



SMOKE version 4.7

Recent Enhancements

- Onroad Mobile Emission Updates
- New PostgeSQL/PostGIS Surrogate Tool

B.H. Baek

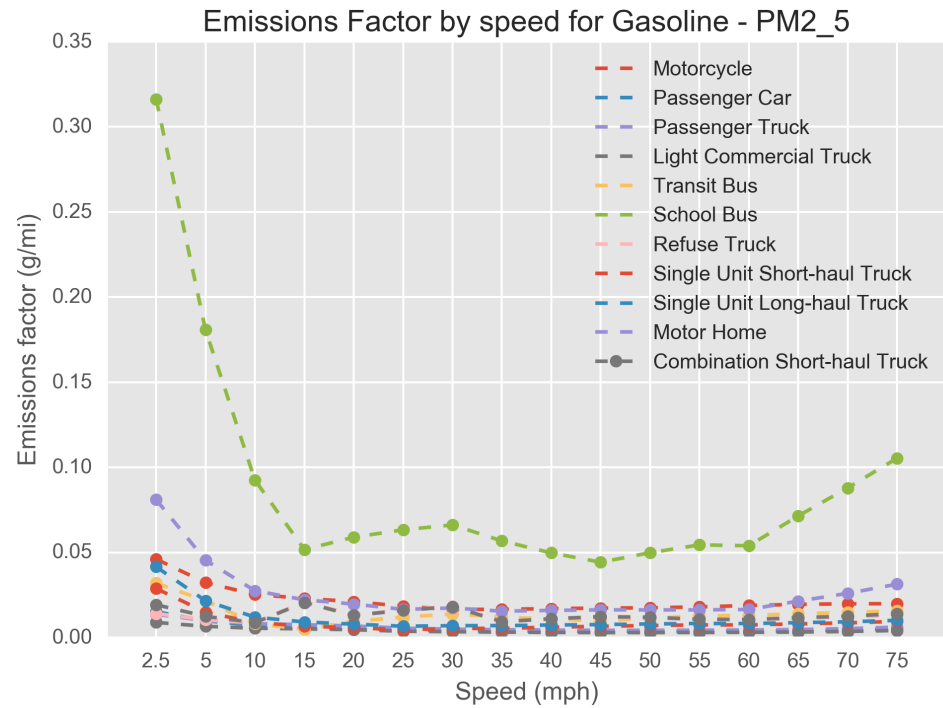
