



FRD ACTIVITIES REPORT

February 2005



Research Programs

Tracer Analysis Facility (TAF) Adaptation for Perfluorocarbon Tracer Analysis

The conversion of ATGAS instrument #4 for perfluorocarbon analysis shows promise for use in the upcoming Urban Dispersion Program field experiment planned for New York City in August. An initial test, using vapors of unknown concentration obtained directly from perfluorocarbon liquid aliquots of PDCB, PMCP, 1,2-PMCP, m-PDCH, o-PDCH, i-PPCH, and PTCH, were each analyzed on the converted ATGAS. Figure 1 shows an analysis of PTCH while Fig. 2 shows an i-PPCH analysis. The graphs illustrate very good separation of most of the peaks, and that an extremely good baseline was generated. The oven temperature was 150°C and all materials eluted within 4 minutes.

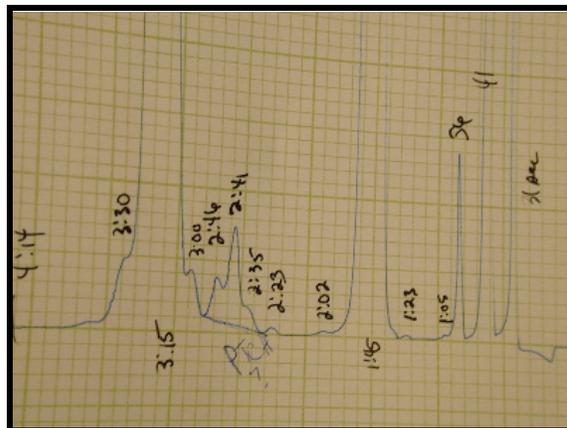


Figure 1. PTCH perfluorocarbon tracer peak at 2 minutes 41 seconds past injection.

The liquid aliquots used for the initial test (except for PDCB) were taken from tracers that had been stored for years. Their purity is not known and even suspect, since at least one of the aliquots contained brown and white particles. Neat standards for PDCB, PMCH and m-PDCH are on order and the PDCB calibration standards are due at the end of this month. A more quantitative investigation can then be completed. (Debbie Lacroix, 208-526-9997)

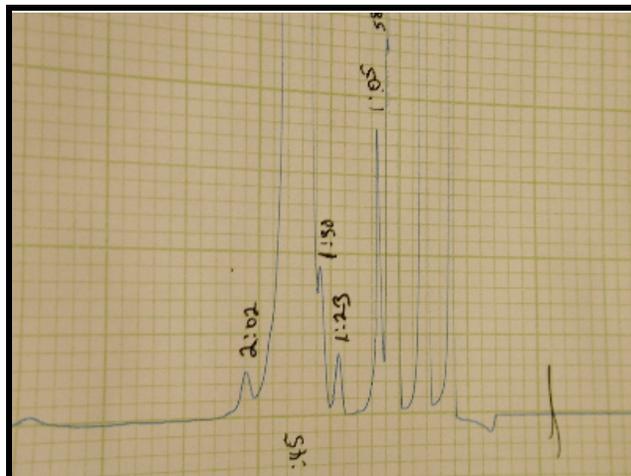


Figure 2. i-PPCH perfluorocarbon tracer peak at 1 minute 45 seconds past injection.

ET Probe

Work has begun on a manuscript describing the design and testing of the ET probes. This is the first of two planned manuscripts on the probes. The current one will focus more on the hardware and performance; it will likely be submitted to the *Journal of Atmospheric and Oceanic Technology*. A second manuscript will then describe the hurricane data collected during the 2004 season. Many of the figures for the

first manuscript, including hardware diagrams, have already been completed. (Richard Eckman, 208-526-2740)

As part of the preparations for the ET probe manuscripts, some of the test data were reevaluated to better understand some of the probe's characteristics. One issue that has not been adequately explained is that the power spectrum for the cross-wind velocity component v usually rolls off faster than the $-5/3$ power law expected from inertial-subrange theory. It was discovered that this problem could be corrected by applying an empirical adjustment to the angle of sideslip computation. Such empirical adjustments are frequently required with pressure spheres, because the underlying equations used for the winds are based on inviscid flow theory. Generally, the adjustments become larger as the pressure ports get further from the flow stagnation point. The horizontal separation of the ports on the ET probe are twice the vertical separation, which may explain why an adjustment is required for the v component. (Richard Eckman, 208-526-2740)

Smart Balloon

Three newly constructed transponders are being operated outside to 1) test the operation of the data acquisition software, 2) test the Iridium satellite modem operation and reliability, and 3) to compare data between all three transponders. When side-by-side testing is complete, one of the transponders will be compared against standard meteorological instruments located at the Idaho Falls INL Mesonet station. In addition, real time mapping displays are being developed for tracking the balloon from the controlling computer and the web. Balloon data updates will be displayed every 15 minutes.

