

# 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>	1/15/23
<b>REPORTING PERIOD</b>	<b>From:</b> Dec. 01, 2022 <b>To:</b> Dec. 31, 2022	<b>REPORT #</b>	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 15<sup>th</sup> of the month following the reporting period shown above.

## Detailed Accomplishments by Task for the reporting period

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

The UH-AQF modeling team performed Quality Control (QC) for NH<sub>3</sub> satellite data. Our team has reviewed the literature and has chosen the quality flag above 3 for the satellite data. The modeling team has had some discussion and literature search on whether to consider both daytime and nighttime NH<sub>3</sub> satellite data or only include daytime data. Preliminary standard CMAQ runs for the modeling period were performed as well.

### 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 team has worked on implementing and adjusting RCCM developed by Momeni et al. (2022) in Texas. To apply RCCM for iFDMB, offline files, which contain hourly sulfate (SO<sup>-2</sup><sub>4</sub>), nitric acid (HNO<sub>3</sub>), nitrate (NO<sup>-3</sup>), chloride (Cl), sodium (NA), hydrochloric acid (HCl) concentrations are required. Generating offline files over Texas and the Gulf of Mexico has started for 2019. Furthermore, the iFDMB setup for the Texas domain has been adjusted as well.

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

No activities during the reporting period.

### **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**

None during the reporting period.

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

UH-AQF team will continue running the iFDMB 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 AQR 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**

---

Submitted to AQRP by  
Yunsoo Choi