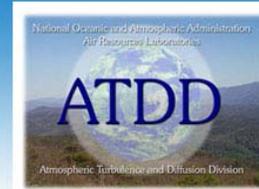




NOAA/ATDD Quarterly Activity Report

October 2010 - December 2010



*Bruce Baker, Director
Atmospheric Turbulence and Diffusion Division*

(This report is prepared for the use of the NOAA/Air Resources Laboratory and is also sent as a courtesy to other agencies. Please do not copy and forward it elsewhere.)

CLIMATE

Local Meteorological Support

Data reduction for October, November, and December was completed without problems. The monthly data (a summary file and precipitation table files for each month) have been downloaded to <ftp.atdd.noaa.gov/> (anonymous FTP, change directory to `pub/data/ormet`). The archived data are located in the sub-folder "archive."
lynne.satterfield@noaa.gov

U.S. Climate Reference Network

In October, November, and December, NCDC retrieved 31 data files from CRN sites through the server <ftp.atdd.noaa.gov>. Data are passed to NCDC by this path when retrieved episodically by ATDD from individual sites to fill data gaps. A record is maintained of the number of missing hours of retrievable data over the past 12 months. Instruments' characteristics for each site are maintained in the database ISIS (Integrated Station Information System) on NCDC's server, along with a record of events which affect data quality. New events are identified from ATDD's field crews, NCDC's Anomaly Tracking System (ATS), and email messages. lynne.satterfield@noaa.gov

The climate programs made a total of 48 separate site visits this quarter in Alabama, Colorado, Nevada, New York, North Carolina, Oregon, Pennsylvania, Virginia, Washington, West Virginia, and Wyoming. mark.e.hall@noaa.gov

Aircraft measurements of temperature and radiation were conducted by NOAA/ATDD, in collaboration with the University of Tennessee Space Institute (UTSI) Aviation Systems and Flight Research Department in Tullahoma, TN. Flights were made over the CRN site in Crossville, TN, and NOAA/ATDD's Chestnut Ridge research tower (CHESS) near Oak Ridge, TN, on November 17-19, and December 2-3, 2010. Comparisons were made in the surface temperature measured at the tower and by MODIS (on board TERRA and AQUA Satellites). The preliminary comparison shows good agreement between the observations. Based on these results more flights will be planned in over various CRN sites in 2011. praveena.krishnan@noaa.gov, E. Dumas, C.B. Baker, T.P. Meyers and J. Kochendorfer

