



FRD ACTIVITIES REPORT

September 2005



Research Programs

Urban Dispersion Program (New York City Study)

All samples for the Urban Dispersion Program were analyzed, and verified by another analyst. The data is beginning the validation process to make sure there is a valid result associated with each sample bag and to determine if any further flagging of the data might be needed due to any quality control issues. The dot plots, time plots, sampler servicing records and quality control documentation will be reviewed.

This project entailed the inclusion of extra quality controls. Field blanks, field controls and field duplicates were implemented as usual, but samplers were programmed to collect samples after the end of each IOP to gauge the possible existence of a higher than usual background SF₆ concentration level. Also, during the first three IOPs, most samplers were programmed to collect a background bag before the first release, during the hour between releases and again after the end of each IOP. The collection of these extra QC samples will increase the confidence of the SF₆ data in such a diverse, urban environment as New York City.

Part of FRD's effort in the Urban Dispersion Program was to deploy air samplers that had been modified to use CATS tubes to sample perfluorocarbon tracers. Brookhaven National Laboratory (BNL) provided the CATS tubes and FRD personnel deployed the samplers. During September, a list showing the location and sampling time for each CATS tube was provided to BNL so they could complete their analysis. The list was generated from computer records and checked by comparison with hand written field notes.

Post processing of continuous analyzer SF₆ data continued with IOP 5 during September. IOPs 1 through 4 were completed during the field deployment. The analyzers worked very well and there are very few problems with the data. Hopefully, the post processing and data verification can be completed in the next few weeks.

A quick-look summary of the UDP deployment was prepared and submitted to the DHS test director. In all, a total of 16 SF₆ tracer release periods were conducted in 6 Intensive Observation Periods (IOPs). Release rates ranged from 3 to 5 g s⁻¹ in 30-minute release periods, which resulted in a total release of about 105 kg of SF₆. More than 3,500 field samples were analyzed for the 6 IOPs. Of these, 93% were usable. The data concentration ranges are as follows:

Concentration Range	Percentage of samples
< 10 ppt	42%
between 10 & 500 ppt	50%

between 500 & 5,000 ppt 0.06%
between 5,000 & 900,000 ppt 0.02%

The highest concentration result for each IOP were: IOP 1, 142,282 ppt; IOP 2, 6,849 ppt; IOP 3, 526,606 ppt; IOP 4, 532,508 ppt; IOP 5, 822,284 ppt; IOP 6, 479,272 ppt. (Kirk Clawson, 208-526-2742, Roger Carter, Debbie Lacroix, Jason Rich)

ET Probe

A manuscript describing the ET probe development and testing is nearing completion. The FRD portion is expected to be completed in October. Some additional sections describing the ET probe work performed at ATDD will then be added. The manuscript will be submitted to the *Journal of Atmospheric and Oceanic Technology*.

Various avenues continue to be explored for follow-on funding to continue the ET probe development. The original 5-year project, which was in collaboration with ONR, ended in FY 2005. Additional ET probe planning has been entered into the NOAA PPBES system, but even if successful this route has a long lead time, with funding not starting until FY 2008. Another possible avenue is hurricane supplemental funding in response to the active 2005 hurricane season. (Richard Eckman, 208-526-2740, Ron Dobosy, ATDD)

Smart Balloon

Two NOAA smart balloons were launched from Puerto Rico in an effort to place the balloons into a hurricane during the RAINEX experiment. Balloon 1 was launched at about 0120 hours (GMT) on September 8th, 2005. It tracked to the northwest in the direction of Hurricane Ophelia. After tracking the balloon for nearly a day and half, the solar radiation increased but the solar panel charging current remained at zero. This was monitored for a few hours and when it was determined for sure that the batteries were not going to charge, the balloon flight was terminated while battery power was good and we could ensure the balloon did drop into the ocean. Balloon 1 is shown as a series of red dots in the map (Figure 1).



Figure 1. Paths of the two NOAA smart balloons launched from Puerto Rico during the RAINEX experiment. The path of balloon 1 is shown in red dots, while the path of balloon 2 is shown in blue dots.

Balloon 2 was launched approximately 4 hours after the termination of balloon 1 at about 1838 hours (GMT) on September 9th, 2005. The balloon started heading mostly to the west, over the Dominican Republic then over Cuba (which was not in the direction that we wanted). After

going across Cuba the balloon headed directly toward the Yucatan Peninsula. After flying for a little over three days the elevation of the balloon was changed from 2600 meters to around 700 meters. Balloon 2 flew for a few more hours, with everything working just fine when communications suddenly failed to connect with the balloon any longer. The path of balloon 2 is shown in Figure 1 as a series of blue dots. (Randy Johnson 208-526-2129, Brad Reese, and Shane Beard)

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

INL Drills, Exercises, and Emergencies

Kirk Clawson and Brad Reese participated in the Idaho National Laboratory (INL) annual exercise at the EOC on 14 September. The exercise simulated a large earthquake in a nearby mountain range in which several facilities at the INL containing nitric acid and chlorine dioxide were breached. The team provided evacuation support by running the transport and dispersion model for the Emergency Director and meteorological support.

Mesoscale Modeling

Several MM5 verification tests were completed in September using INL Mesonet data collected in August. The most obvious biases in the MM5 forecasts were related to the 2 m AGL temperature. During the afternoon, the MM5 temperature forecasts at CFA had only a slight negative temperature bias. However, in the predawn hours the model had a strong positive bias of several degrees Celsius. This suggests a problem with either the surface characterization (e.g., soil moisture) or the PBL parameterization in stable conditions. The wind-speed forecasts were on average fairly accurate, with the median bias near zero and the interquartile range of the bias generally spanning less than 5 m/s during most hours of the day. For the wind direction, the best performance was during the afternoon, when the median bias was less than 20° and the interquartile range was near 50°. At night with light winds, the interquartile range for the direction bias was closer to 120°. (Richard Eckman, 208-526-2740)

Other Activities

Safety

No safety training was given. Most workers were in the field this month. (Debbie Lacroix, 208-526-9997)

Travel

Shane Beard, Sept 1-11, 2005, Aguadilla, Puerto Rico, to participate in the RAINEX experiment. Randy Johnson, Sept 1-14, 2005, Aguadilla, Puerto Rico, to participate in the RAINEX experiment.

Personnel

Jennifer Hutton declined our offer for the meteorologist position. We will begin the process to re-advertise this position in October.