

AQRP Monthly Technical Report

PROJECT TITLE	Emission source region contribution to a high surface ozone episode during DISCOVER-AQ	PROJECT #	14-004
PROJECT PARTICIPANTS	Christopher P. Loughner and Melanie Follette-Cook	DATE SUBMITTED	7/8/2015
REPORTING PERIOD	From: June 1, 2015 To: June 30, 2015	REPORT #	12

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 presented project results at the AQRP Workshop and submitted our draft final report. We re-configured and re-ran CMAQ with ozone source apportionment to isolate the impact of natural emissions from anthropogenic emissions outside of the Houston, Dallas, Beaumont, Lake Charles, and Marine anthropogenic source regions.

Preliminary Analysis

We re-ran CMAQ with a new anthropogenic emissions source region (Other in Figure 1). Without this anthropogenic emissions source region defined, our previous CMAQ simulation with ozone source apportionment lumped the impact of anthropogenic emissions from the Other region and all natural emissions into one category.

Our new results quantifying the impact of emissions source regions on maximum 8 hour average ozone are shown in Figures 2-6 for September 25, 2013 and Figures 7-11 for September 26, 2013. These results show that for September 25 near the area of peak ozone along the western shore of Galveston Bay near La Porte Sylvan Beach, anthropogenic emissions from Houston contributed 45-50 ppbv, boundary conditions contributed 35-40 ppbv, anthropogenic emissions from Dallas contributed 1-3 ppbv, anthropogenic emissions from other source regions contributed 7-10 ppbv, and natural emissions from the entire 4 km domain contributed 10-15 ppbv to the maximum 8 hour average ozone. For September 26 near the peak ozone in the region near Conroe, anthropogenic emissions from Houston contributed 25-30 ppbv, boundary conditions contributed 35-40 ppbv, anthropogenic emissions from Dallas contributed 1-2 ppbv, marine emissions contributed 0-3 ppbv, anthropogenic emissions from other source regions contributed 5-7 ppbv, and natural emissions from the entire 4 km domain contributed 7-10 ppbv to the maximum 8 hour average ozone. These new results will be included in the next draft of the final report.

