

# AQRP Monthly Technical Report

<b>PROJECT TITLE</b>	Quantifying the Emissions and Spatial/Temporal Distributions of Consumer Volatile Chemical Products (VCPs) in the Greater Houston Area	<b>PROJECT #</b>	22-020
<b>PROJECT PARTICIPANTS</b>	Dr. Yue Zhang, Alana Dederó, Yeaseul Kim, Zhenli Lai, Dr. Ying Qi, Hee Won Yim	<b>DATE SUBMITTED</b>	01/10/2023
<b>REPORTING PERIOD</b>	<b>From:</b> 12/1/2022 <b>To:</b> 12/31/2022	<b>REPORT #</b>	5

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 15<sup>th</sup> of the month following the reporting period shown above.

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## Detailed Accomplishments by Task for reporting period

1. Analyzing data from all instruments (Vocus, aerosol mass spectrometer, CO monitor, NO<sub>2</sub> monitor, soot monitor, scanning electric mobility sizer, ozone monitor, and other supporting devices) deployed in the fall around Houston

## Data Collected

1. We have collected full suite of data of the trace gases (Vocus), particle phase chemical composition (AMS), CO, NO<sub>2</sub>, O<sub>3</sub>, aerosol size distribution, GPS location through our deployment around Houston, Rockport, Corpus Christi, San Antonio, and Austin.
2. We have collected the above gas and particle information both during the day and at night, during weekends and weekdays, and on sunny, cloudy, and rainy days.
3. We also have collected Vocus data both in ammonia (NH<sub>4</sub><sup>+</sup>) mode and water cluster (H<sub>3</sub>O<sup>+</sup>) mode.

## Identify Any Problems or Issues Encountered and Proposed Solutions or Adjustments

N/A

## Goals and Anticipated Issues for the Succeeding Reporting Period

1. We successfully made 13 deployments for the AQRP project during our first deployment period.
2. We are currently analyzing the data to understand the VCP and aerosol concentration in the ambient environment in Houston, which we are heavily working on during the month of December.
3. Third goal is to understand whether the current VCP inventory matches the ambient data, which we are currently working with Dr. Qi Ying's lab.

## Detailed Analysis of the Progress of the Task Order to Date

We continue to analyze the data collected during the fall field measurement period. We have finished the quality control and preliminary analysis of most of the data from the instruments during our fall deployment.

Below are some of the analyzed results from the fall deployment. Figure 1 shows the time series data of all major instrument on October 30<sup>th</sup>. Figure 2 shows the mapped concentrations of various volatile consumer products for the deployment on October 30<sup>th</sup>.

