

# Georgia Wildland Fire Emission Inventories

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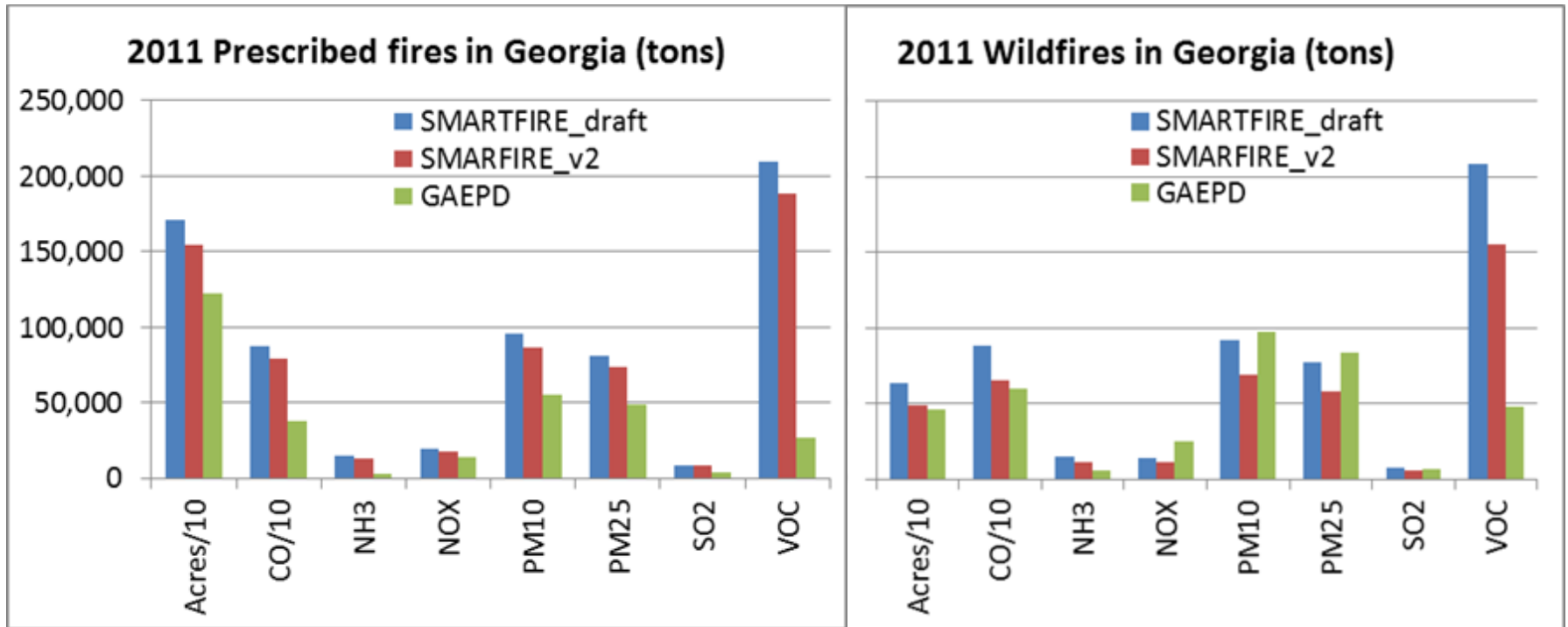
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- Potential changes for Georgia 2014 wildland fires

