Merged LEO-GEO Tropospheric NO_2 Product

Thomas Ely - Mentors: Dr. Shobha Kondragunta, Dr. Zigang Wei

Objective

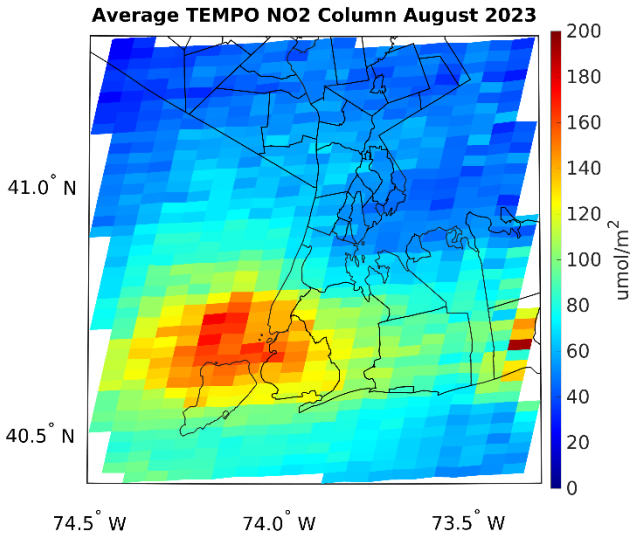
- Use low Earth orbit (LEO) satellite NO_2 dataset to improve quality of geostationary (GEO) satellite NO_2 dataset
- Compare results with PANDORA ground-based spectrometer data
- Track air quality at a local level, especially in coastal cities like New York City and Baltimore

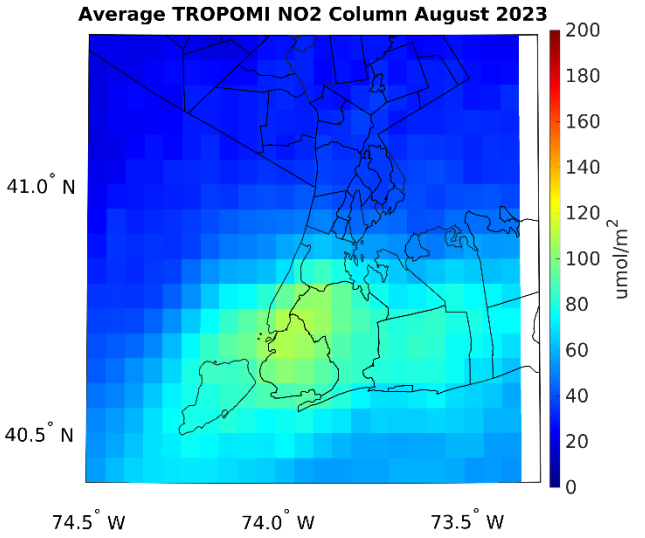
Methodology

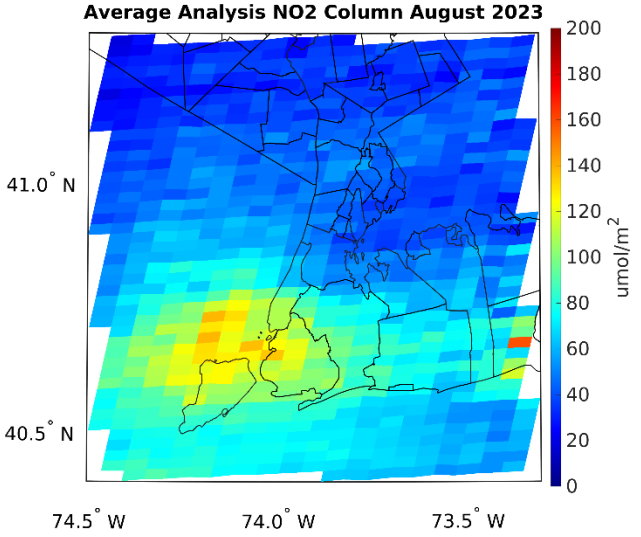
- Kalman Filter algorithm
  - $K = P^b H^T \left(HP^b H^T + R\right)^{-1}$
  - $X^a = X^b + K(X^O - HX^b)$

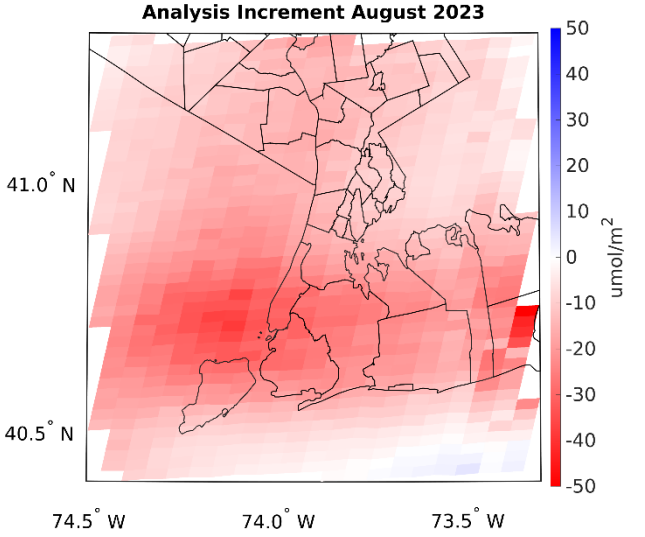
Results

- Reduction in bias between merged data and PANDORA from background data
- Correlation between results and PANDORA improved for NYC, but not MD









This study is supported by The National Oceanic and Atmospheric Administration – Cooperative Science Center for Earth System Sciences and Remote Sensing Technologies (CESSRST-II) under the Cooperative Agreement Award #NA22SEC4810016. The authors would like to thank the NOAA Office of Education, The Educational Partnership Program with Minority Serving Institutions (NOAA-EPP/MSI) and the NOAA-CESSRST-II for full fellowship support for Thomas Ely. The statements, findings, conclusions and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA.