

AQRP Monthly Technical Report

PROJECT TITLE	Analysis of Airborne Formaldehyde Data Over Houston Texas Acquired During the 2013 DISCOVER-AQ and SEAC ⁴ RS Campaigns	PROJECT #	14-002
PROJECT PARTICIPANTS	Alan Fried, Christopher P. Loughner, and Ken Pickering	DATE SUBMITTED	4/9/2015
REPORTING PERIOD	From: March 1, 2015 To: March 31, 2015	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

We completed running the CMAQ 1 km horizontal resolution domain with the improved WRF simulation and analyzed the results with surface observations. We are in the process of comparing the 1 km CMAQ runs to P3 HCHO observations, and this will be the subject of next month's report.

Preliminary Analysis

As shown in previous reports, the new WRF simulation improved the representation of sea and bay breezes and the CMAQ simulation with a horizontal resolution of 4 km. We see that the updated 1 and 4 km CMAQ model simulations have low biases compared to P-3B observed formaldehyde, especially on September 25 (Figures 1-3).

The new 1 km CMAQ simulation is in better agreement with the observations of maximum 8 hour average ozone concentrations than the original 4 km simulation (Figures 4-6). For September 24, the new CMAQ simulation is in agreement while the original CMAQ simulation has a high bias compared to observations (Figure 4). For September 26, both the new and original CMAQ simulations accurately capture the magnitude and spatial distribution of ozone concentrations throughout the Houston metropolitan area (Figure 6). Ongoing work is comparing the new 1km CMAQ simulation with P-3B observations for HCHO.

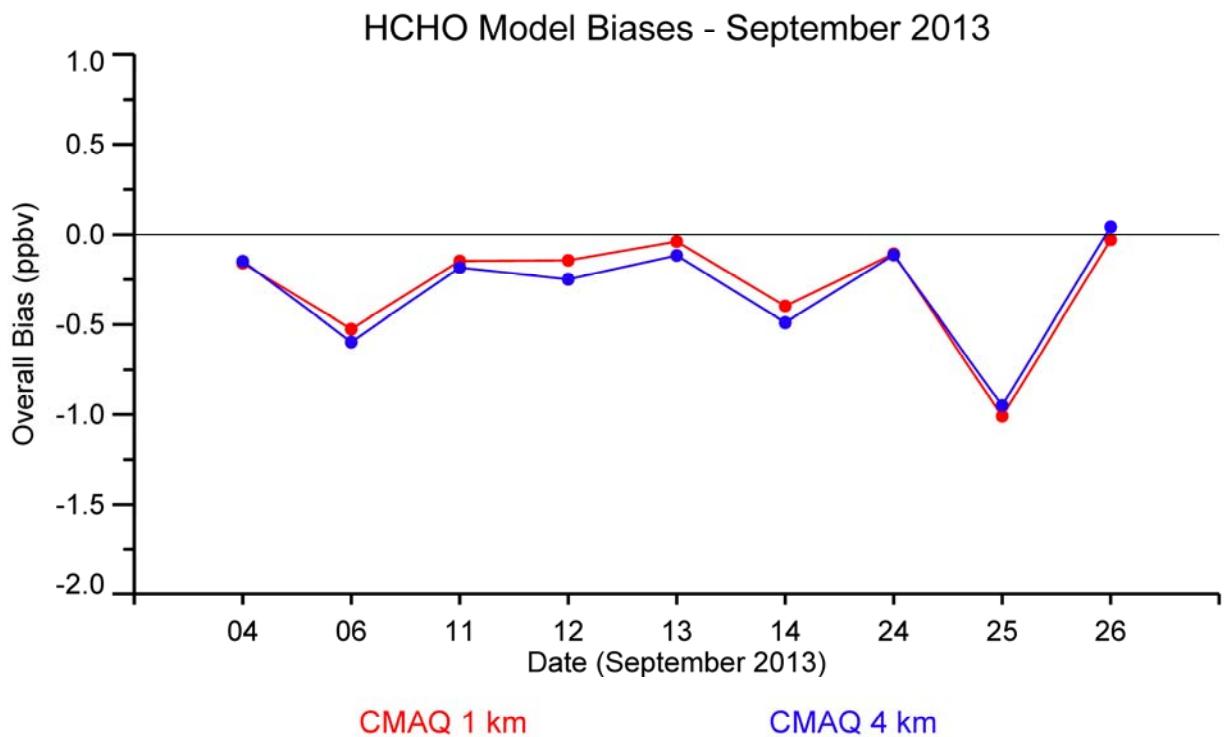


Figure 1: Average HCHO model bias from the new 1 and 4 km CMAQ simulations as compared to P-3B observations on each flight day.