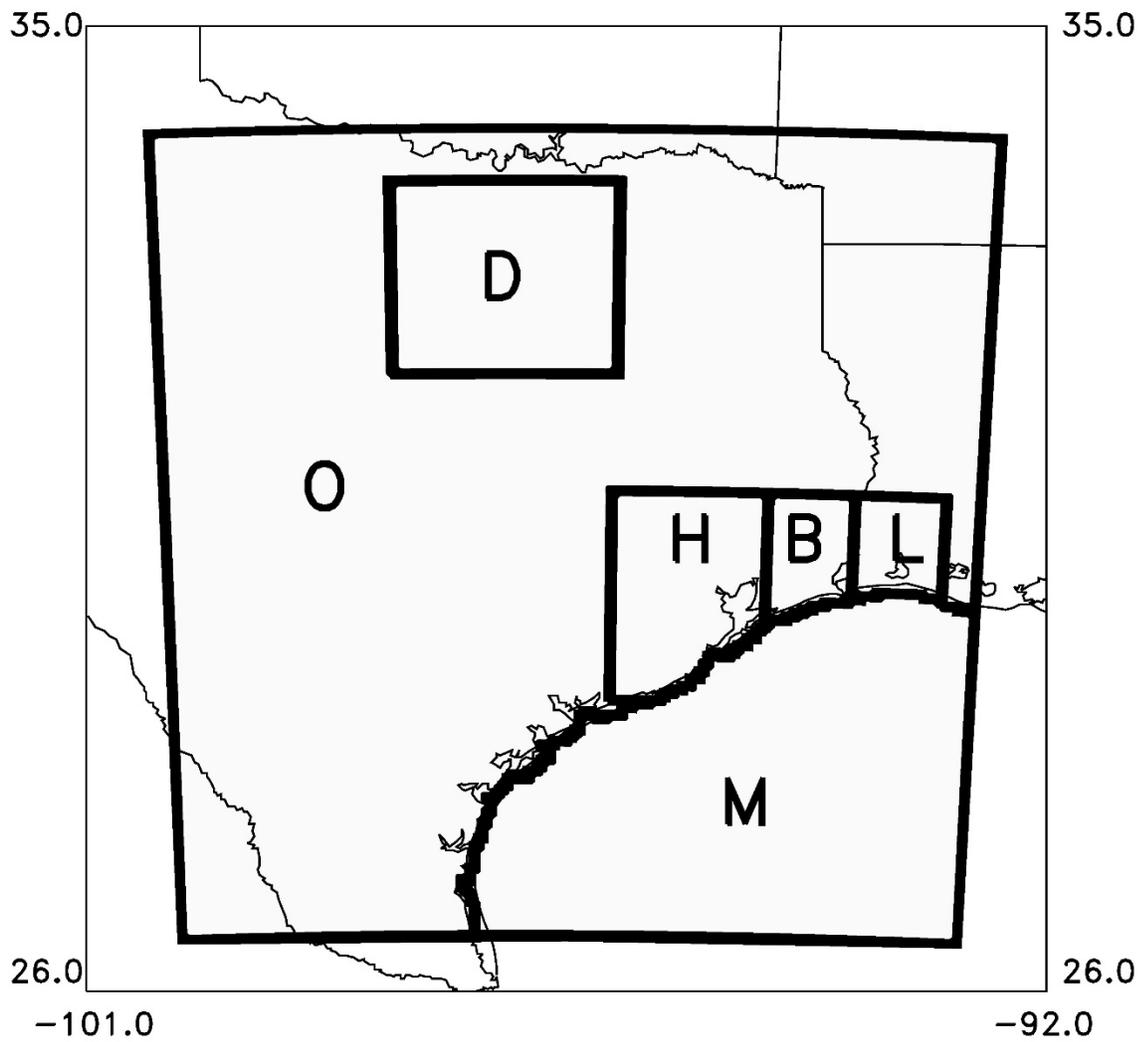


Figure 1: 4 km CMAQ domain showing the five anthropogenic source regions specified in the ozone source apportionment simulation (D=Dallas; H=Houston; B=Beaumont; L=Lake Charles; M=marine; O=other).

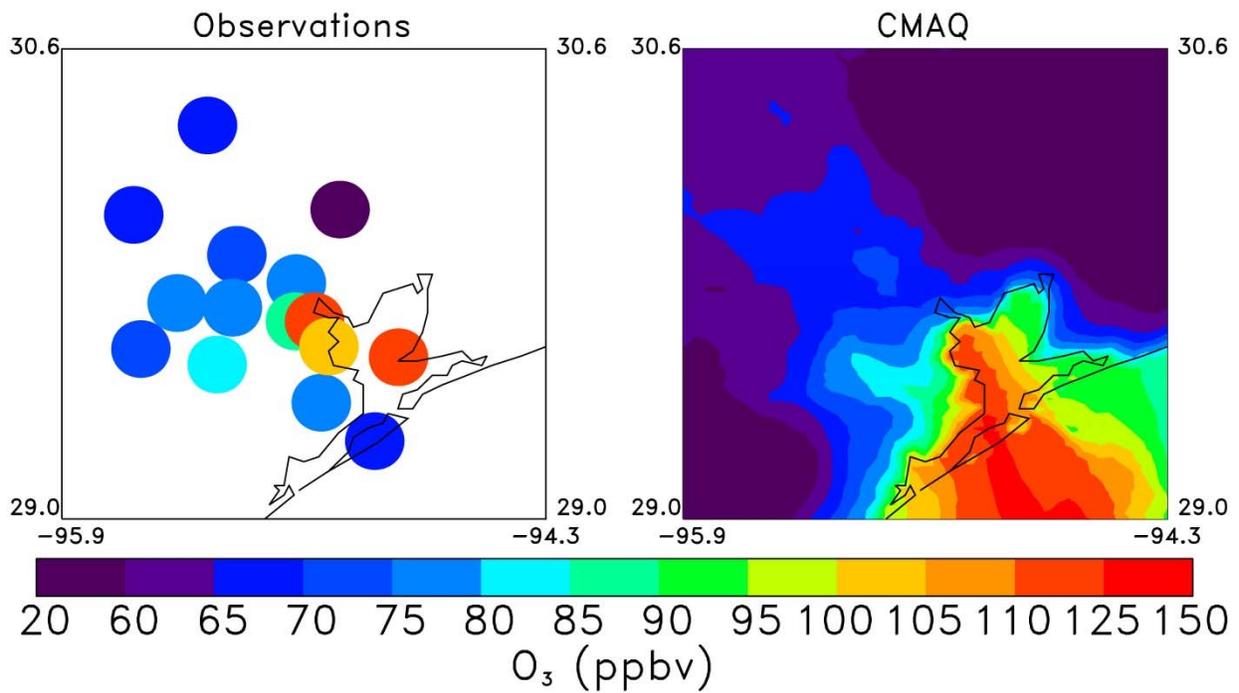


Figure 2: Observed (left) and CMAQ simulated (right) maximum 8 hour average ozone on September 25, 2013.

