

Urban Carbon Fluxes from Anthropogenic and Biogenic Sources



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CO₂-Urban Synthesis and Analysis Workshop

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Salt Lake City, UT

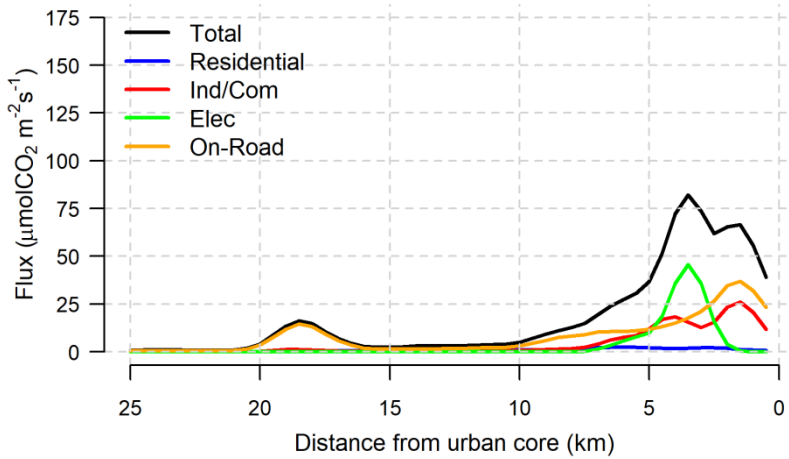
Making Inventories Play Nicely Together

- Modeling urban carbon fluxes requires diverse data
- Interoperability is a persistent challenge
- Harmonizing model inputs and outputs is time-consuming

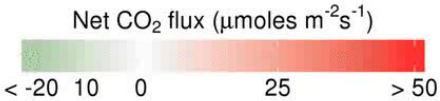
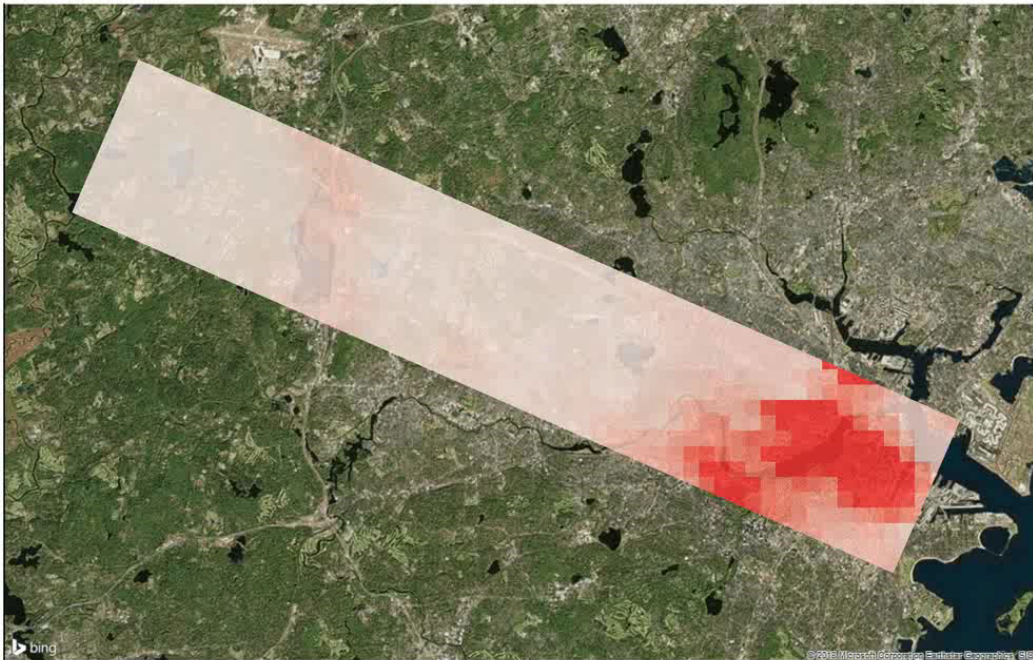
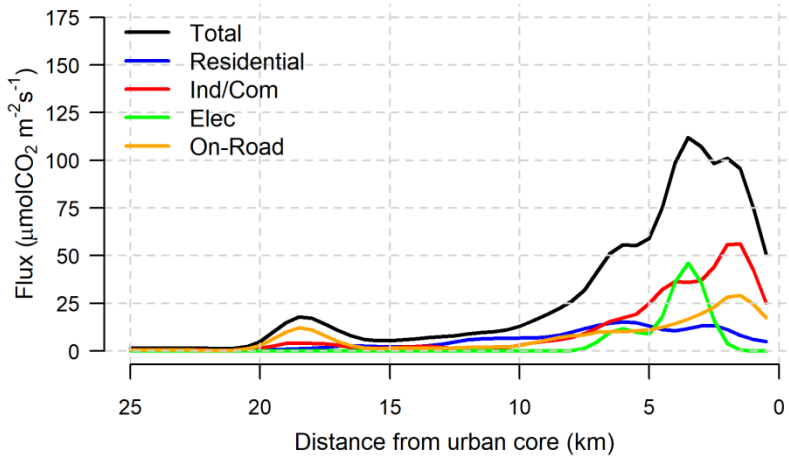


Synchronizing fossil and biosphere fluxes in time and space

Mean Daily Flux in Summer



Mean Daily Flux in Spring



May 2016

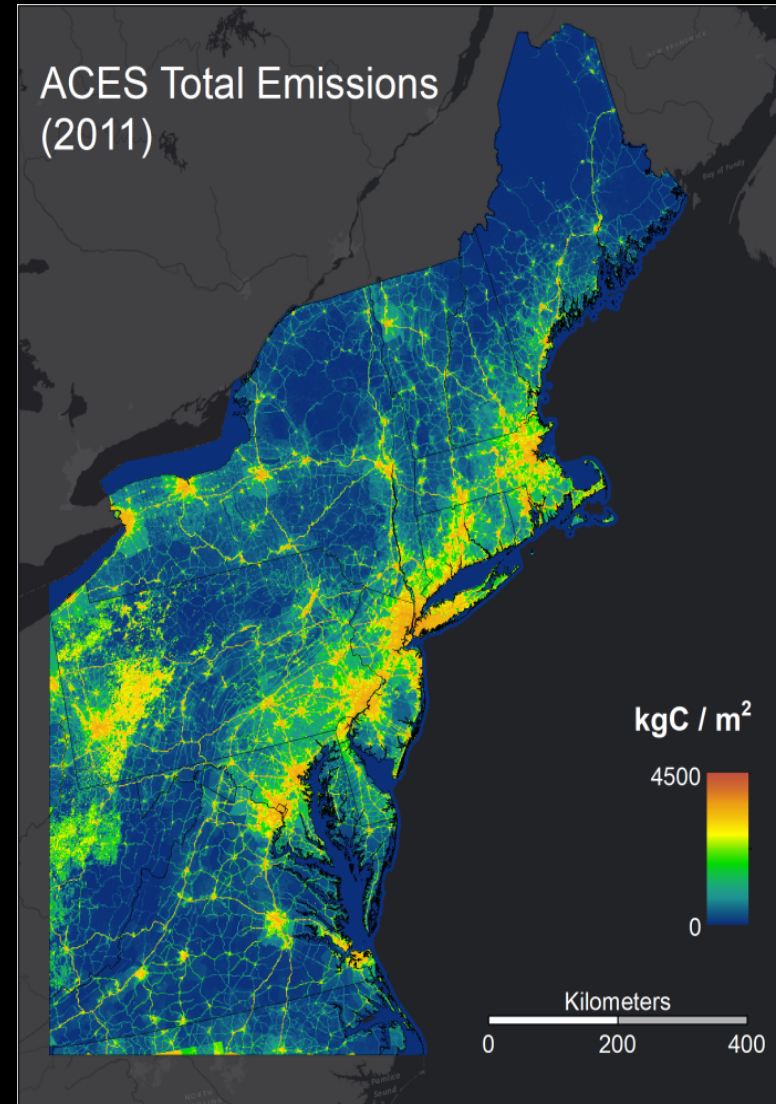
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29	30	31				

