Georgia Comments to Fire Emissions in NEI2011

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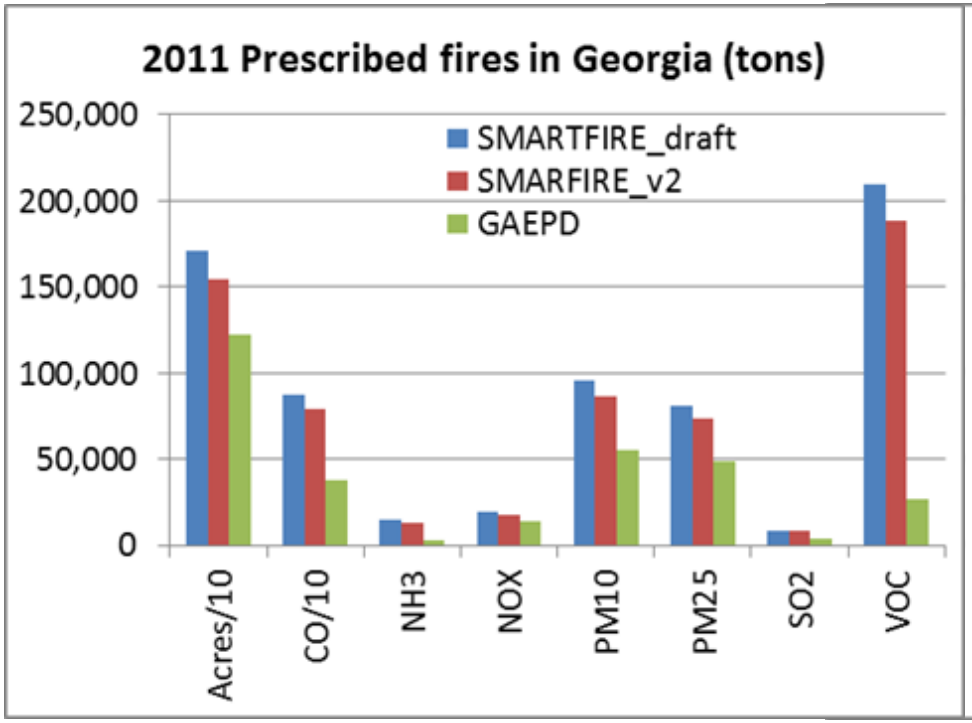
Outline

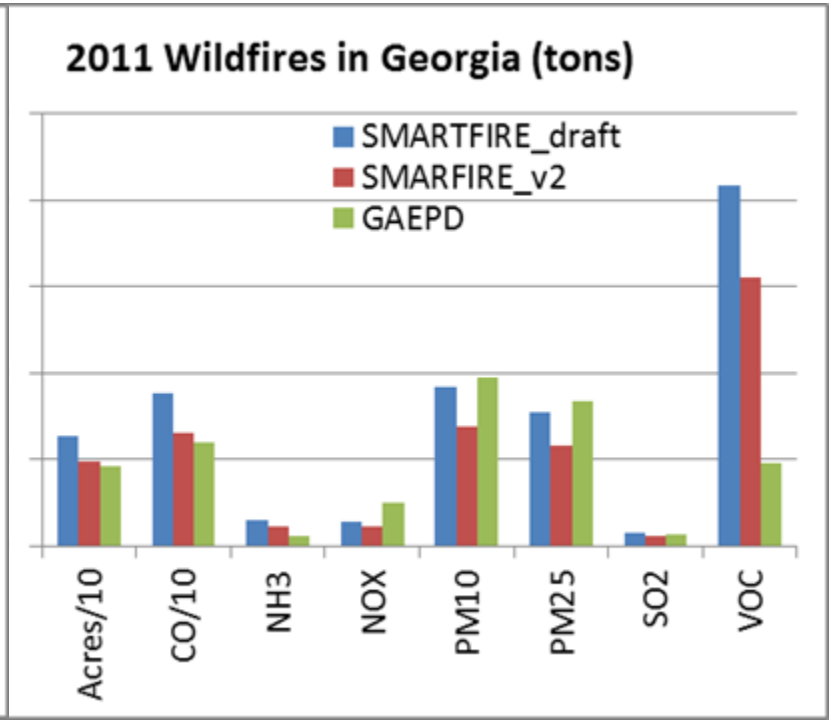
- Background
- SMARTFIRE Estimates vs. GA EPD Estimates
  - Total emissions
  - Spatial distribution
  - Temporal distribution
  - Fire counts and acres distribution by fire
  - Fuel consumption values
- Evaluating agriculture burning emissions in Georgia
- GA EPD comments for U.S. EPA 2011 and 2018 emissions modeling platforms
  - Docket for 2011 Emissions Modeling Platform: www.regulations.gov/#!docketDetail;D=EPA-HQ-OAR-2013-0743
  - Docket for 2018 Emissions Modeling Platform: www.regulations.gov/#!docketDetail;D=EPA-HQ-OAR-2013-0809

