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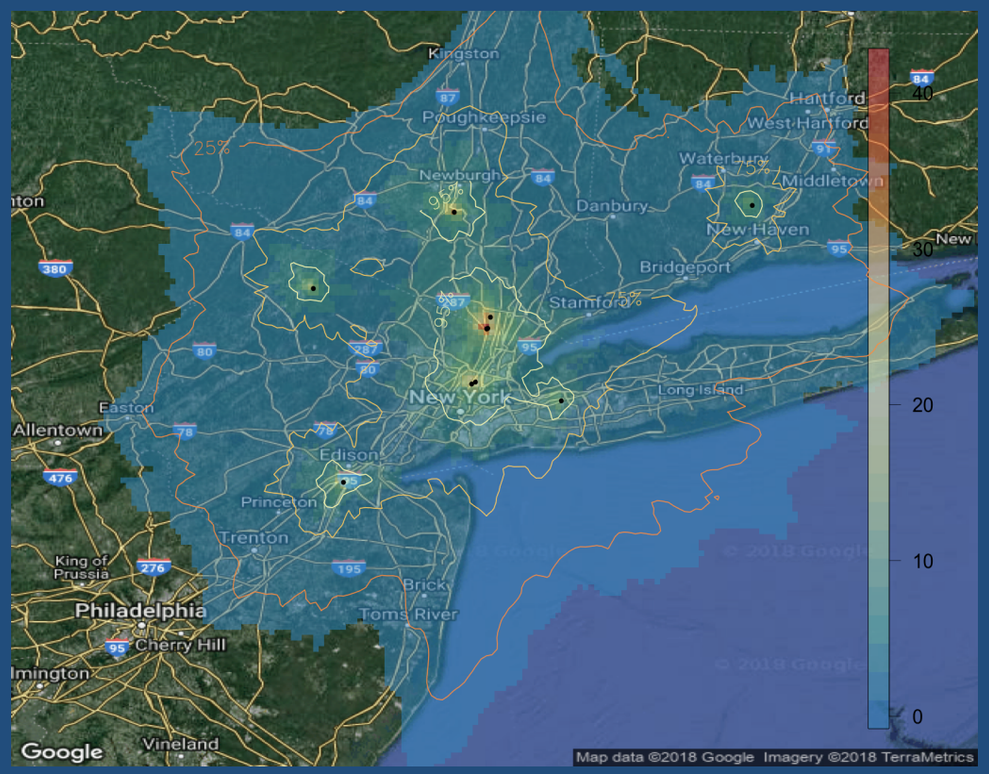
Relating concentrations and fluxes in urban domains