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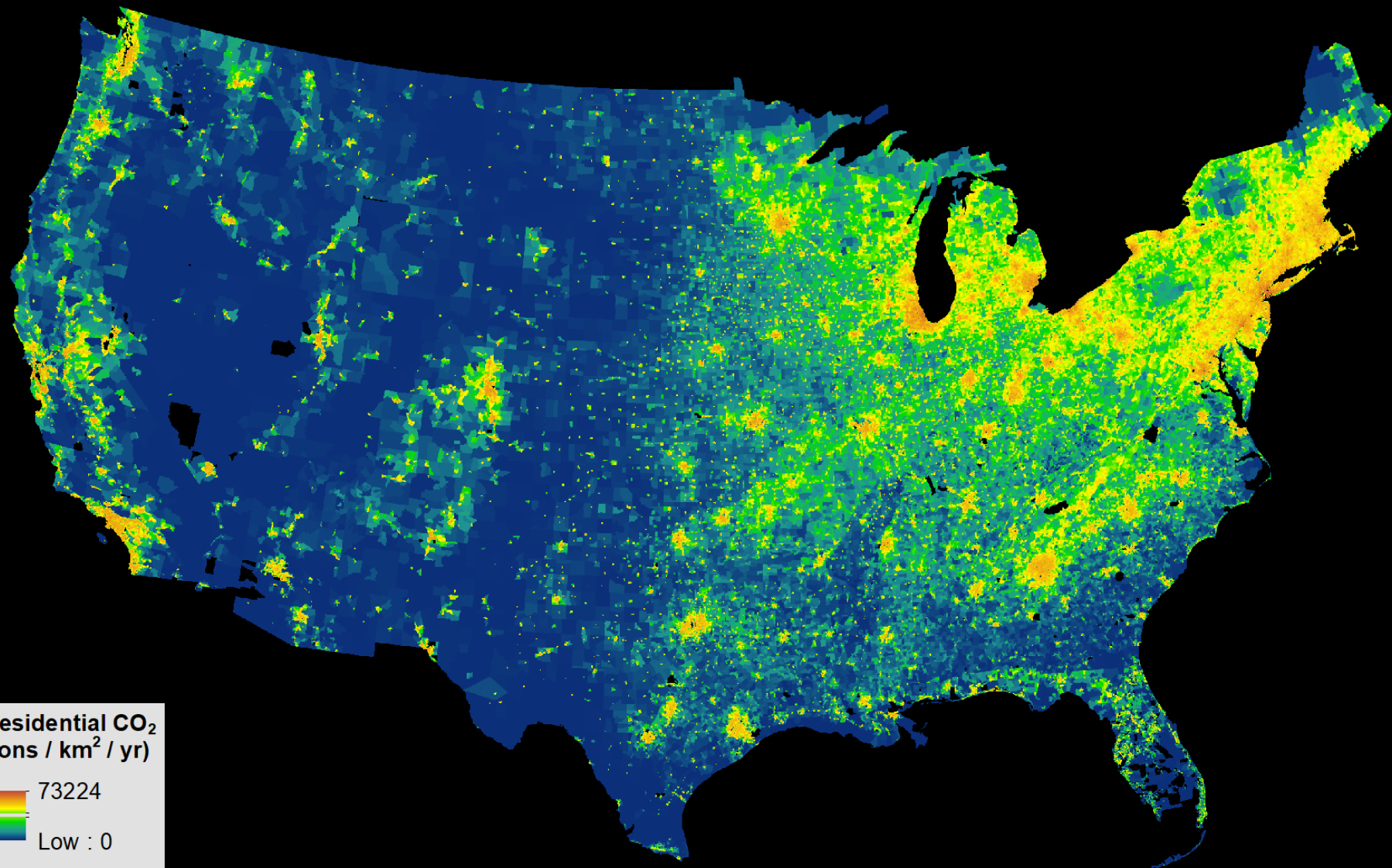
Anthropogenic Carbon Emissions System (ACES)

- High resolution (1 km², hourly) bottom-up inventory of FFCO₂ emissions
- Ten fossil fuel source sectors
- Available at ORNL DAAC: <https://daac.ornl.gov/>

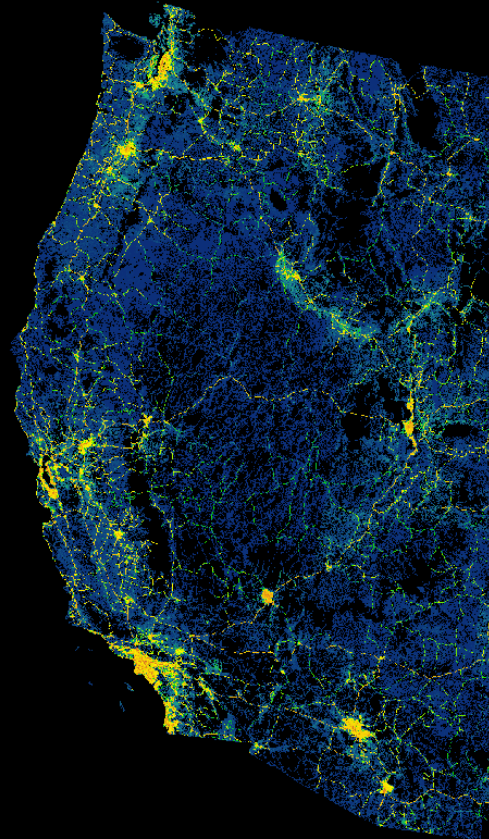
- ACES v2 covers CONUS + AK
 - Spanning years 2012-2016
 - Multiple gridded and cartographic boundary products