Background

- Georgia Fire emissions inventory
  - There are a lot of fire activities in Georgia
  - 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
- Georgia fire emissions in NEI2011
  - 2011 burned records: 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
  - Reviewed SMARTFIRE estimates and U.S. EPA agriculture burning emissions
  - 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.*

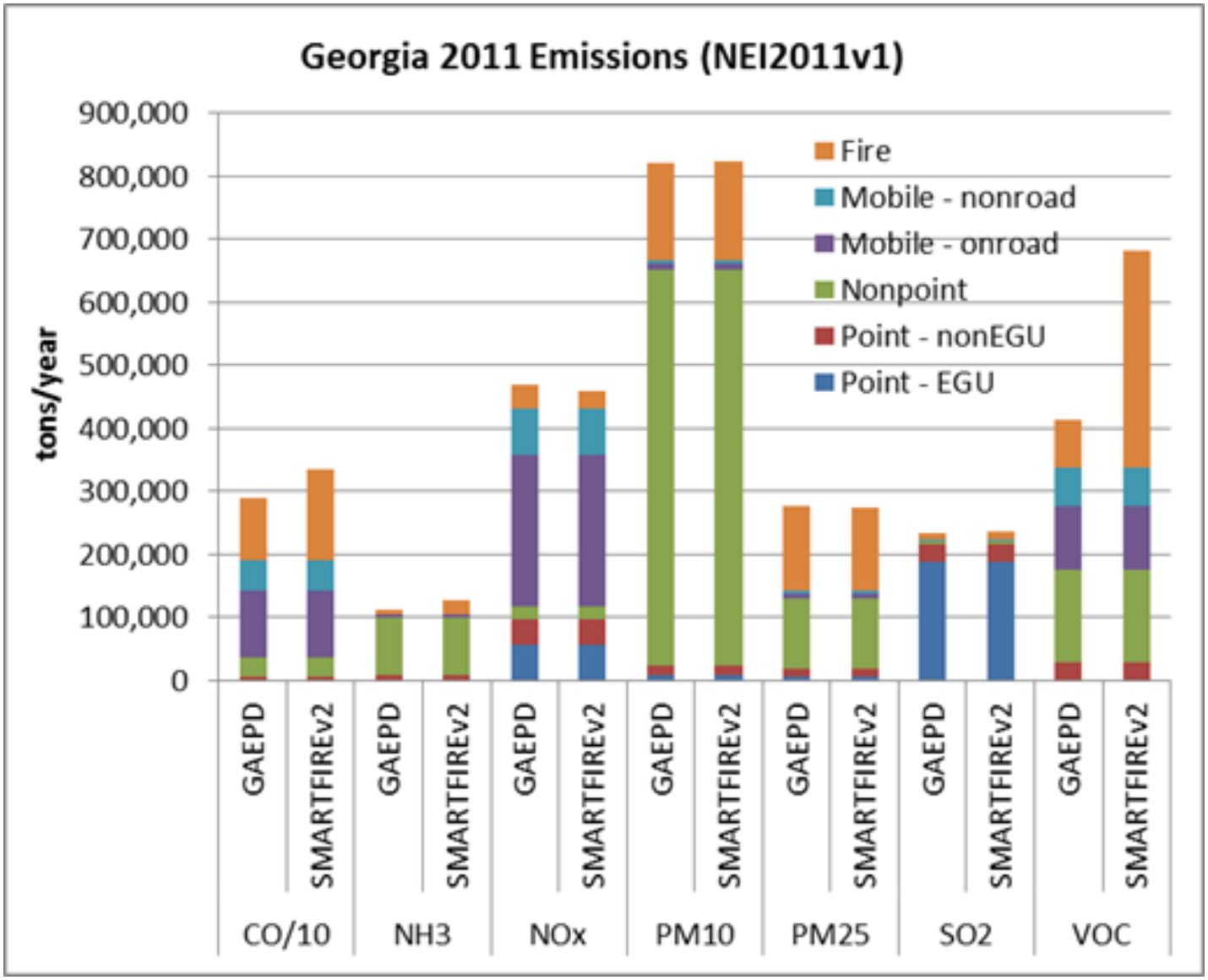
Comparison of SMARTFIRE Estimates and GA EPD Estimates