# Background

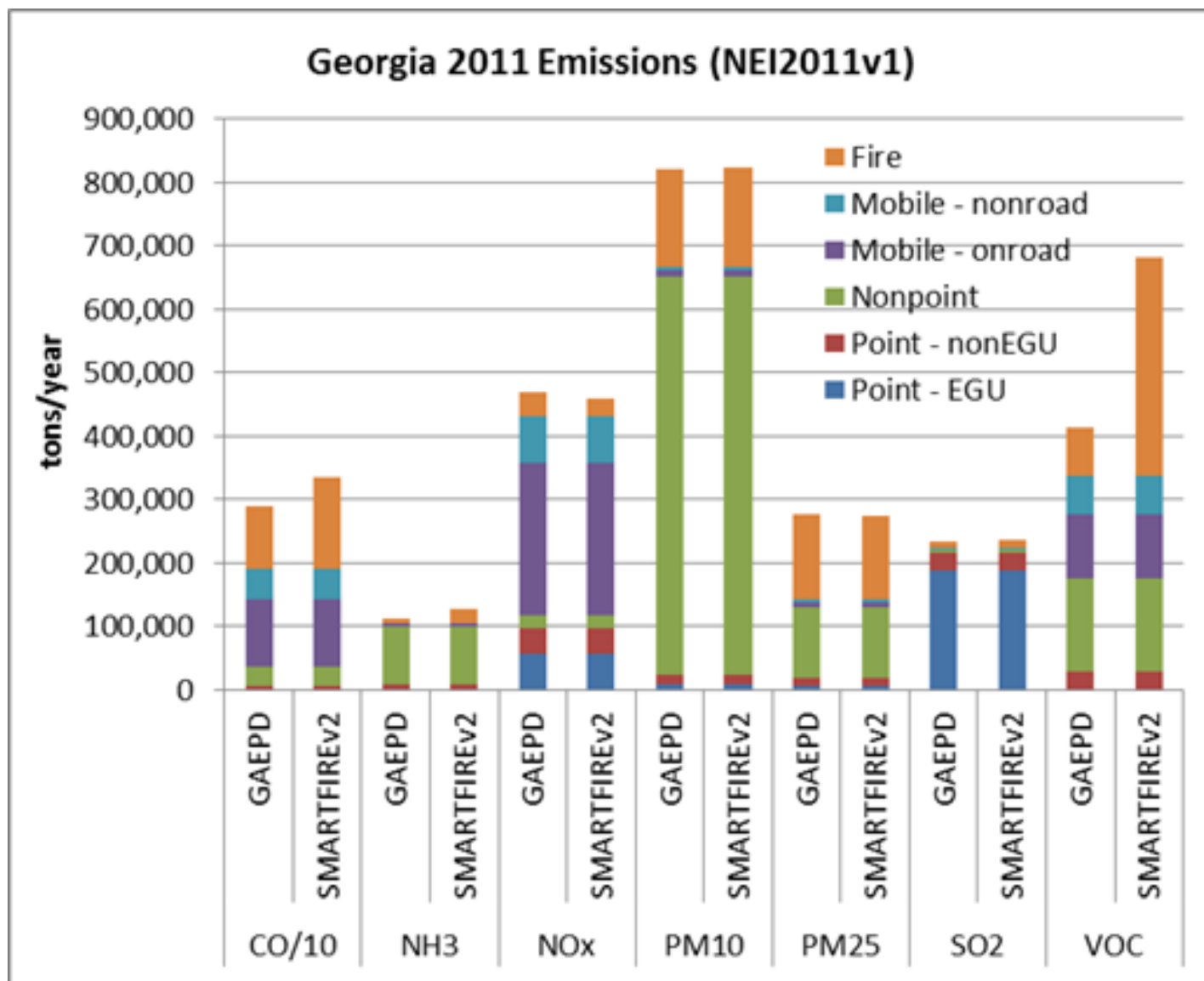
- Georgia Fire emissions inventory
  - Three NEI inventories: 2005, 2008 and 2011 fire emissions developed by GA EPD and submitted to U.S. EPA to include as part of NEI
  - Two SIP fire inventories: VISTAS2002 and SEMAP2007, collaborative efforts in the southeast
- Georgia fire emissions in NEI2011
  - 2011 burned records: by events, Georgia Forestry Commission (GFC), military bases, USFS, and FWS (daily burned area for the Okefenokee area fire)
  - Shared these burning records with U.S. EPA and USFS to support development of national wildland fire emission inventory
  - Reviewed SMARTFIRE/BlueSky estimates
  - Developed GA estimates using the same method as used in the SEMAP2007 fire inventory development, no satellite data are used in the GA estimates
    - AMEC, 2012. *Development of the 2007 Base Year and Typical Year Fire Emission Inventory for the Southeastern States Air Resource Managers, Inc.*