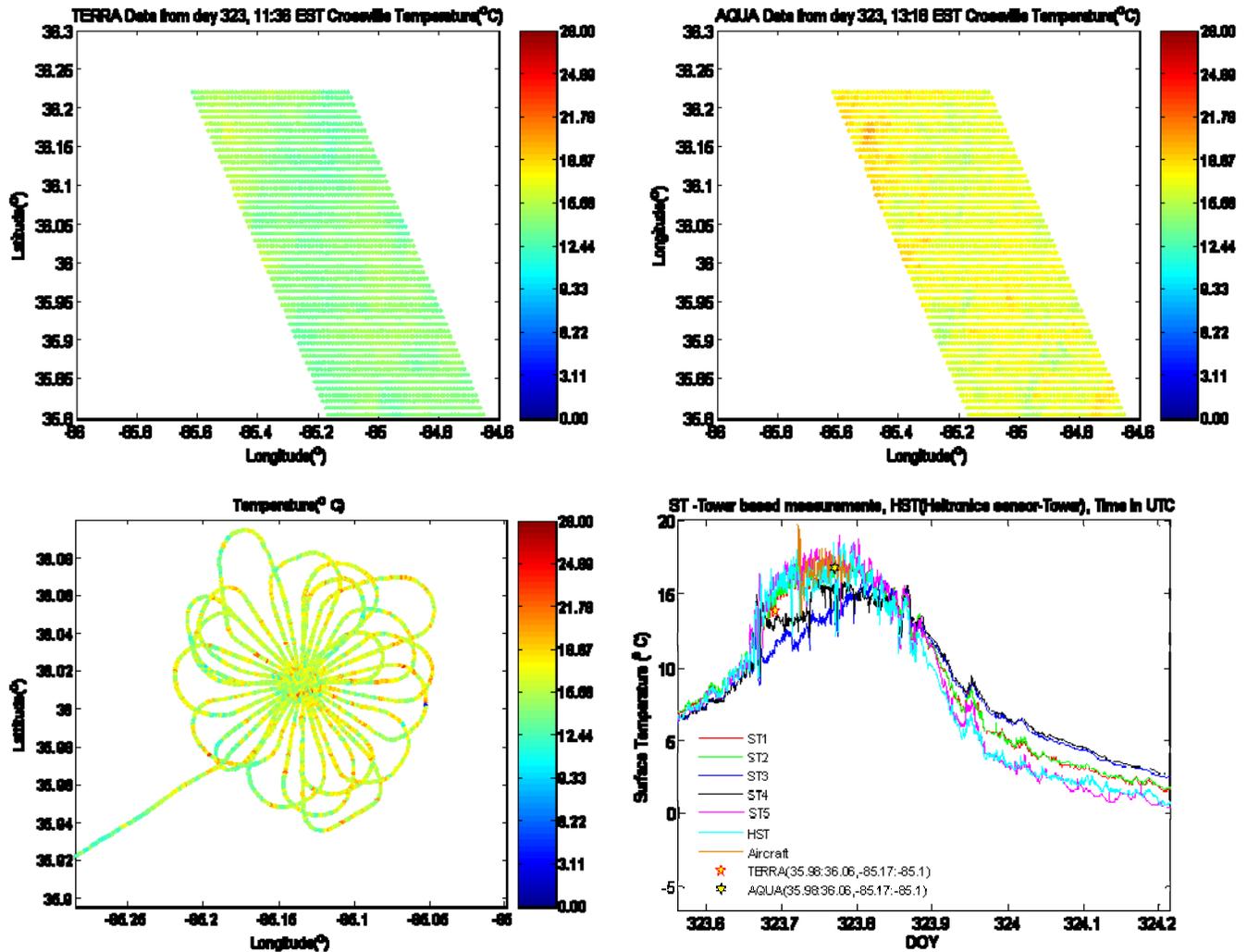


Figure 1: Surface temperature measurements over Crossville on November 19, 2010.

Manuscripts

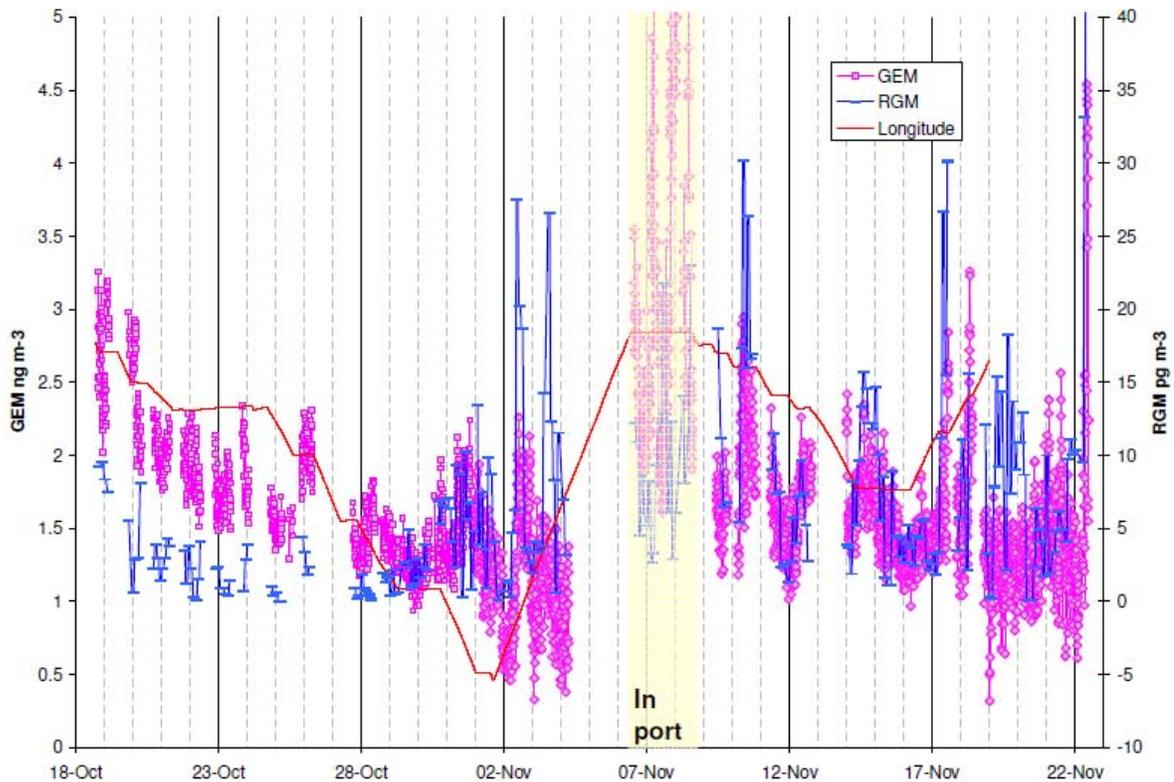
A manuscript entitled “Net ecosystem exchange, evapotranspiration and canopy conductance in a riparian forest” by J. Kochendorfer, E.G. Castillo, E. Haas, W.C. Oechel and K.T. Paw U has been accepted for publication in *Agricultural and Forest Meteorology*. john.kochendorfer@noaa.gov