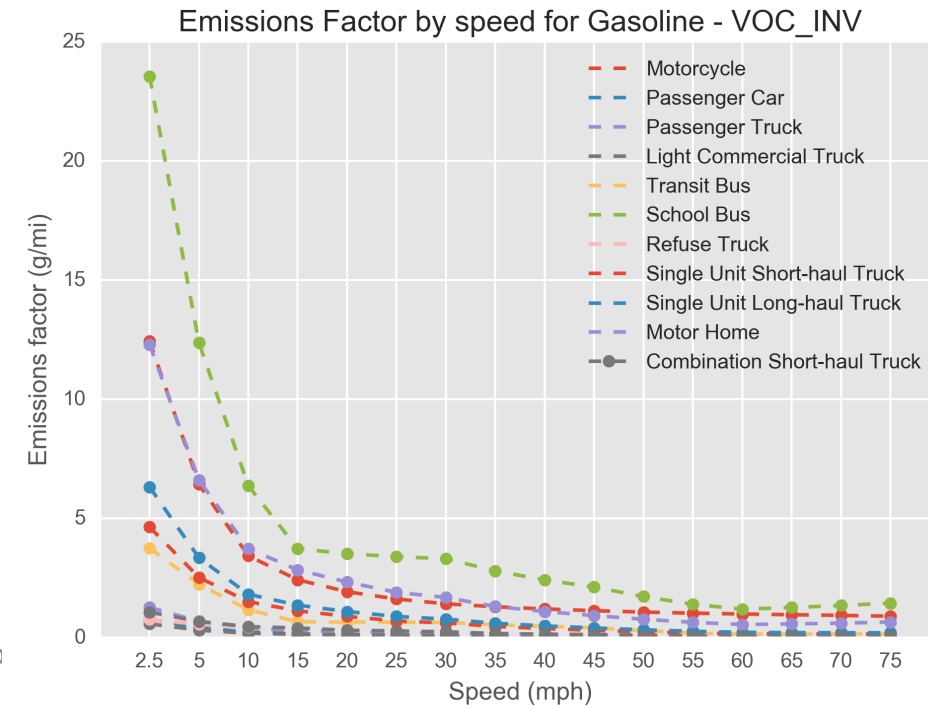
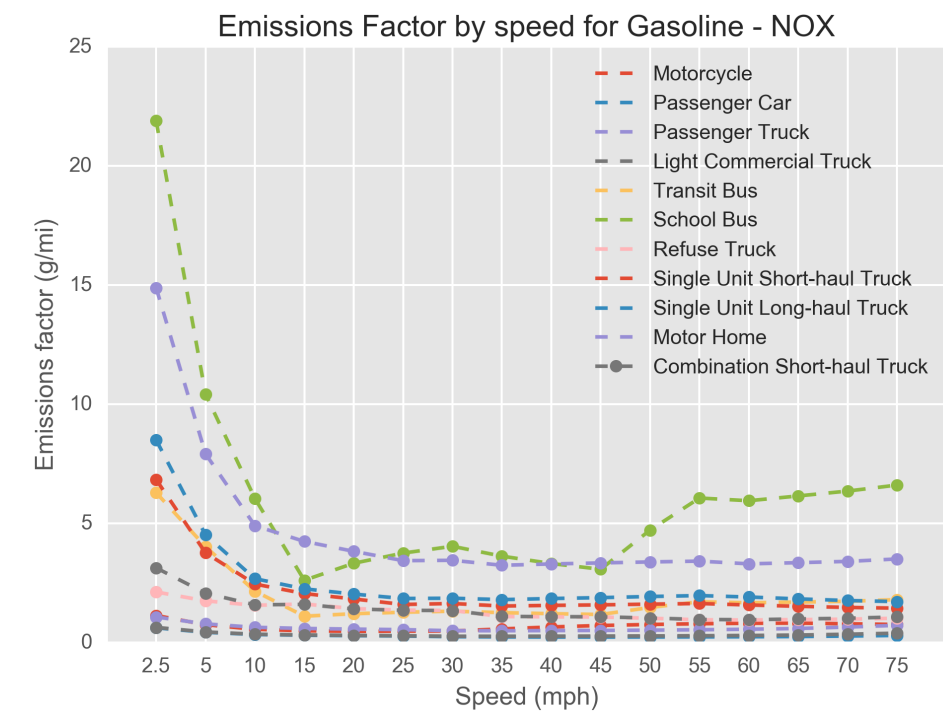
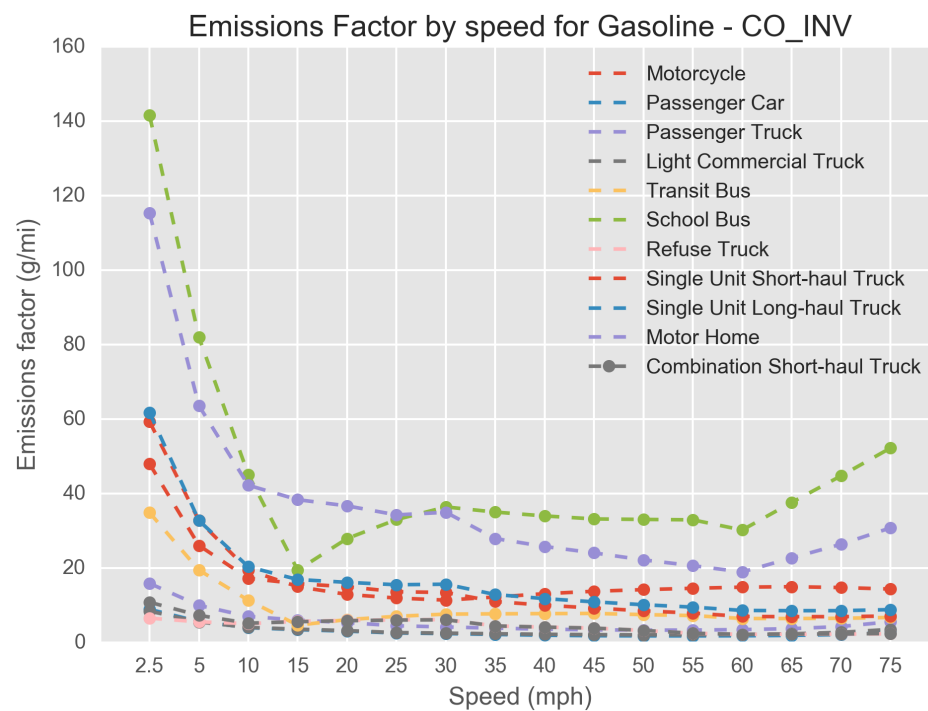
University of North Carolina at Chapel Hill