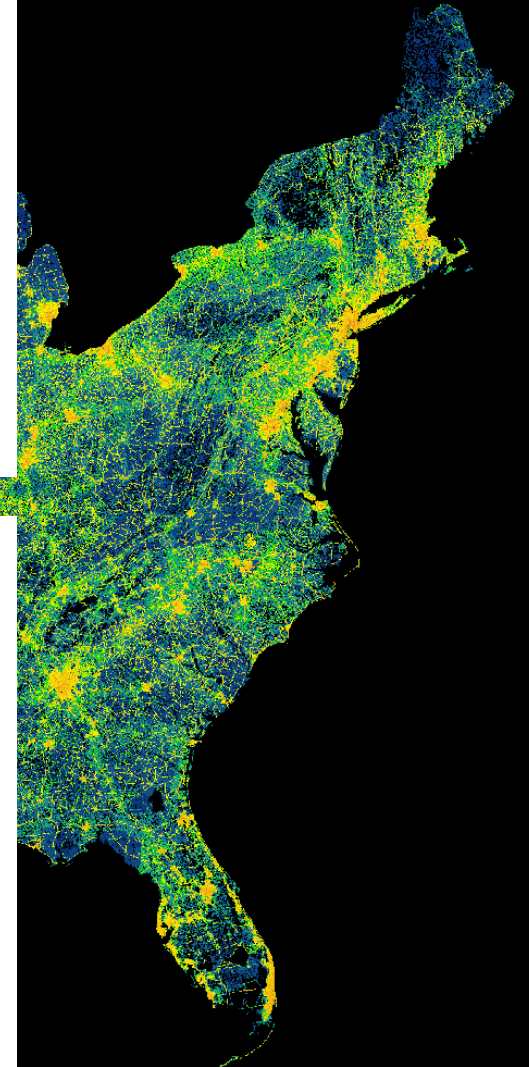
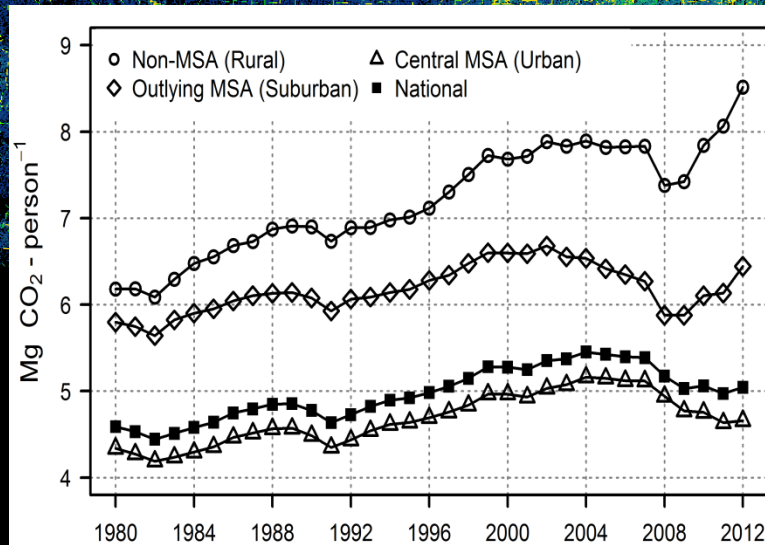
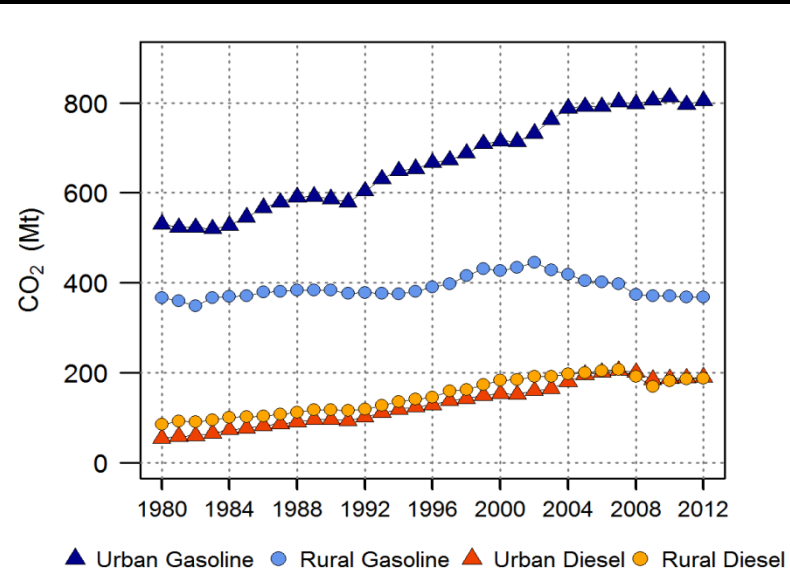
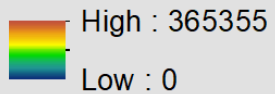
ACES v2 – Residential Sector



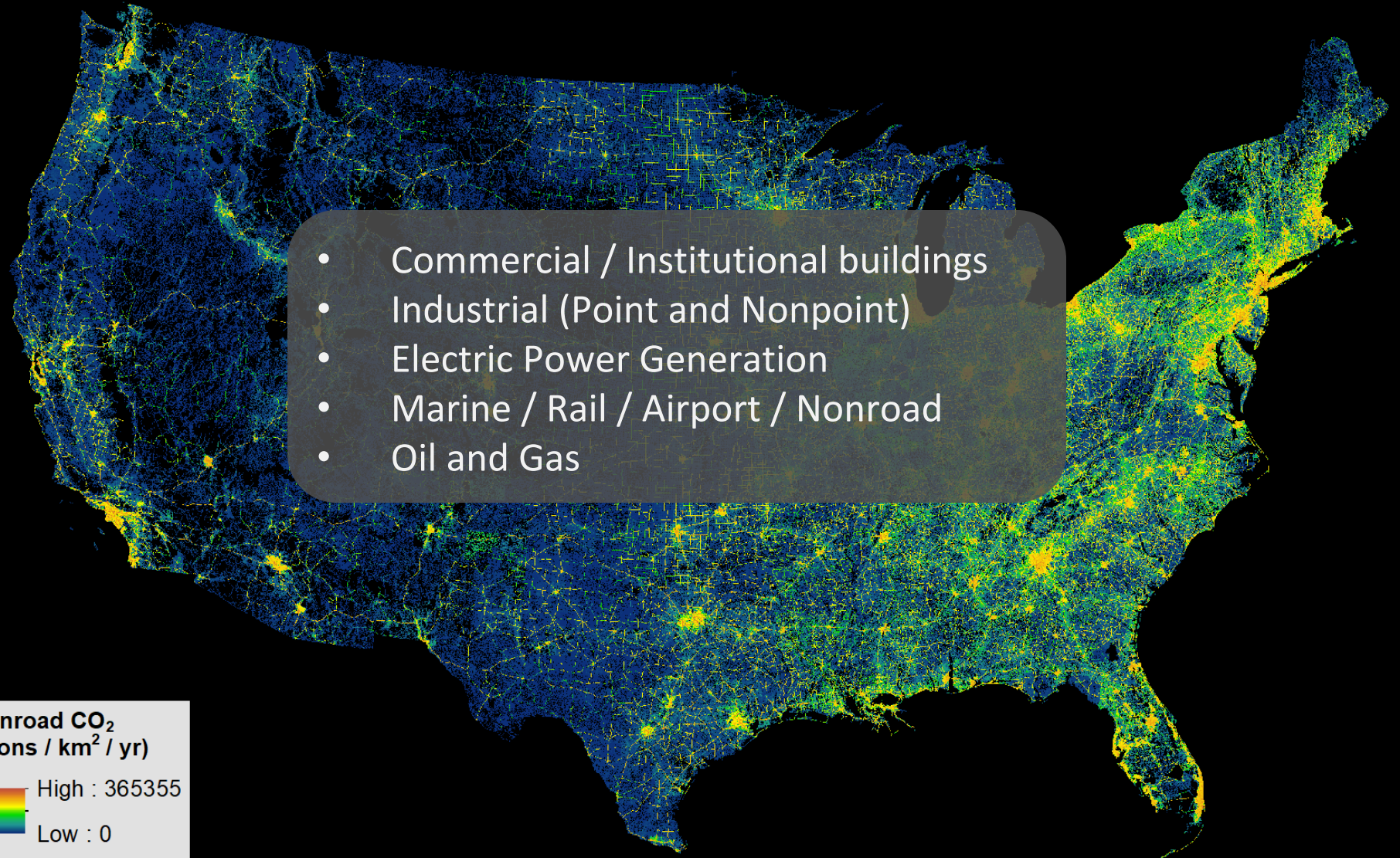
ACES v2 – Onroad Sector (DARTE v2)