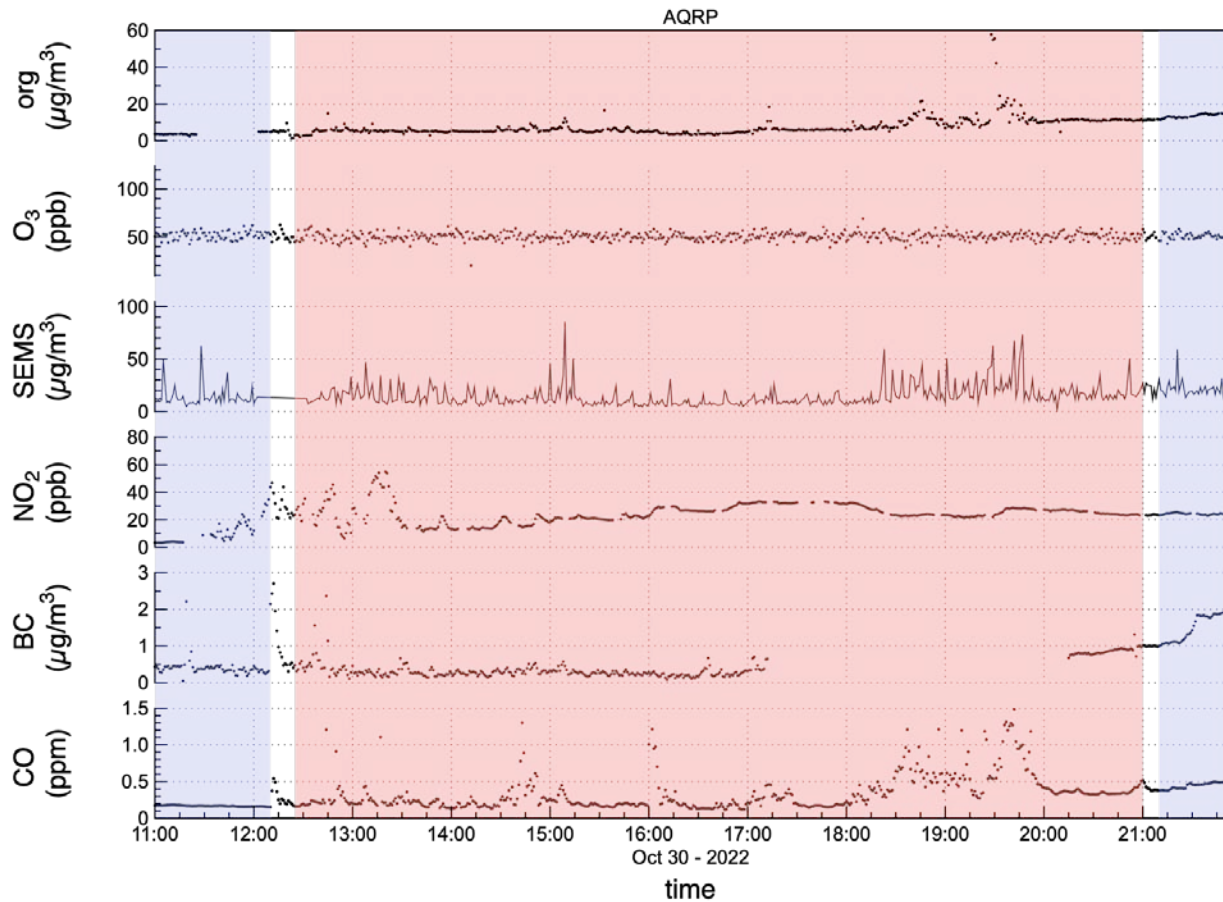


Figure 1. Time series data of major instruments during the fall deployment in Houston (October 30th as an example)

