

AQRP Monthly Technical Report

PROJECT TITLE	Quantifying the Emissions and Spatial/Temporal Distributions of Consumer Volatile Chemical Products (VCPs) in the Greater Houston Area	PROJECT #	22-020
PROJECT PARTICIPANTS	Dr. Yue Zhang, Alana Dederó, Zhenli Lai, Dr. Ying Qi, Hee Won Yim	DATE SUBMITTED	12/10/2022
REPORTING PERIOD	From: 11/1/2022 To: 11/30/2022	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 for reporting period

1. Continued deploying our instrument (Vocus, aerosol mass spectrometer, CO monitor, NO₂ monitor, soot monitor, scanning electric mobility sizer, ozone monitor, and other supporting devices) around Houston
2. Deployed the instrument to Rockport, Corpus Christi, San Antonio, and Austin for comparison with the VCP concentration in Houston and for background concentration calculations.
3. Analyzing all instrument data

Data Collected

1. We have collected full suite of data of the trace gases (Vocus), particle phase chemical composition (AMS), CO, NO₂, O₃, 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 (NH₄⁺) mode and water cluster (H₃O⁺) mode.

Identify Any Problems or Issues Encountered and Proposed Solutions or Adjustments

N/A

Goals and Anticipated Issues for the Succeeding Reporting Period

1. Our first goal is to deliver 10-15 deployments for the AQRP project
2. We are currently analyzing the data to understand the VCP and aerosol concentration in the ambient environment in Houston
3. Third goal is to understand whether the current VCP inventory matches the ambient data.

Based on the current progress, our first goal is successfully finished. We successfully provided 13 deployments during the first half of this AQRP project. We are also analyzing the data during the field deployment to achieve the second and the third goal.

In addition, Dr. Ying Qi also created an online air pollution forecasting map to identify any gases and particulate pollution around the Houston area and in the United State.

The link is: <http://yingqi95616.ddns.net:8001/aqforecast/>

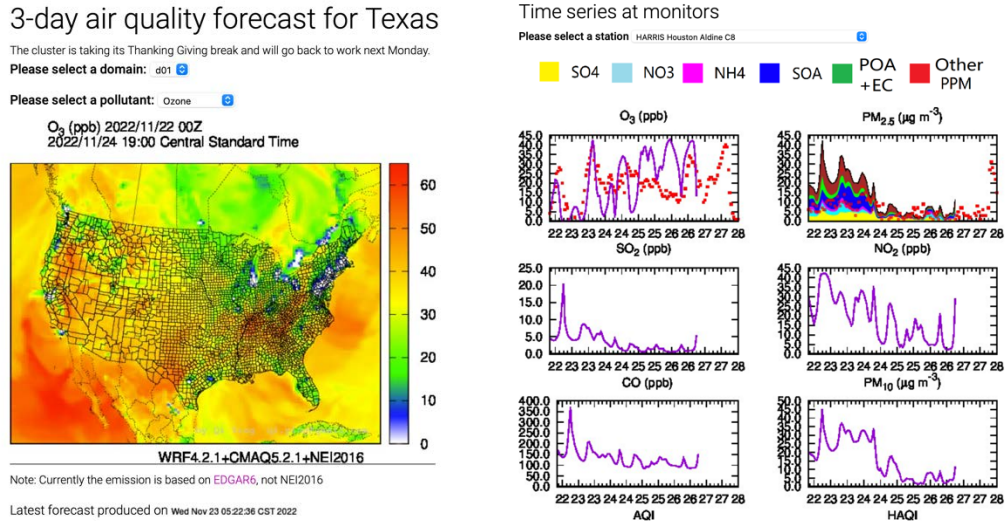


Figure 1. Air Quality Forecasting map of the United State and the Houston area

Detailed Analysis of the Progress of the Task Order to Date

We successfully completed the fall field measurement and performed some of the data analysis.