Alison Eyth

U.S. EPA Office of Air Quality Planning and Standards

Impact of Speed by Pollutant and Source Type

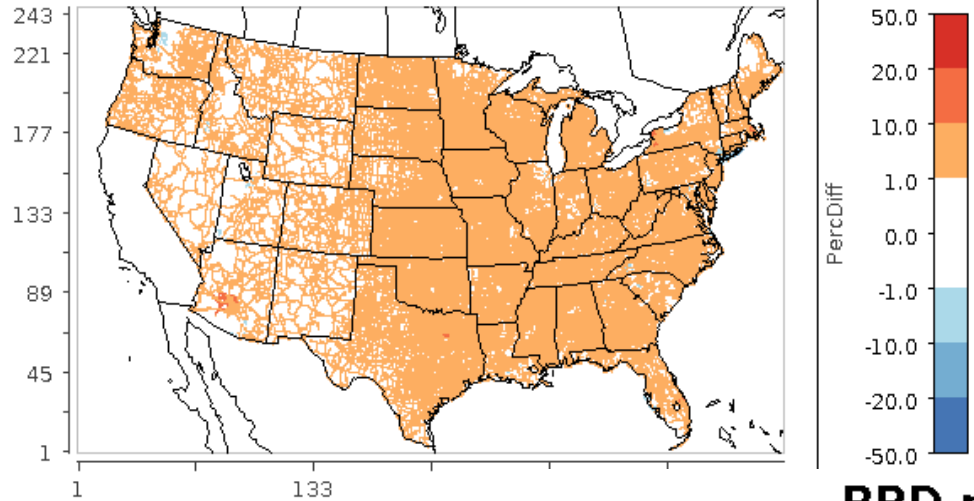
Fuel: Gasoline



Difference in July total using Average Speed Distribution in SMOKE

RPD mon07 Percdiff

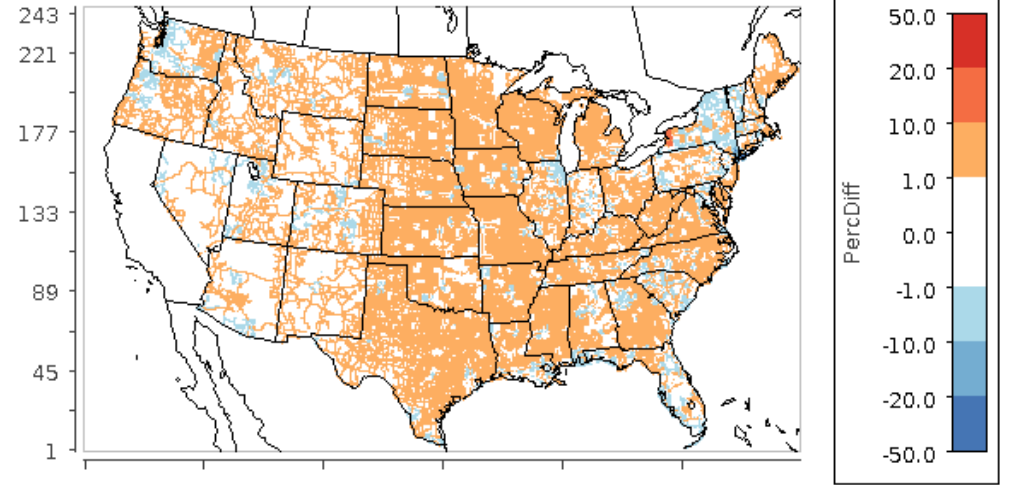
Full_ASD-ORG NOX