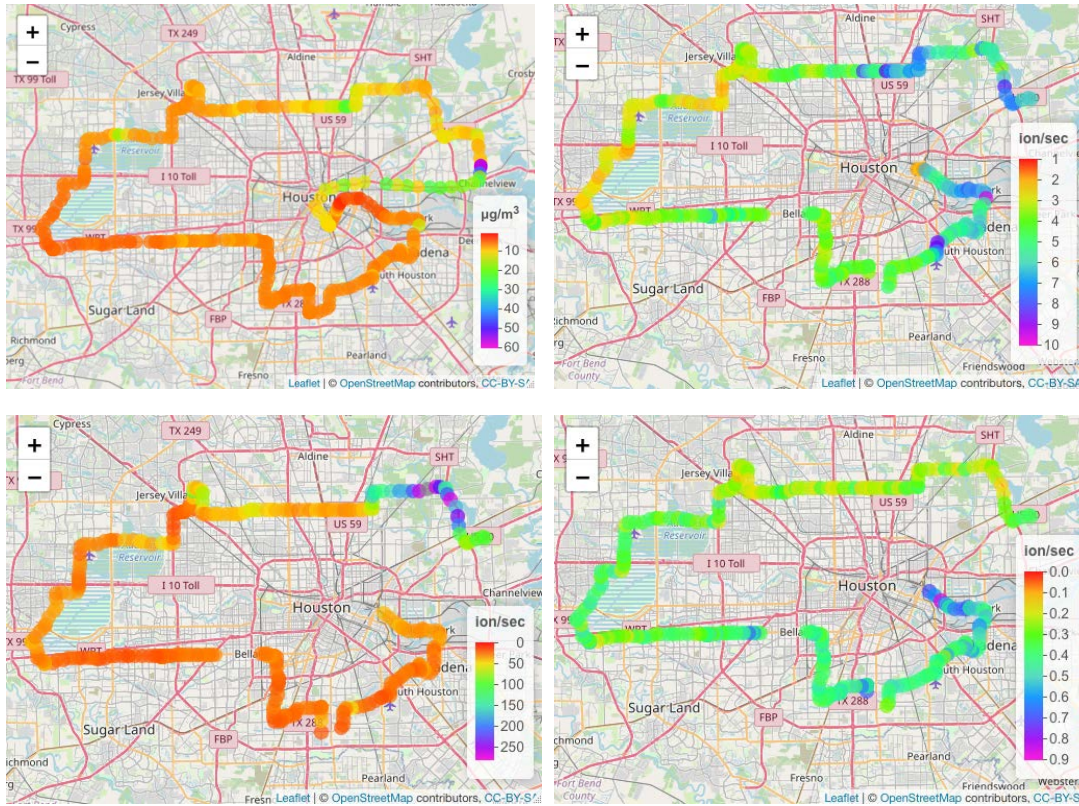


Figure 2. Concentration of aerosol mass concentration and three major VCPs sampled on October 30th in Houston. The upper left is total organic aerosol mass loading. The upper right plot is texanol. The lower left and lower right plots are monoterpenes and D4-siloxane.

Figures 1 and 2 above demonstrate the concentration of VCPs and other parameters measured during the circular mobile deployment. Figures 3-4 below demonstrate the east-west route of the mobile deployment data.

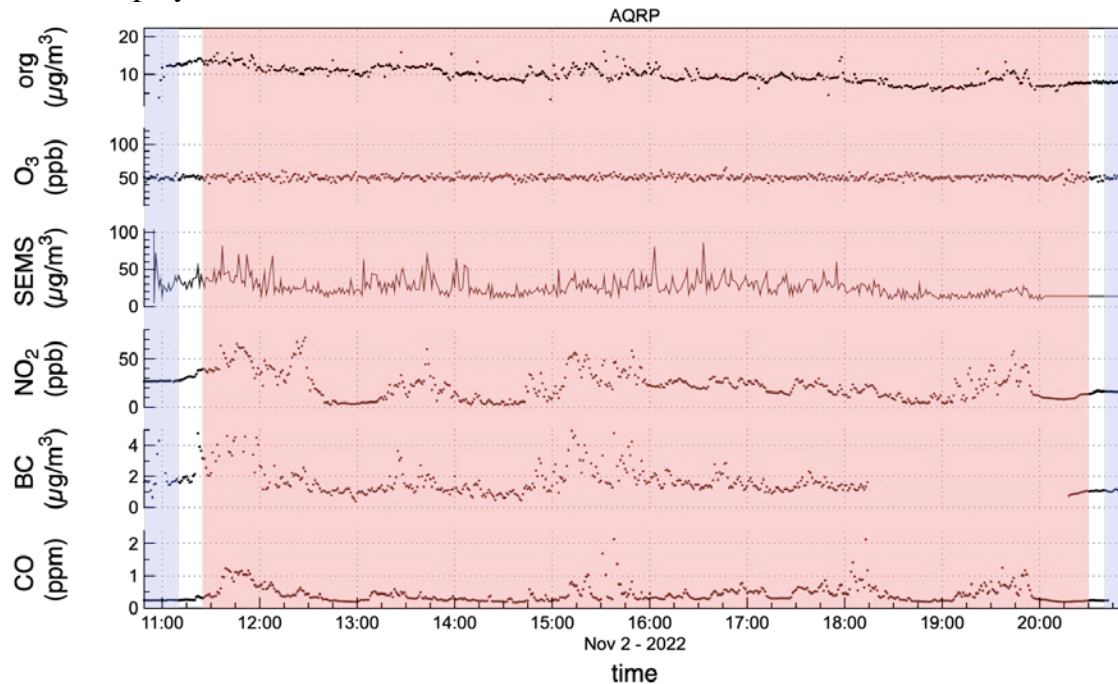


Figure 3. Time series data of major instruments during the fall deployment in Houston (Nov. 2<sup>nd</sup> as an example)

The times series data shows variations of aerosol mass concentration, ozone, particle mass, NO<sub>2</sub>, black carbon, and CO as the mobile lab is driving through Houston.

