorado City were also restarted during this visit using two of the remaining good speakers. Tom Strong made the May trip. RASS operations had again failed since the April site visit and it was again restarted using the last two available good speakers. On 7 June it was discovered that the sodar and RASS at Colorado City had ceased operation, again probably due to electrical storm activity. Fortunately, Kirk Clawson was on annual leave in Texas at this time and was able to visit the Colorado City site. Measurements were restored on the sodar by cycling the amplifier and on the RASS by cycling the power. Unfortunately, another electrical storm late on 21 June damaged the sodar, cellular router, and other equipment at Colorado City and they had to be removed from service for repair.

Other activities involved routine maintenance and data retrieval. Data recovery for the sonics was excellent from all sites and it was good to very good for the sodars at the Brady and Jayton sites. At the Colorado City sodar, data recovery was only fair to good and there was a high speaker failure rate and the situation was being closely monitored. A few minor remote communications problems were quickly resolved. Sodar and surface flux measurement data from the sonics covering the period from late February to late May were provided to Will Pendergrass at ATDD and Jeff Freedman from AWS Truepower. The project is slated to end at the end of August and there is only one more regularly scheduled maintenance visit. (dennis.finn@noaa.gov)

HRRR Collaboration with ESRL

As reported in last quarter's report, the FRD computer running WRF forecasts for Southeast Idaho failed in March. A new system was quickly brought on line. This provided an opportunity to improve the local forecast products being generated from the High Resolution Rapid Refresh (HRRR) model run at ESRL. The HRRR model runs hourly on a 3 km horizontal grid, and FRD has been receiving HRRR output for a sub-domain covering Southeast Idaho. A set of scripts was developed for the new WRF computer that automatically generates forecast products from the HRRR output and posts them to a web site. The products include map animations, meteograms, text forecasts for selected locations, and comparisons of the model forecast with NOAA/INL Mesonet observations. (richard.eckman@noaa.gov)

High Performance Computing

The difficulties encountered in the effort to restructure HYSPLIT for the optimization of parallel computing were described in the last quarterly report. This prompted the work at Boise State University to be refocused on the development of a general purpose Lagrangian dispersion kernel that could be used in a version of HYSPLIT that was optimized for parallel processing with GPUs or with other geophysical dispersion models. By late in the 3rd quarter, a prototype of this kernel had been developed and is currently being tested by the BSU graduate student. (dennis.finn@noaa.gov)

High Desert Prairie Grass, aka Prairie Grass II

To complete this project, a sufficient quantity of reliable air sampling bags are required. The sampling bags we currently have on hand have a leakage problem. A significant fraction of the bags leak around the fitting where the tubing attaches to the bag. For the last several projects, this problem was solved by checking all the bags and replacing the leaking ones before the project began. Usually about 10% of the bags are replaced, but as time passes more bags seem to develop leaks. Since High Desert Prairie Grass will likely extend over multiple years, the bags would need to be leak checked several times. This is a very labor intensive process. As a potential solution to this problem, we have identified a method of sealing the sampler bags that are leaking. The industrial adhesive PLIOBOND is applied around the base of each fitting after the bag has been connected to an inlet tube and laid flat on a surface with the fitting facing up. PLIOBOND is a liquid and may be easily applied from a squeeze bottle. It is then allowed to cure for 24 hours.

Testing indicates that this method will seal virtually 100% of the leaks around the tube fittings and also prevent the bags from developing leaks as time passes. This would leave only the bags that leak due to other problems such as pin holes. This should be less than 1% of the bags, which is an acceptable level. (roger.carter@noaa.gov)

Transport and Dispersion Modeling

The formal protocol adopted in the last quarter for testing all facets of the NOAA/INL EOC HYSPLIT implementation, EHY version 1.0, was transitioned to the evaluation of EHY version 1.1. In addition to testing all of the preconfigured scenarios and other functions, version 1.1 testing is also evaluating some new features of the interface and upgrades of the dose calculation and dose plotting programs Con2dose and Doseplot. Furthermore, version 1.1 uses an upgraded version of the HYSPLIT model itself. This testing regimen found several problems and most of these have been resolved. Testing continues but one of the remaining issues involves discrepancies between plumes generated by the 3d particle dispersion option versus the puff dispersion options and differences between puff results using the older and newer version of HYSPLIT. (roger.carter@noaa.gov; dennis.finn@noaa.gov)