Our second shipment this year of a high strength balloon shell and 2 bladders was received. One of the bladders was tested and two significant leaks were found. We will not be testing the other bladder or the shell until the manufacturing problems with the bladders have been resolved. (Randy Johnson 208-526-2129, Shane Beard, Vance Hawley, Brad Reese)

Bag Sampler Software Upgrade

The software upgrade for the Programmable Integrating Gas Samplers (PIGS) has been completed and bench tested. The upgraded firmware is being loaded on a number of PIGS in preparation for a series of tests that will exercise the complete system in simulated field tests. The tests have been designed to check the operation of the new system and also document some of the capabilities of the PIGS. This upgrade greatly increases the capabilities of the PIGS but also increases the complexity of operating the samplers. Over 400 parameters must be specified by the operator every time a test is conducted with the PIGS. In order to avoid errors, a great deal of care must be exercised and sufficient time will need to be allowed for the operation. (Roger Carter, 208-526-2745)

Cooperative Research with DOE NE-ID (Idaho National Laboratory)

INL Drills, Exercises, and Emergencies

The annual INL Emergency Operation Center qualification drills continued during February. Two staff members from FRD participated in a drill involving a tanker accident at the site on February 23. The staff members gave real-time meteorological conditions and forecasts to the Emergency Director for simulated evacuation support. (Richard Eckman, 208-526-2740, and Randy Johnson)

Mesoscale Modeling

As part of a planned update of the FRD web pages, a new link has been created to describe the general configuration of the MM5 simulations performed at FRD. This link also shows some three-dimensional output from a HYSPLIT dispersion model run based on the MM5 simulations. With the 3-D perspective view, one can see both the horizontal and vertical motion of the HYSPLIT particles relative to the terrain. This contrasts with the current modeling based on MDIFF, which is limited to a two-dimensional wind field. (Richard Eckman, 208-526-2740)

Other Activities

Travel

Randy Johnson to Silver Spring, MD on February 2-3 to give a presentation on the Smart Balloon Operational Characteristics and Capabilities to NOAA Management and scientists.

Paula Fee to Seattle, WA to attend the Financial Data Management System (FDMS) training at OAR/PMEL.

Training

On February 1, Paula Fee completed the mandatory on-line Sunflower Assets Property Custodian Training Program WebEx course for NOAA property accountable officers and property custodians. The Sunflower System will be used to capture all of NOAA's personal property and replace the DOS-base system currently in use.

On February 9-10, Paula Fee attended the Financial Data Management System (FDMS) training at PMEL in Seattle, WA. Cindy Loitsch, PMEL Administrative Officer, and her IT staff presented this course. The training was arranged to help ARL HQ and Field Administrative Officers (AO) to fully utilize the various features and reports available in the FDMS program. It was also a good opportunity to meet other ARL AO's and to share experiences, ideas, problems, etc. with one another.

In January and February, FRD federal and contractor personnel completed the mandatory 2005 NOAA IT Security Awareness on-line course.

Personnel

Dr. Thomas B. Watson, Research Chemist, resigned after nearly 13 years with NOAA, to accept a job with Battelle, at their Brookhaven National Laboratory in Upton, New York.

Visitors

On February 2, the ARL Core Competencies Review Team which consisted of Drs. James Meagher, John Schneider, Paula Davidson, Howard Diamond, and Ms. Mary Anne Whitcomb met with FRD management and personnel. FRD's scientific staff gave presentations about their programs to the team. Betsy Jonker and Stacey Madsen of DOE-Idaho; Scott Schum, Battelle Energy Alliance; Douglas Walker, State of Idaho Environmental Program; and James Meyer, NOAA National Weather Service in Pocatello, ID met individually with the Review Team.