Figures 2 and 3 are the route maps we have conducted during this field study. We are working on analyzing the full suite of data since the deployment finished.

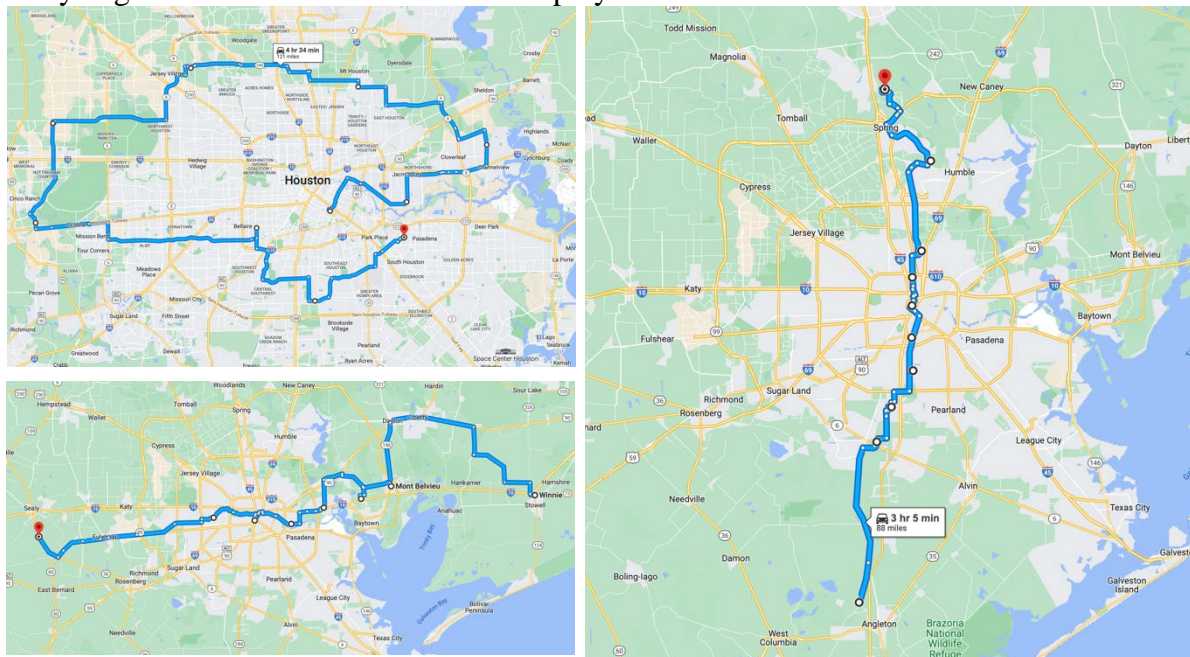


Figure 2. Deployment map during the field project in November 2022 (Houston route)

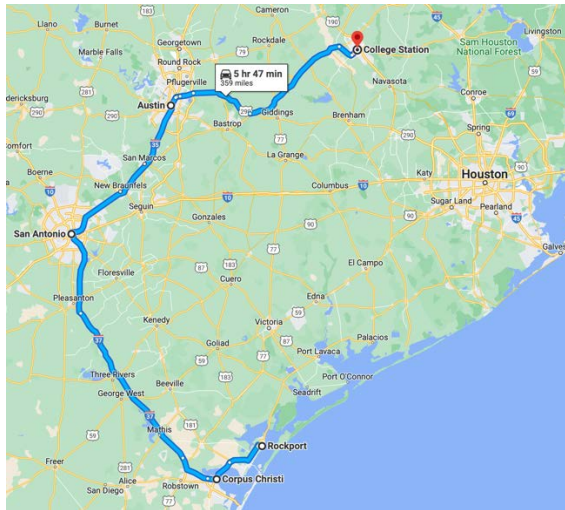


Figure 3. Deployment map during the field project in November 2022 (Rockport, Corpus Christi, San Antonio, and Austin route)

So far, we have completed all the calibration analysis of AMS and Vocus. We have identified more than 3000 peaks in the mass spectra of Vocus software and calculated the mass concentrations of the aerosol species. Below is the preliminary data of the aerosol mass concentration with other measurement performed during the whole deployment.