When the new Hysplit servers were installed in February and March of this year, the version of Hysplit we were using was also upgraded. This has added an additional level of complication to the testing that we are doing. A number of differences have been observed between current Hysplit runs and previous results. However, it is unclear whether these changes are due to changes in the FRD system or due to changes that have been made in Hysplit. To help resolve these issues, the version of Hysplit that was originally used in the Emergency Response Hysplit development was installed on our current Hysplit server. The configuration allows an easy switch between the current version and this older version so direct comparisons may be made on runs with the only difference being the version of Hysplit, making it

much easier to identify the source of any observed differences or errors. (roger.carter@noaa.gov; richard.eckman@noaa.gov; dennis.finn@noaa.gov)

Progress is continuing to be made on the integration of the WindNinja mass consistent wind fields with the Emergency Response Hysplit (EHY) in spite of the limited time available for this project. WindNinja has been setup up with appropriate terrain files and input parameters so that it generates an output grid that matches the one being used by EHY. The format and content of the WindNinja output files has been determined. The next step is to develop software to integrate the WindNinja winds with the other meteorological values needed for running Hysplit. (roger.carter@noaa.gov)

Mesoscale Forecast Modeling

In early May the Rapid Update Cycle (RUC) model was replaced by the Rapid Refresh (RAP) model at the National Center for Environmental Prediction. This required changes to the local WRF runs at FRD, which were being initialized from the RUC output. The most serious problem was that the RAP output files (in Grib 2 format) are only compatible with the latest version of WRF, namely version 3.4. The FRD system therefore had to be upgraded to this version. After this upgrade, the transition to the use of the RAP model for WRF initial and boundary conditions went relatively smoothly. (richard.eckman@noaa.gov)

Preliminary tests have been completed on a probabilistic WRF forecast system that attempts to account for model bias and uncertainty. It uses past comparisons of the WRF forecasts with NOAA/INL Mesonet observations to generate predictive distributions for forecast variables such as 10 m wind speed and 2 m temperature. The intent is to provide a range of values (such as an interquartile range or 95% probability interval for the wind speed) in a point forecast rather than just a single value. The system is adaptive in that the probabilities are adjusted as new forecasts and observations come in. (richard.eckman@noaa.gov)

NOAA/IDAHO NATIONAL LABORATORY (INL) METEOROLOGICAL RESEARCH PARTNERSHIP

Emergency Operations Center (EOC)

The annual exercise dress rehearsal was conducted at the EOC on April 10. The drill centered on a strong earthquake that struck near Idaho Falls. Many in-town INL buildings had sustained damage and few employees were injured. Short term forecasts were provided but simulations from HYSPLIT or Aloha were not needed during the drill. This drill caused the EOC team members to begin thinking and discussing the challenges and potential solutions to this particular scenario. (Jason.rich@noaa.gov)

The EOC was activated on April 16 for a roof fire at the Materials and Fuels Complex. The fire was caused by workers doing some welding on top of one of the buildings. Several short range forecasts were provided during the 1-hour activation. There were no injuries reported during the incident. (Jason.rich@noaa.gov)

The annual exercise was conducted on 13 June with Team C substituting for Team A. The drill simulated a series of strong earthquakes near Idaho Falls that severely damaged several structures and knocked out all normal communications including regular phone service, cell phones, the internet, and INL intranet. The scenario's severely restricted communications created numerous difficulties for everyone involved. NOAA was able to continue functioning in this scenario better than most of the other

participants due to the dedicated landline from the EOC to our office for accessing data from the NOAA/INL Mesonet. This exercise raised some questions about how we would be able to respond to some worst-case scenarios. (dennis.finn@noaa.gov)

HYSPLIT training for version 1.1 was provided on 25 June to Brad Salmonson and Phil Pfeiffer, who are hazard assessment specialists for the INL EOC. (dennis.finn@noaa.gov; brad.reese@noaa.gov, richard.eckman@noaa.gov)

