

AQRP Monthly Technical Report

PROJECT TITLE	Use of Satellite Data to Improve Specifications of Land Surface Parameters	PROJECT #	16-039
PROJECT PARTICIPANTS	Richard McNider, Arastoo Pour –Biazar, Kevin Doty, Yuling Wu	DATE SUBMITTED	Oct 8, 2017
REPORTING PERIOD	From: July 1, 2017 To: July 31, 2017	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

Task 1 - Focus on Small Scale Performance Around Houston and Dallas and Other Metrics Such as Wind Performance

Special profiler data was available around the Houston area during the Discover AQ period in September 2013. Data from the profilers is being obtained. Additionally, software to read and analyze is being written.

Task 4 - Vegetative Fraction. However, in processing the 2013 data and preparing to process the data for the 2012 case, it was found that the data only extended back to September 2012. NASA MODIS greenness product for the 2012 case has been processed and has been employed in 2012 runs. Initial runs indicate that the satellite vegetation improves model performance.

Task 6 - Satellite Derived Insolation and Albedo – The 2013 Discover AQ case that was run during the project last year was run with satellite insolation but not satellite albedo. As part of rerunning the 2013 Discovery AQ a consistent set of satellite insolation and cloud albedo was developed. The new insolation and albedo data have been processed and incorporated in the WRF system. The initial runs show that the satellite albedo being lower appears to make the model too warm. This is because the lower albedo in the satellite product adds additional net energy to the surface causing surface temperatures to be too warm.

Task 7 - Additional Model Evaluation Period: Data has been collected for the 2012 model evaluation period. A control run for 2012 with no satellite assimilation has been completed. Base line statistics are being calculated. A second run using only insolation assimilation has also been completed. However, the control case for 2012 seems to be consistent in that bias and RMSE statistics are worse than in the new than in comparable statistics in the control run for 2013 carried out in the last biennium project.

Preliminary Analysis

See above discussions for the initial results for the 2012 run and satellite albedo runs.

Data Collected

Wind profiler data has been collected initially analyzed.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments

Issues have been found with the control run statistics compared to previous control runs made for 2013. We are investigating causes of these differences. It may be model set up options or the new WRF 8.6.1 version.

Goals and Anticipated Issues for the Succeeding Reporting Period

We anticipate have initial model runs for the 2012 and 2013 cases in June.

Detailed Analysis of the Progress of the Task Order to Date

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

Toward the use of Satellite Skin Temperature Data to Improve Land Surface Parameters in Air Quality Studies, to be submitted to Journal of Applied Meteorology.

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

We are including some of the land surface work in a presentation at the Meteorology and Air Quality Conference at UC Davis in September 2017.

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

Principal Investigator

Richard T. McNider
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