

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	10 November 2020
REPORTING PERIOD	From: 1 October 2020 To: 31 October 2020	REPORT #	3

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

Work performed in this month was related to Task #1, campaign preparation.

The team has continued training of new graduate students and research staff and preparation of instrumentation and the mobile air quality laboratory. Specifically, the Baylor team has begun planning for the required mobile facility suspension retrofit. All instruments continue to undergo checks, maintenance and calibration. The Rice team has begun collection of a test data set outside their laboratory in Houston to allow new staff to learn data analysis procedures.

Additional work was performed for Task #3, data analysis. The University of Houston modeling team set up the WRF-GC model at a 9 km x 9 km resolution (**Figure 1**) that will serve as the outmost model domain and provide boundary conditions for the planned 1 km x 1 km resolution simulation over the field campaign region (e.g., Corpus Christi). Model physics options tested in this reporting period are listed in **Table 1**.

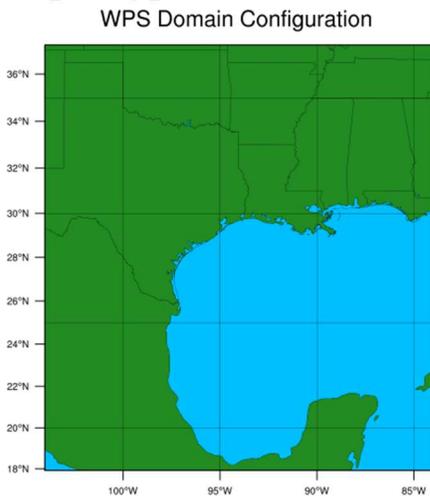


Figure 1. The outmost WRF-GC modeling domain at 9 km x 9 km.

Table 1. WRF-GC configuration tested in this reporting period.

Configuration	Setting	Scheme
PBL scheme	bl_pbl_physics = 1	YSU
Surface layer	sf_sfclay_physics = 1	Monin-Obukhov Similarity
Land surface	sf_surface_physics = 4	Noah-MP (Multi-physics) Land Surface Model
Microphysics	mp_physics = 10	Morrison 2-moment
Shortwave radiation	ra_sw_physics = 4	RRTMG
Longwave radiation	ra_lw_physics = 4	RRTMG
Cumulus parametrization	cu_physics = 16	New Tiedtke
Initial & boundary conditions	MOZART	
Resolution	9km * 9 km	
Model version	Alpha	

Initial and boundary conditions (IC/BC) for the outmost WRF-GC domain can be provided by the MOZART global model (default) or the GEOS-Chem global model. We used the default MOZART boundary conditions in this reporting period. **Figure 2** shows hourly results of surface ozone of April 27, 2017 simulated by WRF-GC after a 2-day spin-up (April 25 and 26, 2017). 2017 is the latest year of available MOZART boundary conditions. The simulation day was randomly chosen. We were surprised by high ozone over the Gulf of Mexico predicted by the model. Upon checking, we found the high ozone originated from the MOZART IC/BC conditions. We suspect the high ozone in the MOZART model was caused by Central American fire emissions, which peak in April and May each year. We will test GEOS-Chem boundary conditions in the next reporting period and check whether the high ozone is model dependent.

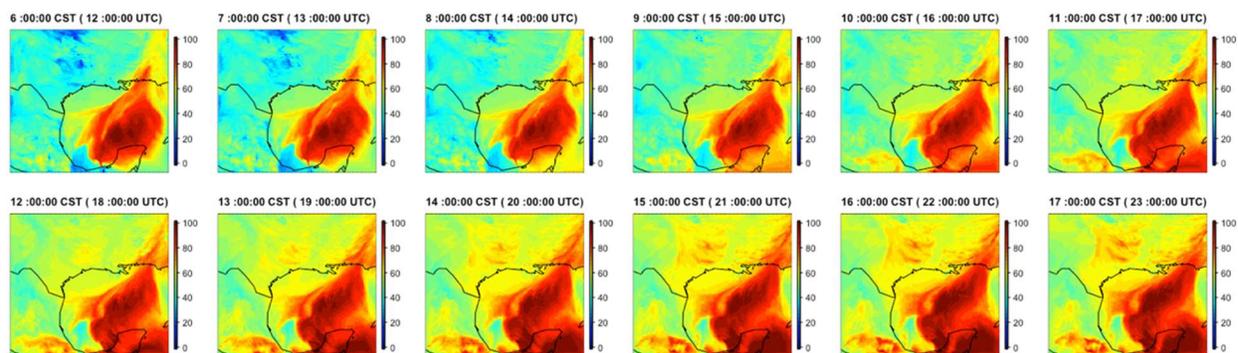


Figure 2. Hourly model outputs of surface ozone on April 27, 2017.

Preliminary Analysis

None yet

Data Collected

None yet

Identify Any Problems or Issues Encountered and Proposed Solutions or Adjustments

As referenced in the first two monthly reports, delays in finalizing task orders and issues associated with the COVID pandemic have necessitated shifting the field work from fall 2020 to spring 2021. With approval from the AQRP, we have adjusted and added to the scientific questions to be addressed using our field data analysis and modeling.

Goals and Anticipated Issues for the Succeeding Reporting Period

Model: Continue generation of appropriate input files for three-dimensional modeling efforts, continued training of researchers on use of the three-dimensional model

Field: Continue preparation of mobile air quality laboratory, continue assessment of equipment maintenance needs, continue training of researchers on equipment usage (including generation of HR-ToF-AMS test data for training), and continue assessment of locations for deployment (in light of the new statement of work) and travel planning.

Detailed Analysis of the Progress of the Task Order to Date

Given the late start and the approved change in project field work, we believe that our progress on the project has been appropriate.

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

See response above regarding problems encountered. This is more a shift in timing as it will not impact our ability to complete the project by the scheduled end date.

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