Róisín Commane
Columbia University

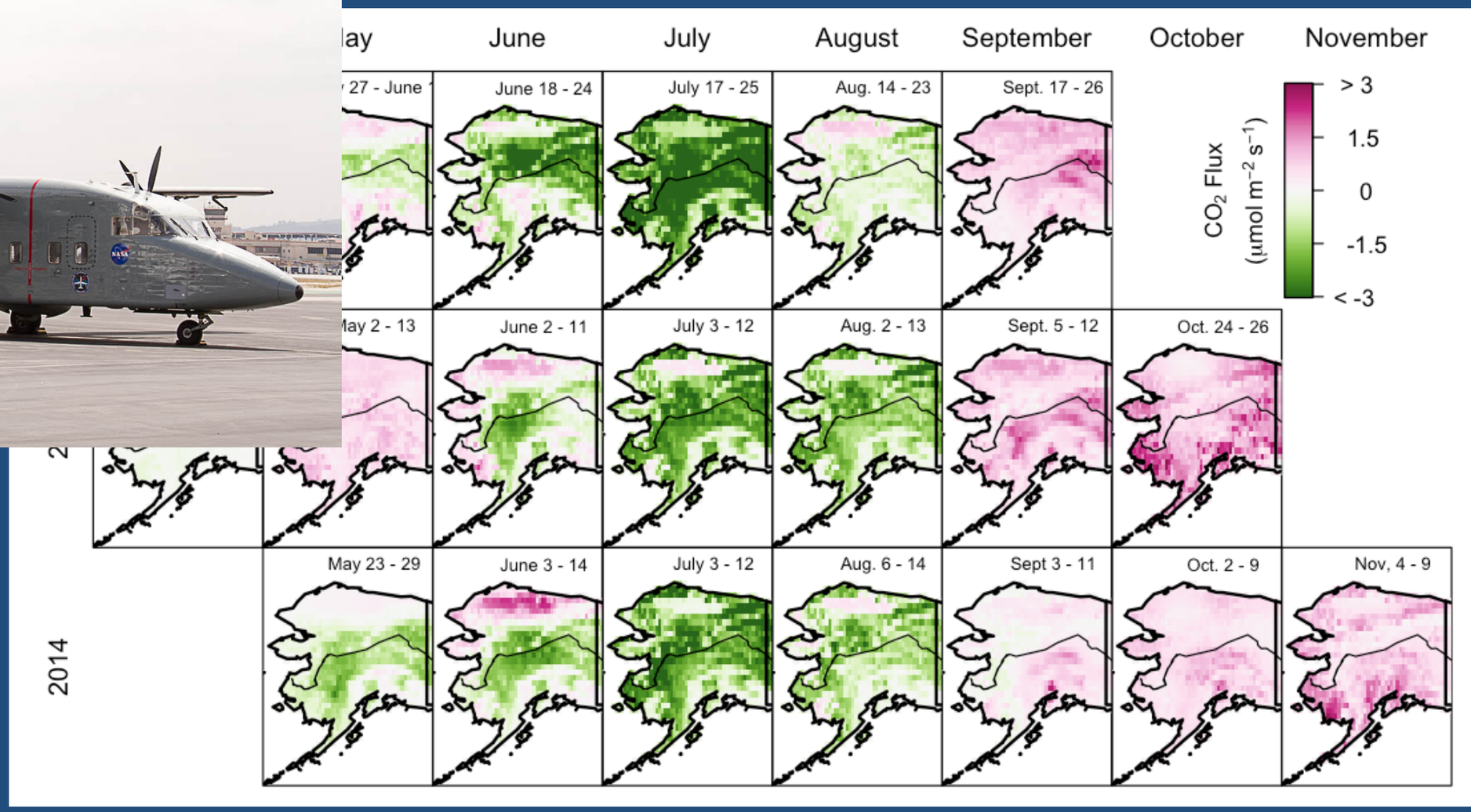
r.commane@columbia.edu

Biogenic CO_2 Fluxes: Arctic

NAS

Carbon dioxide sources from Alaska driven by increasing early winter respiration from Arctic tundra

Róisín Commane[a,b,1], Jakob Lindaas[b], Joshua Benmergui[a], Kristina A. Luus[c], Rachel Y.-W. Chang[d], Bruce C. Daube[a,b], Eugénie S. Euskirchen[e], John M. Henderson[f], Anna Karion[g], John B. Miller[h], Scot M. Miller[i], Nicholas C. Parazoo[j,k], James T. Randerson[l], Colm Sweeney[g,m], Pieter Tans[m], Kirk Thoning[m], Sander Veraverbeke[l,n], Charles E. Miller[k], and Steven C. Wofsy[a,b]



