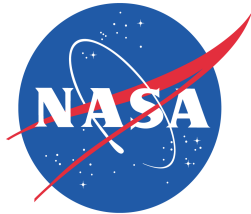


Source Attribution Using Satellite Products and Models to Inform Air Quality Planning and Health Accountability



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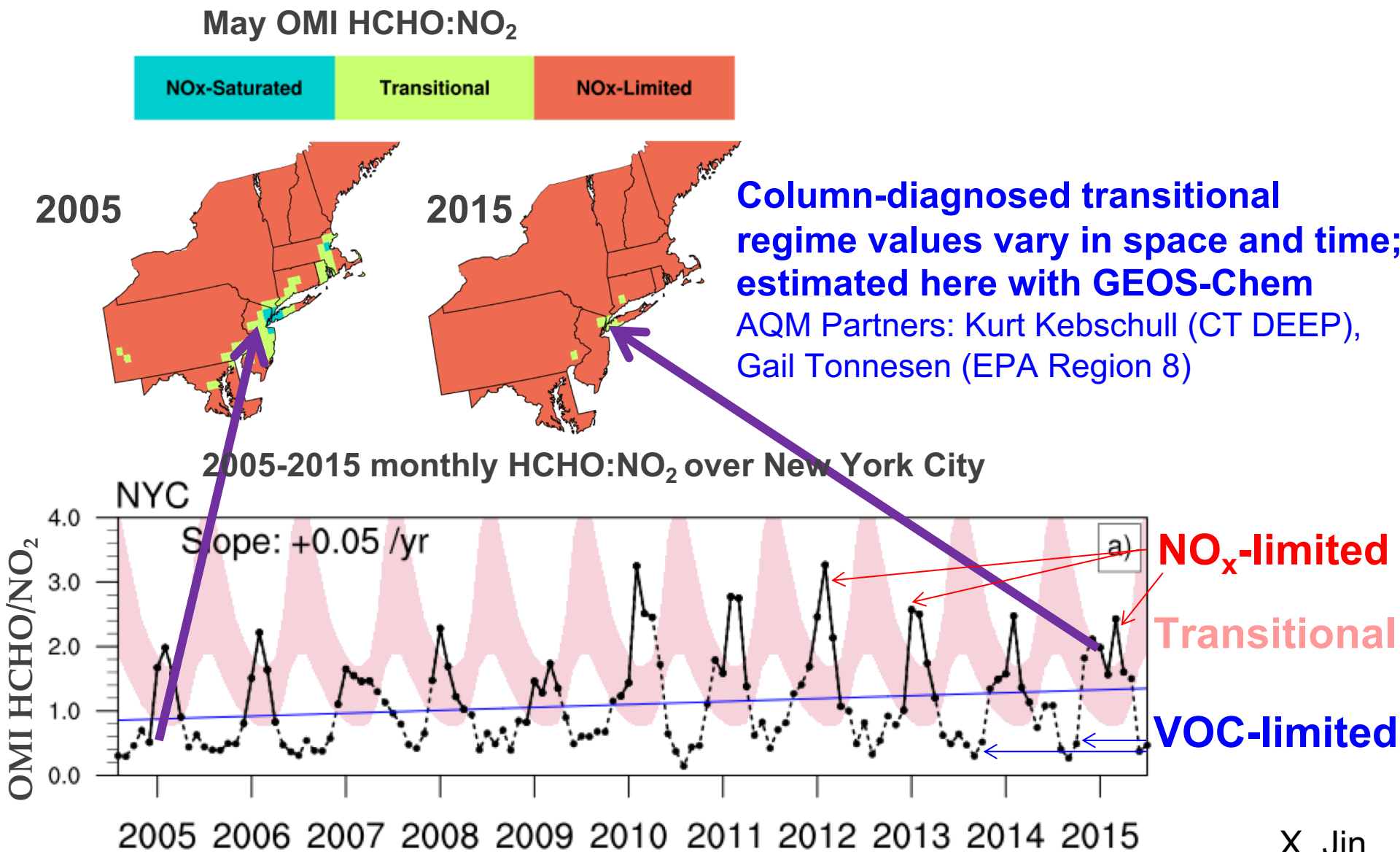
Xiaomeng Jin (CU/LDEO graduate student)