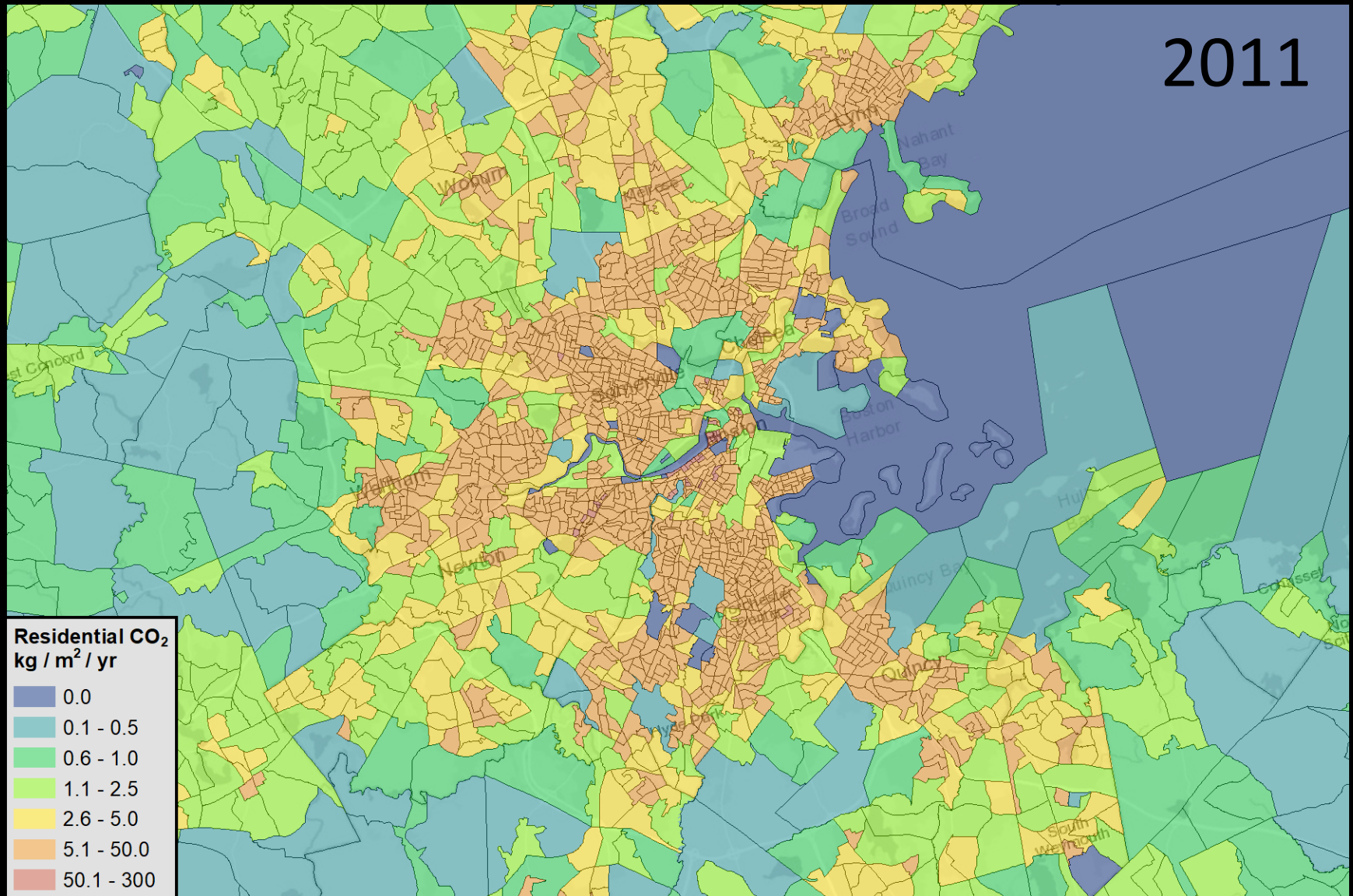


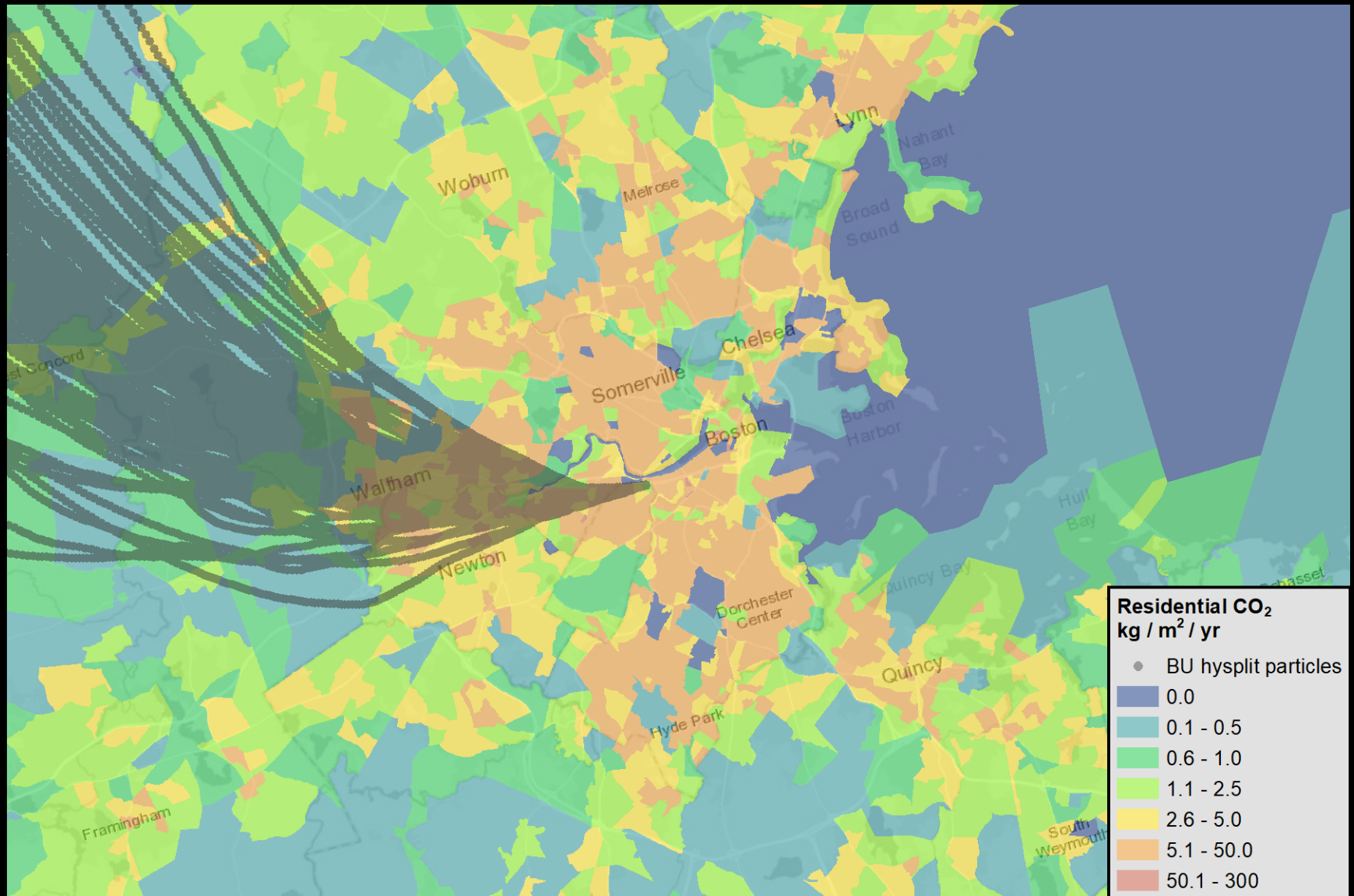
Onroad CO₂
(tons / km² / yr)