INL Hazardous Weather Alert System

A fairly active spring weather pattern kept the NOAA/INL Weather Center forecaster busy. In all, 27 INL weather statements were issued during this last quarter. Nineteen of those statements were issued due to high winds and 8 were issued for lightning. Most of the statements were issued when the Pocatello National Weather Service did not issue any warning or advisory, since their criteria for warning the general public is less stringent than the INL. (Jason.rich@noaa.gov and dennis.finn@noaa.gov)

NOAA/INL Mesonet

Over the weekend of March 31 to April 1, one of the radio repeaters in the NOAA/INL Mesonet network failed, thereby stopping all data collection at the NOAA office. All the mesonet stations were subsequently switched to transmit data through the two other repeaters. Additional antennas were installed at a couple of stations to improve communications with these backup repeaters and adequate communications were reestablished within a week. The failed repeater was repaired on May 14, 2012 after the snow on Jumpoff Peak had melted enough to allow access. Normal operations then resumed.

Several improvements were made to the NOAA/INL Mesonet this quarter. A number of new instruments at the three tall towers became operational on April 1. These include wind and temperature measurements at two new levels. The physical tower locations in the database were updated to reflect our improved meta data gathering procedures. Stability class was added to the other meteorological measurements available on our automated weather information telephone line at 526-8884. Stability class was included so that this telephone line could serve as a backup emergency response data distribution method.

Several internal discussions were held on determining the best method for computing the daily minimum and maximum air temperatures for the Mesonet. Currently FRD uses the highest/lowest one-second average as the daily max/min temperature. However, using one-second numbers have always been susceptible to noise spikes in the instrumentation. After contacting the Pocatello NWS and the manager of the U.S. Climate Reference Network, FRD has decided to calculate the daily maximum and minimum temperature as a one-minute average. Using the one-minute averaging should help alleviate the noise spikes in the data. As a result, the time needed to manually quality control the data should be greatly reduced. These changes will go into sometime in the next reporting quarter.

OTHER ACTIVITIES

Safety

At April's staff meeting, handouts were provided on the subject of "Bad Posture Blamed for Stress and Strain." Information was provided by Worklife4you, the employee assistance program for NOAA federal employees.

During May's monthly staff meeting, employees viewed a safety training video by Child's Play on safe lifting.

During June's staff meeting, everyone enjoyed an online video of working with compressed gas.

Training

Rick Eckman has continued to be involved in the Leadership Effectiveness and Advancement Program (LEAP) sponsored by OAR. A training session was scheduled for June, but was postponed because of new travel restrictions. As part of the program, a LEAP personality type survey was conducted at FRD. One of the projects that the LEAP class is working on is workplace civility. As part of this effort, an OAR-wide civility survey is being developed for distribution later in the summer of 2012.

Kirk Clawson attended fork lift training, and Dennis Finn, Tom Strong, and Shane Beard attended fall protection training at the 2012 Safety Fest in Pocatello in April.

Kirk Clawson and Donna Davis completed the annual training requirements for property custodians and approving officials. They also completed annual training requirements for GSA purchase and travel card holders and approving officials. This training included ethics, personal property management concepts, Sunflower PPMS, GSA purchase/travel card, and Section 508.

Travel

Kirk Clawson traveled to San Antonio, TX from April 9-15 to service equipment at the three WFIP sites. He retrieved data cards and performed general maintenance.

Kirk Clawson traveled to Seattle, WA from May 13-16 to attend the DOE EMI SIG Meeting and give a presentation.

Tom Strong traveled to San Antonio, TX from May 29-June 1 to service equipment at the three WFIP sites. He retrieved data cards and performed general maintenance.

During Kirk Clawson's scheduled vacation in Texas (June 11), it was discovered that the Colorado City sodar was down. Kirk Clawson rented a vehicle to make the necessary repairs while in the area.

Outreach

On 20 June Rick Eckman provided a TV interview for the local ABC affiliate in Idaho Falls. The station did a segment on the summer solstice and wanted a scientific description of the event. The story aired on the local evening news.

Jason Rich was guest speaker to Mr. Hyde's sixth grade science classes at Madison Middle School on Friday April 27th.

Over 50% of FRD employees participated in the bike to work day in May.