

# AQRP Monthly Technical Report

<b>PROJECT TITLE</b>	Refining ammonia emissions using inverse modeling and satellite observations over Texas and the Gulf of Mexico and investigating its effect on fine particulate matter	<b>PROJECT #</b>	22-019
<b>PROJECT PARTICIPANTS</b>	University of Houston	<b>DATE SUBMITTED</b>	3/10/23
<b>REPORTING PERIOD</b>	<b>From:</b> Feb. 01, 2023 <b>To:</b> Feb. 28, 2023	<b>REPORT #</b>	6

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 15<sup>th</sup> of the month following the reporting period shown above.

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## Detailed Accomplishments by Task for reporting period

### Task1: Preparation of comprehensive satellite, in situ, and modeling data for the iterative Finite Difference Mass Balance (iFDMB) method:

No activities during the reporting period.

### Task2: Development of the Reduced-Complexity CMAQ Model (RCCM) for NH<sub>3</sub> and refinement of NH<sub>3</sub> emissions using iFDMB with the combination of CMAQ model and CrIS satellite observations:

The UH-AQF modeling has continued working on producing offline files over the modeling domain. We faced an issue while generating the offline files. The UH-AQF modeling resolved the issue; however, we had to restart running the CMAQ model to create the offline files. The issue was unexpected, but such an issue can happen during running CMAQ. Generating Offline files is an important part of running RCCM and iFDMB. As it was mentioned, offline files contain sulfate (SO<sub>4</sub><sup>-2</sup>), nitric acid (HNO<sub>3</sub>), nitrate (NO<sub>3</sub><sup>-</sup>), chloride (Cl), sodium (NA), and hydrochloric acid (HCl) concentrations in all times steps. We implemented a CMAQ model that can produce files containing the concentration of species of interest in all time steps as offline files.

### Task3: Investigation of PM<sub>2.5</sub> concentrations using the updated emission inventory:

Our team has reviewed the literature to improve our understanding of underline chemistry related to inorganic PM<sub>2.5</sub>.

### **Preliminary Analysis**

None during the reporting period.

**Data Collected**

None during the reporting period.

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

We had an issue regarding running the CMAQ model to generate offline files. The issue came from the subroutine of ZADVYPPM for failing vertical advection at 090000 with an advection step of 001200 HHMMSS. It happens because the max iterations to calculate it is more than 30. The solution to fix the issue is to reduce CTM\_MAXSYNC value. We set both CTM\_MAXSYNC and CTM\_MINSYNC equal 300, and the issue was resolved.

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

UH-AQF team will continue running the iFDDB over Texas and the Gulf of Mexico.

**Detailed Analysis of the Progress of the Task Order to Date**

None during the reporting period.

**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 AQR 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 AQR 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  
Yunsoo Choi