Preparing Key State and Local Health and Air Quality Agencies for Upcoming Earth Observations

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Health and Air Quality Applications Program Review

March 27, 2023

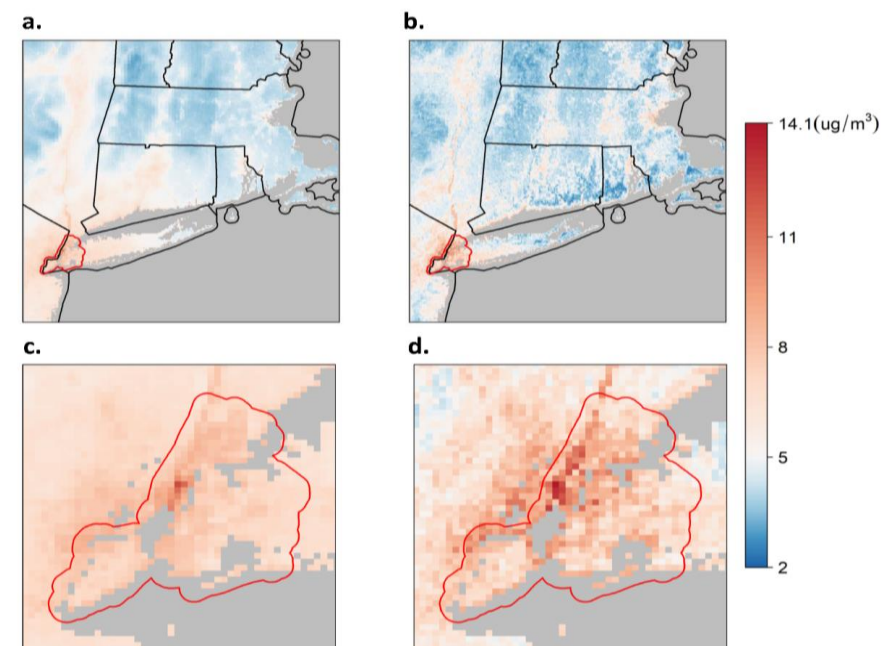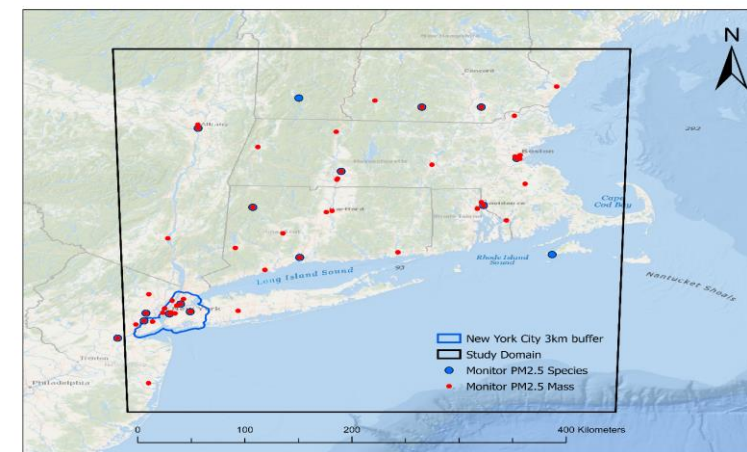ROLLINS SCHOOL OF PUBLIC HEALTH