Commane, et al., 2017, PNAS

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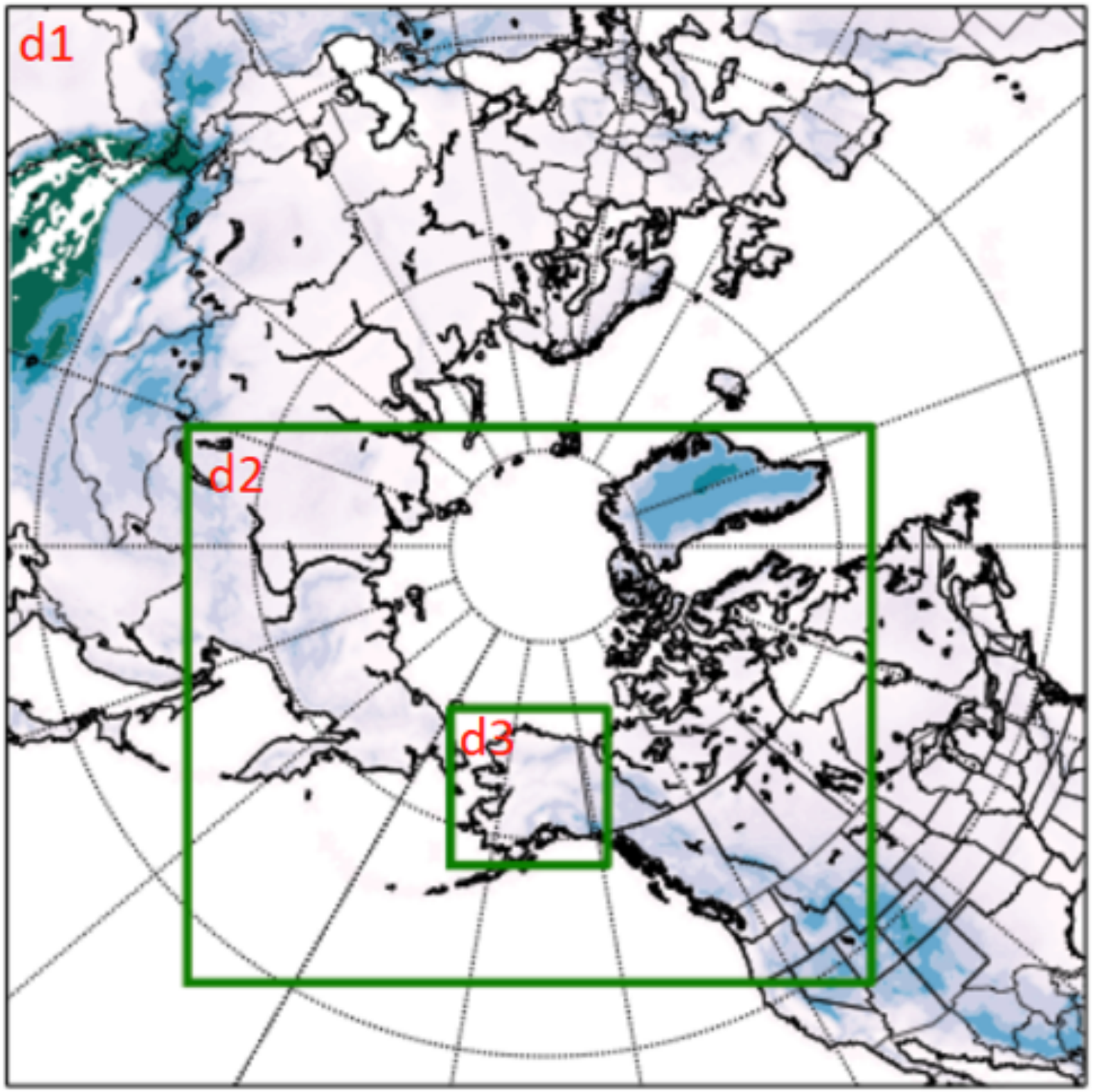
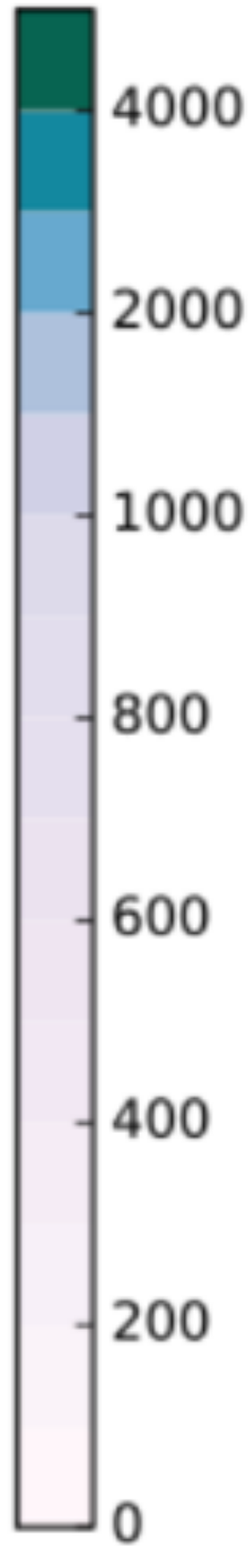
polar-WRF-STILT nested grid