July 31, 2014 00:00:00
Min (363, 162) = -20.4, Max (37

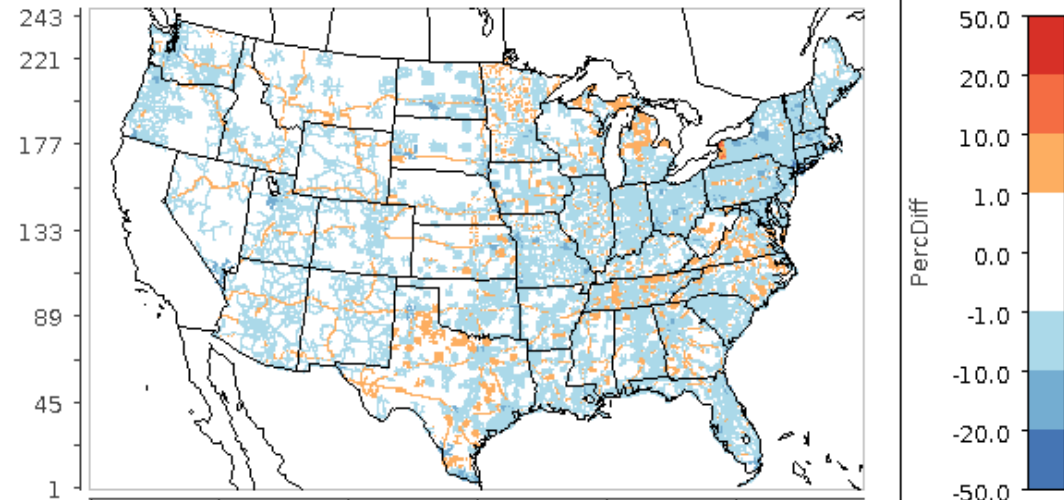
RPD mon07 Percdiff

Full_ASD-ORG VOC



RPD mon07 Percdiff

Full_ASD-ORG PM25



7.2

NOx Humidity Correction

Humidity impacts NOx emissions

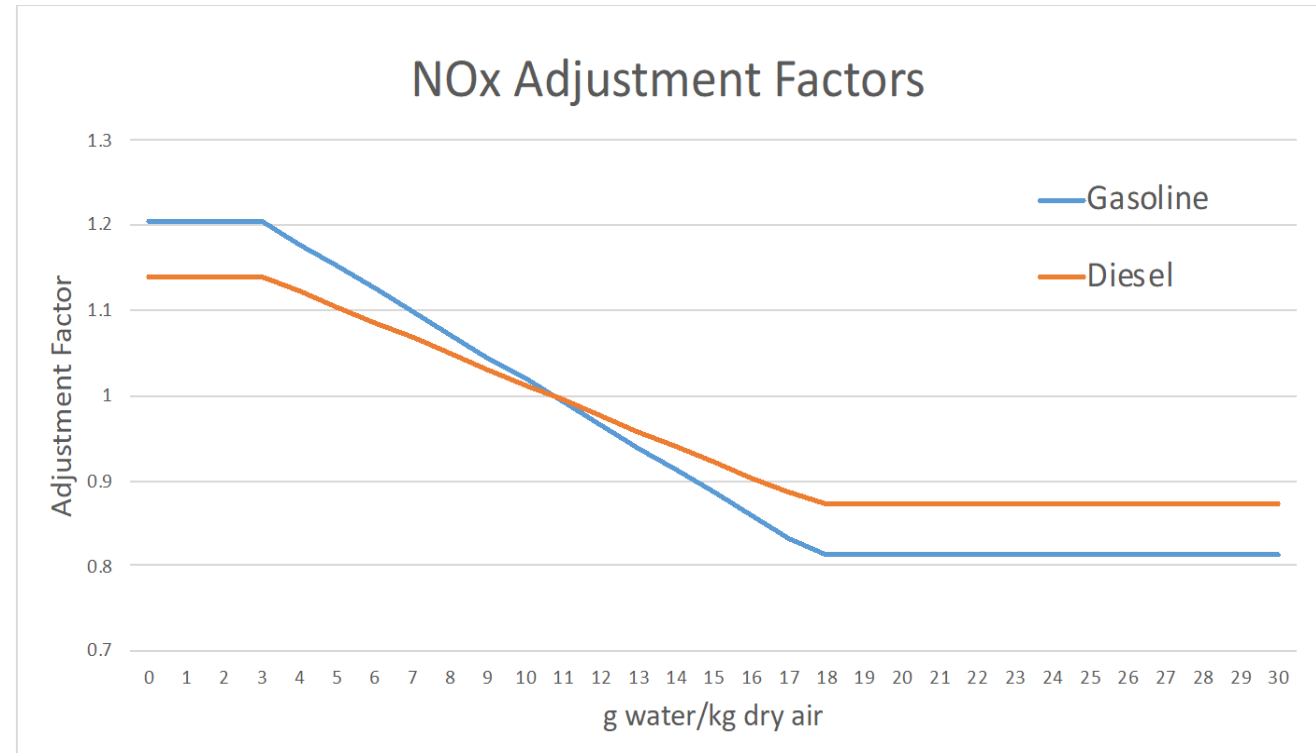
Compute the Correction Using:

