

# AQRP Monthly Technical Report

<b>PROJECT TITLE</b>	Improve Cloud Modeled by WRF using COSP and Generative Adversarial Network	<b>PROJECT #</b>	20-026
<b>PROJECT PARTICIPANTS</b>	PI: Zheng Lu	<b>DATE SUBMITTED</b>	May. 12, 2021
<b>REPORTING PERIOD</b>	<b>From:</b> Apr. 11, 2021 <b>To:</b> May. 11, 2021	<b>REPORT #</b>	9

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 15<sup>th</sup> of the month following the reporting period shown above.

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## Detailed Accomplishments by Task for reporting period

We are preparing the image inputs for GAN training from GOSP outputs. We are generating grayscale figures of cloud fields (cloud fraction, cloud water path, cloud optical depth) outputted from COSP packages. We plan to train the GAN for individual fields as well as RGB-composed field from three variables. Previously, we use machine learning/deep learning tool Tensorflow; however, it turns out that this tool is unstable when sample size is very large because of our machine specs. The training crashes after a few epochs. We are now switching to another ML/DL tool Pytorch. The test cases run smoothly on our machine.

## Preliminary Analysis

N.A.

## Data Collected

Figures of cloud fields from GOSP packages.

## Identify Any Problems or Issues Encountered and Proposed Solutions or Adjustments

N.A.

## Goals and Anticipated Issues for the Succeeding Reporting Period

Examining the performance of GAN training and tuning hyper-parameters of GANs including epoch number, learning rates, etc.

## Detailed Analysis of the Progress of the Task Order to Date

100% of Task 1& 2. 40% 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

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Submitted to AQRP by  
[Zheng Lu]