

AQRP Monthly Technical Report

PROJECT TITLE	Characterization of Corpus Christi and San Antonio Air Quality During the 2020 Ozone Season	PROJECT #	20-003
PROJECT PARTICIPANTS	Robert Griffin, Rice James Flynn and Yuxuan Wang, UH Rebecca Sheesley and Sascha Usenko, Baylor	DATE SUBMITTED	9 July 2021
REPORTING PERIOD	From: 1 June 2021 To: 30 June 2021	REPORT #	11

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

All work performed during the current reporting period focused on Task #3, data analysis, as described in the Preliminary Analysis section below. Task #3 also includes three-dimensional (3D) modeling. Over the reporting period, actions for Task #3 related to 3D modeling include finishing the multi-nested simulations of WRF-Chem for Corpus Christi and San Antonio during the campaign period (April and May 2021), with the finest horizontal resolution of 1 km x 1 km for these two urban centers; evaluating modeled meteorological (temperature, relative humidity and wind speed/direction) and trace gas mixing ratios (ozone, nitrogen oxides and sulfur dioxide) with respect to observations from CAMS sites located within the domain; and archiving model output.

Preliminary Analysis

Data collected during the preceding two reporting periods underwent ‘field-level’ analysis, which is aimed at ensuring appropriate operation of the instrumentation and serving as an in situ reality check. Over the course of the current reporting period, these data underwent higher level quality assurance/quality control efforts. This includes:

- Finalizing the calculation of the uncertainties associated with each volatile organic compound (VOC) measurement;
- Finalizing the calculation of the 5-min averaged minimum detection limits for each VOC;
- Correcting the particle scattering coefficient data for truncation error and span adjustment;
- Applying neutralization-dependent particle collection efficiency and time-dependent carbon dioxide-subtraction to the entire aerosol mass spectrometer dataset;
- Processing, finalizing and applying multi-point calibration data for trace gas analysis;
- Correcting the baseline for trace gas measurements; and

- Reprocessing ceilometer data to include full 24-hr sampling periods.

The result is time series of aerosol composition, concentration and properties; trace gas mixing ratios; and meteorological parameters. These time series have been shared among the project team for further analysis to be conducted in the remaining two months of the project.

Data Collected

Seven weeks' worth of air quality measurements including particle size, composition, properties and concentration; VOC composition and concentration; trace gas concentration; and meteorological parameters has been collected. During mobile measurements, GPS position data also were collected to allow assigning specific pollutant measurements at a given time to a given point in space.

Identify Any Problems or Issues Encountered and Proposed Solutions or Adjustments

As referenced in the previous monthly reports, delays in finalizing task orders and issues associated with the COVID pandemic necessitated shifting the field work from fall 2020 to spring 2021. With approval from the AQRP, we adjusted and added to the scientific questions to be addressed using our field data analysis and modeling. Note that a few individuals from the Baylor group were forced to quarantine due to potential exposure to COVID-19. This resulted in some delays, but the group worked diligently to catch up. There also were delays caused by the winter storm that hit Texas in mid-February, preventing access to laboratories for essentially a week. The teams again worked hard to make up for that lost time. Baylor also experienced delays in receiving equipment and supplies; the most noticeable were the tower (3 weeks delay), TAPs (2 weeks delay), and PTR-MS heated sampling line (3 weeks delay). These delays were a result of COVID-related logistical hurdles (based on personnel communication with vendors). The team members worked extremely hard to be ready to deploy to the field as of April 1, which was done successfully. No new issues were encountered during the current reporting period.

Goals and Anticipated Issues for the Succeeding Reporting Period

Model: All model output will be compared with the field campaign data.

Field: In-depth analysis of finalized data will continue.

No issues are anticipated.

Detailed Analysis of the Progress of the Task Order to Date

We believe that our progress on the project has been appropriate. Task #3 (data analysis) will continue through the end of the project.

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

Introduction to TRACER-MAP and the Mobile Air Quality Laboratory (MAQL2), with a case study from the Texas coast 2021, presentation at the DOE ARM meeting.

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

Beyond those reported previously, no further delays are expected.

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

None not addressed previously.

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

Submitted to AQRP by Robert J. Griffin