A manuscript entitled “Energy exchange and evapotranspiration over two temperate semi-arid grasslands in North America” by P. Krishnan, T.P. Meyers, R.L. Scott, L. Kennedy and M. Heuer was submitted to *Agricultural and Forest Meteorology* in December. Praveena.krishnan@noaa.gov

AIR QUALITY

GEOTRACES Atmospheric Mercury Measurements

ARL provided atmospheric mercury sensors and guidance to the recently completed first leg of the multi-year GEOTRACES cruise. The initial cruise in the South Atlantic ended in late November 2010. Dr. Melanie Witt from Oxford University operated the on-board atmospheric mercury sensors. At first, the data appears fairly typical with gaseous elemental mercury averaging close to its southern hemispheric background of $\sim 1.2 \text{ ng m}^{-3}$, and reactive gaseous mercury averaging an unremarkable $\sim 7 \text{ pg m}^{-3}$. However, there is an interesting correlation between mercury and longitude (see graph below). In the coming weeks, back trajectories and synoptic conditions will be studied to characterize the East-West gradient that was measured during the cruise. The second leg of the GEOTRACES cruise is scheduled for February 2011 in the Tropical Atlantic. steve.brooks@noaa.gov



Mercury-in-biota research

S. Brooks is part of a new mercury-in-biota research program in partnership with the Fish and Wildlife Service (FWS) in Canaan Valley, WV. FWS has concluded that *in the Appalachian region* mercury levels in sparrows and Carolina wrens (*Thryothorus ludovicianus*) are elevated and potentially causing reproductive problems. Previous studies have shown that these birds consume large numbers of orb-weaving spiders and that orb-weaving spiders generally have elevated mercury levels. In March, Brook and collaborators will begin collecting orb-weaving spiders around vernal ponds in the upslope forests and collecting wood frog (*Rana sylvatica*) egg masses from these same

ponds. They will look for correlations between mercury levels in frog eggs and in the surrounding spiders. From our previous studies at Canaan Valley, they have determined that mercury levels in pond water depends on the size and shading of the individual pond. In coming years, the study may expand to include bird sampling.

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Research at the Nexus of Air Quality and Climate Change (CalNex 2010)

Analysis of the ammonia flux dataset from ATDD's CalNex 2010 field study is ongoing. Fluxes were measured with annular denuders and a cavity-ring down spectrometer at 0.5 and 2.5 m over a maize field adjacent to a dairy farm in Stanislaus County, CA. Ammonia concentrations measured with annular denuders in May are shown below in Figure 1. As expected, concentrations decreased during periods of precipitation on May 9, 10, and 19. Concentrations increased substantially after the field was fertilized with urea on May 20. The cavity-ring down system operated in June and initial comparisons with denuder data are shown in Table 1. Ammonia concentrations from annular denuders were consistently greater than those measured with the cavity-ring down analyzer (Picarro). We continue to investigate possible reasons for these differences; however one contributing factor may be the cavity-ring down analyzer's relatively slow equilibration time (10-15 min). In recent discussions with colleagues in academia, we learned that the equilibration effect has been a challenge for their ammonia measurements as well. latoya.myles@noaa.gov, M. Heuer