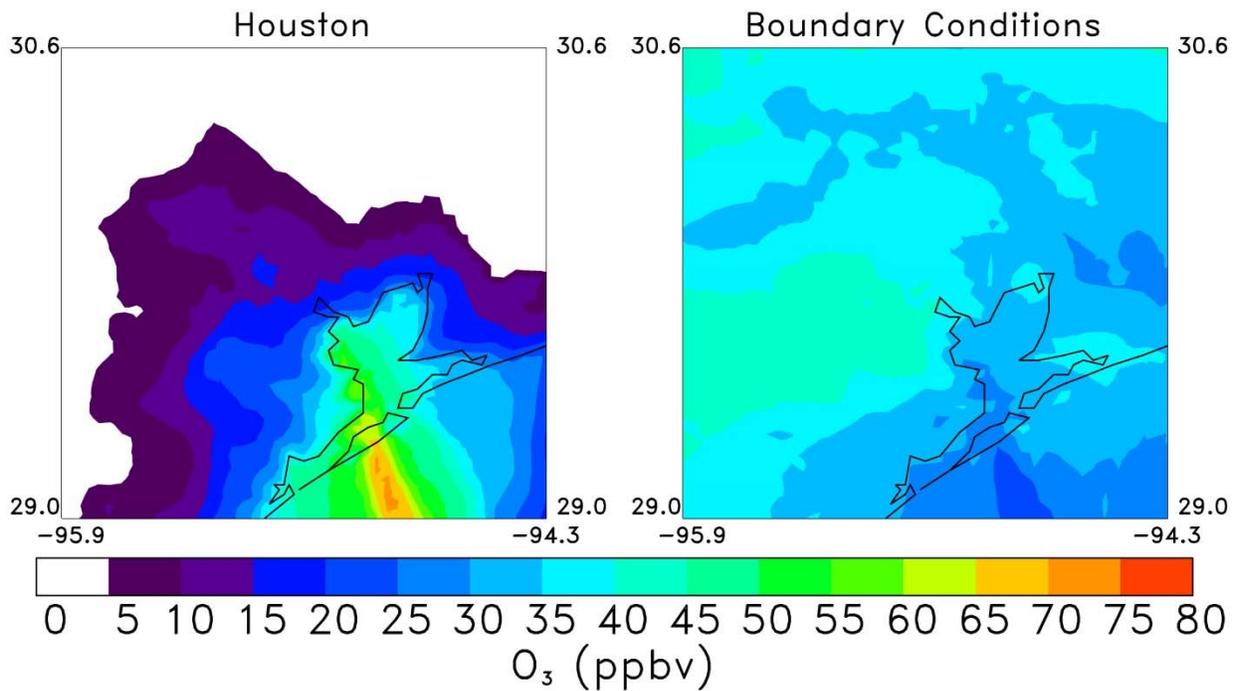


Figure 3: Amount of ozone that contributed to the maximum 8 hour average ozone on September 25, 2013 from anthropogenic emissions in the Houston source region (left) and boundary conditions (right).