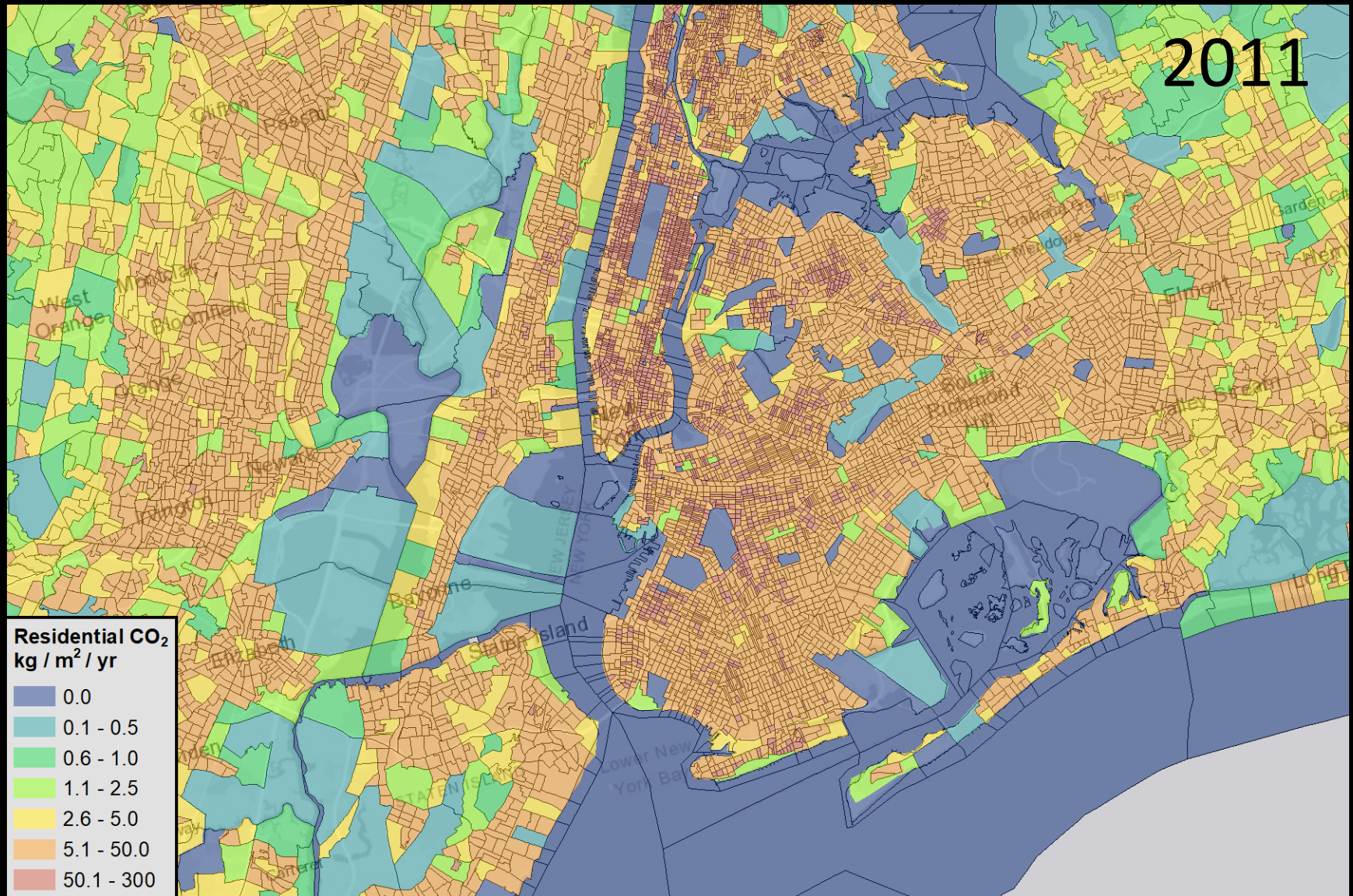


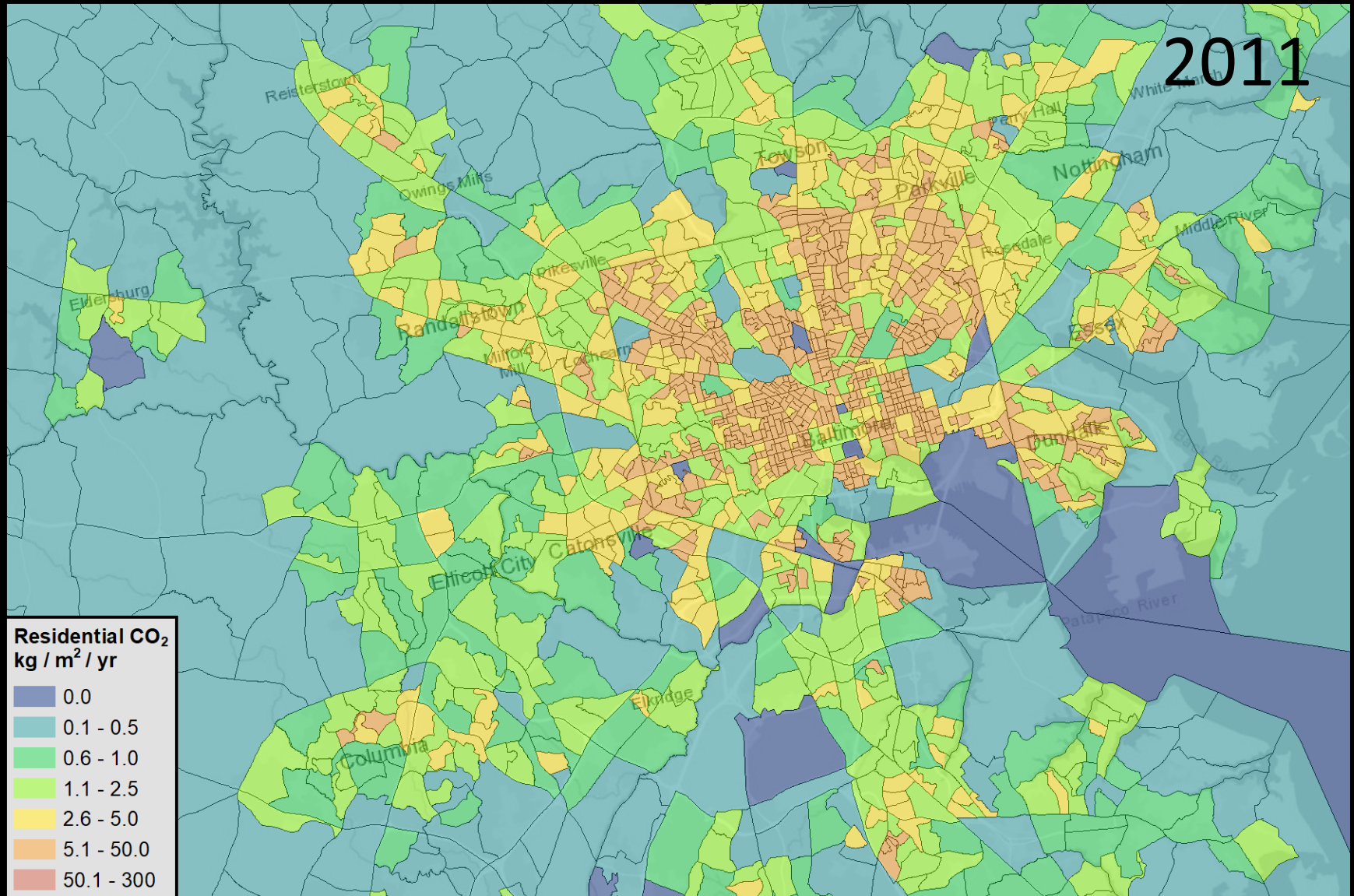
