

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

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**October 12, 2021**



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# Project Goals



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- Prepare air quality and public health stakeholders for data from the next-generation satellite instruments such as MAIA, TEMPO, and GOES-R series
- Use actual or synthetic data of these instruments to demonstrate how the new information can enhance stakeholders' decision support activities



# Study Aims after Descoping

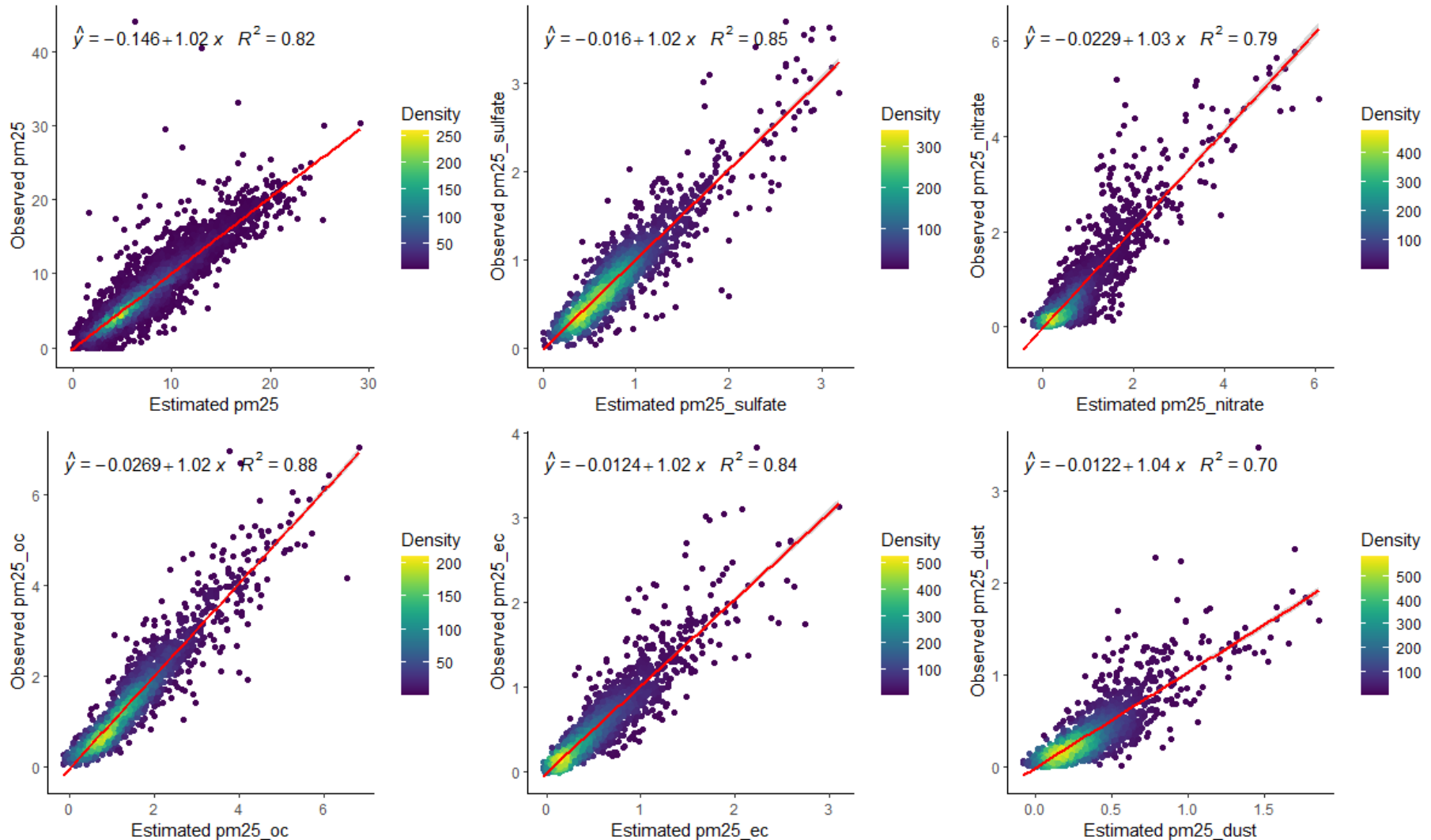
- NYC – no change after communication
- Decision support systems: (1) Community Air Survey (NYCCAS) - to evaluate how air quality differs across New York City, (2) Syndromic Surveillance of ED visits for emergency response and situational awareness
- Proposed deliverables: (1) generate synthetic MAIA PM<sub>2.5</sub> speciation data, and (2) develop daily PM<sub>2.5</sub> model with GOES-R AOD

We developed a Bayesian downscaler similar to MAIA's operational L4 PM product algorithm for NYC using U. Iowa's WRF-Chem simulations in 2018.