Collaborators: Joe Pinto, Pat Dolwick, Luke Valin (U.S. EPA)
Tabassum Insaf (NYSDOH), Mike Ku (NYSDEC),
Randall Martin & Aaron van Donkelaar (Dalhousie),
Bryan Duncan & Lok Lamsal (NASA GSFC)



HAQAST1
Emory University
Atlanta, GA
November 4, 2016

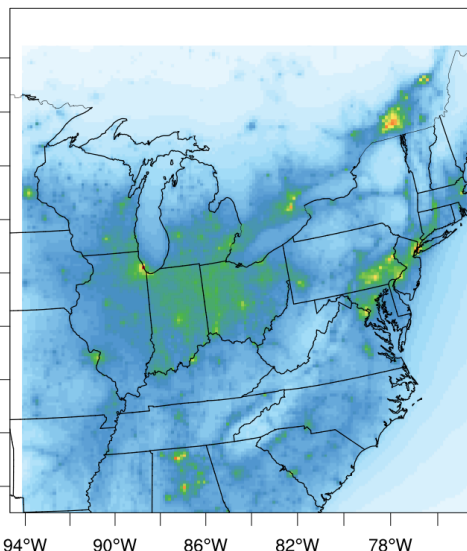
OMI satellite products indicate continued efficacy of ground-level ozone abatement via regional NO_x emission controls



Evaluating existing and newly derived annual mean PM_{2.5} products for the NE U.S.A. (2011)

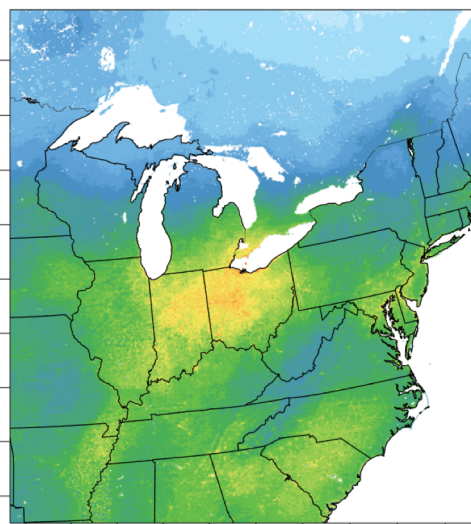
CMAQ

(c/o NYSDEC)



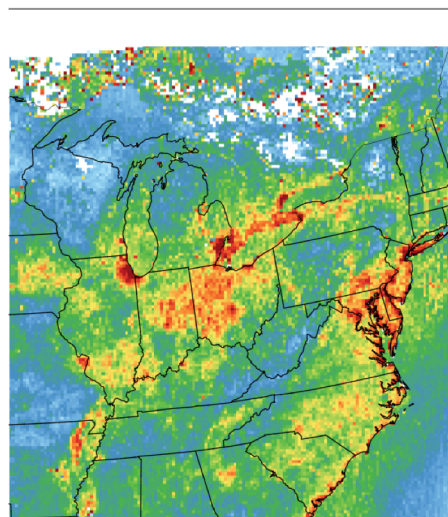
Multi-satellite/in situ/model fusion

(van Donkelaar et al., 2016)



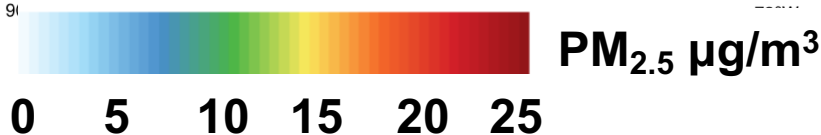
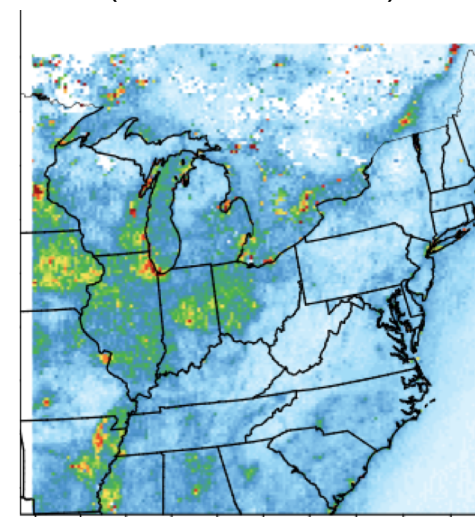
MODIS-derived via GC AOD:PM

(X. Jin, HAQAST)