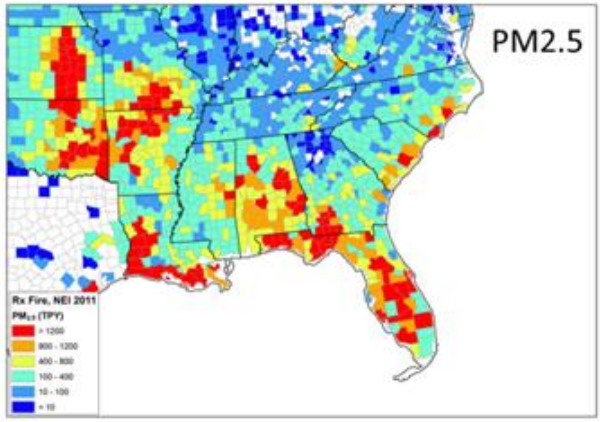
	Emissions (tons/year)			Difference (%)	
	SMARTFIRE_draft	SMARFIRE_v2	GA EPD	SMARTFIRE_draft	SMARFIRE_v2
Acres	2,349,116	2,034,861	1,686,655	39%	21%
CO	1,761,852	1,450,815	981,215	80%	48%
NH3	29,102	23,981	8,154	257%	194%
NOX	33,575	28,530	38,888	-14%	-27%
PM10	187,746	155,390	152,840	23%	2%
PM25	159,107	131,686	132,861	20%	-1%
SO2	16,156	13,574	10,663	52%	27%
VOC	418,337	344,731	74,976	458%	360%

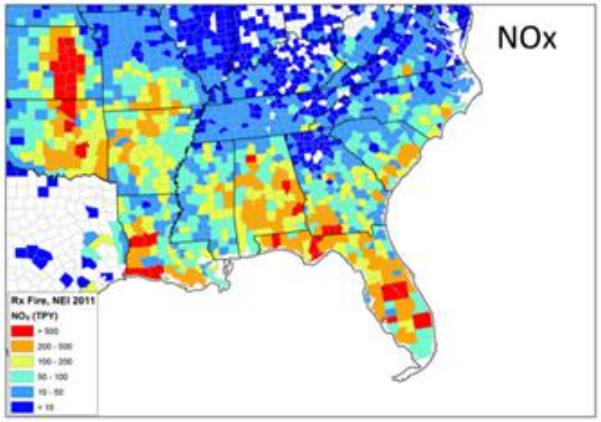
Emissions by Source Categories in Georgia during 2011