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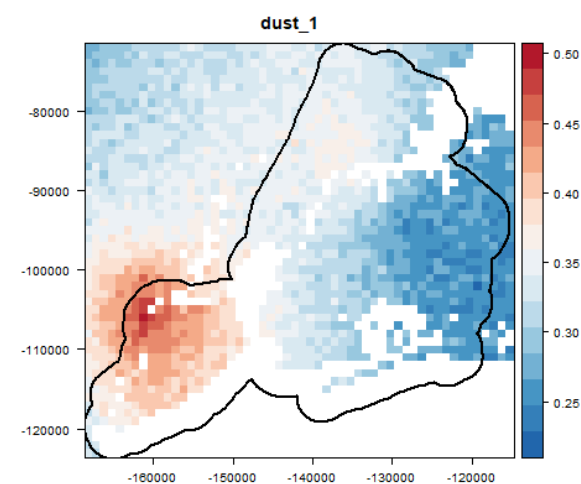
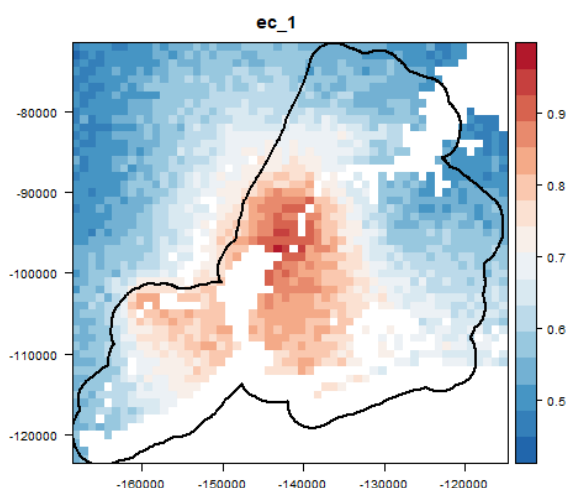
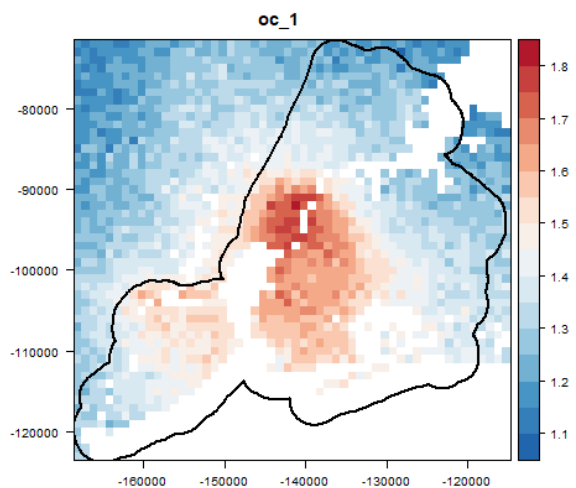
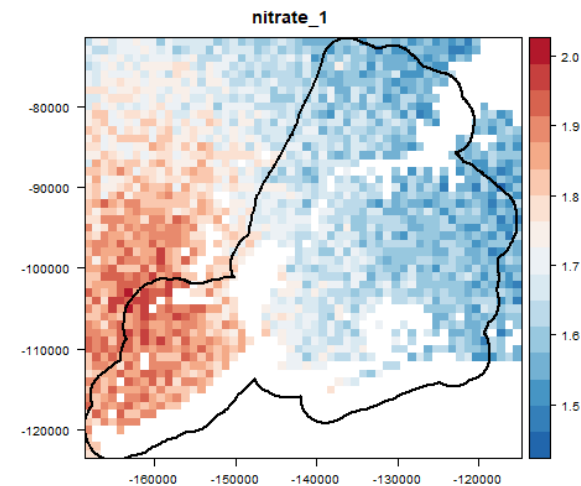
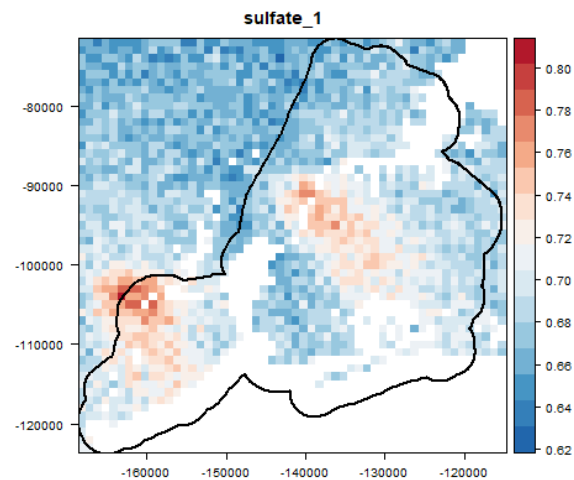
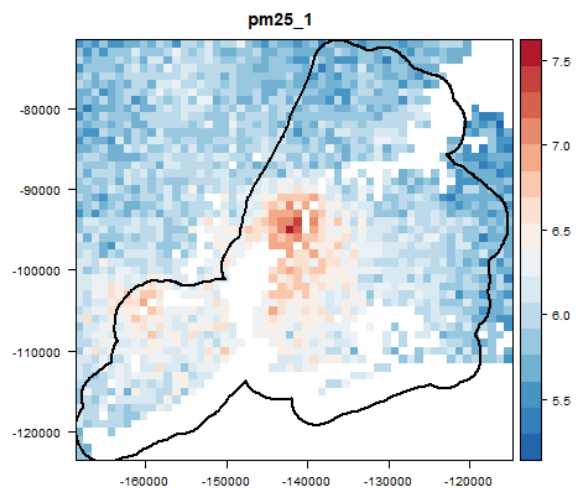