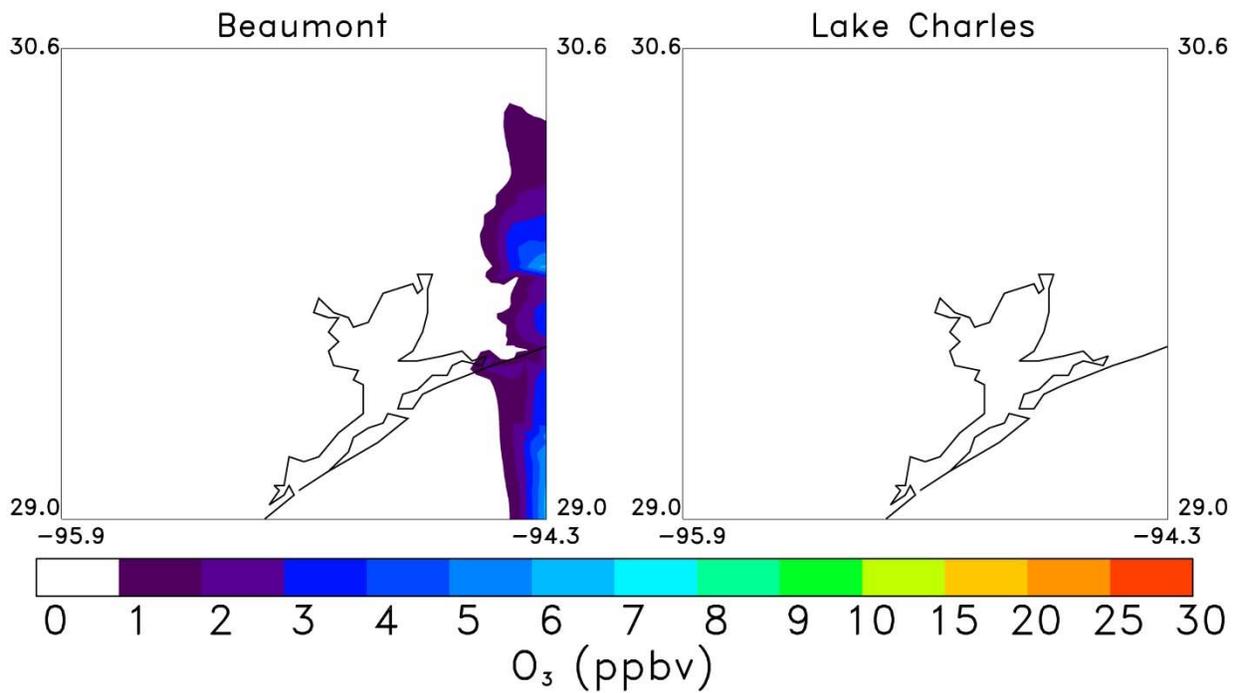


Figure 4: Amount of ozone that contributed to the maximum 8 hour average ozone on September 25, 2013 from anthropogenic emissions in the Beaumont source region (left) and Lake Charles source region (right).

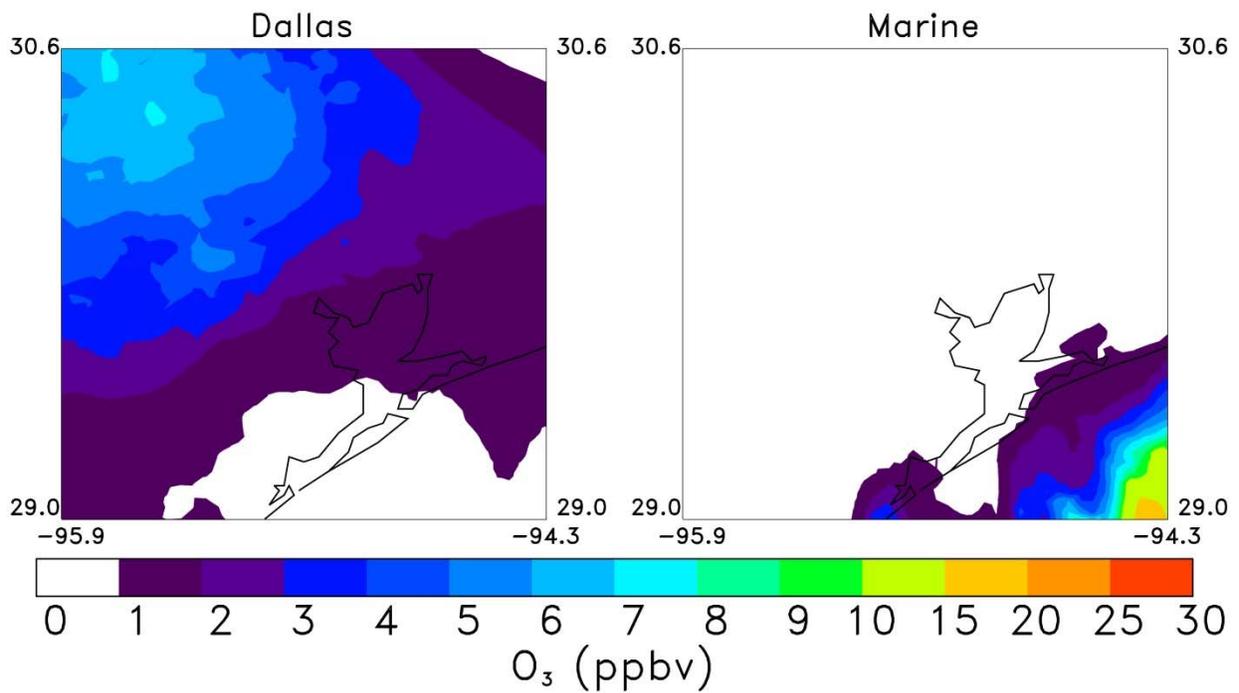


Figure 5: Amount of ozone that contributed to the maximum 8 hour average ozone on September 25, 2013 from anthropogenic emissions in the Dallas source region (left) and Marine source region (right).