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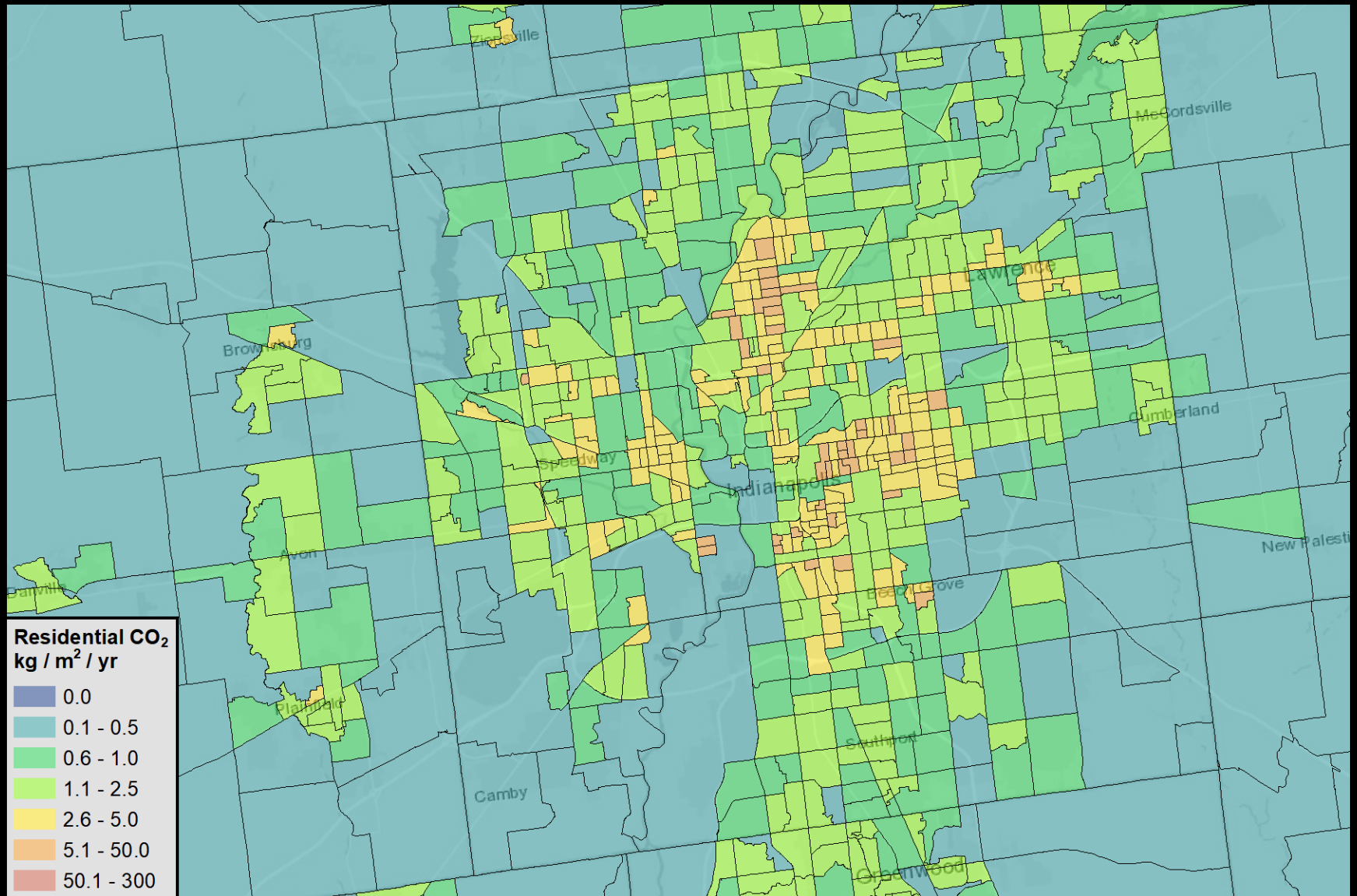


