

Monthly Technical Report

PROJECT TITLE	Constraining NO _x Emissions Using Satellite NO ₂ Measurements Over The Southeast Texas	PROJECT #	14-014
PROJECT PARTICIPANTS	University of Houston	DATE SUBMITTED	2/8/2015
REPORTING PERIOD	From: January 27, 2015 To: January 31, 2015	REPORT #	1

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

1. Assembled the work team and assigned the tasks
2. WRF simulation and implementation of objective analysis (OA).

Preliminary Analysis

OA is a technique to improve meteorological simulation through assimilating direct measurements. We have generated the necessary input for OA from several data streams as described in the SOW, i.e., NPN, RAOB, METAR, CAP and CAMS (abbreviation seen SOW). We have tested a number of settings in OA and WRF, such as OA frequency (hourly or 3-hourly), grid nudging option, and different cumulus schemes. Our preliminary findings are: 1) the winds from hourly OA and 3-hourly OA are quite similar, although statistically hourly OA slightly outperforms 3-hourly OA in terms of winds and temperature. 2) Grid nudging greatly impacts the simulation. Though nudging on all domains show better winds generally, but sometimes nudging at inner domain can suppress important meteorological features such as the development of bay-breeze or sea-breeze when such features are absent in input analysis data. 3) Cumulus schemes are responsible in developing vertical convection cells in model. The Grell-Freitas (GF) scheme tends to generate more convective cells than Kain-Fritsch (KF) scheme at similar atmospheric conditions. Since the model frequently has more moisture than reality, using GF scheme can generate unwanted convections which may interrupt flow fields. As a result, the transport of pollutants may be distorted. Therefore, we will use KF in our simulation.

Data Collected

CAMS data and MADIS data, meteorological and chemical observations for Texas; meteorological measurements for US through MADIS.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments

No problems or issues were encountered during the reporting period.

Goals and Anticipated Issues for the Succeeding Reporting Period

UH will test a few more WRF cases before determining the best WRF configurations. In the meantime, we will work on the emission inventories and generate necessary files ready for CMAQ model. We do not expect significant issues in the next reporting period.

Detailed Analysis of the Progress of the Task Order to Date

The completion of each of the project tasks and the draft and final project reports are expected to be on the schedule from the Work Plan schedule.

Submitted to AQRP by: Yunsoo Choi

Principal Investigator: Yunsoo Choi