AQRP Monthly Technical Report

PROJECT TITLE	Improve Cloud Modeled by WRF using COSP and Generative Adversarial Network	PROJECT #	20-026
PROJECT PARTICIPANTS	PI: Zheng Lu	DATE SUBMITTED	Mar. 10, 2021
REPORTING PERIOD	**From:** Feb. 10, 2021 **To:** Mar. 10, 2021	REPORT #	7

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 for reporting period

We examined the COSP outputs of 27 cases and compared them against MODIS cloud property observations. The results reveal that model underestimate the cloud fraction especially during the summer. Given the fact that we found before that PBL scheme plays more important role in summer (June and July), we believe that this underestimation is largely related to the PBL scheme. Finally, we found the optimal model configuration for cloud simulation over Texas is the Morrison microphysics scheme + the YSU PBL scheme + North American Mesoscale Forecast System (NAM) reanalysis

NAM reanalysis data from year 2012 to 2021 are available n NCAR Cheyenne machine and we finished the model simulation for these years by submitting the jobs parallelly. We also spent some time downloading the NAM data (2005-2011) from NOAA server. Due to the scheduled shutdown of Cheyenne machine, these simulations are not conducted yet but will be finished soon.

As for the task 3, we examined the images produced by NCL script that will be eventually used in machine learning analysis.

Preliminary Analysis
As mentioned above

Data Collected
NAM reanalysis data and WRF simulation outputs using the Morrison scheme, YSU PBL scheme and NAM reanalysis data.

Identify Any Problems or Issues Encountered and Proposed Solutions or Adjustments

N.A.

Goals and Anticipated Issues for the Succeeding Reporting Period

We plan to finish long-term WRF simulation in the next reporting period.

Detailed Analysis of the Progress of the Task Order to Date

90% of Task 1& 2. 20% of Task 3

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

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 (ie: publications that cite the project) 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

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

Have any personnel changes occurred that were not listed in the original proposal? If so, please include a detailed description of the personnel change(s) below.

☐ Yes ☒ No

Are any delays expected in the progress of the research? If so, please include a detailed description of the potential delay below.

☐ Yes ☒ No

Describe any possible concerns/issues (technical or non-technical) that AQRP should be made aware of.

Are you anticipating using all the available funds allocated to this project by the end date? If not, why and approximately what is the amount to be returned?

☒ **Yes**   ☐ **No**

Submitted to AQRP by
[Zheng Lu]