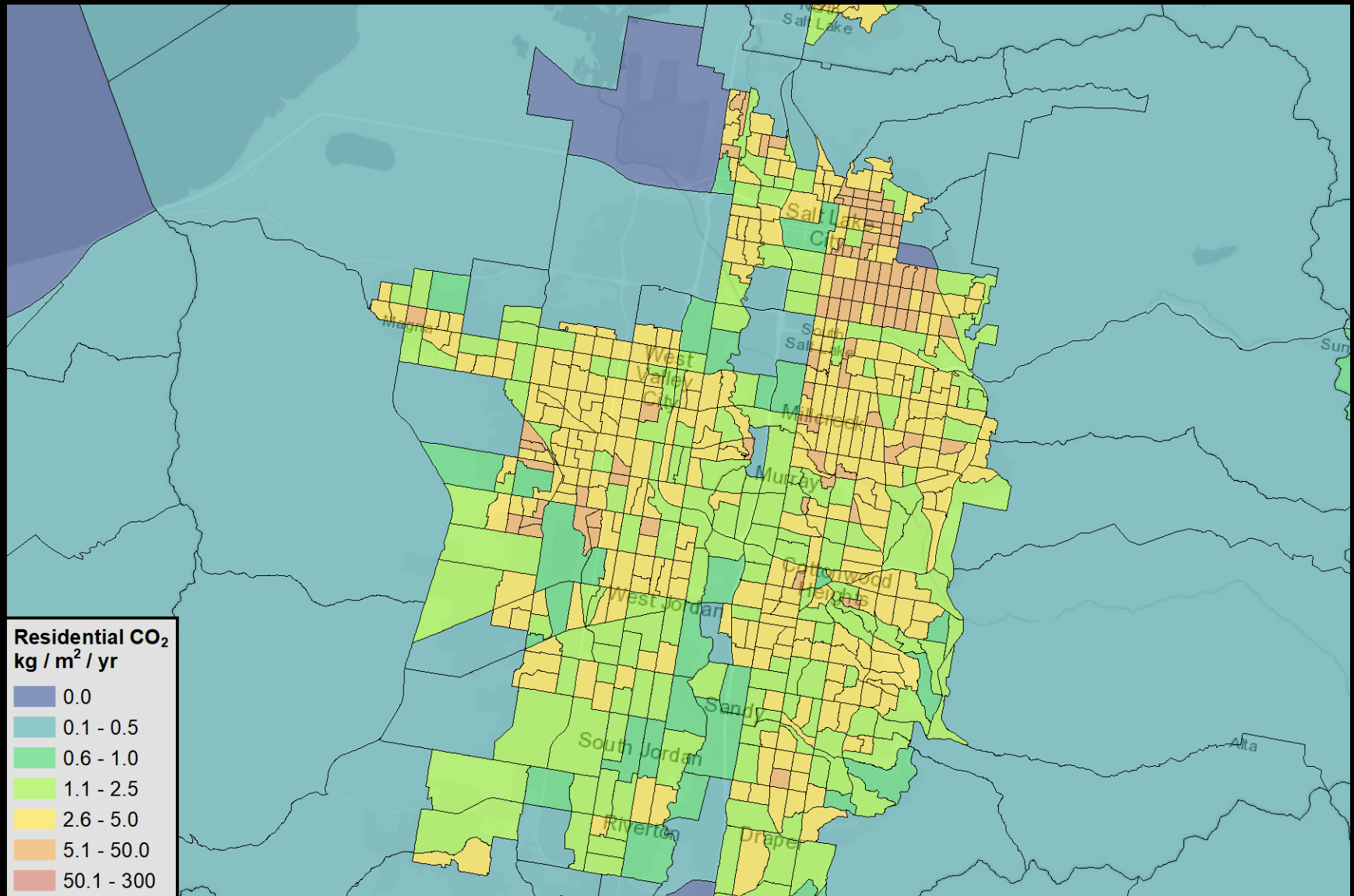


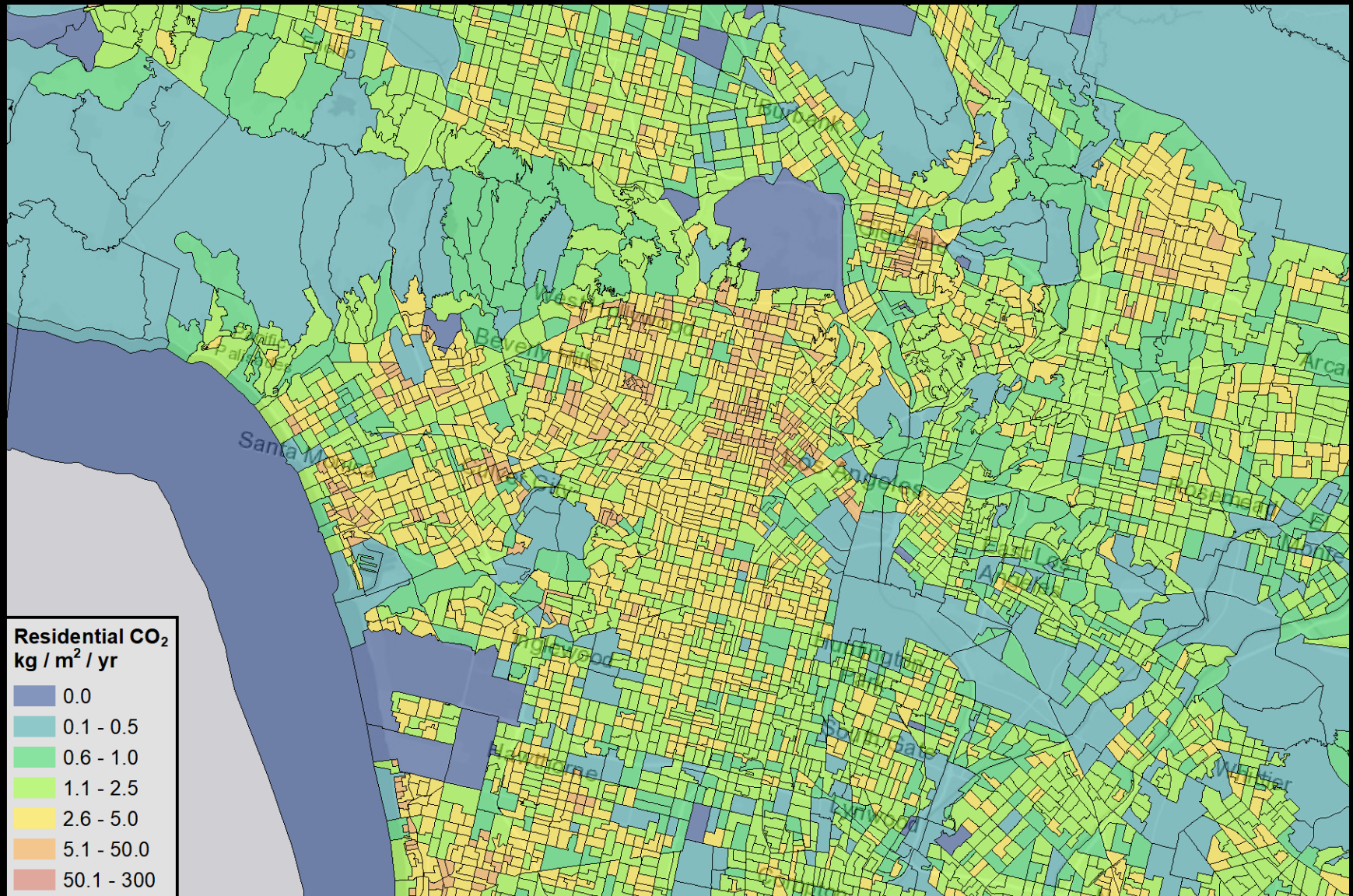


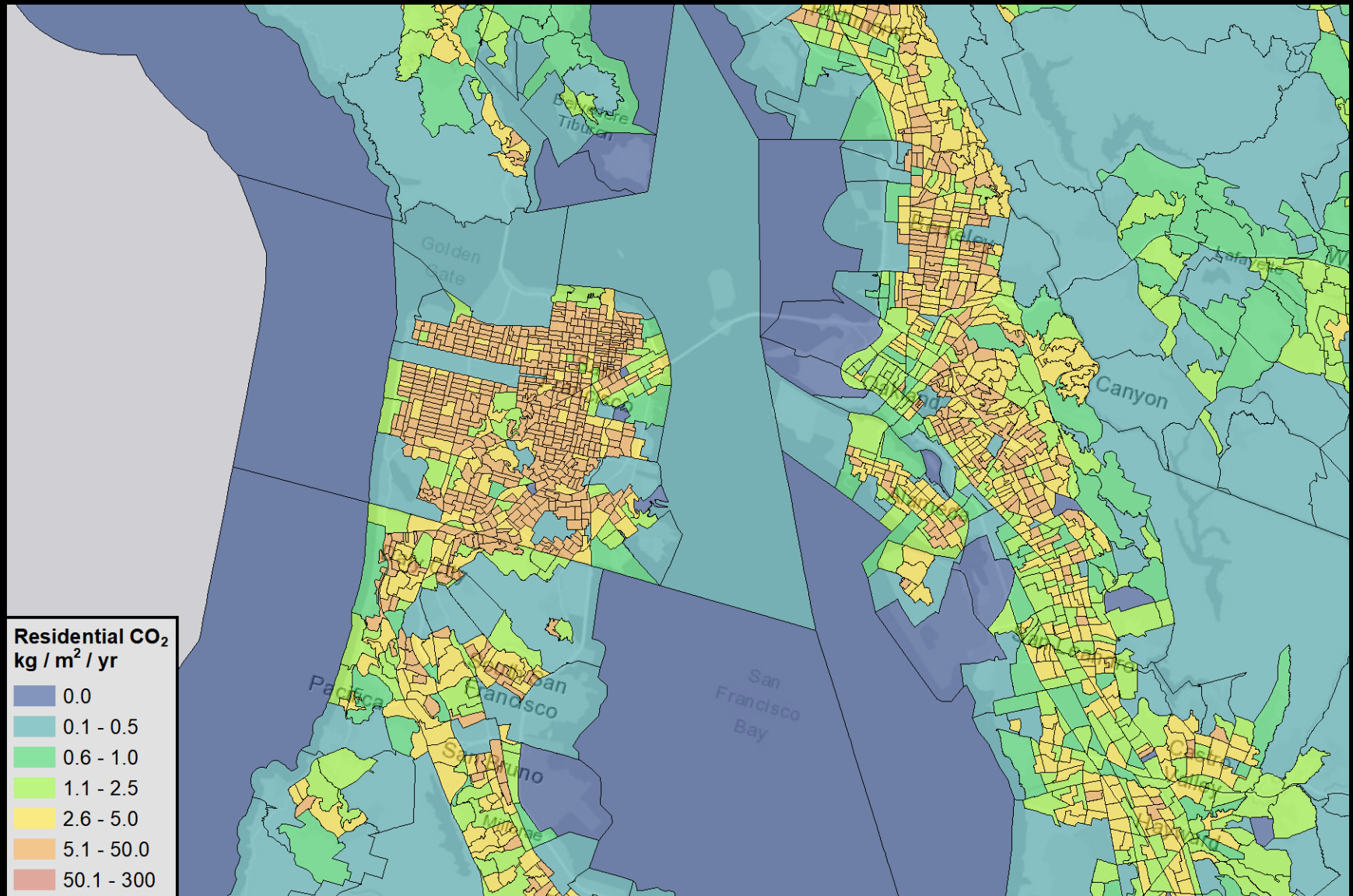




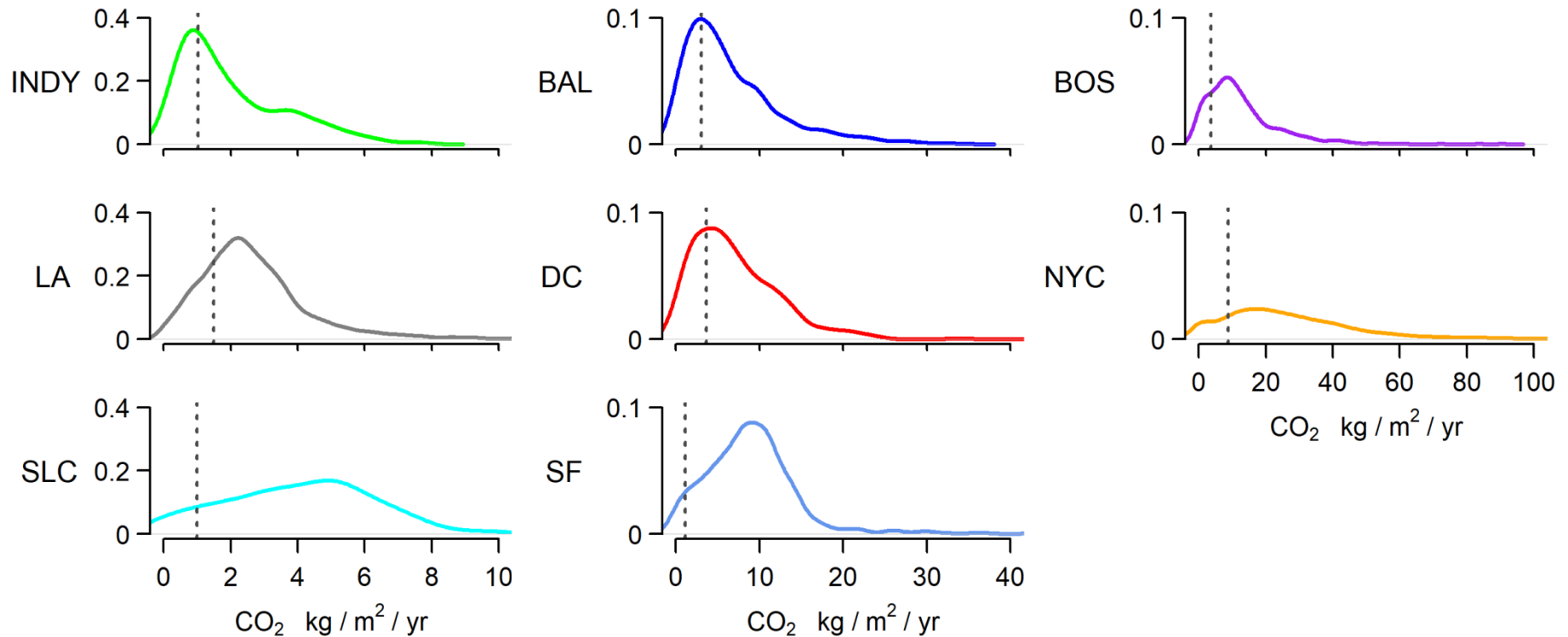








ACES v2 – Blockgroup variation vs. Municipal Totals



Large spatial variations in emissions intensity within cities

ACES v2 – Coming soon to a DAAC near you!

- CONUS + AK for 2012 – 2016 at hourly time step
 - 1 x 1 km Lambert Conformal Conic grid
 - 0.01° WGS84 grid
 - 500m MODIS projection grid
 - CF1.7 compliant NetCDFs
- Points, lines, and polygons
 - Census Block and Blockgroup
 - County and Municipal boundaries
 - Road segments and point source facilities