# Comparison of SMARTFIRE Estimates and GA EPD Estimates



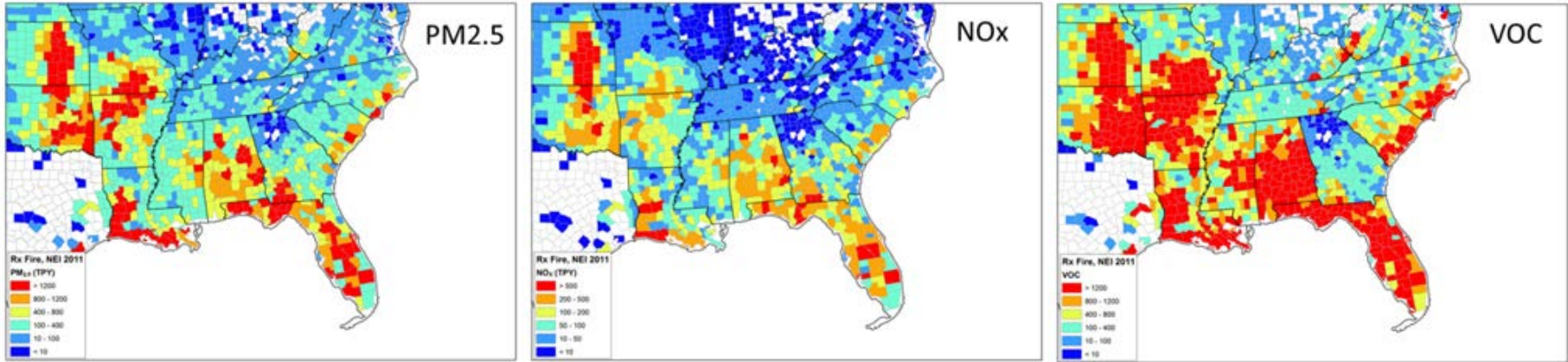
	Emissions (tons/year)			Difference (%)	
	SMARTFIRE_draft	SMARTFIRE_v2	GA EPD	SMARTFIRE_draft	SMARTFIRE_v2
<b>Acres</b>	2,349,116	2,034,861	1,686,655	39%	21%
<b>CO</b>	1,761,852	1,450,815	981,215	80%	48%
<b>NH3</b>	29,102	23,981	8,154	257%	194%
<b>NOX</b>	33,575	28,530	38,888	-14%	-27%
<b>PM10</b>	187,746	155,390	152,840	23%	2%
<b>PM25</b>	159,107	131,686	132,861	20%	-1%
<b>SO2</b>	16,156	13,574	10,663	52%	27%
<b>VOC</b>	418,337	344,731	74,976	458%	360%

