AQRP Monthly Technical Report

PROJECT TITLE	**Use of satellite data to improve specifications of land surface parameters**	**PROJECT # 14-022**	14-022
PROJECT PARTICIPANTS	R. McNider, Y. Wu, K.Doty, Pius Lee, Min Huang	**DATE SUBMITTED**	4/9/2015
REPORTING PERIOD	**From:** April 1, 2015 **To:** April 30, 2015	**REPORT #**	4

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 Insolation Impacts: Following the report on the insolation impacts we have carried out further comparisons of four insolation products – the WRF product, the GSIP Product and the UAH old product and the new UAH/UW product. During this month we have completed the evaluation of three different satellite insolation products against pyranometer data and compared the clear sky products to the WRF clear sky insolation. All satellite products compared well to the pyranometer data with little bias. Differences are probably within the range of pyranometer error and inherent limits on pixel navigation from the satellite. The updated Task 1 (March 15) report containing these analyses will be delivered on June 1.

Task 2 Diagnosed Skin Temperature in the WRF Pleim-Xiu Scheme: No further activity this month. The deliverable report on the documentation and implementation of a diagnosed skin temperature in the Pleim-Xiu scheme was delivered April 9, 2015.

Task 3 Evaluation of Satellite Skin Temperature Products: This is the main activity this month. We have continued collecting and auditing the satellite derived skin temperature data. We are evaluating whether temporal restrictions (e.g. only use data before a certain time) to limit the outliers (temperatures that are physically too warm in the Western U.S.) found in the GOES NOAA GCIP data base. We made initial comparisons against a second GOES data set and these will be reported in the May 15 deliverable on the skin temperature data sets. NOAA/GMU have also developed techniques to compare the model and satellite skin temperatures to the Discovery AQ aircraft skin temperatures. Initial plots have been made and quantitative (statistical) comparisons will be carried out. NOAA GMU have also made preliminary analyses of the WRF-NOAH performance compared to Discovery AQ data.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments – We did find some issues in the way OBSGRID was used and configured in the model evaluation and

assimilation of NWS data into the Pleim –Xiu scheme. We have made this correction and rerun the model cases.

Goals and Anticipated Issues for the Succeeding Reporting Period

We expect to have a plan for removing the GSIP skin temperature outliers by the May 15 report and during the next reporting period will write and test the code for removing the outliers. There are also some striping in the GSIP skin temperature product and we will do some filtering to attempt to remove or minimize its influence. Fortunately, it is a small fraction of available data. If we have issues with the GSIP temperature outliers that we cannot resolve we will switch to another in-house skin temperature product. We have also developed a method to develop a quasi-observed skin temperature tied to the WRF skin temperature field but modified by observed tendencies. This will be coded and tested in the next reporting period.

Detailed Analysis of the Progress of the Task Order to Date

We believe we are on schedule for the project but the NOAA skin temperature error in the High Plains is troublesome. NOAA GMU have made good progress in obtaining the DISCOVERY AQ special observations.

Submitted to AQRP by:

Principal Investigator: Richard T. McNider