d1: 30 km
d2: 10 km
d3: 3 km

Nested grid maximizes resolution over the CARVE domain

Need improved met data density for model validation

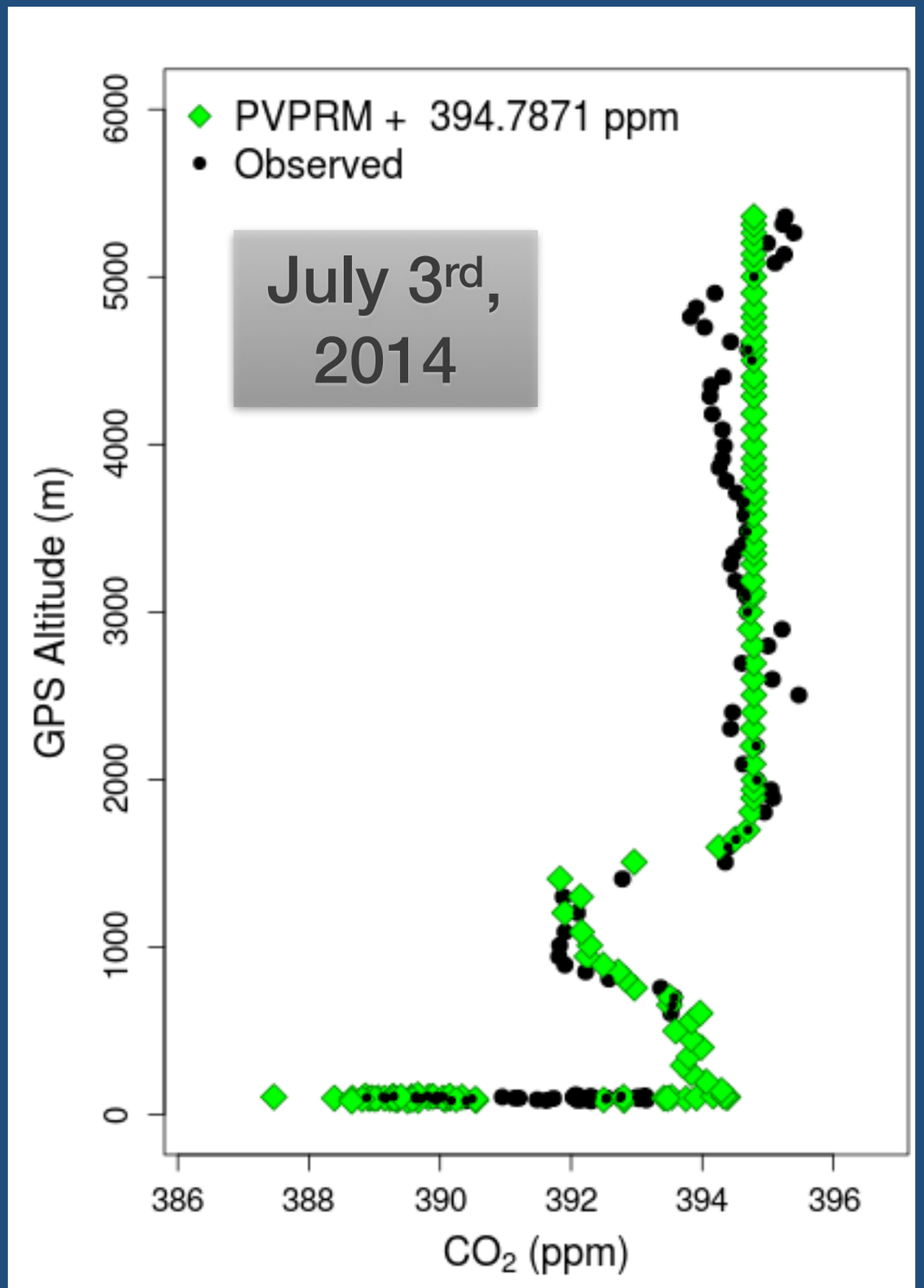




Henderson et al., Atm Chem Phys (2015)