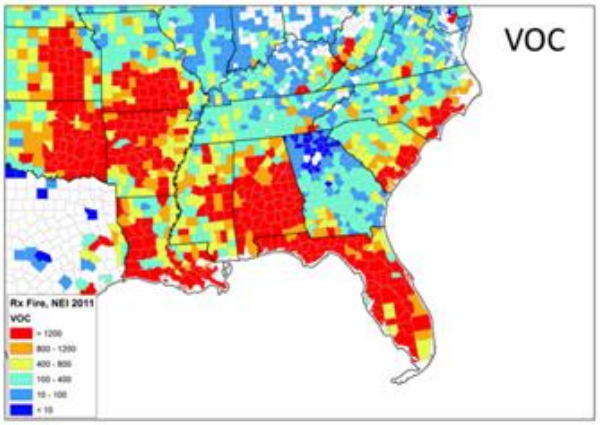


Spatial Distribution of Wildland Fire Emissions in NEI2011v1

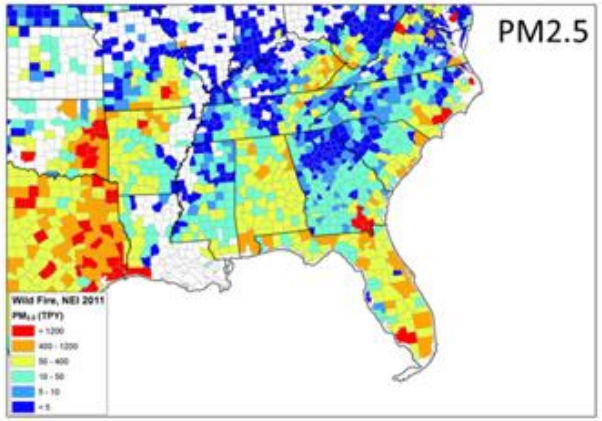
Prescribed fires

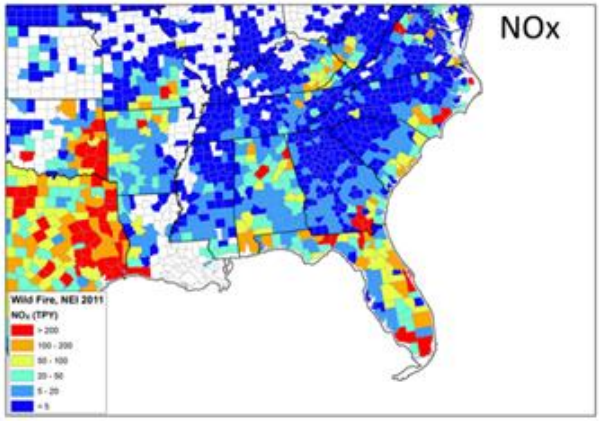


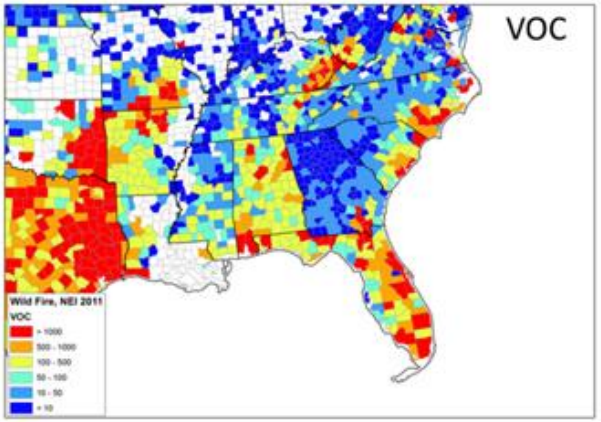




Wildfires



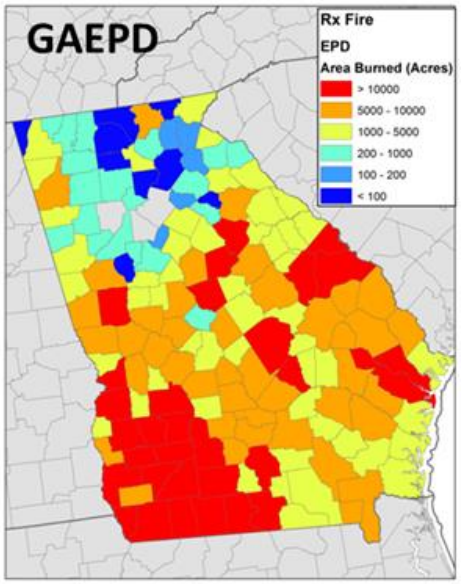


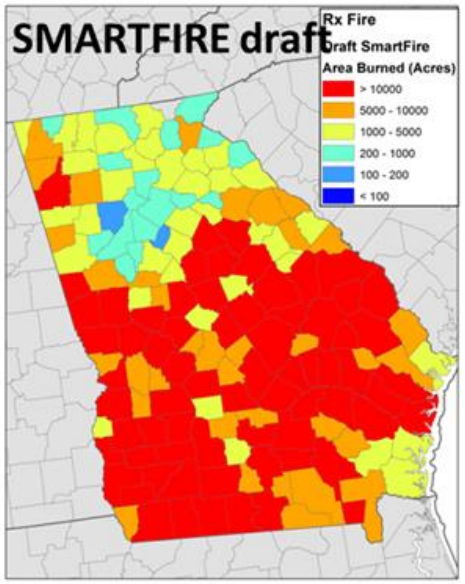


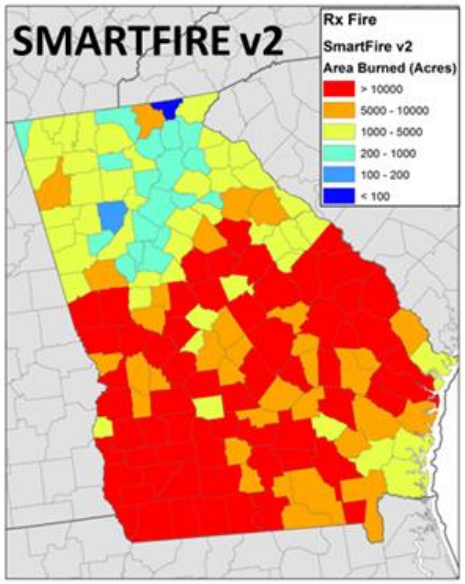
