# AQRP Monthly Technical Report

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| **PROJECT TITLE** | Improving WRF representation of coastal, marine, and residual boundary layers and quantifying the effects on ozone prediction | **PROJECT #** | 24-021 |
| **PROJECT PARTICIPANTS** | Yuxuan Wang, James Flynn | **DATE SUBMITTED** | 05/10/2025 |
| **REPORTING PERIOD** | **From:** 04/01/2025<br>**To:** 04/31/2025 | **REPORT #** | 8 |

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.

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**Detailed Accomplishments by Task for reporting period**

**Task 5:**

- Submitted Task 5 Report on April 15.

**Task 6:**

- Prepared the Domain for CAMx.

We have set up three nested domains for the Comprehensive Air Quality Model with extensions (CAMx) that cover the contiguous United States, Southeast Texas, and the Houston-Galveston-Brazoria (HGB) area, as shown in **Figure 1**a. The domains are aligned with the Weather Research and Forecasting (WRF) domains but have smaller spatial coverage. The horizontal resolution of the outermost domain (d01), the inner domain (d02), and the innermost domain (d03) is 12 km × 12 km, 4 km × 4 km, and 1.33 km × 1.33 km, respectively. All the domains have identical vertical resolutions with 30 vertical levels from the surface to ~100 hPa. The number of grid cells in the domains d01, d02, and d03 is 372 × 222, 180 × 150, and 216 × 180, respectively.

We are currently preparing the emission input files for the CAMx simulations. Emissions will be based on the 2019 State Implementation Plan (SIP) modeling platform provided by the Texas Commission on Environmental Quality (TCEQ). For domains d01 and d02, the emissions inventories are spatially cropped to match the respective model domains. For domain d03 (**Figure 1**b), emissions are being regridded from the 4 km inventory following the approach described in Li et al. (2023).

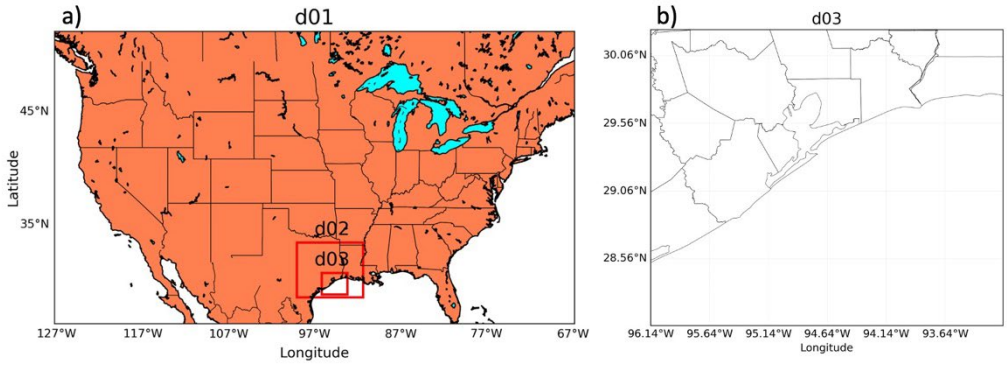


**Figure 1** a) CAMx nested model domains, b) the finest domain covering the HGB region.

References:

Li, W., Wang, Y., Liu, X., Soleimanian, E., Griggs, T., Flynn, J., and Walter, P.: Understanding offshore high-ozone events during TRACER-AQ 2021 in Houston: Insights from WRF-CAMx photochemical modeling, Atmos. Chem. Phys., 23, 13685–13699, https://doi.org/10.5194/acp-23-13685-2023, 2023

**Data Collected**

None

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

None

**Goals and Anticipated Issues for the Succeeding Reporting Period**

Goals: Continue with Task 6. Run the CAMx model with improved meteorology.
Anticipated Issues: None.

**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.**

**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**

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Submitted to AQRP by
Yuxuan Wang