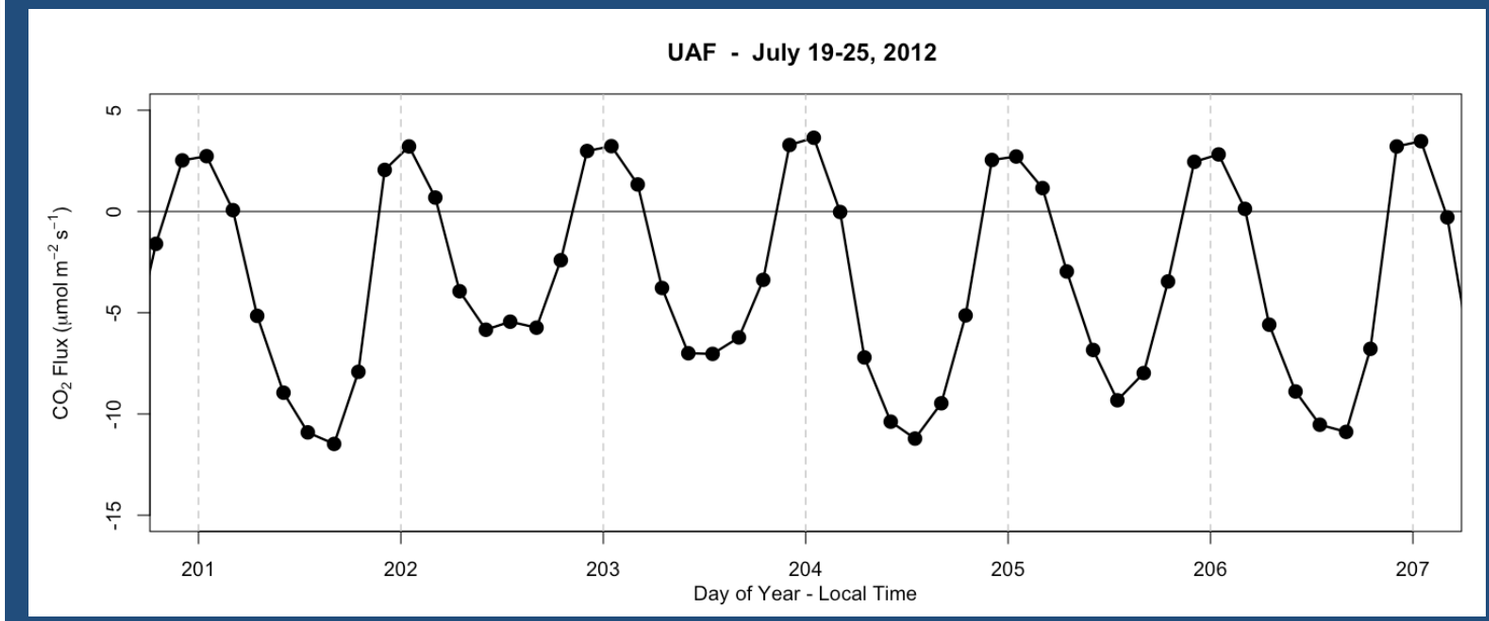
John Henderson, AER

WRF-STILT defines height of various layers
Additional flux calculated from profiles

