AQRP Monthly Technical Report

PROJECT TITLE	Refining ammonia emissions using inverse modeling and satellite observations over Texas and the Gulf of Mexico and investigating its effect on fine particulate matter	**PROJECT #**	22-019
PROJECT PARTICIPANTS	University of Houston	**DATE SUBMITTED**	2/10/23
REPORTING PERIOD	**From:** Jan. 01, 2023 **To:** Jan. 31, 2023	**REPORT #**	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 15th of the month following the reporting period shown above.

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:
The UH-AQF modeling has obtained biweekly ammonia data from Ammonia Monitoring Network (AMoN) and has prepared the data for preliminary ammonia concentration evaluation. To do so, we wrote a python code to prepare the observation data and to find the corresponding grid points in the modeling domain for all stations.

Task2: Development of the Reduced-Complexity CMAQ Model (RCCM) for NH_3 and refinement of NH_3 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. Offline files contain hourly sulfate (SO_4^{-2}), nitric acid (HNO_3), nitrate (NO_3^-), chloride (Cl), sodium (Na), hydrochloric acid (HCl) concentration in all times steps required for RCCM process. To produce the offline files, we implement a CMAQ model, which can write the concentration of species of interest in all time steps in separate files based on time.

Task3: Investigation of $PM_{2.5}$ concentrations using the updated emission inventory:
No activities during the reporting period.

Preliminary Analysis
None during the reporting period.

Data Collected

Biweekly ammonia data from Ammonia Monitoring Network (AMoN) for 2019 over the modeling domain.

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 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**

Submitted to AQRP by
Yunsoo Choi