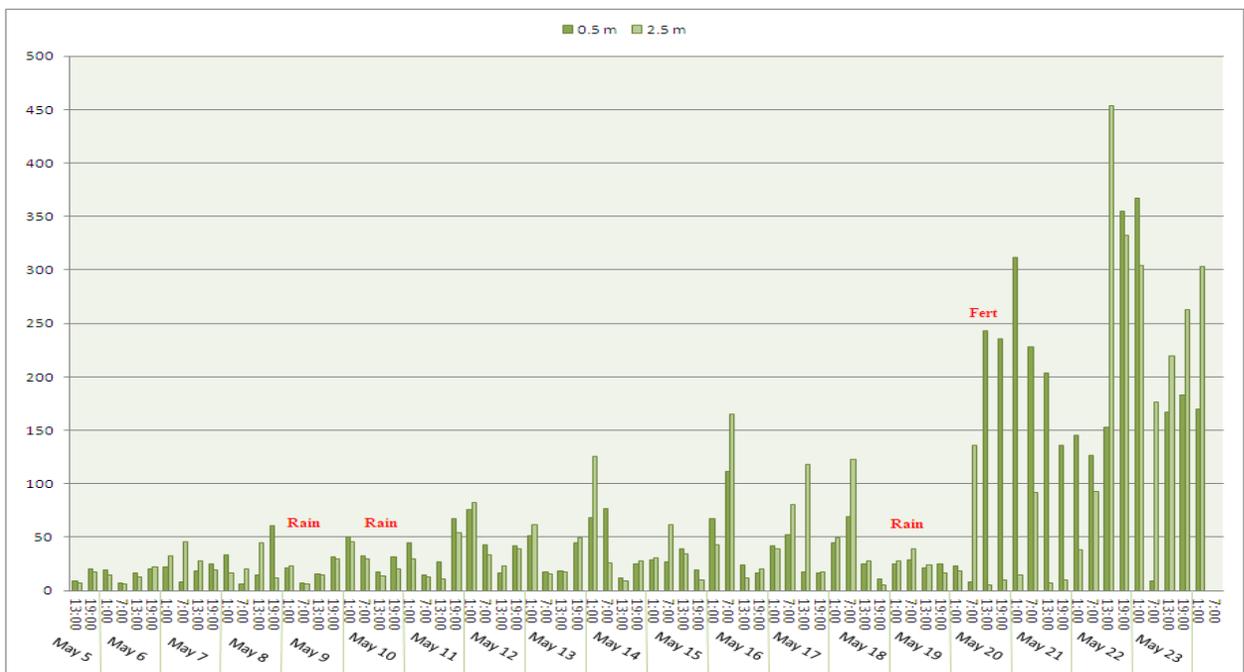


Figure 1

June Concentration Comparison			
Technique (ug m-3)	Mean	StdDev	Max
Picarro @ 0.5 m	10.62	12.10	89.11
Picarro @ 2.5 m	13.07	17.16	123.84
Denuder @ 0.5 m	25.04	40.02	192.11
Denuder @ 2.5 m	28.79	45.63	206.52

Table 1

Manuscripts

A paper entitled "An integrated WRF/HYSPLIT modeling approach for the assessment of PM_{2.5} source regions over Mississippi Gulf Coast Region" has been published in *Air Quality, Atmosphere, & Health*. L. Myles, W. Pendergrass, and C.A. Vogel serve as co-authors of the paper, which is a result of the collaboration between ATDD and Jackson State University's Trent Lott Geospatial and Visualization Research Center. latoya.myles@noaa.gov, W. Pendergrass, and C.A. Vogel

A paper entitled "Temperature and sunlight controls of mercury oxidation and deposition atop the Greenland Ice Sheet" by S.B. Brooks, C. Moore, D. Lew, B. Lefer, and D. Tanner has been published in *Atmospheric Chemistry and Physics Discussions*. steve.brooks@noaa.gov