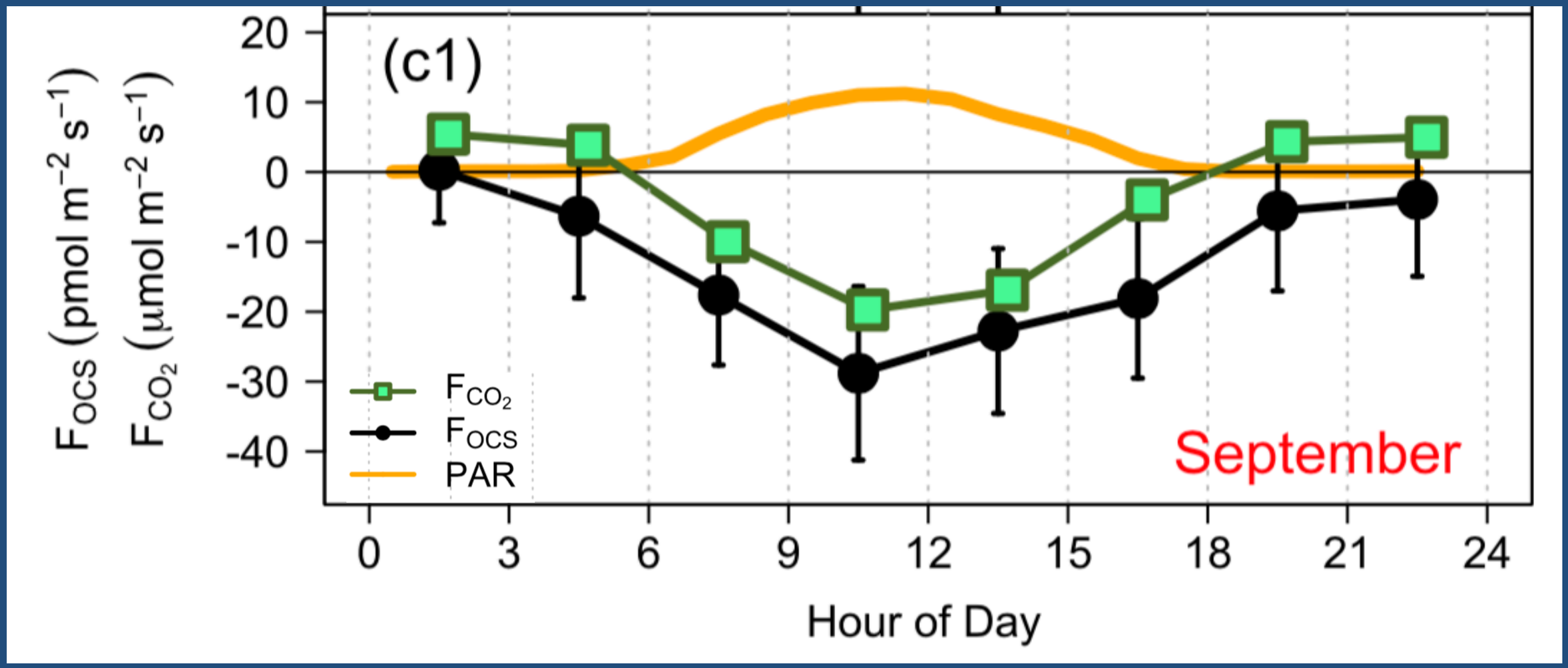


Biogenic CO_2 Flux:
PVPRM-SIF

Scaled up functional relationships with gridded met, etc.
Based on eddy flux towers in range of ecosystem types

