AQRP Monthly Technical Report

PROJECT TITLE	Sources of Organic Particulate Matter in Houston: Evidence from DISCOVER-AQ data Modeling and Experiments	PROJECT #	14-024
PROJECT PARTICIPANTS	Lea Hildebrandt Ruiz and Ying Xu (The University of Texas at Austin) Greg Yarwood Bonyoung Koo (ENVIRON) Gookyoung Heo (University of California, Riverside)	DATE SUBMITTED	12/8/2014
REPORTING PERIOD	From: November 1, 2014 To: November 30, 2014	REPORT #	6

A Financial Status Report (FSR) and Invoice will be submitted separately from each of the Project Participants reflecting charges for this Reporting Period. I understand that the FSR and Invoice are due to the AQRP by the 15th of the month following the reporting period shown above.

Detailed Accomplishments by Task

Task 2. Environmental Chamber Experiments and Box Modeling

The UT Austin team received the valve and temperature controller from Aerodyne, which will be used and set up with the thermodenuder, as well as heating tapes and thermocouples for the thermodenuder. The team is now in the process of setting up the thermodenuder, and initial tests indicate that the temperature controller is functioning as expected. The heated injector was set up and tested in in trial runs. UT Austin also developed calibration curves for GC analysis of the IVOCs studied as part of this project.

Task 4. Photochemical Modeling

ENVIRON has determined the Weather Research and Forecast (WRF) model configuration to be used for simulations of the DISCOVER-AQ period based on model performance evaluation with different convection schemes, a sub-grid scale radiation treatment model, and domain feedback settings. Other model inputs (e.g., biogenic and fire emissions) for the modeling period are being developed.

Task 5. Discover-AQ data analysis

PM$_{2.5}$ filter samples have been cut and sent to Dessert Research Institute (DRI) for analysis of inorganic ions. Analysis of DISCOVER-AQ data will not be completed until the results of the DRI analysis are available.

Task 6. Positive matrix factorization

UT Austin has been working on positive matrix factorization of the organic aerosol mass spectra measured by the ACSM to better understand the OA source and composition in Conroe, TX. On December 3 the team met with experts at Aerodyne research to discuss in more detail the PMF methods including pre-averaging and error estimation of data exhibiting low signal-to-noise. The UT Austin team is now in the process of revising and refining the PMF analysis. Considering that the air sampled at Conroe was influenced by fires in Louisiana, we expect to be able to extract a "biomass burning" factor in addition to "oxygenated organic aerosol", representative of secondary organic aerosol, and "hydrocarbon-like organic aerosol", representative of fresher emissions.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments

Goals and Anticipated Issues for the Succeeding Reporting Period

Task 2. Environmental Chamber Experiments and Box Modeling

First trial experiments will be conducted in December 2014 and beginning of January 2015.

Task 6. Positive matrix factorization

PMF analysis will be continued.

Detailed Analysis of the Progress of the Task Order to Date

Progress to date has been appropriate. There have been delays, but overall we do not anticipate problems completing all project tasks by the end of the project period (June 30, 2015). We have not, yet, begun conducting environmental chamber experiments because it has taken longer than expected to develop the IVOC analysis procedures and to build the heated injector and the thermodenuder. We are now ready to start the environmental chamber experiments and intend to finish conducting and analyzing the experiments by the end of March, 2015.

Submitted to AQRP by: Lea Hildebrandt Ruiz

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