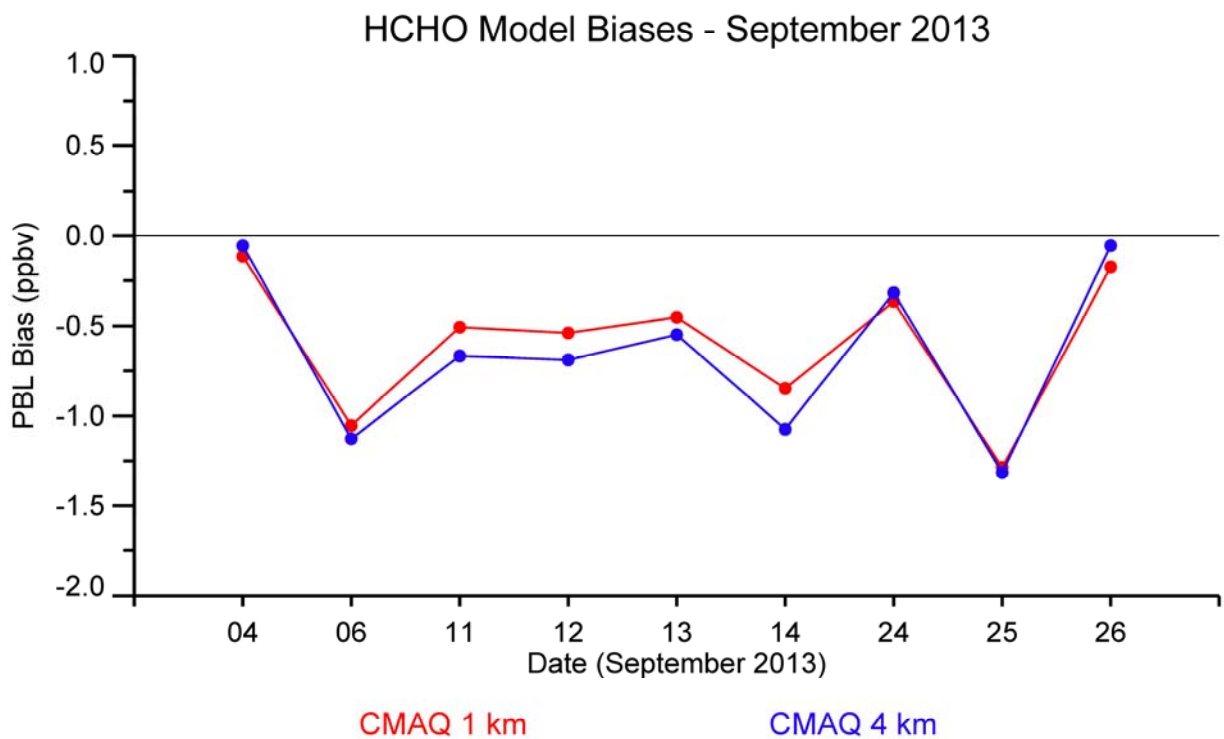


Figure 2: Average HCHO model bias from the new 1 and 4 km CMAQ simulations as compared to P-3B observations on each flight day within the PBL.