# Emissions by Source Categories in Georgia during 2011

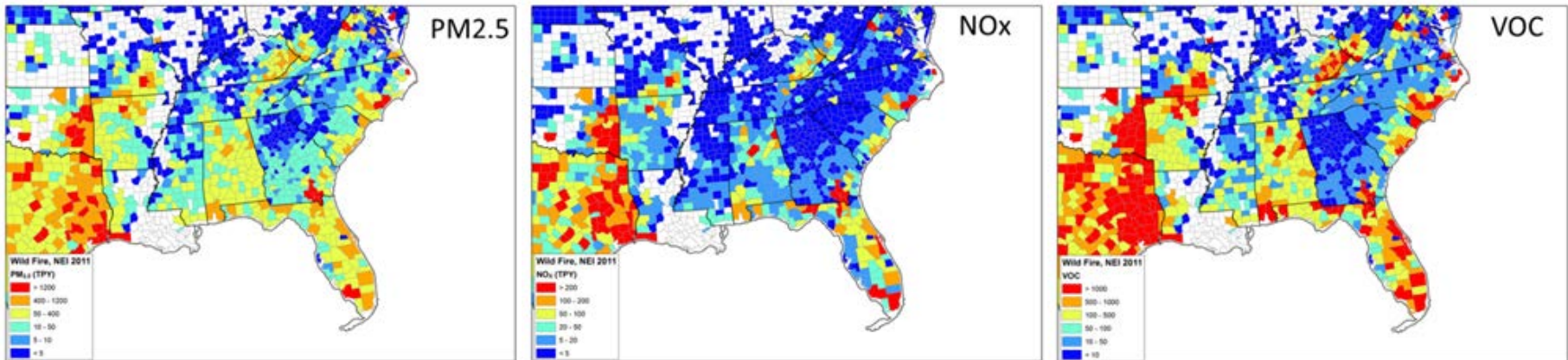


# Spatial Distribution of Wildland Fire Emissions in NEI2011v1

## Prescribed fires



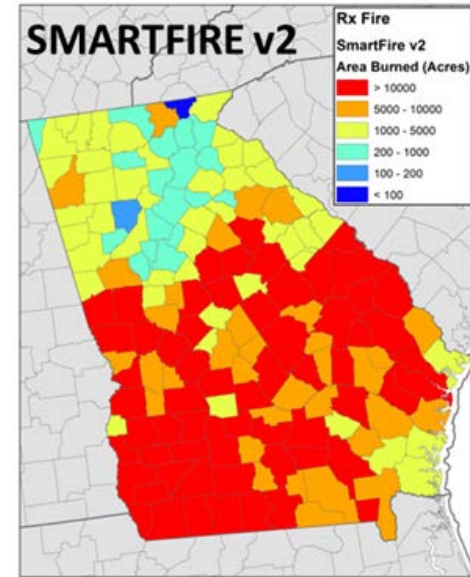
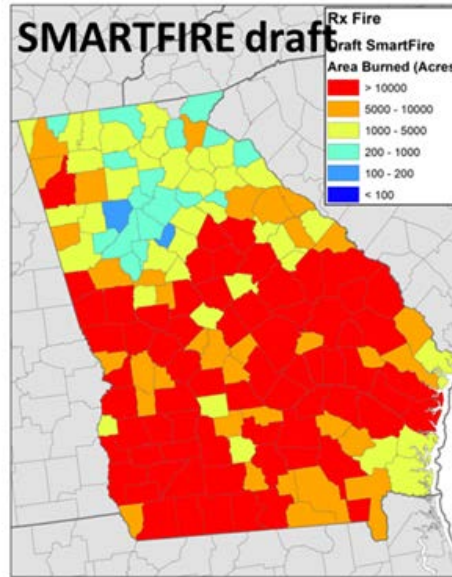
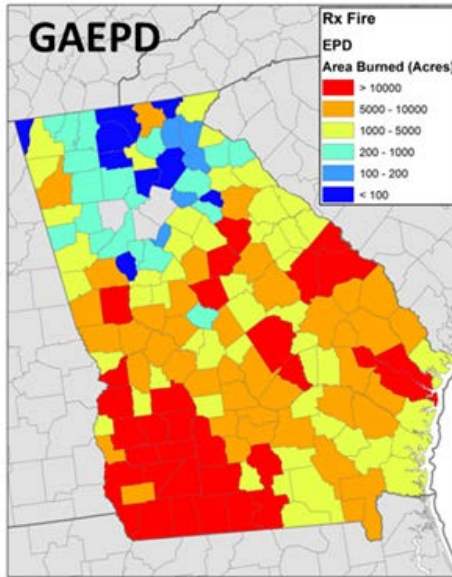
## Wildfires