EMORY

Project Goals

- Prepare air quality and public health stakeholders for data from the next-generation satellite instruments such as MAIA, TROPOMI, and GOES-R series
- Use actual or synthetic data of these instruments to demonstrate how the new information can enhance stakeholders' decision support activities
- Stakeholders: GA EPD, NYC Department of Health and Mental Hygiene
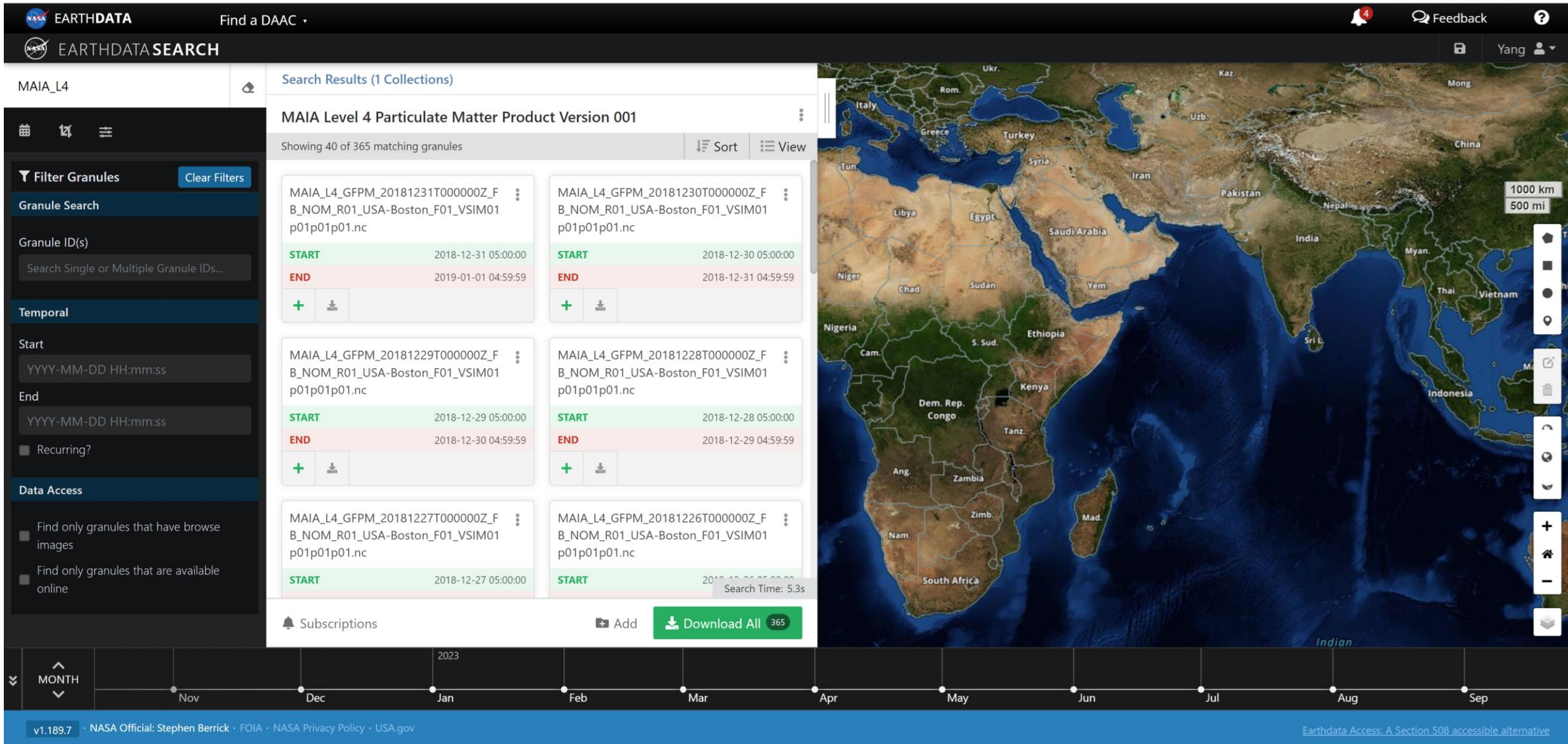- Current ARL = 6, expected ARL = 8

Project Updates - MAIA-like PM product for NYC

- Developed a MAIA-like L4 PM product for the NE US domain in 2018

- Model evaluation is complete

- A manuscript is being prepared

  - Key findings: MAIA's Bayesian statistics-based operational algorithm is robust and well suited to produce high-resolution PM2.5 speciation estimates with limited ground observations. Machine learning models might be under trained, therefore underperform.

NYC Simulated MAIA L4 PM data in NASA Earthdata

Technology Transfer to NYC

Emory R code library

ndvi.R
2 KB

GOES_16_download.R
1 KB

Emory test runs & video instructions

AWS open source website: registry.open data.aws
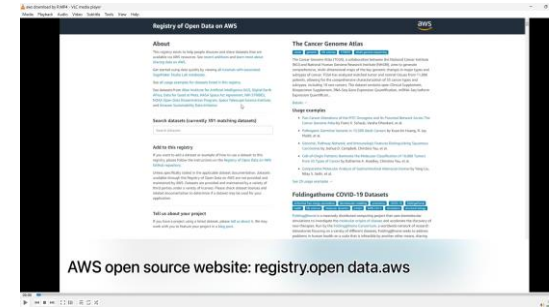
ASDC po-daac subscriber

