

AQRP Monthly Technical Report

PROJECT TITLE	A synthesis study of the role of mesoscale and synoptic-scale wind on the concentrations of ozone and its precursors in Houston	PROJECT #	10-010
PROJECT PARTICIPANTS	Qi Ying, John Nielsen-Gammon	DATE SUBMITTED	1/8/2019
REPORTING PERIOD	From: 12/1/2018 To: 12/31/2018	REPORT #	3

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

Task 1: Synthesis of mesoscale wind structures in the synoptic-scale context

Requested access to the NOAA data site where the TCEQ profiler data is stored. No response for several weeks, probably due to the government shutdown. Will see if TCEQ has a backup archive.

Task 2: Development of source and age-resolved CMAQ

The source-oriented CS07A mechanism was modified to track the atmospheric age of the primary VOCs, NO_x, and O₃. The modified CMAQ model was applied to study atmospheric age of ozone and its precursors during TexAQS2006 as a preliminary application of the age-resolved mechanism.

Task 3: Analysis of the interaction of mesoscale winds and ozone formation during key episodes
None to report.

Preliminary Analysis

Preliminary analyzed for performed for two sites: Galveston and Aldine. Figure 1 shows that O₃ at the two sites have very different atmospheric age distributions. At Galveston, O₃ formed from fresh emissions (< 1 hour) accounts for a small fraction of the total nonbackground ozone. O₃ from aged emissions (>8 hours) is important in a number of days. At Aldine, most of the nonbackground O₃ is due to emissions < 2 hours old.

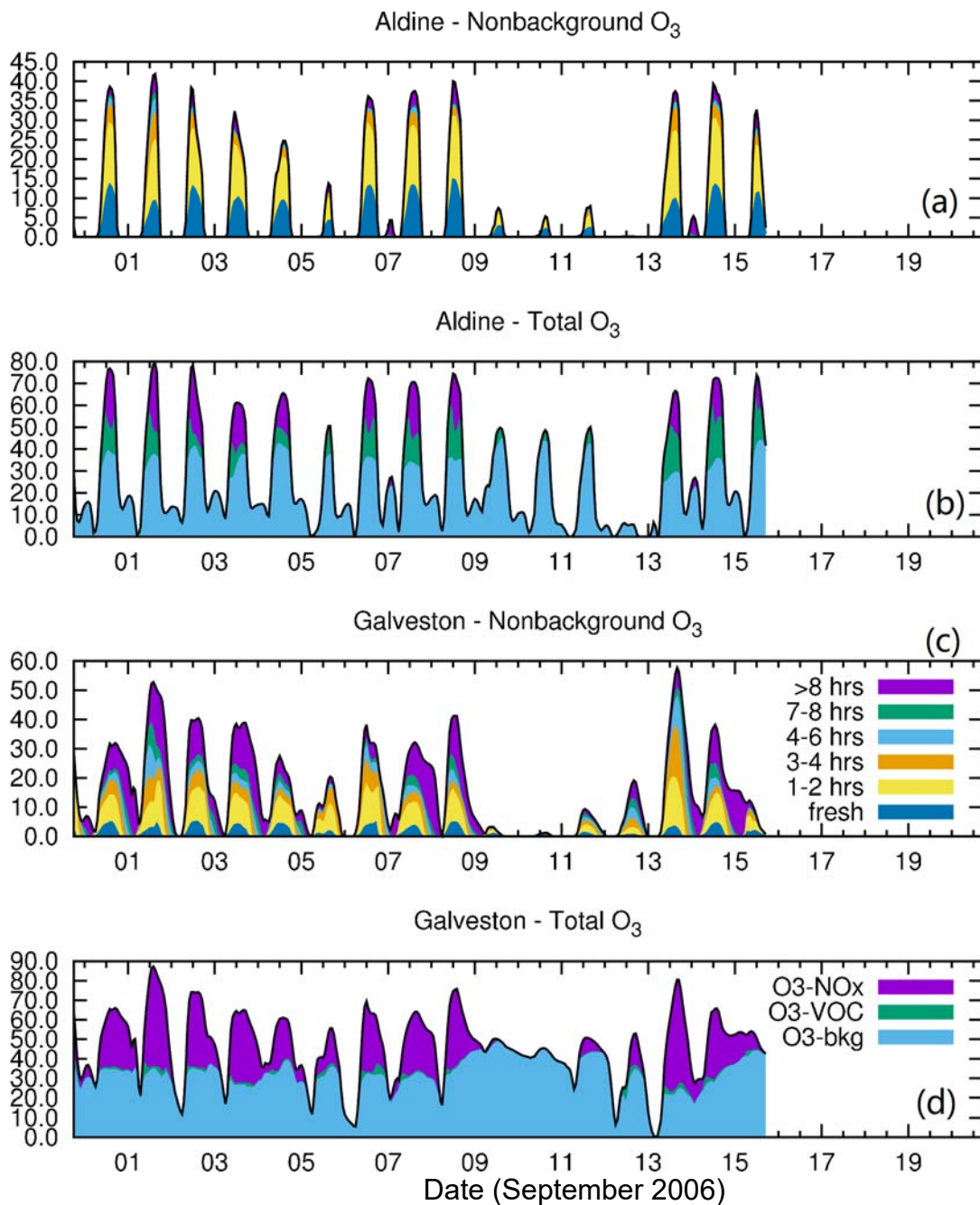


Figure 1 Predicted total O₃ concentrations at Aldine (b) and Galveston and the attribution of O₃ to NO_x (O₃-NO_x) and VOC precursors (O₃-VOC), and to background concentration (O₃-bkg). Panels (a) and (c) shows the non-background ozone grouped by the atmospheric time of the precursors or ozone itself.

Data Collected

None to report.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments

None to report.

Goals and Anticipated Issues for the Succeeding Reporting Period

We plan to further analyze the preliminary simulation results for TexAQS 2006. In addition, we plan to run the simulations for TexAQS 2000 and see if there are any differences between those two ozone seasons. If Task 2 makes sufficient progress, we will start preparing emission and meteorology input files for the identified episodes.

Detailed Analysis of the Progress of the Task Order to Date

While the project has a late official start, we have made sufficient progress that in time completion is expected.

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

We are working on a manuscript with a preliminary title "Improve the computation efficiency of source-oriented chemical mechanisms for the source apportionment of secondary gaseous and particulate pollutants", which we plan to submit to Atmospheric Environment.

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 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

Submitted to AQRP by Qi Ying, on January 8, 2018.

Principal Investigator