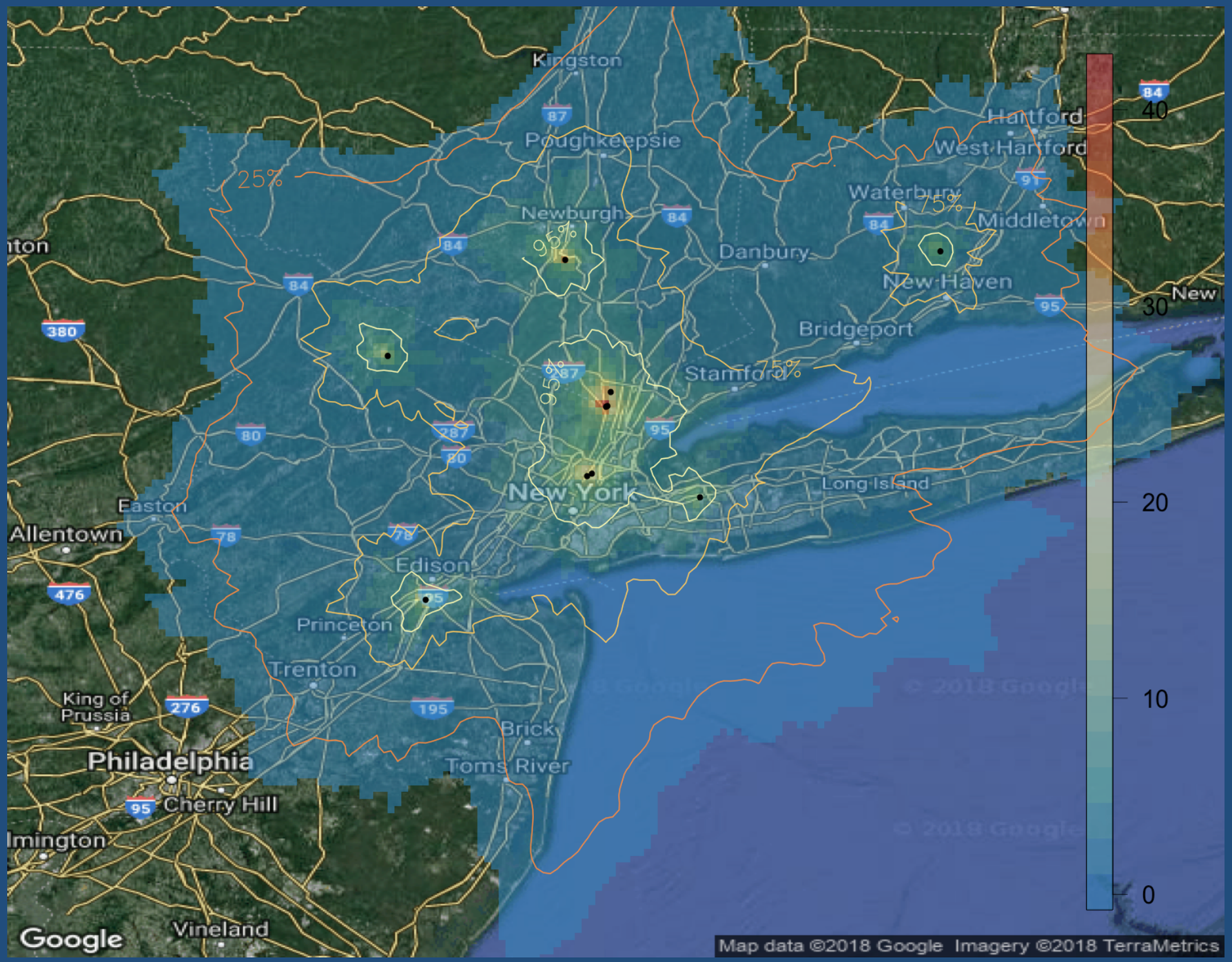


CO_2 fluxes in an oak dominated forest (Harvard Forest)



Commane, et al., 2015, PNAS

Top down: Inverse analysis



HRRR - STILT
Where do towers sample air from?

Earth Networks Sites: Mineola NY, Stockholm NJ, Hamden, CT

Proposed high precision sites: CUNY, Lamont-Doherty Earth Observatory, Blackrock Forest, Rutgers PAMS site