Simple to Install/Use

1. Pip install podaac-data-subscriber
2. Get Earthdata Login (if you don't have already)
3. Create .netrc file for Earthdata Login info

```
machine urs.earthdata.nasa.gov
    login <your username>
    password <your password>
```
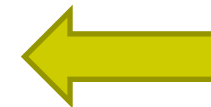
4. Run "podaac-data-subscriber -c MODIS_A-JPL-L2P-v2019.0 -d C:\Users\mstisdal\myData -sd 2023-02-23T09:00:00Z -p POCLOUD"
5. Can then be setup to run as a cron or through Windows Task Scheduler
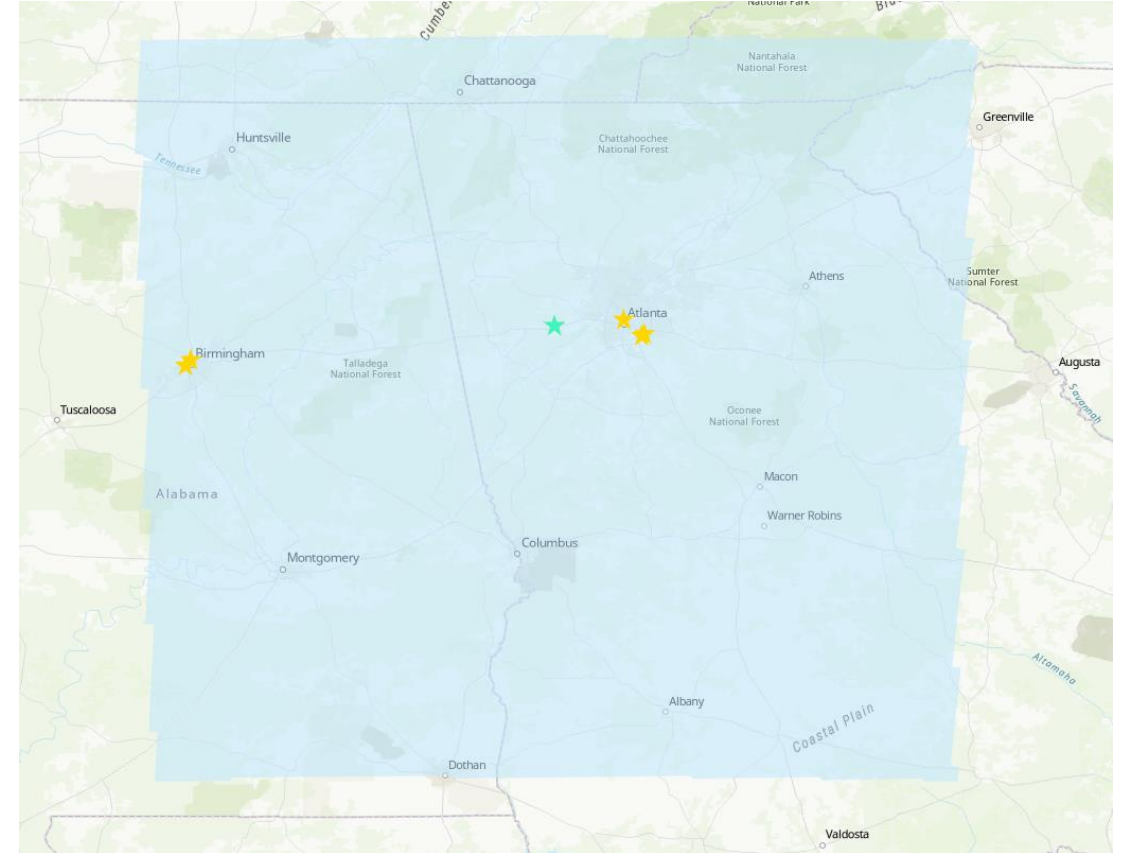
NYC™ Health
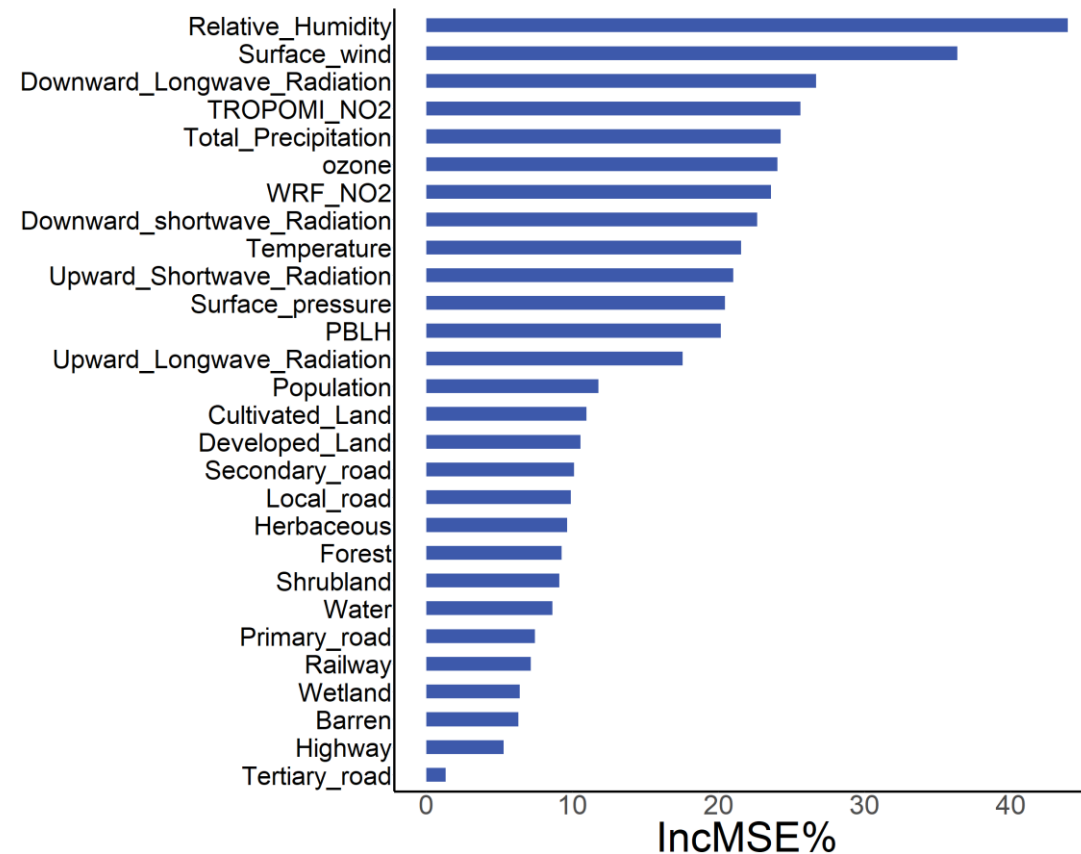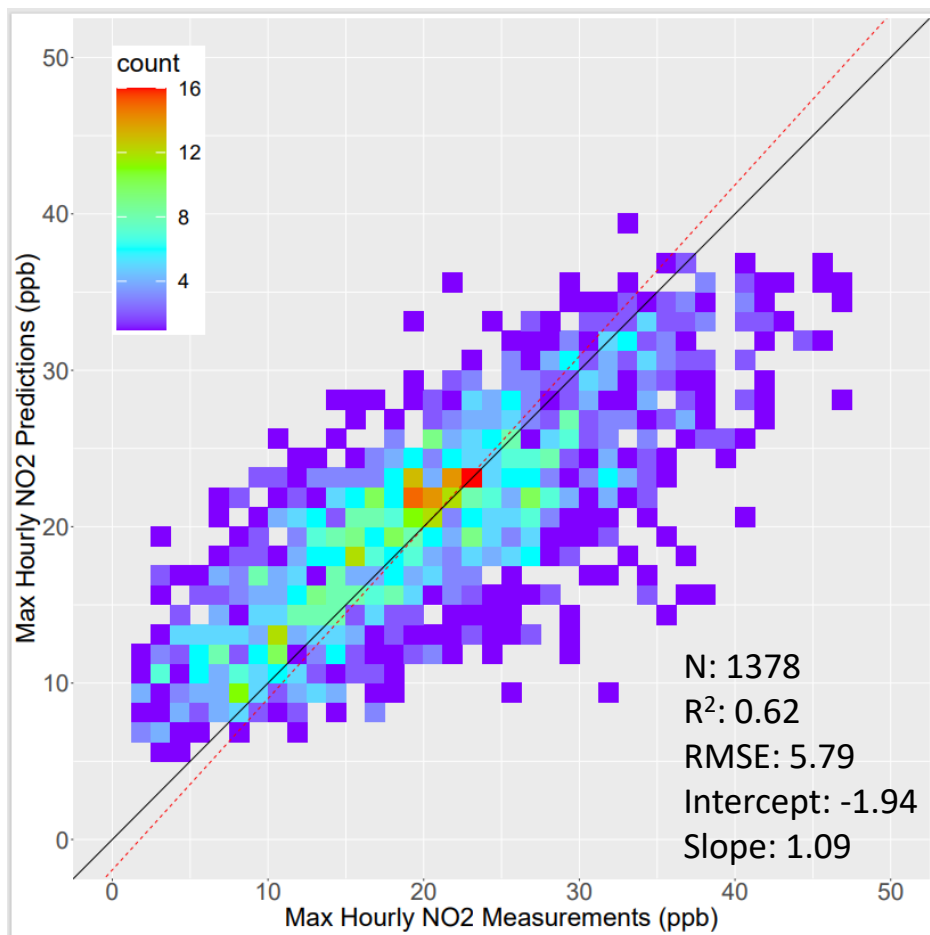
In-person training if necessary