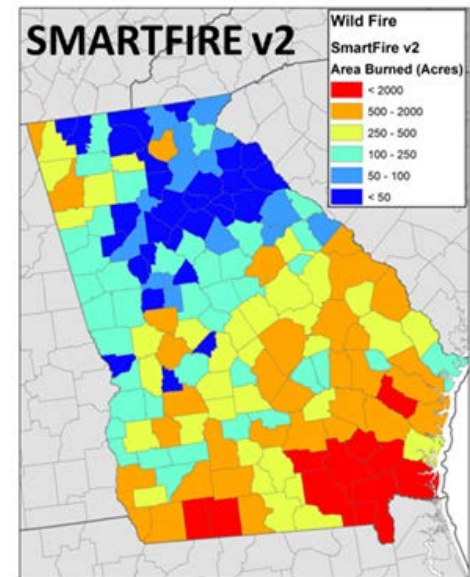
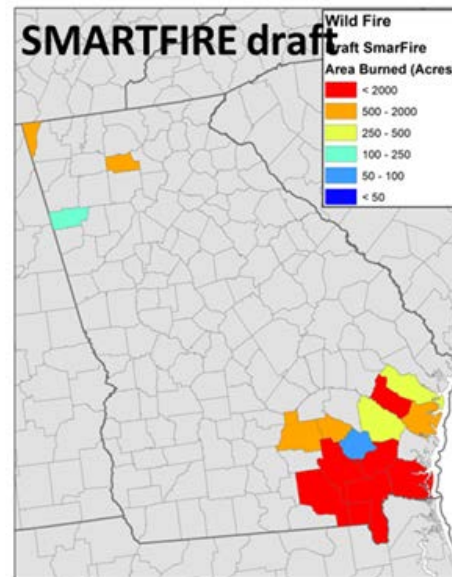
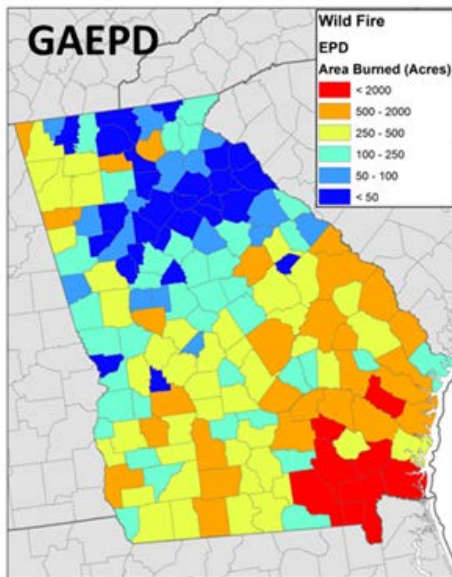
- VOC emissions in NEI2011 look high in all states except Georgia
- Large difference in PM2.5 and NOx emissions between GA and AL/FL
- Low prescribed fire emissions in TX and low wildfire emissions in LA