1. MOVES Model OR
2. SMOKE-MOVES Integration Tool

The prior version uses a single humidity value for each temperature bin for the winter or summer months

The NOx Humidity Correction Equation differs by fuel Type:

1. Gasoline, Ethanol and CNG
2. Diesel

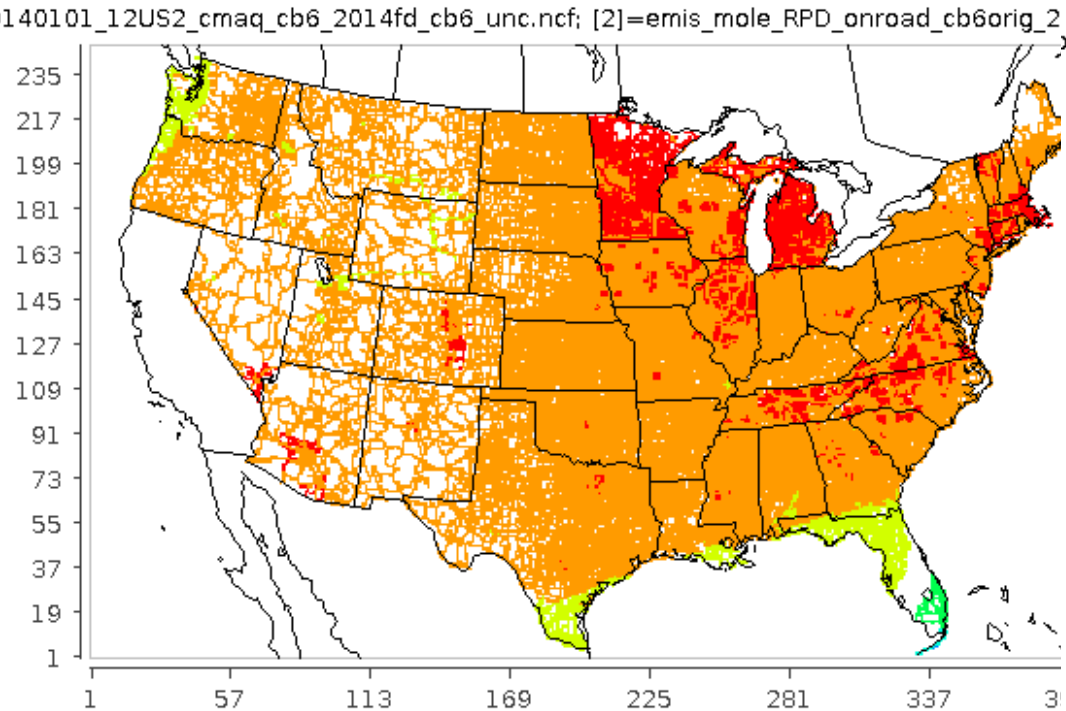


The humidity correction equation has been coded into the latest version of SMOKE-MOVES, thus allowing the adjustment to be applied according to hourly changes in humidity instead of seasonal averages