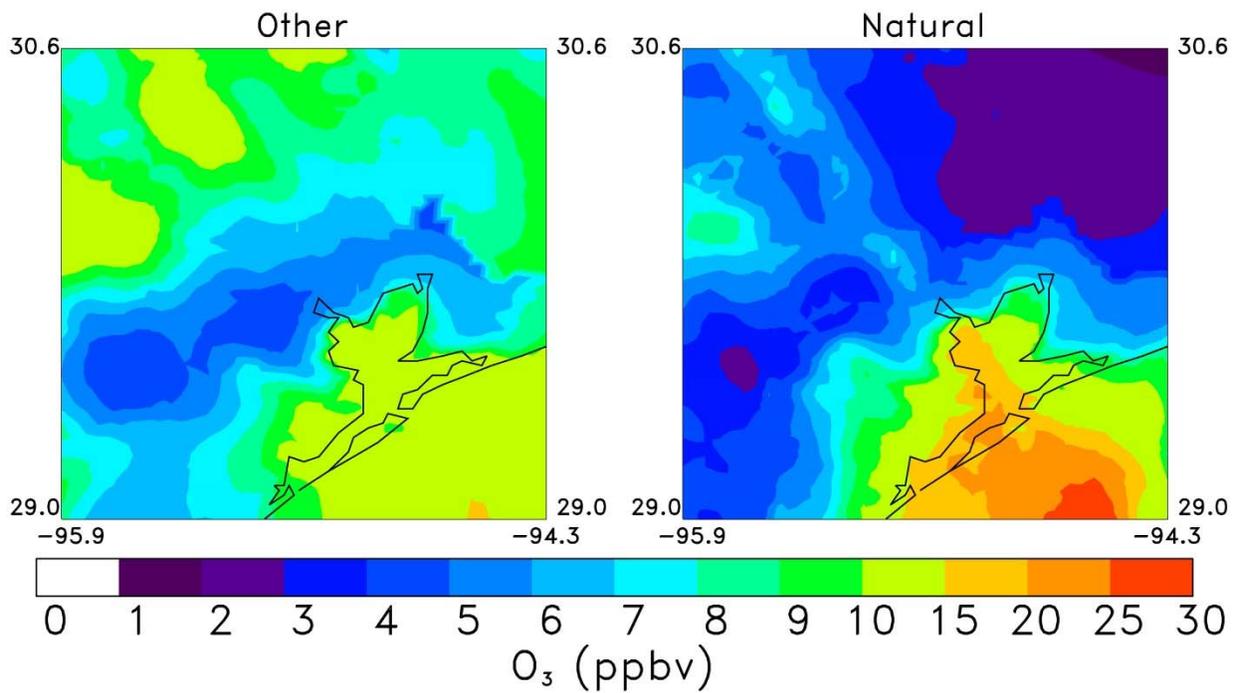


Figure 6: Amount of ozone that contributed to the maximum 8 hour average ozone on September 25, 2013 from anthropogenic emissions in the Other source region (left) and all natural sources (i.e., biogenic, lightning) within the 4 km domain (right).