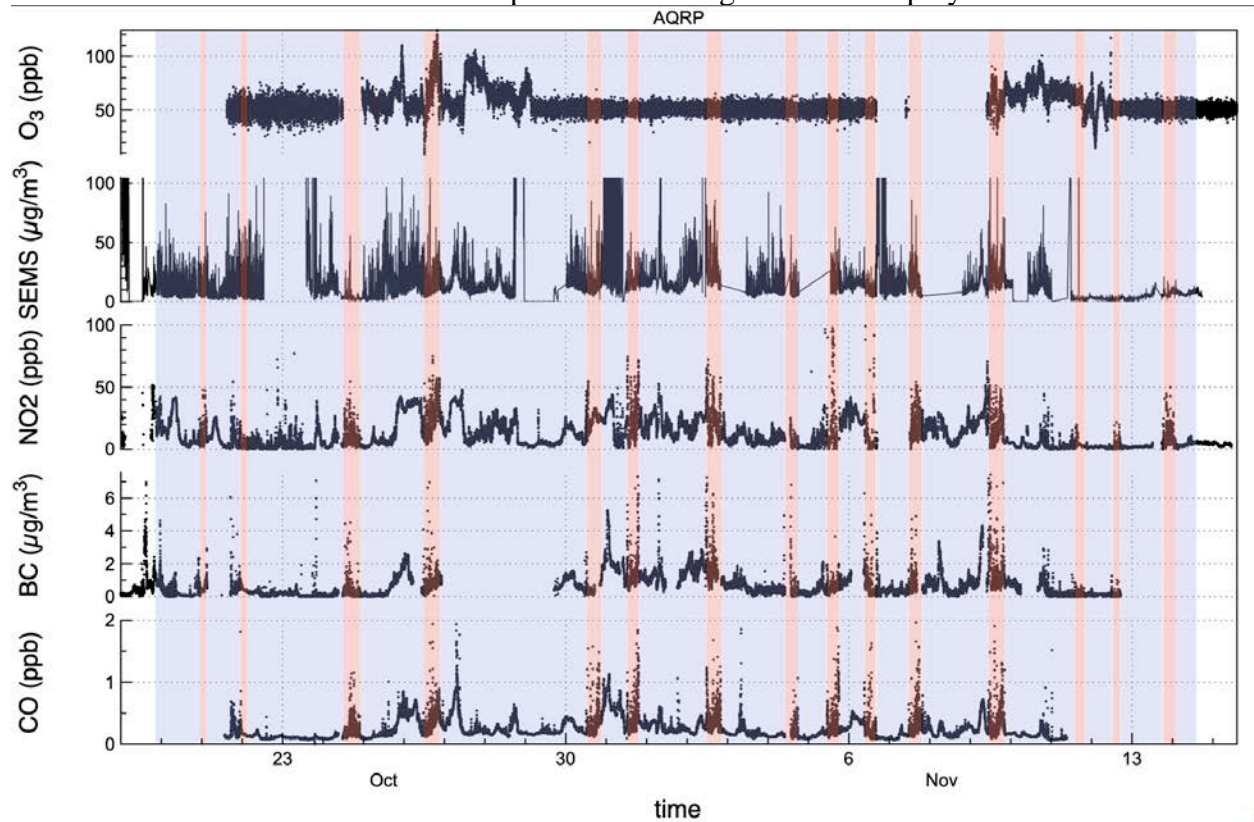


Figure 4. Aerosol Mass, Ozone, CO, NO₂, and black carbon measurement during the whole deployment. The purple shaded areas were when vehicles are parked and the orange shaded areas were when instruments are deployed in motion.

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.

Submitted to AQRP by Dr. Yue Zhang