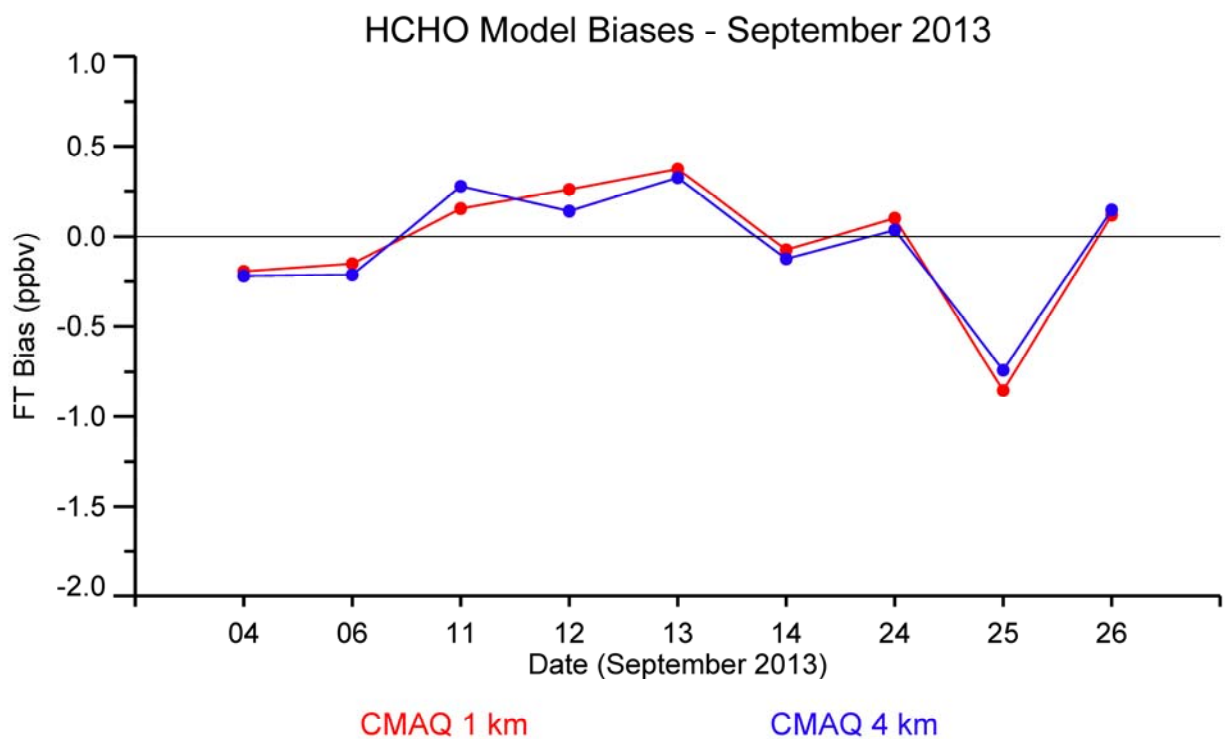


Figure 3: Average HCHO model bias from the new 1 and 4 km CMAQ simulations as compared to P-3B observations on each flight day within the free troposphere.

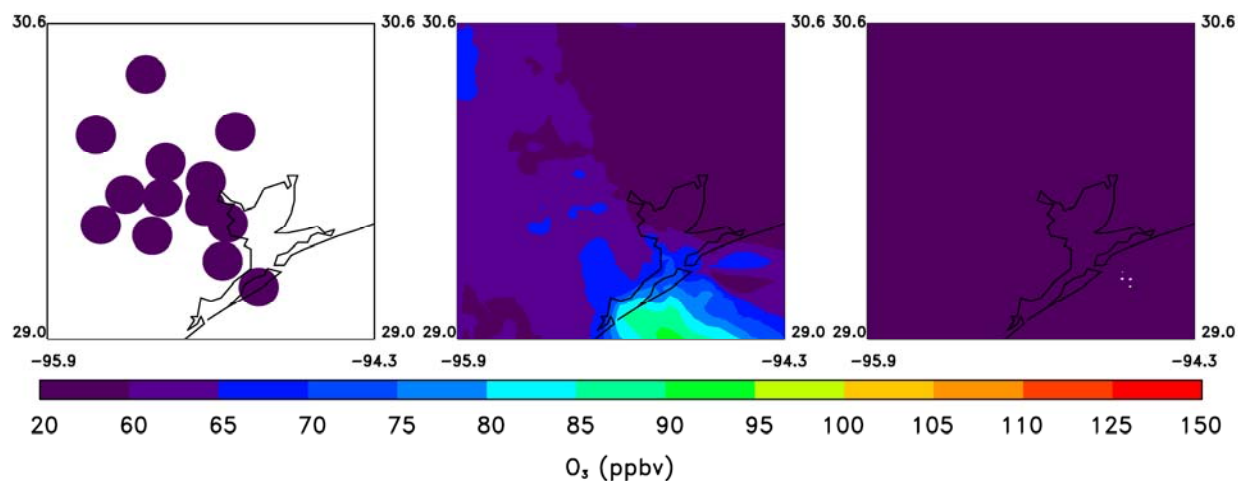


Figure 4: Eight-hour average ozone maximum from observations (left), original 4 km CMAQ simulation (middle), and new 1 km CMAQ simulation on 24 September 2013.