Percent Change on RPD NO₂

January 1, 2014

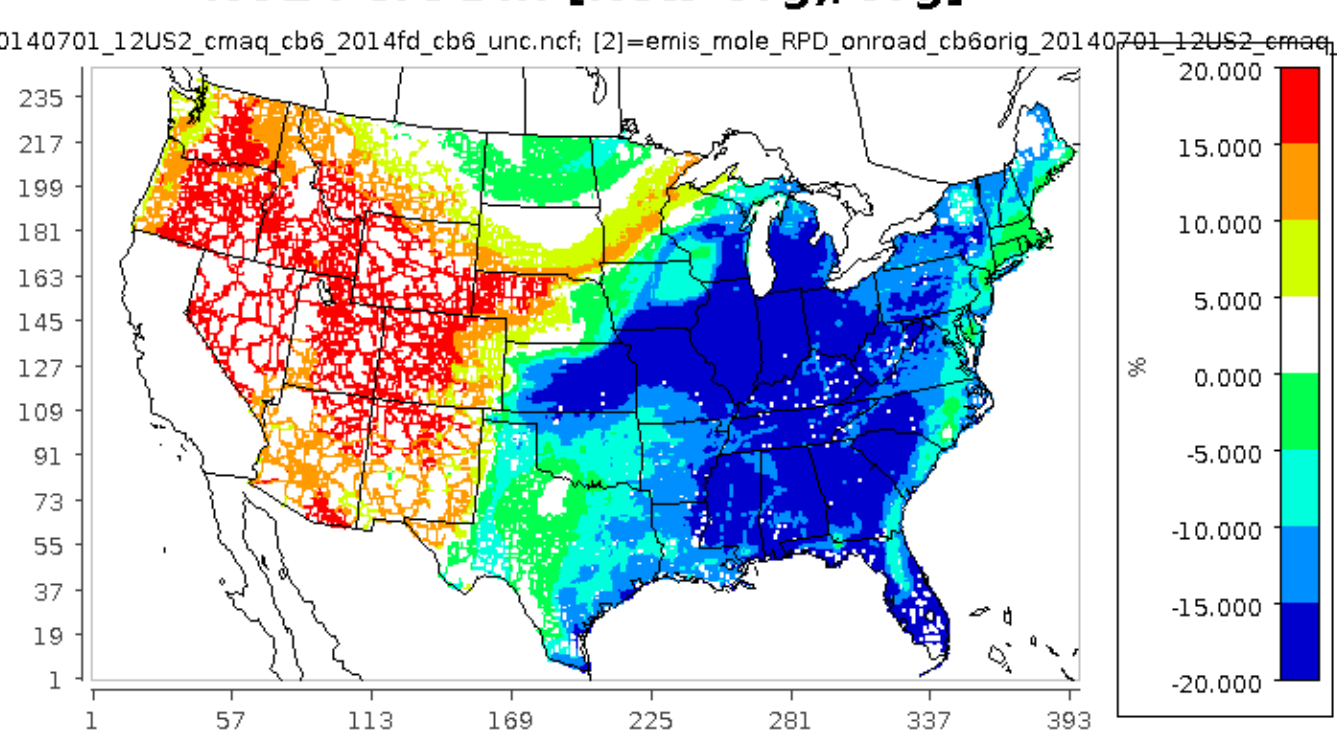
Perc Diff ([New-Org]/Org*100)



January 01, 2014 00:00:00 UTC
Min (339, 5) = -16.270, Max (226, 195) = 25.010

July 1, 2014

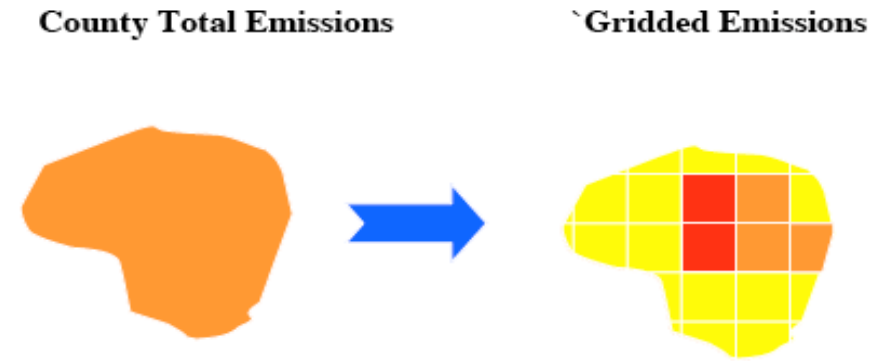
NO2 Perc Diff [New-Org]/Org]



July 01, 2014 00:00:00 UTC
Min (274, 158) = -22.075, Max (41, 148) = 22.774

New: Postgres/PostGIS Spatial Surrogate Tool

- Spatial allocation is the process of mapping county-level emissions inventory data to modeling grid cells
- Written in the PostgreSQL and PostGIS database language
- We do this using spatial surrogates - each has a unique code (ID)
 - There are more than 60 surrogates currently used – e.g., Population (100), Total agriculture (310), Railroad Density (261), Offshore shipping (806), Urban unrestricted daily VMT (222), Gas well count (698)
- Value =
$$\frac{\text{sum of attribute in grid cell}}{\text{sum of attribute in county}}$$
- *Values sum to 1 for each county / province*
- Download from CMAS Center Spatial Allocator Github:
<https://github.com/CMASCenter/Spatial-Allocator>



Poster and Oral Presentation

- Oral Presentation

- “SMOKE Updates: Mobile Enhancements and New Spatial Surrogates Tool”

- Air Quality Modeling Session

- Reunion B on Wednesday (7/31/2019) @ 9:15am

- Poster Presentation

- “SMOKE v4.7 Enhancements”

- Reunion EF on Tuesday to Thursday