# Model Prediction Surfaces



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# Work During NCE

- Communicate with New York City Department of Health and Mental Hygiene on data quality and analytical support to compare with existing methods
- Package PM2.5 product into MAIA L4 netCDF file template
- Complete development of the daily PM2.5 model using GOES-16 AOD data – massive data volume and a potential challenge for stakeholder use
- Generate daily PM2.5 concentrations to support NYC's Syndromic Surveillance program
- Expected end of project ARL: 7 (Functionality Demonstrated)

# GA EPD study aims after Descoping



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- Change of scope after communication
- Decision support system: CMAQ NO<sub>2</sub> simulations
- Proposed deliverables: (1) WRF-Chem simulations of ground level NO<sub>2</sub> in 2018; (2) a data fusion model with OMI/TROPOMI, WRF-Chem data, and ground observations as input; (3) gridded predicted MDA1 NO<sub>2</sub> concentrations

# Work During NCE



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- WRF-Chem simulation complete. Compile other data in Emory.
- Process extra NO<sub>2</sub> measurements from a GA EPD research site to enhance spatial coverage
- Complete NO<sub>2</sub> model development
- Work with GA EPD on result interpretation and evaluate value of information
- Expected end of project ARL: 7 (Functionality Demonstrated)



# Other research products last year



- Manuscripts:
  - Vu B, Bi J, Wang W, Huff A, Kondragunta S, Liu Y. Application of geostationary satellite and high-resolution meteorology data in estimating hourly PM<sub>2.5</sub> levels during the Camp Fire episode in California. Remote Sens Environ. Revision submitted.
  - Gladson L, Garcia N, Bi J, Liu Y, Cromar K. Evaluating the Utility of High-Resolution Spatiotemporal Data in Estimating Local Air Pollution Exposures in 92 California Cities from 2015-2018. Atmosphere. Submitted.
  - Zhang, H., J. Wang, et al., Development of UI-WRF-Chem for MAIA satellite mission: case demonstrations. Geoscientific Model Development. In preparation.
- Presentations in ISEE (Cromar), Asthma, Airways and the Environment Conference (Cromar), MAC-MAQ (Liu), NIEHS Meeting on Integrating Multiscale Geospatial Environmental Data into Large Population Health Studies (Liu)