Project Updates - NO2 model in Georgia with the latest TROPOMI data

- Goal: help GA EPD understand the spatial pattern of NO2 in GA

- Input: TROPOMI NO2 tropospheric column, WRF-Chem NO2 simulations (4/2018-3/2019) and met fields, land use

- MDA1 and daily predictions made on the TEMPO 2.0 x 4.5 km grid

MDA1 Model

Scatter Plots for 10-fold CV
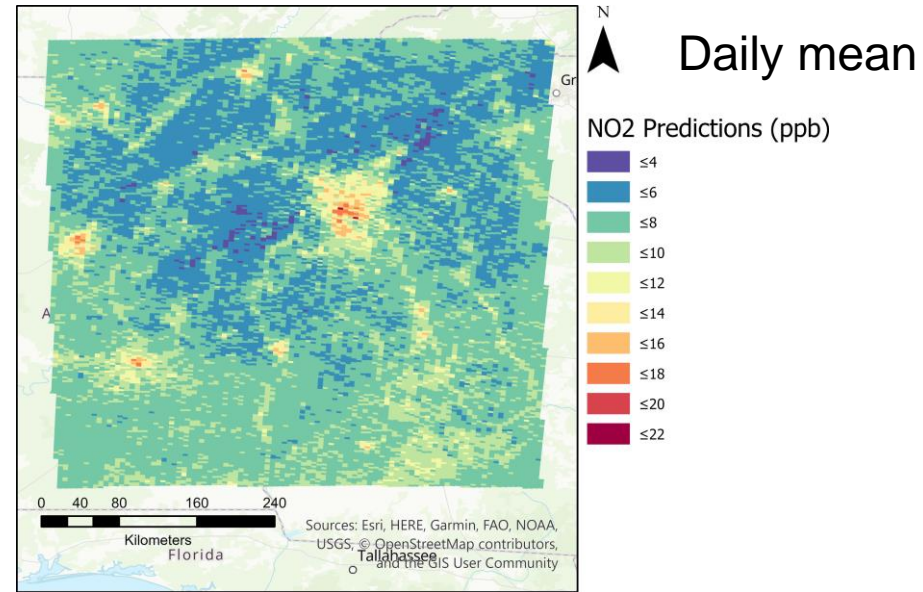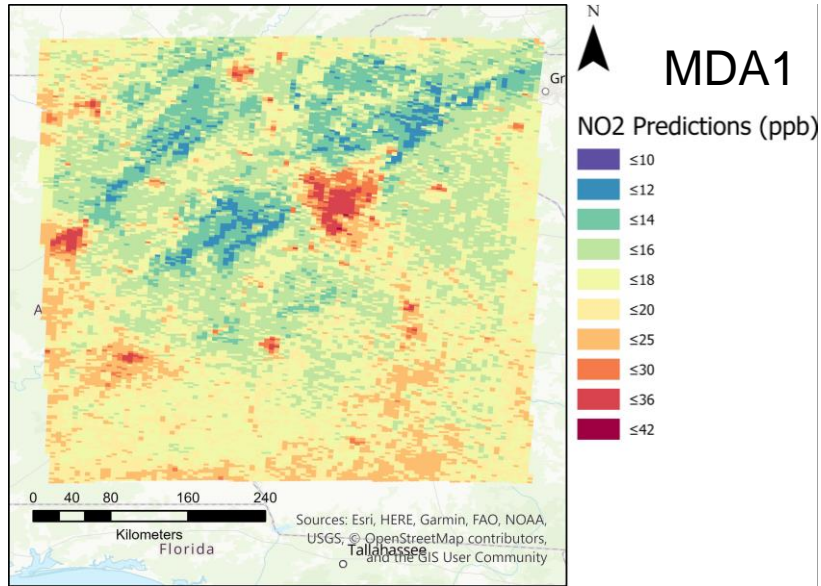Red line is regression line and black line is 1:1 line.

