Monthly Technical Report

PROJECT TITLE	Development and Evaluation of an Interactive Sub-Grid Cloud Framework for the CAMx Photochemical Model	PROJECT #	14-025
PROJECT PARTICIPANTS	ENVIRON International Corporation Texas A&M University	DATE SUBMITTED	2/5/15
REPORTING PERIOD	From: January 1, 2015 To: January 31, 2015	REPORT #	8

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

This project was initiated on May 21, 2014. This report documents progress during the month of December 2014.

Task 1: Preparation and Software Design

This task was completed in August.

Tasks 2 and 3: Implementation of a Sub-Grid Convective Model in CAMx

EPA transferred their "multi-scale" Kain-Fritsch (MSKF) version of WRF on January 6. We reviewed the new WRF code, and implemented additional modifications to support the transfer of convective model fields (vertical fluxes, convective time scales, etc.) to CAMx. Our testing of the EPA's MSKF version of WRF (with and without our additional modifications) resulted in model crashes. This issue was discussed with EPA, but no solution could be identified.

As a result, the team decided to use EPA's original WRF updates for the remainder of the project (i.e., the version of WRF successfully employed in late 2014 to drive CAMx convection testing). This intermediate version of WRF, and new WRFCAMx and CAMx codes supporting the new CAMx convection treatment, were transferred to Texas A&M (TAMU) to begin their applications over the DISCOVER-AQ and START08 episodes.

Task 4: Model Evaluation

No progress during the reporting period.

Preliminary Analysis

None this period.

Data Collected

No additional data were collected by the project team.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments

The EPA version of WRF/MSKF exhibited runtime crashes with segmentation faults. We were able to isolate the crashes to EPA's MSKF code updates. Discussions with EPA developers did not yield any clear solutions, but the problem appears to be related to incompatibilities among compiler options and MPICH libraries. We decided to move the project forward by using the original EPA updates to WRF that we employed this past fall to develop and test the CAMx convection algorithm (as documented in previous progress reports).

Goals and Anticipated Issues for the Succeeding Reporting Period

We anticipate that TAMU will begin running WRF and CAMx in February for the DISCOVER-AQ testing and evaluation episode.

Detailed Analysis of the Progress of the Task Order to Date

Progress on Task 1 (software design) was completed in August. Task 2 (implementation of a sub-grid convective model in CAMx) and Task 3 (implementation of chemistry and wet deposition) was completed in October. Task 4 (model evaluation) is expected to begin in February, which has been pushed back in waiting for EPA's WRF/MSKF model.

The project remains on budget, but the schedule is roughly one month behind. Project completion and delivery of the final AQRP-reviewed report is scheduled for June 30, 2015.

Submitted to AQRP by: _Chris Emery_____

Principal Investigator: __Chris Emery_____