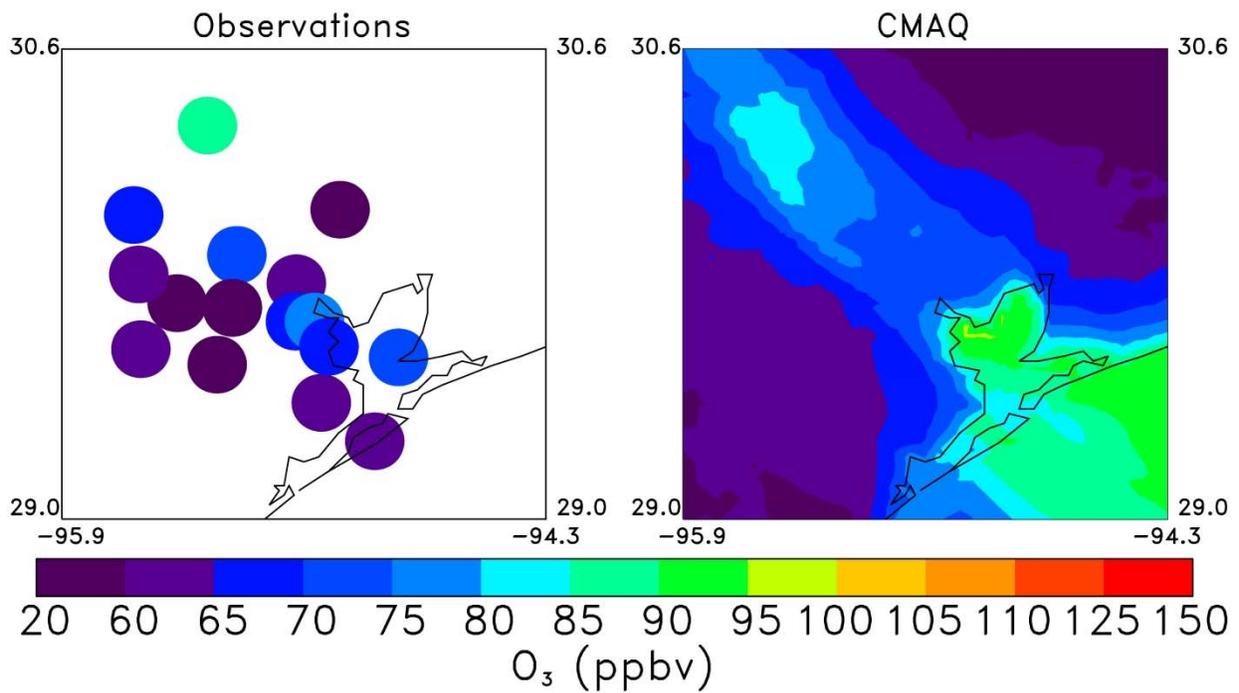


Figure 7: Observed (left) and CMAQ simulated (right) maximum 8 hour average ozone on September 26, 2013.

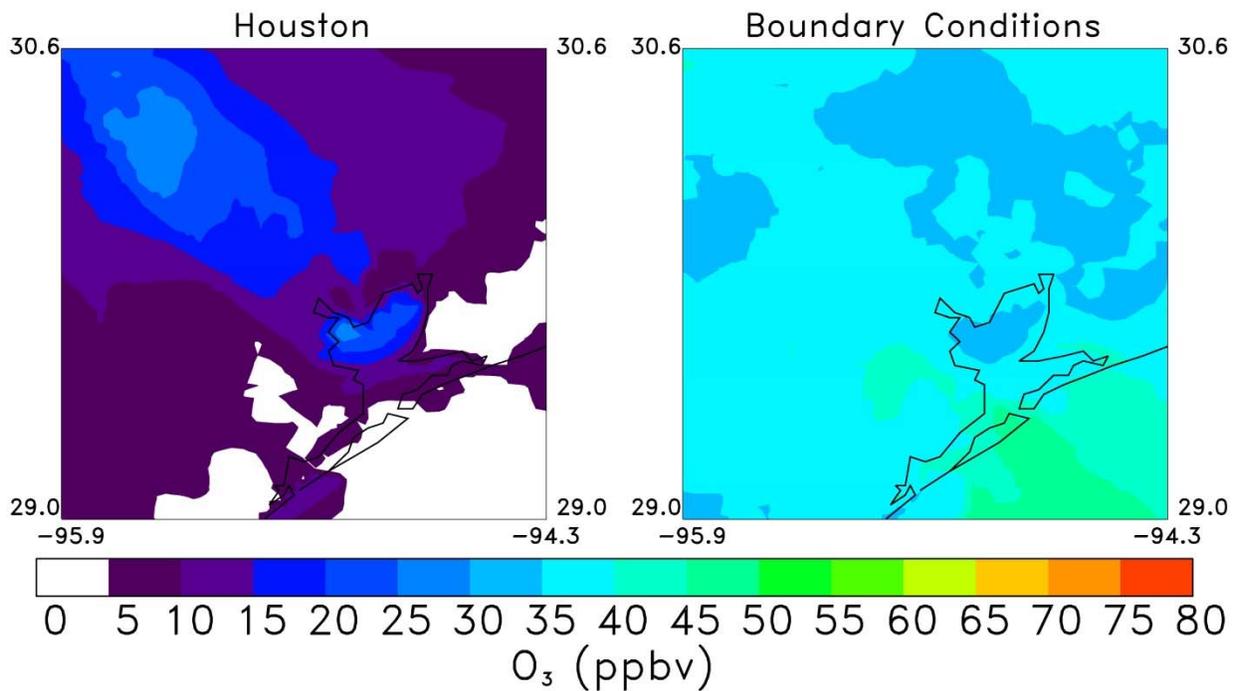


Figure 8: Amount of ozone that contributed to the maximum 8 hour average ozone on September 26, 2013 from anthropogenic emissions in the Houston source region (left) and boundary conditions (right).