# Spatial Distribution of Burned Area in Georgia during 2011

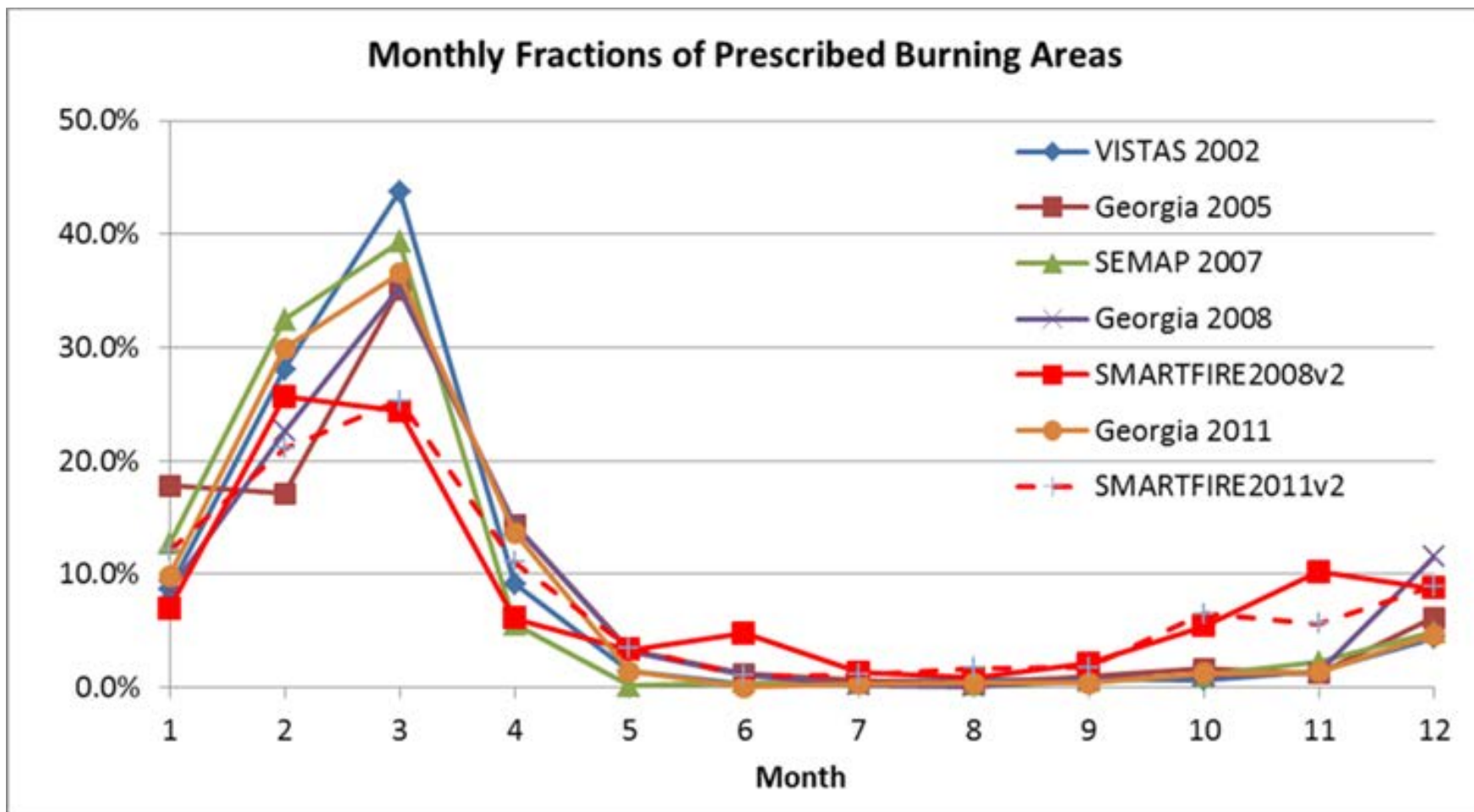
Prescribed fires