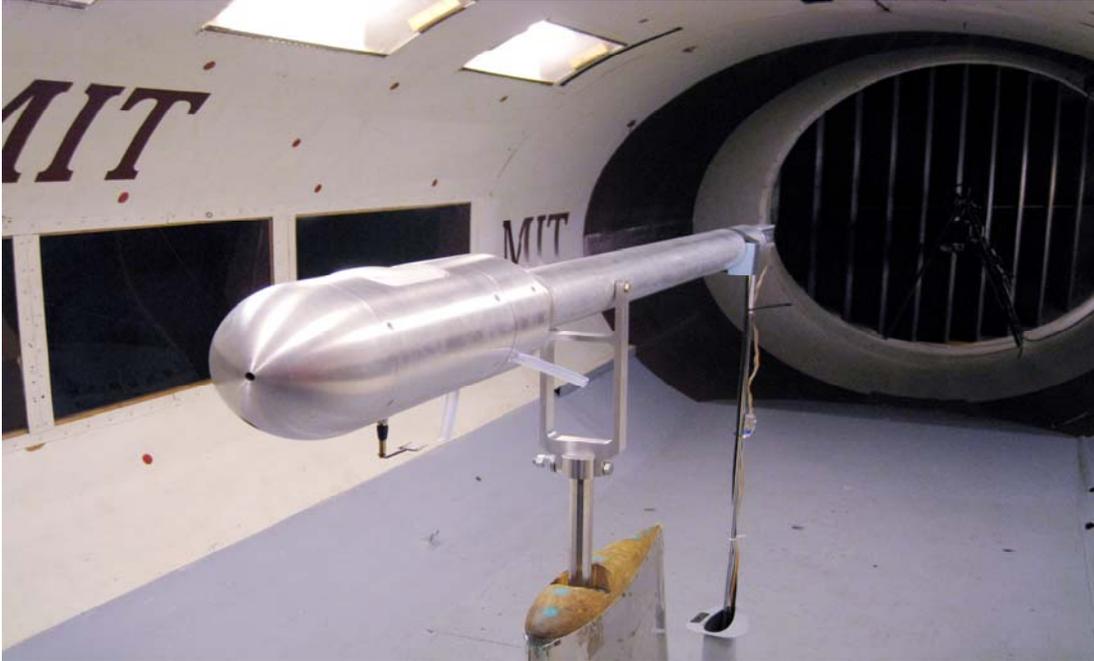
Presentations

Two research posters were presented during the Fall 2010 meeting of the American Geophysical Union (AGU) in San Francisco, CA. The posters, entitled "Air-surface exchange of ammonia at an agricultural site in the northern San Joaquin Valley during CalNex" and "Estimating ammonia volatilization and deposition from fertilized vegetation" were well-received. Interest in ATDD's application of cavity-ring down spectroscopy for measuring ammonia fluxes generated great interest among colleagues in attendance. latoya.myles@noaa.gov, M. Heuer

DISPERSION AND BOUNDARY LAYER

ARL/Harvard Collaboration

The second test of the BAT (Best Airborne Turbulence) probe in MIT's Wright Brothers Wind Tunnel, October 11 and 12, was highly successful. It yielded a wealth of data under strongly controlled conditions free of airplane-induced flow distortion, but in a spacious environment far from walls, floor, and roof at airspeeds actually used during operational data flights. Over this first quarter of FY2011 we have been analyzing these data to characterize the BAT probe's accuracy in measuring the airspeed and the incident angles of flow relative to its hemispherical head. A publication reporting the results is anticipated to be submitted for review in the next quarter. ed.dumas@noaa.gov, R. Dobosy, D. Senn, B. Baker



MISCELLANEOUS

L. Myles participated in the fourth training session for the Leadership Effectiveness and Advancement Program (LEAP) on January 18-21. The theme of the session was "Leaders as Change Agents." Activities included an 'amazing race' exercise, effective communications training by Jim Snack, and an analysis of change in the current Presidential Administration and 112th Congress by Dr. James Thurber.

latoya.myles@noaa.gov

TRAVEL

Land, G., Washington, DC, September 19 - October 2, 2010, to attend Management Concepts Training.

Hall, M. and Blackwell, J., Jackson Hole, WY, Lander, WY; and Steamboat Springs, CO, September 27 – October 8, 2010, to make annual maintenance visits.

Hamby, A. and Edgemon, T., Portland, OR, October 3-17, 2010, to make annual maintenance visits at CRN stations.

Meyers, T., College Park, MD, October 4-6, 2010, to attend a meeting on satellite validation activity.