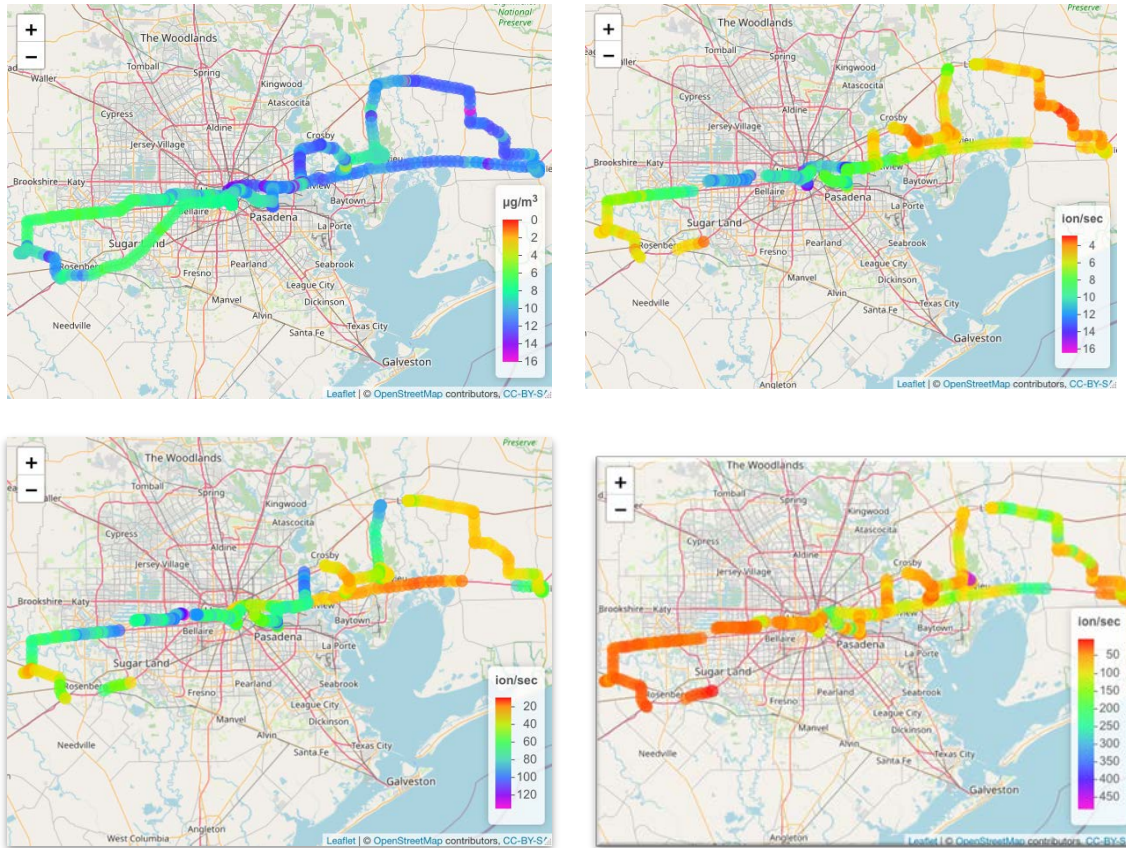


Figure 4. Concentration of aerosol mass concentration and three major VCPs sampled on November 2<sup>nd</sup> in Houston. The upper left is total organic aerosol mass loading. The upper right plot is texanol. The lower left and lower right plots are D5-siloxane and monoterpenes.

We are still working on analyzing and compiling all data from the fall campaign, and plan to write the above results into a scientific paper.

**Do you have any publications related to this project currently under development? If so, please provide a working title, and the journals you plan to submit to.**

- Yes       No

**Do you have any publications related to this project currently under review by a journal? If so, what is the working title and the journal name? Have you sent a copy of the article to your AQRP Project Manager and your TCEQ Liaison?**

- Yes       No

**Do you have any bibliographic publications (ie: publications that cite the project) related to this project that have been published? If so, please list the reference information. List all items for the lifetime of the project.**

Yes       No

**Do you have any presentations related to this project currently under development? If so, please provide working title, and the conference you plan to present it (this does not include presentations for the AQRP Workshop).**

Yes       No

**Do you have any presentations related to this project that have been published? If so, please list reference information. List all items for the lifetime of the project.**

Yes       No

**Have any personnel changes occurred that were not listed in the original proposal? If so, please include a detailed description of the personnel change(s) below.**

Yes       No

**Are any delays expected in the progress of the research? If so, please include a detailed description of the potential delay below.**

Yes       No

**Describe any possible concerns/issues (technical or non-technical) that AQRP should be made aware of.**

**Are you anticipating using all the available funds allocated to this project by the end date? If not, why and approximately what is the amount to be returned?**

Yes       No

The whole funding is expected to be used by the end of the project date.

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Submitted to AQRP by Dr. Yue Zhang