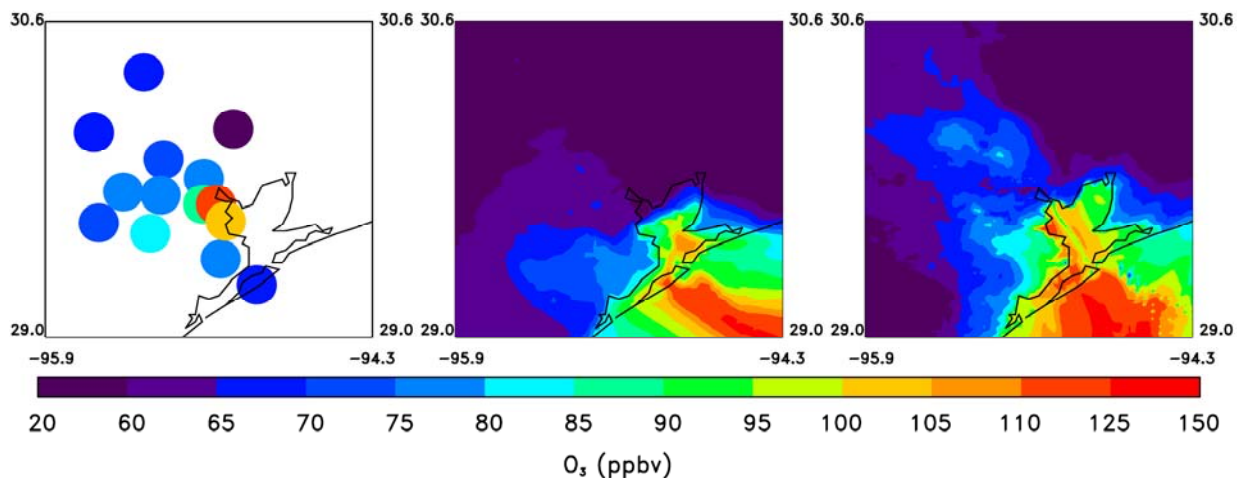


Figure 5: Eight-hour average ozone maximum from observations (left), original 4 km CMAQ simulation (middle), and new 1 km CMAQ simulation on 25 September 2013.

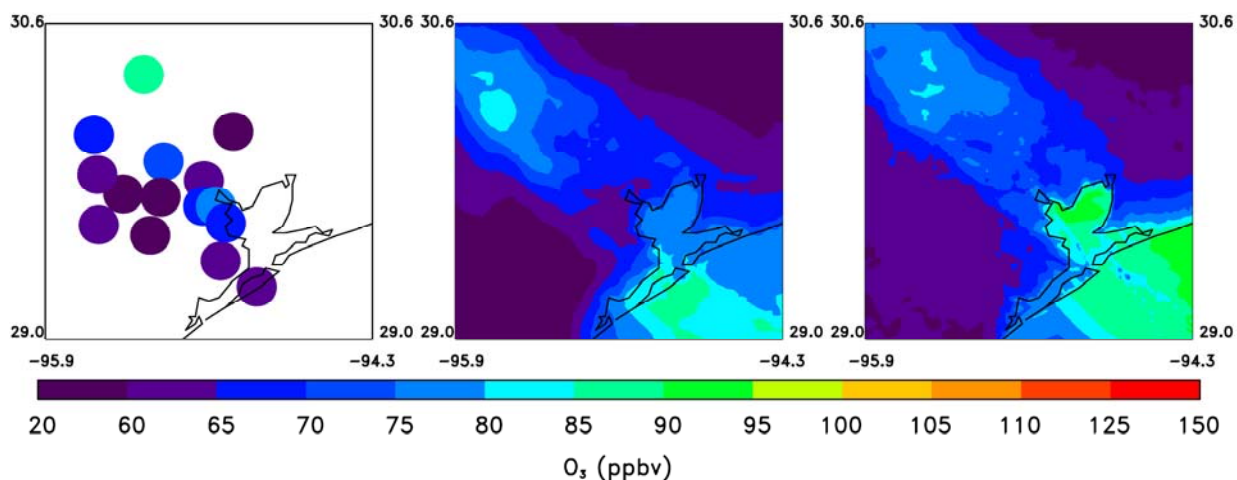


Figure 6: Eight-hour average ozone maximum from observations (left), original 4 km CMAQ simulation (middle), and new 1 km CMAQ simulation on 26 September 2013.

Data Collected

None.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments

No problems encountered.

Goals and Anticipated Issues for the Succeeding Reporting Period

Analyze new 1 km CMAQ HCHO simulations with P-3B observations and improve emissions inventory based on analysis for a new CMAQ simulation with process analysis.

Detailed Analysis of the Progress of the Task Order to Date

We don't anticipate delays in the completion of this project.

Submitted to AQRP by: Alan Fried
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