Baker, B. and Kochendorfer, J., Boulder, CO, October 6-8, 2010, to attend a winter precipitation workshop at the National Center for Atmospheric Research (NCAR).

Dobosy, R., Dumas, E., and Senn, D. Cambridge, MA, October 11-15, 2010, to conduct a wind tunnel test at MIT for the Harvard/ATDD BAT probe.

Myles, L., St. Michaels, MD, October 12-15, 2010, to attend LEAP Training.

Jordan, J. and Rutherford, J., Portland, OR and Salt Lake City, UT, October 15-26, 2010, to perform annual maintenance at CRN sites.

Meyer, R. and White, J., Big Spring, TX, October 17-23, 2010, to install sodar for Duke wind experiment.

Meyers, T., College Park, MD, October 18-20, 2010, to attend NOAA climate summit.

Pendergrass, W. and Vogel, C., Big Spring, TX, October 18-22, 2010, to conduct research at Texas Wind Farm.

Brooks, S., Oak Ridge, TN, October 18-22, 2010, to surrogate surface samplers modification at ATDD and to make an instrument exchange at ORNL/ESD.

Burris, J. and Johnson, K., Elkins, WV; Charlottesville, VA; Cape Charles, VA; Avondale, PA and Millbrook, NY, October 18 – 27, 2010, to make CRN annual maintenance visits.

Myles, L., Atlanta, GA, October 22-23, 2010, to attend the NOBCCChE Southeast Regional Conference.

Land, G., Washington, DC, October 24-30, 2010, to attend Management Concepts Training.

Heuer, M. and Miller, J., Rapid City, SD and Wolf Point, MT, October 25-29, 2010, to make a SEBN site visit.

White, R., Big Spring, TX, October 27-29, 2010, to conduct maintenance at Duke Energy site.

Edgemon, T. Lafayette, LA and Fairhope, AL, October 31 – November 3, 2010, to conduct unscheduled maintenance.

French, B., Asheville, NC, November 2, 2010, to make a CRN maintenance visit.

Hamby, T., Newton, MS, November 5-7, 2010, to make a CRN maintenance visit.

Baker, B. and Shifflett, B., Miami, FL, November 7-11, 2010, to attend the OAR Management Conference.

French, B., Asheville, NC, November 8, 2010, to conduct an unscheduled maintenance visit at CRN site.

Pendergrass, W., Cheyenne, WY, and Denver, CO, November 8-10, 2010, to attend a meeting on the Happy Jack Wind Farm project.

Meyer, R. and White, R., Big Spring, TX, November 8-12, 2010, to remove 10M tower at Duke Energy site.

Edgemon, T., Asheville, NC, November 12-13, 2010, to conduct a CRN unscheduled maintenance visit.

Land, G., Washington, DC, November 12-20, 2010, to attend Management Concepts Training.

Meyers, T., Champaign, IL, November 23-24, 2010, to visit SEBN site.

Edgemon, T., Asheville, NC, November 28, 2010, conduct an unscheduled maintenance visit at CRN site.

Galloway, K., and Sells, D., Huntsville, AL, November 29 – December 3, 2010, to make nine HCN maintenance visits.

French, B., Asheville, NC, December 6, 2010, to conduct an unscheduled maintenance visit at CRN site..

Burris, J. and Hamby, A., Montgomery, AL, December 6-10, 2010, to service HCN sites.

French, B. Asheville, NC, December 10, 2010, to conduct an unscheduled maintenance visit at CRN site.

Pendergrass, W., San Francisco, CA, December 12-15, 2010, to attend the American Geophysical Union annual fall meeting.

Myles, L. and Vogel, C., San Francisco, CA, , December 12-17, 2010, to attend the American Geophysical Union annual fall meeting.

Meyer, R. and White, R., Big Spring, TX, December 14-18, 2010, to remove equipment from Duke Energy site.

cc:

Abelquist, E.
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Bach, W. D.
Baldocchi, D.D.
Berlinrut, D.
Cunningham, D.C.
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Holland, M.
Hosker, R.P.
Jacobs, G.
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Michalsky, J.
Mills, D.
Mills, G.A.
Page, A.
Petty, R.
Radcliffe, L.
Riches, M.R.
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Roddye, L.C.M.
Wilson, K.B.
Womack, J.