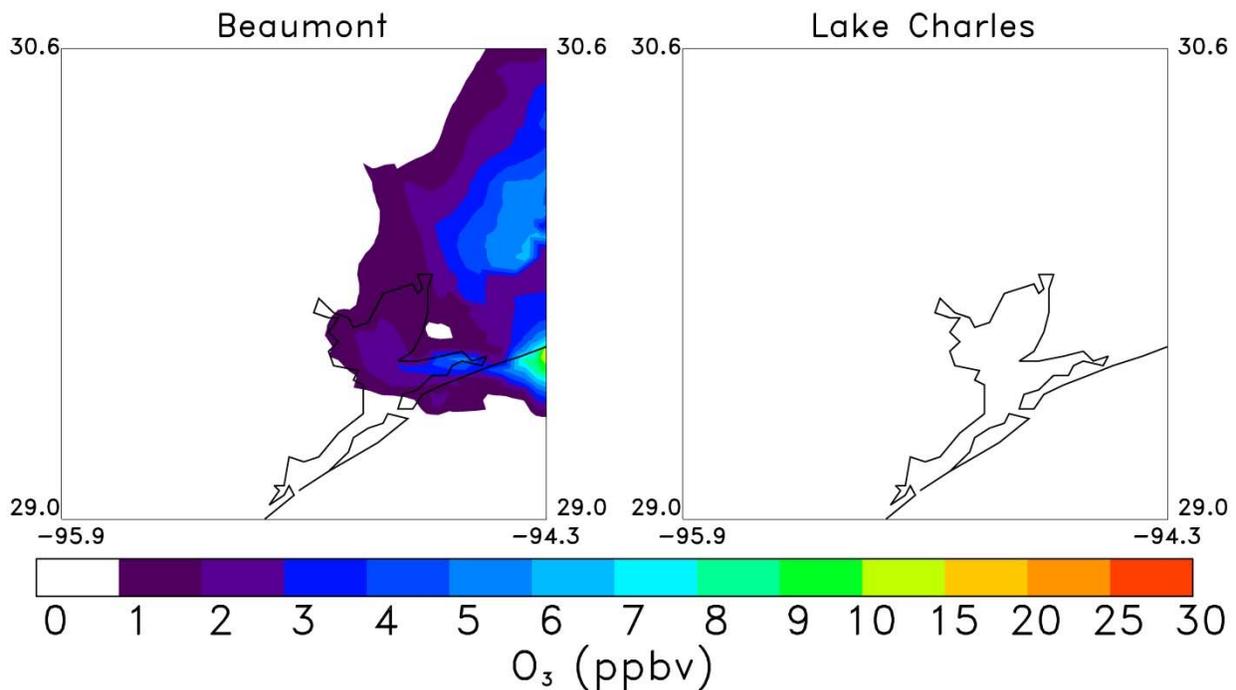


Figure 9: Amount of ozone that contributed to the maximum 8 hour average ozone on September 26, 2013 from anthropogenic emissions in the Beaumont source region (left) and Lake Charles source region (right).