Wildfires



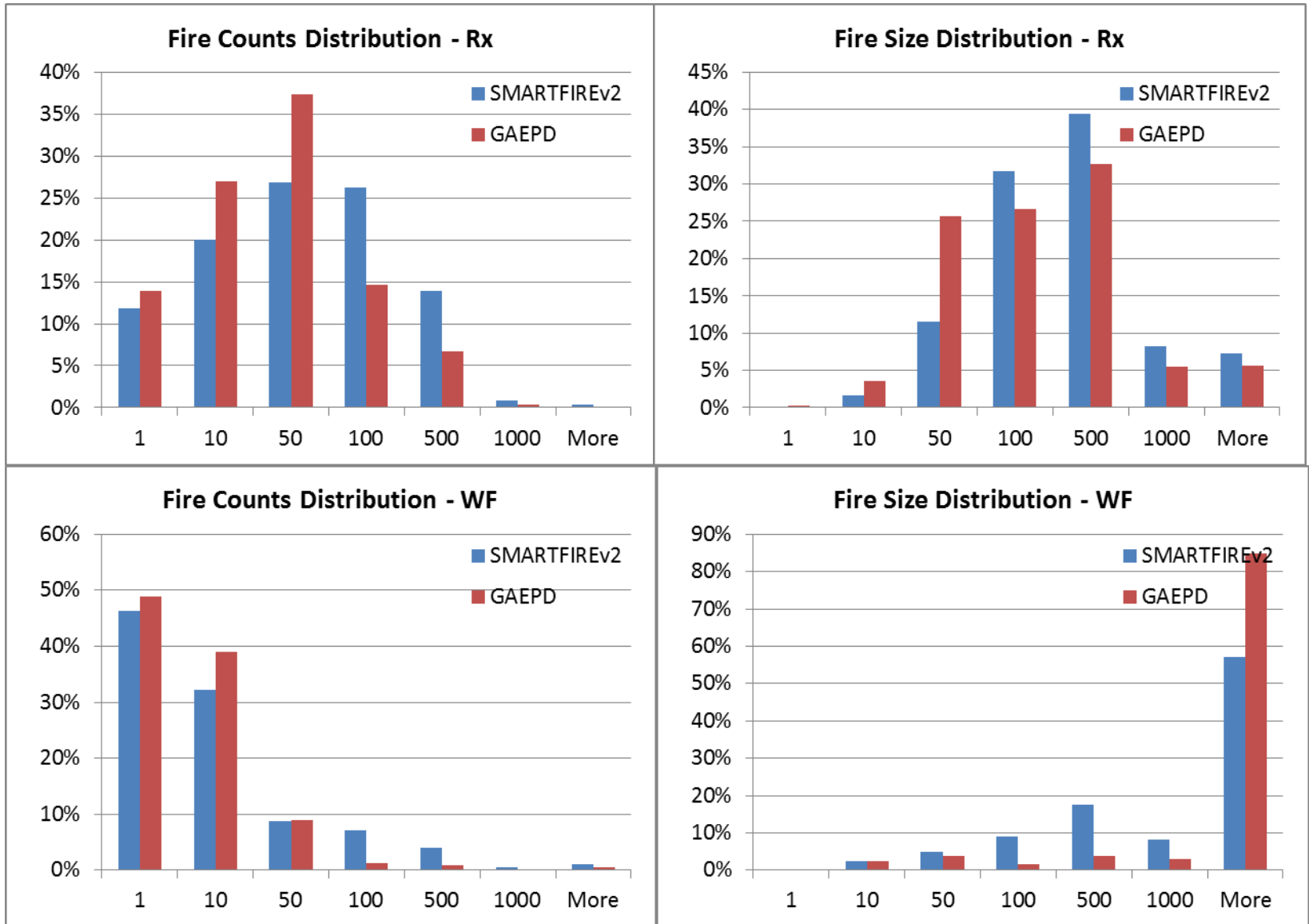
# Monthly Fractions of Prescribed Burning Areas



