



FRD ACTIVITIES REPORT

October - December 2013



RESEARCH PROGRAMS

Project Sagebrush

Phase 1 of Project Sagebrush started the first week of October in spite of the government shutdown. The Piper Navajo aircraft from the University of Tennessee Space Institute (UTSI) had arrived the previous week and was fitted out with a Trace Gas Analyzer (TGA) for sampling the SF₆ tracer used in the project. A shakedown flight of the aircraft was completed on 1 October. The weather during the first two weeks of October was unfortunately rather unsettled and not ideal for the planned tracer studies. Regardless, three of the planned five Sagebrush tracer releases were completed on 2, 5, and 7 October with the UTSI aircraft participating in all three.

After the release on the 7th, the weather turned more unsettled and looked to remain so through much of the original two-week window for Phase 1. The UTSI staff therefore decided to return to Tennessee on the 9th. FRD extended Phase 1 for one week to conduct additional releases without the aircraft. This entailed reducing the tracer release rate and moving some of the tracer samplers closer to the source. Two final releases were conducted on 11 and 18 October. Overall, the one-week extension of the study allowed FRD to meet its original objective of completing five successful tracer releases.

Quality control and assurance analyses of the bag sampler tracer data set for all 5 tests have been largely completed and data has been flagged appropriately or corrected as necessary. This process should be completed early in the next quarter. Quality control and assurance analyses of the fast-response tracer data set have begun but they are not as far along.

A preliminary consolidation and review of the extensive suite of Project Sagebrush meteorological measurements has been completed. A much more detailed analysis of the meteorological data will be conducted when the tracer data becomes available in order to link observed tracer plume dispersion with measured turbulence and other meteorological data. The Grid 3 tall tower was heavily instrumented for Project Sagebrush with additional sonic anemometers provided by FRD and additional extensive turbulence and energy balance instrumentation provided by Washington State University. All of the tower instrumentation will remain in place indefinitely in an ongoing study of the structure of vertical turbulence in a wide range of meteorological conditions.

An abstract "Project Sagebrush: Revisiting Short-range Dispersion Using Modern Instrumentation" by Rick Eckman, Kirk Clawson, Dennis Finn, and Roger Carter has been accepted for oral presentation at the 2014 American Meteorological Society Annual Meeting in Atlanta. The presentation will give an overview of the project together with some preliminary results from Phase 1 in October 2013.

(richard.eckman@noaa.gov, Kirk Clawson, Dennis Finn, and Roger Carter)

Birch Creek Valley Wind Flow Study

Analysis of the Birch Creek dataset during the first quarter focused on: (1) the monthly/seasonal changes in diurnal flow patterns, especially with respect to the interaction between mountain valley flows and flows on the Snake River Plain; and (2) an analysis of individual wind events featuring unusual flow patterns and abrupt temporal and/or spatial changes. Considerable progress was made on item (1) as that analysis depended primarily on data acquired by FRD. Work on item (2) is preliminary, pending the availability of the higher spatial resolution datasets acquired by our partner, the USFS Fire Sciences Laboratory. The Fire Sciences Laboratory anticipates their data will be available by about March. However, several potentially very interesting cases have been identified in the data presently available to us. (dennis.finn@noaa.gov)

Transport and Dispersion Modeling

We received informal notification that the review of the HYSPLIT Radiological Software Quality Assurance plan (HYRad SQA) and its gap analysis were successfully completed. The successful review means that HYRAD has been accepted for inclusion in the DOE Emergency Managers Issues Special Interest Group (EMI SIG) Subcommittee on Consequence Assessment and Protective Actions (SCAPA) Consequence Assessment Model Toolbox. The appropriate documentation and other protocols required by the Toolbox have been maintained since the second quarter of FY2013 when the package was submitted for review. (dennis.finn@noaa.gov)

ARL Convective Initiation Project

A position description was written for a postdoctoral research associate to assist in modeling for the Convective Initiation project. This position will be filled through the Cooperative Institute for Climate & Satellites-Maryland (CICS-MD), but the intention is for the associate to be located at FRD. The associate will be focusing on improving model parameterizations of the land surface and boundary layer that affect convective initiation forecasts. Time has also been reserved on a NOAA high-performance computer to run numerical simulations related to the project. The computing requirements for the project are still somewhat uncertain, but the NOAA computing resources must be reserved well in advance. (richard.eckman@noaa.gov)

Wind Forecast Improvement Project (WFIP)

An abstract entitled “A Probabilistic Method for the Estimation of Surface Roughness and Displacement Height Using Limited Wind Profile Information” by Rick Eckman, Dennis Finn, and Kirk Clawson was accepted for presentation during a poster session at the 2014 American Meteorological Society Annual Meeting. The poster will describe some of the boundary-layer work conducted using data from three Texas measurement sites operated during WFIP. It will be presented as part of the Fifth Conference on Weather, Climate, and the New Energy Economy (richard.eckman@noaa.gov, Dennis Finn, and Kirk Clawson)

INLViz, MDIFF, HYSPLIT, and Viz+

FRD is transitioning away from MDIFF and INLViz for its dispersion modeling and meteorological display. HYSPLIT and Viz+ are the primary replacements for these two applications and are intended for users needing more sophisticated capabilities. HYSPLIT expands substantially on MDIFF's concentrations calculations. In addition to concentration, HYSPLIT will calculate dose and deposition directly. Viz+ expands INLViz capabilities by providing data in daily chunks as opposed to 5 minute

chunks. This provides the ability to display daily graphical and summary data. By using Google Maps, both applications provide more sophisticated mapping displays. These are but a few of the many improvements these new applications provide. For users needing just current weather conditions, FRD has replaced the windvector page with a new page, also built around Google Maps. The URL for this new web page is <http://www.noaa.inel.gov/mvp/iviz>. This page is also accessible from FRD's NIWC page. (Brad.Reese@noaa.gov)