MODIS-derived via CMAQ AOD:PM

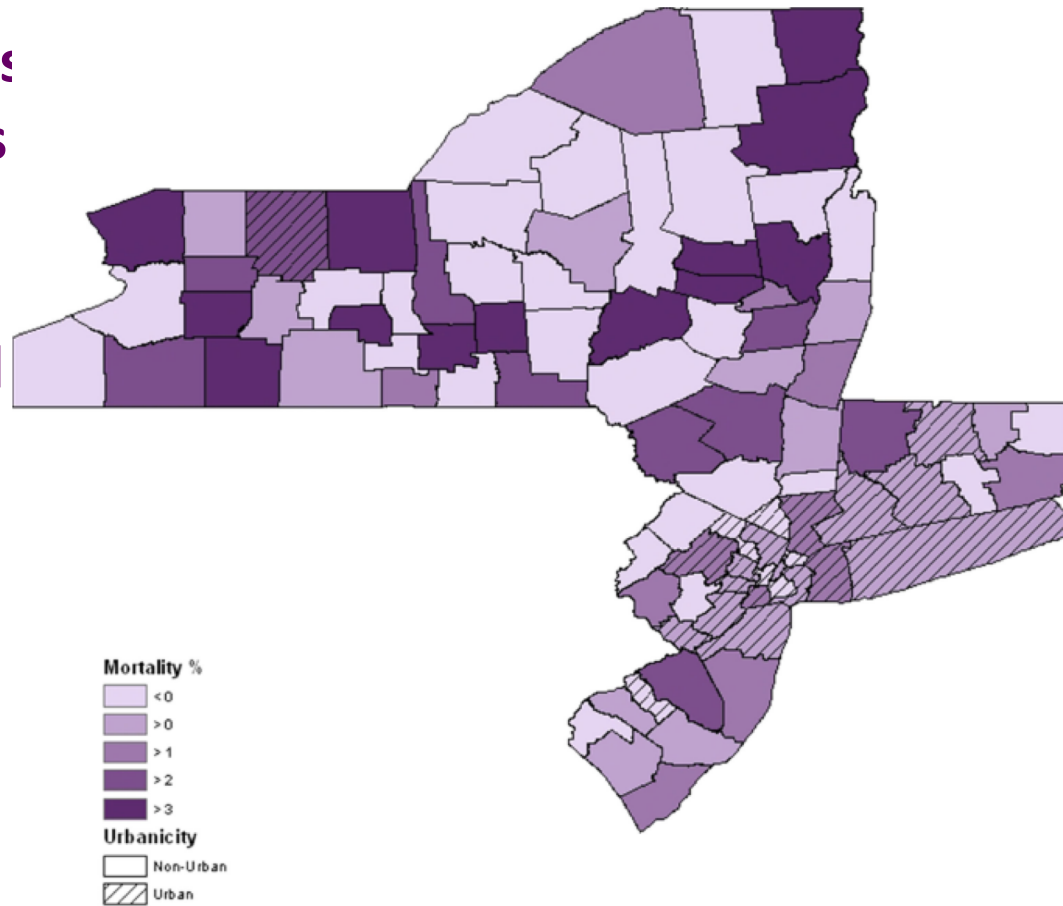
(X. Jin, HAQAST)



- Gauge uncertainties via different approaches
- Determine 'best estimate' for NYS health impacts studies; try seasonal/daily exposure maps
- New tool: with Gabriele Curci (University of L'Aquila), adapted GEOS-Chem FlexAOD to calculate CMAQ AOD

Health Impact Analyses

- Quantitative risk assessments for multiple health outcomes in response to modeled/measured changes in (source-specific) $\text{PM}_{2.5}$ and O_3 .
- Determine empirical associations between air pollution and hospital admissions and emergency department visits using time series regression methods.



**% Change in Mortality per 10 ppb
Change in MD8 Ozone**

From: Madrigano, Jack, Anderson, Bell and Kinney, **Temperature, ozone and mortality in urban and non-urban counties of the northeastern U.S.**, Environmental Health, 2015

Objectives of our proposed core activities

- Conduct a multi-pollutant health impact analysis for at least the past decade over NYS
- Attribute background vs. U.S. anthropogenic sources of pollution for linkage to health analyses on inter-annual to daily (where possible) time scales
- Estimate uncertainties in satellite-based and modeling approaches to source attribution and to exposure mapping at multiple time and space scales