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**	12/8/2014
REPORTING PERIOD	**From:** November 1, 2014 **To:** November 30, 2014	**REPORT #**	5

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

The Preliminary Analysis from the last monthly report showed that our initial WRF model simulation calculated weaker sea and bay breezes than observed. We revised our WRF modeling technique to improve our model results by increasing the resolution of the input files, including a higher resolution domain (1 km), and preforming more nudging.

We created new WRF input files and are currently re-running WRF with different model inputs and options to try to improve the model representation of the sea and bay breezes. We are now using the North American Mesoscale (NAM) 12 km model for initial and boundary conditions instead of the North American Regional Reanalysis (NARR), which has a horizontal resolution of 40 km. We are also nudging all domains, whereas previously we only nudged the 36 km domain, and we also added a higher resolution domain (1 km). In addition we are now using a WRF iterative technique, where we first run WRF performing analysis nudging based on the NAM 12 km, and then re-run WRF performing analysis nudging based on the previous WRF simulation. This modeling technique prevents the relatively coarse NAM 12 km model from degrading the high resolution WRF modeling domains (4 km and 1 km modeling domains).

In addition, Dr. HyunCheol Kim is in the process of creating a new high spatial and temporal resolution sea surface temperature (SST) WRF input files for our study. In a previous Texas AQRP funded study (Project #12-TN2), Drs. HyunCheol Kim, Fong Ngan, Pius Lee, and Daniel Tong created a tool to create a gridded hourly SST dataset for input to WRF from GOES observations, which has a spatial resolution of 4 km and a temporal resolution of 1 hour. Dr. Kim is now building on this tool to create a gridded hourly SST dataset for input to WRF at a spatial resolution of 1 km and a temporal resolution of 1 hour by combining the Multi-scale Ultra-high Resolution (MUR) SST analysis, which has a sptatial resolution of 1 km and a temporal resolution of 1 day, with the GOES SST product. We are currently using the MUR SST analysis in our WRF runs. We will again re-run WRF when Dr. Kim finishes creating this new SST product.

Preliminary Analysis
No new analysis was performed during this reporting period.

Data Collected
We obtained NAM 12 km model output for input to the WRF model.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments
No new problems were encountered. We refined our modeling adjustments to the problems encountered in October and addressed the last monthly report.

Goals and Anticipated Issues for the Succeeding Reporting Period
We will finish the WRF simulation that is currently underway and evaluate the model results with observations.

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: Chris Loughner

Principal Investigator: Chris Loughner