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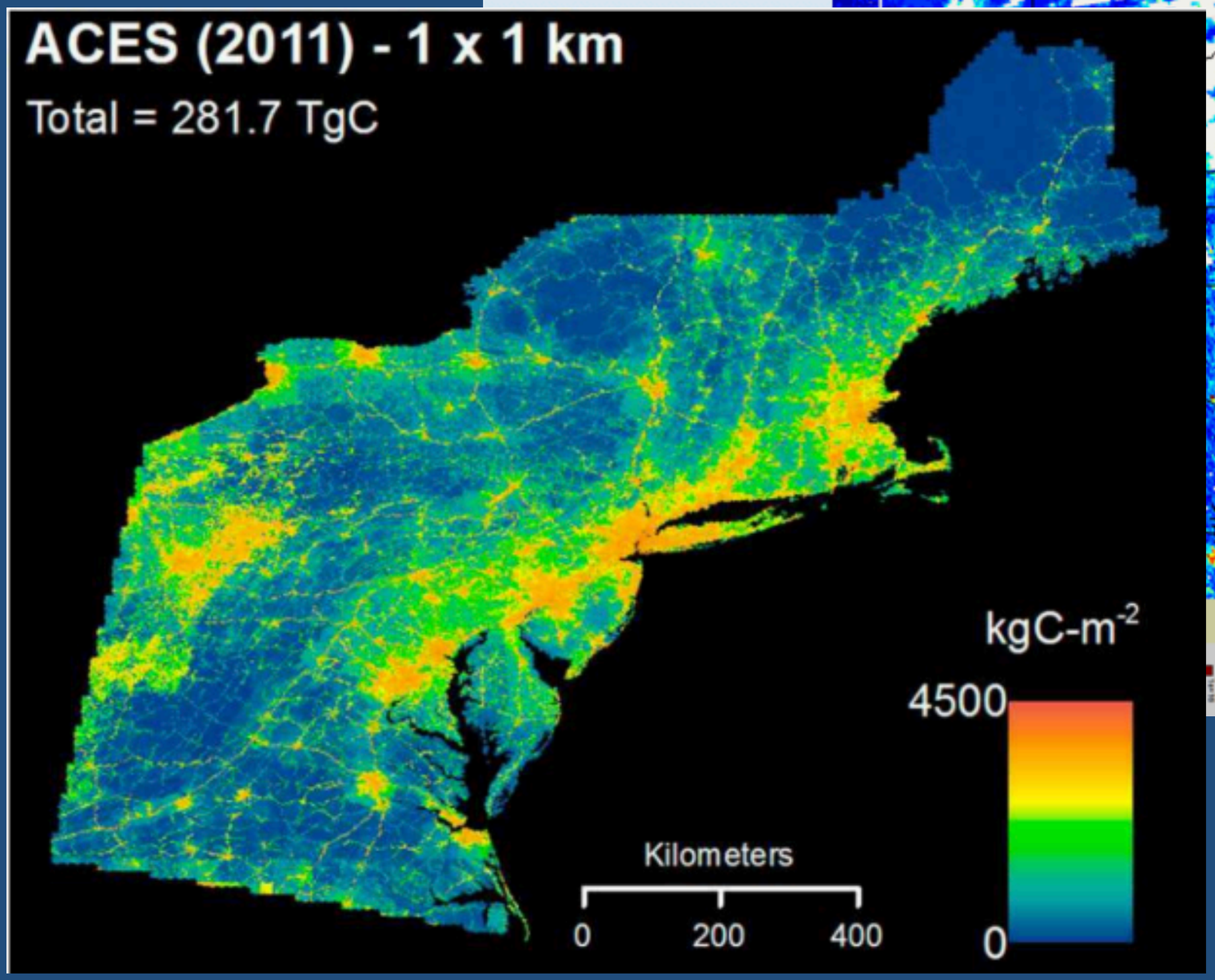
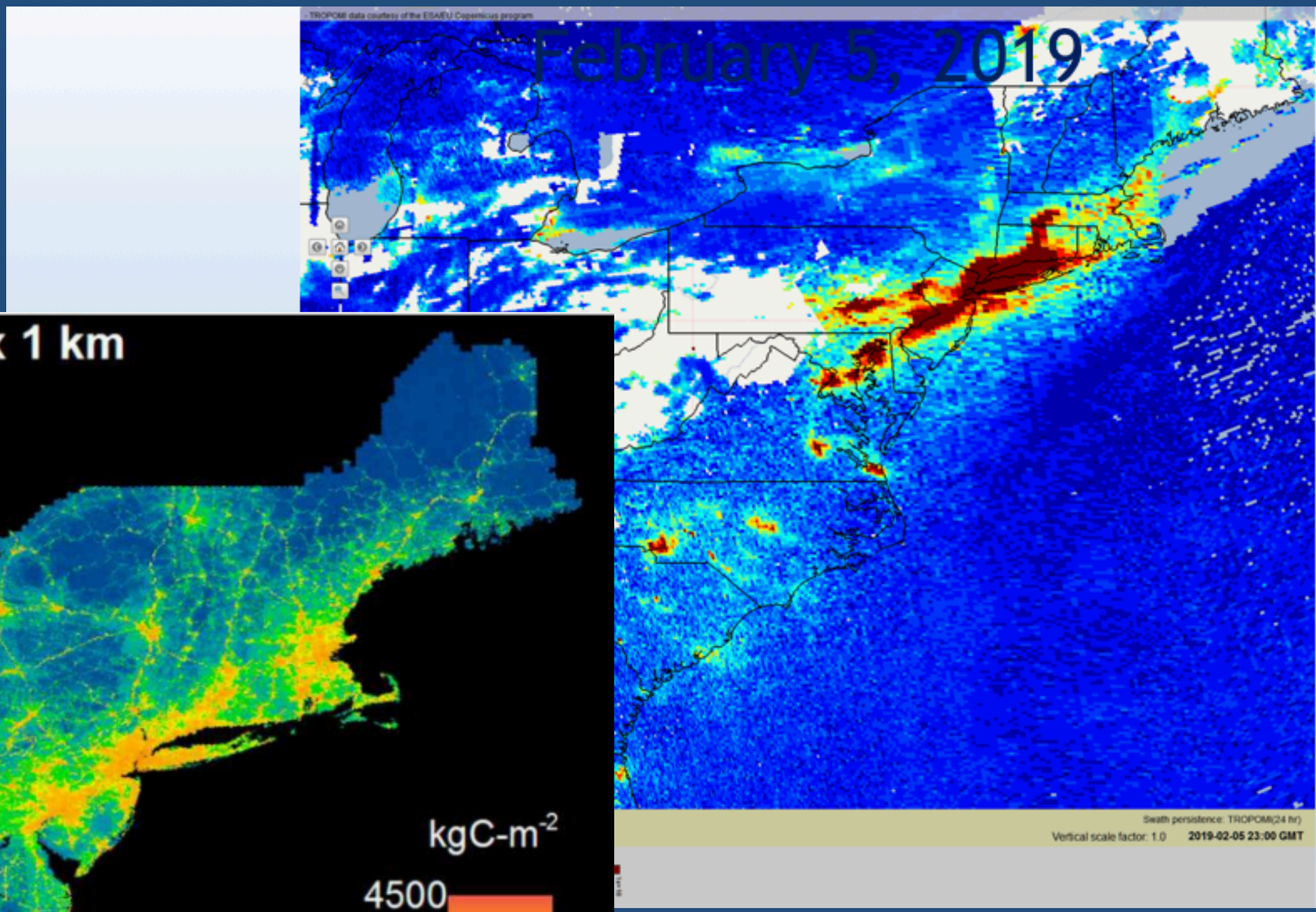
TropOMI NO2 on February 5, 2019





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