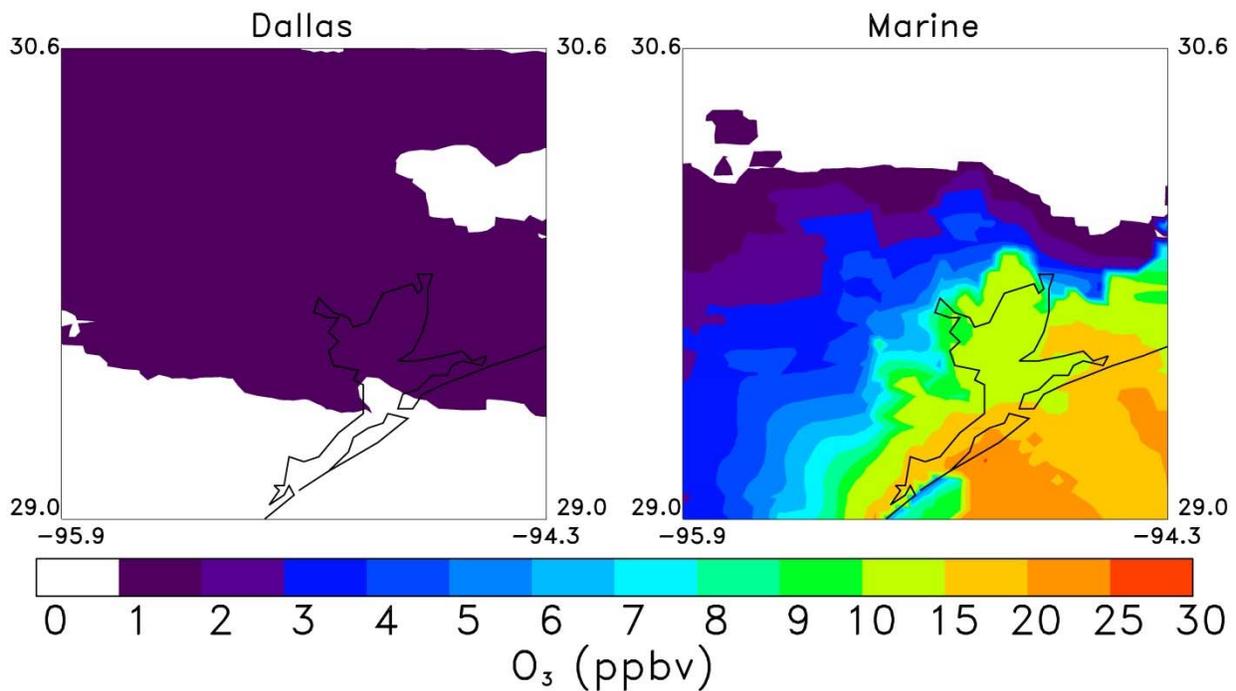


Figure 10: Amount of ozone that contributed to the maximum 8 hour average ozone on September 26, 2013 from anthropogenic emissions in the Dallas source region (left) and Marine source region (right).

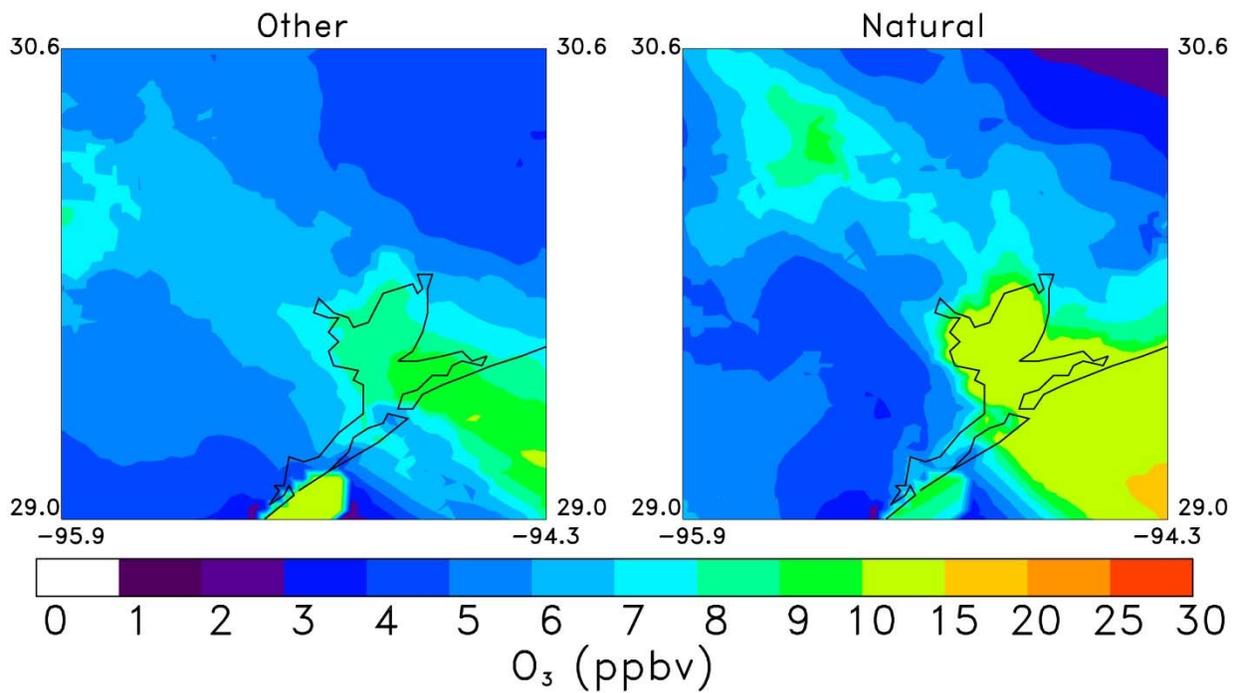


Figure 11: Amount of ozone that contributed to the maximum 8 hour average ozone on September 26, 2013 from anthropogenic emissions in the Other source region (left) and all natural sources (i.e., biogenic, lightning) within the 4 km domain (right).

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

Submit Final Report.

Detailed Analysis of the Progress of the Task Order to Date

A 1 month no cost extension was granted. The project completion date is now July 31, 2015.

Submitted to AQRP by: Chris Loughner

Principal Investigator: Chris Loughner