AQRP Monthly Technical Report

PROJECT TITLE	Source-sector NOx emissions analysis with sub-kilometer scale airborne observations in Houston during TRACER-AQ	**PROJECT #**	22-023
PROJECT PARTICIPANTS	George Washington University Ramboll	**DATE SUBMITTED**	1/10/2023
REPORTING PERIOD	**From:** December 1, 2022 **To:** December 31, 2022	**REPORT #**	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 15th of the month following the reporting period shown above.

Detailed Accomplishments by Task for reporting period

Task 1: Simulate NO_2, HCHO, O_3 at 444 × 444 m^2 spatial resolution using WRF-CAMx
The emissions for the CAMx simulation continue to be processed. This includes processing the CEMS data, line source data, biogenic emissions data. The group also decided which emission source sectors will be tagged in the CAMx simulation.

Task 2. Process the GCAS measurements
The native files of the GCAS data are being re-processed to better account for missing data. New files with very minor adjustments should be available in January 2023.

Task 3. Process the satellite NO_2 data
The GCAS NO_2 data has been qualitatively compared to operational TROPOMI NO_2 data now that both are on the same grid.

Code has been optimized to ingest model simulation output. Waiting on model simulation in order to re-process the satellite air mass factor.

Task 4. Calculating NO_X from NO_2 airshed measurements
Waiting on re-formatted GCAS data (See Task 2).

Task 5. Comparison of NO_2, HCHO, O_3 between model, aircraft, and satellite
Task 5 has not yet been initiated.

Task 6. Use of machine learning to estimate emission factors for individual sectors
Task 6 has not yet been initiated.

Preliminary Analysis
None.

Data Collected

None.

Identify Any Problems or Issues Encountered and Proposed Solutions or Adjustments
Project approvals occurred later than anticipated. Development of the WRF-CAMx simulation is still delayed by approximately one month. Model simulation output now expected in early February 2023 instead of end of December 2022. Effort for Tasks 3 – 6 will be back-loaded, and we do not anticipate any end-of-project delays.

Goals and Anticipated Issues for the Succeeding Reporting Period
Continue developing WRF-CAMx modeling platform by processing line-source (on-road mobile, rail and shipping) and EGU emissions. A full set of emissions is expected in mid-January. We anticipate the CAMx simulation beginning in the last week of January or first week of February, with some model output expected in mid-February.

Re-processed GCAS data will be available and Task 4 will restart.

We expect to engage in Tasks 3 – 6 in earnest starting in February 2023.

Detailed Analysis of the Progress of the Task Order to Date
None.

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.
None.

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 Daniel Goldberg

Principal Investigator Daniel Goldberg