Tennessee Tracer Study

The Tennessee Valley Authority (TVA) is proposing to install a modular nuclear reactor at a site near Oak Ridge, TN. A fast breeder reactor was planned at this site back in the 1970s, but that reactor was ultimately canceled. As part of the planning for the modular reactor, there has been some discussion about conducting a tracer study at the proposed site. A preliminary meeting in Oak Ridge is planned for the spring of 2014 to discuss developing a proposal for a tracer study. The University of Tennessee Space Institute is involved in the planning after their successful use of FRD's tracer equipment in their aircraft during Project Sagebrush. (richard.eckman@noaa.gov, Kirk Clawson)

NOAA/IDAHO NATIONAL LABORATORY (INL) METEOROLOGICAL RESEARCH PARTNERSHIP

INL Tornadoes

The INL is updating its safety analysis report and has requested that FRD review the section related to high winds and tornadoes. They are particularly interested in updating the description of tornado risk. Tornadoes are uncommon in the area, but the safety analysis report has to address hazards that meet certain risk levels (e.g., one-in-a-million risk annually). Most Idaho tornadoes are weak, but they are common enough statewide that the return period for a tornado of any intensity striking somewhere on the INL Site—which covers about 2,300 km²—is approximately 20 years. However, any tornado will likely be weak, with an intensity of EF0 or EF1. Since buildings and other structures cover only a small fraction of the site, the return period of a tornado striking sensitive structures is of course much lower. (richard.eckman@noaa.gov, Kirk Clawson)

Emergency Operations Center (EOC)

On 2 October Rick Eckman participated in an EOC drill involving a coolant leak at the Advanced Test Reactor. This accident scenario is available as a radiological source option in FRD's HYSPLIT modeling system. HYSPLIT runs were successfully completed based on two different coolant-leak scenarios, and the projected radiological doses were supplied to the EOC management team. (richard.eckman@noaa.gov)

Team A participated in a drill at the EOC on 26 November. The drill centered on an earthquake that caused a leak in a canal housing nuclear fuel rods. Nowcast and short term forecasts were issued during the drill. Several HYSPLIT model runs were created during the drill showing the potential hazard if the fuel rods became exposed. (Jason.Rich@noaa.gov)

INL Hazardous Weather Alert System

A relatively tranquil weather period this quarter resulted in only 3 NOAA/INL Hazardous Weather Statements being issued. Two of the statements were issued for high winds and the third was issued for lightning, an unusual weather phenomenon this time of the year. (Jason.Rich@noaa.gov)

NOAA/INL Mesonet

The NOAA/INL Mesonet telemetry system began experiencing having radio interference that entirely blocked the transmission of data that began during the last week of November through the second week in December. Periods of interruption lasted for 12 or more hours. We set up a mobile device in a utility truck for detecting that interference and drove around the city looking for the source. These investigations were inconclusive although it appeared that the source could be located near the FRD office. In response to this problem, we set up an alternate base station at the INL (40 miles west of our office) to collect the Mesonet data during periods of interference. We also reported the interference problems to the INL radio frequency manager, the INL Wireless Testbed manager, and Idaho Falls Power. IFP sent out technicians to repair street lights in our neighborhood, surmising that the radio interference was being caused by the continuous restriking of bad bulbs when they wouldn't light. The last two weeks of December the interference problems have not recurred but we continue to closely monitor the Mesonet telemetry performance.

OTHER ACTIVITIES

Safety

FRD participated in the 2013 Great Idaho Shakeout earthquake drill on October 17, 2013.

At November's staff meeting the staff viewed a video on indoor air pollution provided by videojug.com.

Several employees participated in DOE's Fit for Life Health Fair on November 14, 2013.

December's staff meeting safety presentation covered Christmas safety.

Training

In November, all employees completed the required INL training (General Employee Access and Counterintelligence).

Kirk Clawson and Donna Davis attended the Commerce Alternative Personnel System (CAPS) webinar in November.

Donna Davis attended the WorkLife4You webinar on November 21, 2013. The webinar was "Dealing with the Elephant in the Room" which provided skills so you can talk to anyone about anything.

CPR/First Aid/AED training was provided to the staff on December 2, 2013 by Duane Nelson from the Idaho Falls Fire Department.

Worklife provided a webinar "Diversity in the Workplace" on December 5, 2013 which Donna Davis attended.

Donna Davis completed the DOC Administrative Professional Online Certificate Program in December. The program was developed for advanced administrative professions. The program required completion of 15 online courses.

Outreach

Jason Rich gave a group of varsity scouts (ages 16-17) and their leaders a tour of the FRD building on November 20. The scouts wanted to learn about the career of meteorology.

Shane Beard gave a tour of the FRD facility to a small group of Boy Scouts (12-17 years old). He explained how science, electronics, and weather are involved in various research projects at FRD along with the services we provide DOE.

Jason Rich answered an Ask a Scientist question submitted by a local school in November. The question was “Why do thunderstorms in the summer most often happen in the afternoon (at least in Idaho)? The answer was published in Idaho Falls *Post Register* on November 12.

Rick Eckman answered an Ask a Scientist question submitted by a local school in December. The question was about the color of lightning. The response will be appearing in the Idaho Falls newspaper in January.