Variables Importance Rank
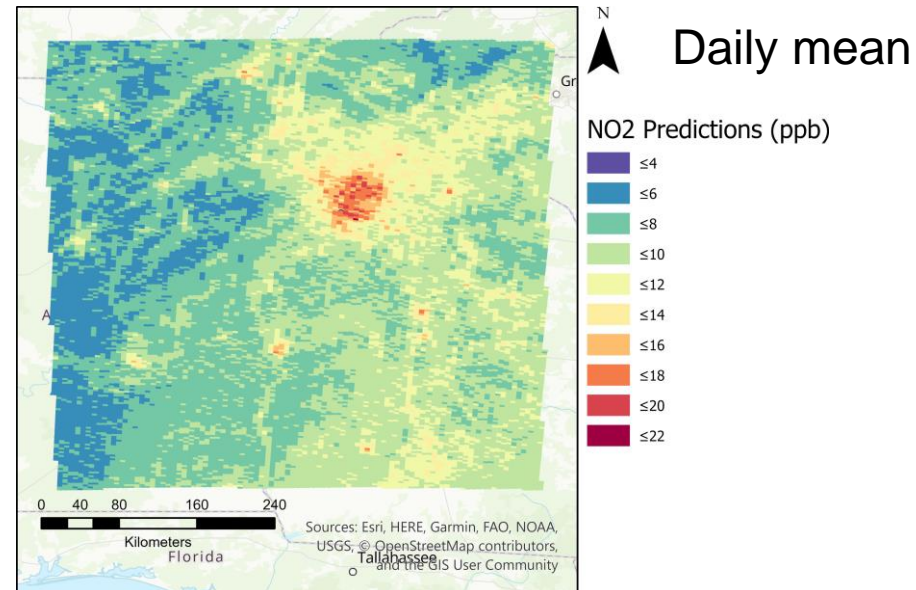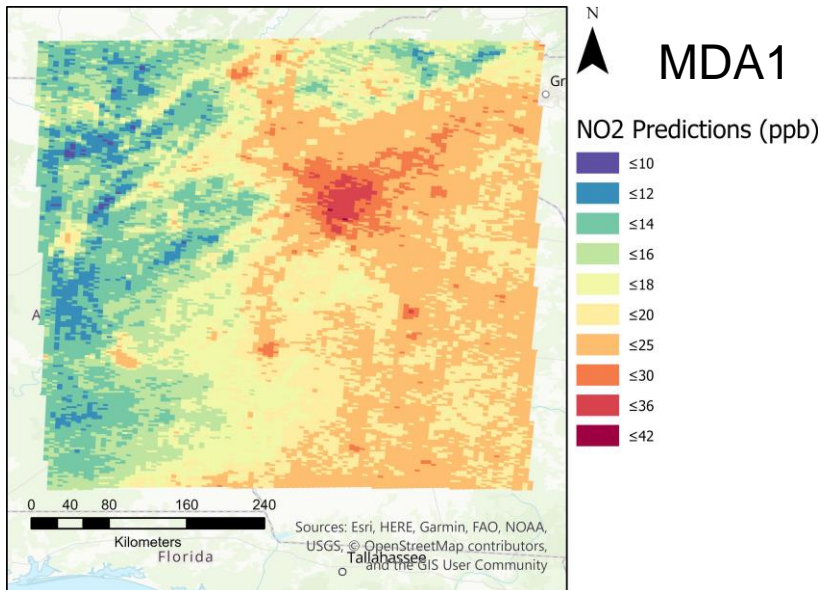
Prediction Maps on 06/05/2018

Prediction Maps on 11/29/2018

Plan for the Rest of the NCE

- NYC
  - Make sure NYC can adopt model codes to generate their own PM2.5 mass concentration
  - Make sure NYC can pull MAIA data from NASA Earthdata seasonally
- GA EPD
  - Collaborate with GA EPD to assess the value of satellite data in monitoring NO2 levels in GA
  - Try TEMPO data?