

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	10/8/2014
REPORTING PERIOD	From: September 8, 2014 To: October 8, 2014	REPORT #	4

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 0. Data Sharing

We have shared preliminary ACSM data and finalized CIMS data with the PIs of AQRP projects 14-009 and 14-029 (Drs. Robert Griffin and Rebecca Sheesley, respectively). Dr. Griffin shared finalized HR-AMS data with us, and Dr. Sheesley shared data on water soluble organic carbon (WSOC), organic carbon (OC), elemental carbon (EC) and black carbon (BC) measured at Conroe.

Task 2. Environmental Chamber Experiments and Box Modeling

ENVIRON worked together with Dr. Gookyoung Heo for implementing the VBS partitioning scheme in the SAPRC chamber simulation software.

Dr. Heo at UCR provided a training session on using the SAPRC software to the UT-Austin team on September 24, 2014. He also provided documents (e.g. a presentation file on using the SAPRC software and an unofficial user guide) and Excel macro files that can be useful to the UT-Austin researchers working on simulating chamber experiments with the SAPRC software. Dr. Heo clarified various technical issues related to using the 1.5 dimensional (1.5D) volatility basis set (VBS) approach to model secondary organic aerosol (SOA) formation under environmental chamber conditions based on the discussion with the UT-Austin team during his visit to Austin.

The UT Austin team developed thermal-desorption, gas chromatography and mass spectrometry methods (TD-GC/MS) for analyzing five target compounds (IVOCs). Samples of all target compounds were ordered and received. The heated injector used in these experiments was built and is now ready for trial experiments. A quote was obtained from Aerodyne Instruments for a controller which can be used to control the temperature and switch valves of the thermodenuder.

Task 4. Photochemical Modeling

ENVIRON initiated updating the 1.5-D VBS module for the latest version of CAMx (v6.10).

Task 5. Discover-AQ Data Analysis

Data analysis of the Discover-AQ data was continued. For example, data on the gas-phase concentrations of N_2O_5 , $ClNO_2$, Cl_2 and HCl was finalized. Additional data analysis is still in progress.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments

Dr. Heo needed to move to South Korea by early October to work as a deputy director at the National Institute of Environmental Research of the Republic of Korea. His moving to South Korea resulted in delays in developing a working version of the SAPRC software to model SOA formation under UT-Austin's environmental chamber conditions. He will wrap up developing a working version and deliver it with an associated document in a month so that the UT-Austin team can use the modified SAPRC software to model chamber experiments to be carried out for this project in the coming months.

The controller for the thermodenuder is more expensive than expected, exceeding \$5,000 and therefore requiring rebudgeting of the UT Austin budget. This is possible because other items (e.g. the body of the thermodenuder) were less expensive than expected, so overall there are still enough funds available from this project.

Goals and Anticipated Issues for the Succeeding Reporting Period

Purchased samples of IVOCs will be tested using proposed methods to verify the validity of these methods. Upon the verification, calibration curves for these compounds will be developed on the TD-GC/MS system prior to conducting laboratory chamber experiments.

Air sampling methods of the target compounds need to be developed in detail including the air flow rate, sampling time, and sampling pumps, based on expected concentrations of these compounds.

Environmental chamber experiments will commence in November, either shortly before or after the end of the next reporting period.

The controller for the thermodenuder will be purchased and hopefully received. The heated injector will be tested and installed in the chamber.

Detailed Analysis of the Progress of the Task Order to Date

Progress to date has been appropriate. Some changes have been made to the project timeline, but overall we do not anticipate problems completing all project tasks by the end of the project period (June 30, 2015).

Submitted to AQRP by: Lea Hildebrandt Ruiz

Principal Investigator: Lea Hildebrandt Ruiz