SMARTFIRE\_v2 has overestimated prescribed fire activities during October and November and underestimated such activity during March



# Fire Counts and Acres Distribution by Fire Size



Southeastern wildland fires are usually small and under canopy prescribed fires with short duration

# High CO, NH<sub>3</sub> and VOC emissions in SMARTFIREv2

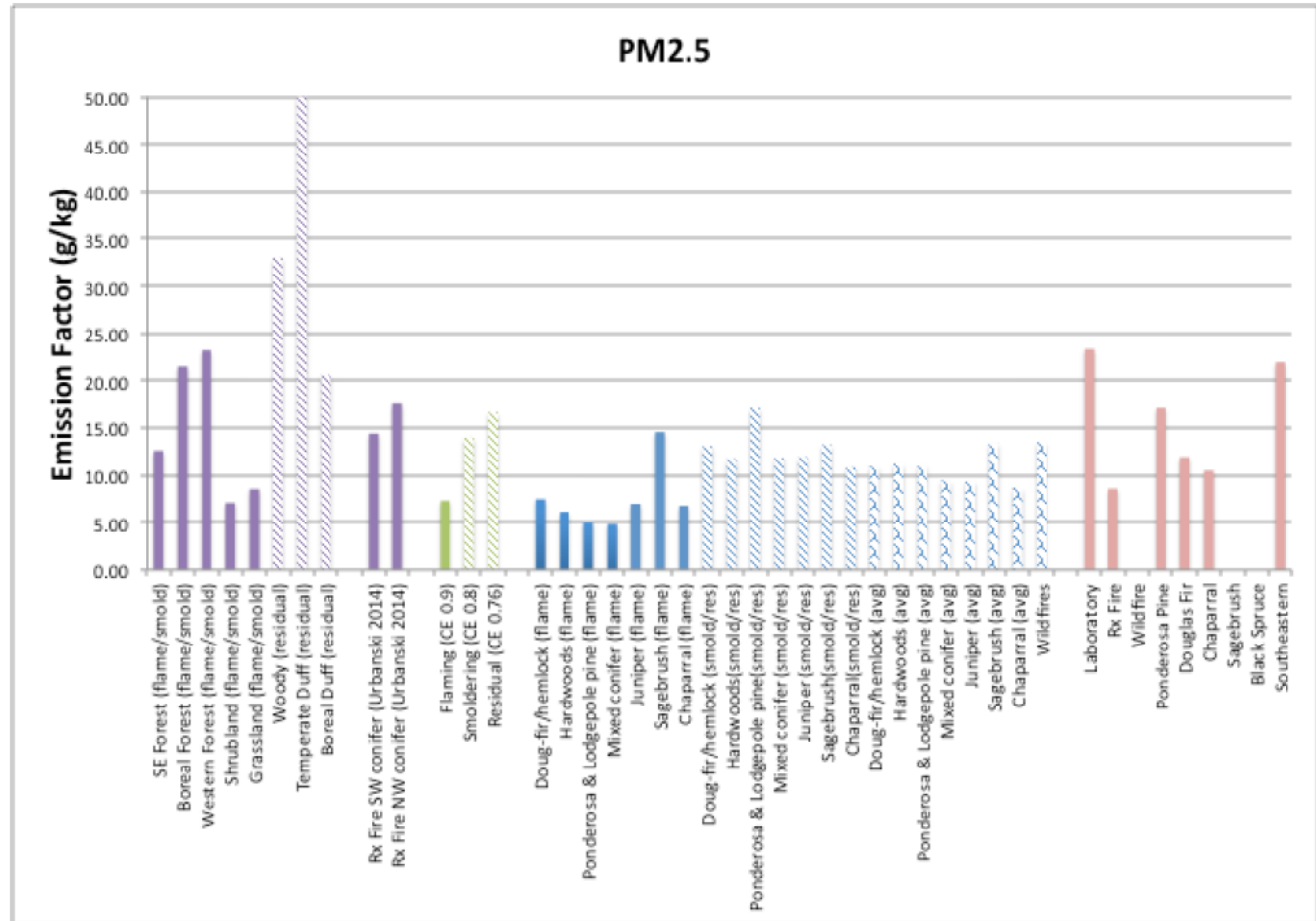
- EFs used in SMARTFIREv2 are not available
  - Comparing EFs in GAEPD Fire Inventory with EFs for Prescribed fire southeast conifer forest in Urbanski 2014
  - CO – Similar, NH<sub>3</sub> – lower, VOC – higher
- Likely caused by high fuel consumption during smoldering phase in SMARTFIREv2
  - These three pollutants mainly emit during smoldering phase.
  - Percent of fuel consumption for prescribed fires in SMARTFIREv2: flaming (36.7%-93.2%), smoldering (6.7%-25.2%), residual smoldering (0.2%-38.1%)
  - Few emissions during residual smoldering for prescribed fires in the southeast
- Should VOC for unidentified species in Urbanski 2014 be used in the emission calculation??
  - VOC (Urbanski): 52 lbs/ton, 32 lbs/ton (without unidentified species)
  - VOC (GAEPD/SEMAP): 13-15 lbs/ton
  - How to update VOC Speciation profiles for wildland fires

# Potential Changes for Georgia 2014 Wildland Fires

- EPA requires states to submit wildland fire emissions by flaming and smoldering for NEI2014
  - Separate fuel combustion and emission factors values by combustion phases
  - Flaming and smoldering: simultaneously occur, often mixed together
  - Residual smoldering: after strong fire flames
- NO satellite data used for Georgia Wildland Fires
  - More work need to be done to improve satellite fire detection for fires in the southeast
- Update fuel consumption calculation method
  - Percent of fuel consumption during smoldering: Literature review/CONSUME
  - EPA/USFS: Set maximum fuel consumption value by fuel types with local knowledge, fuel moisture inputs, duff consumption
  - Local knowledge about fuel consumption should be used in addition to the fuel consumption model results.
- Update emission factors using most recent research
  - Lumped emission factors in Urbanski 2014 for both flaming and smoldering phases
  - Much higher emission factors for Stumps and logs or temperate forest duff/organic soil, need to identify such fires

# Emissions Factor Update

- Urbanski 2014 summary
- Includes recent work
- CONSUME & FOFEM being updated
- 200+ species



Urbanski 2014 = purple, FEPs = green, CONSUME = blue, Strand et al. = peach