- VOC emissions in NEI2011 look too high in all states except Georgia
- Large difference in PM2.5 and NOx emissions between GA and AL/FL
- Strangely low prescribed fire emissions in TX and low wildfire emissions in LA

Spatial Distribution of Burned Area in Georgia during 2011

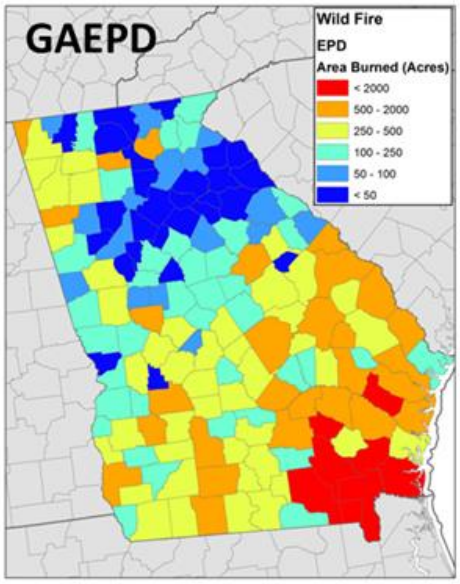
Prescribed fires

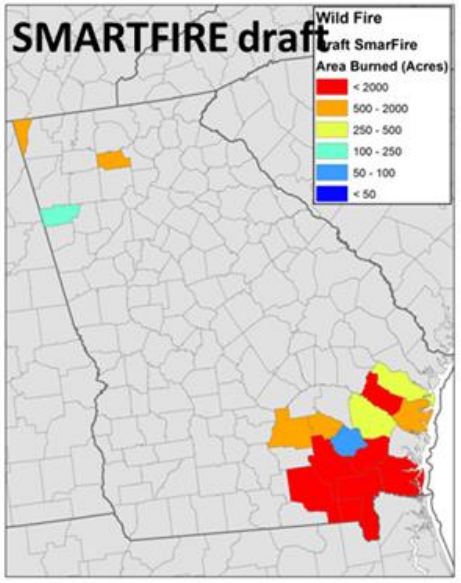


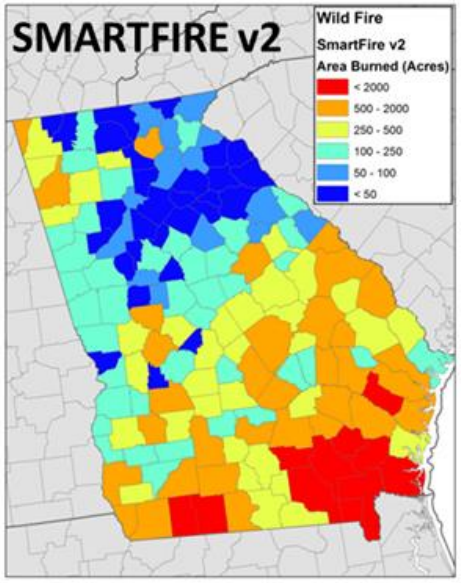




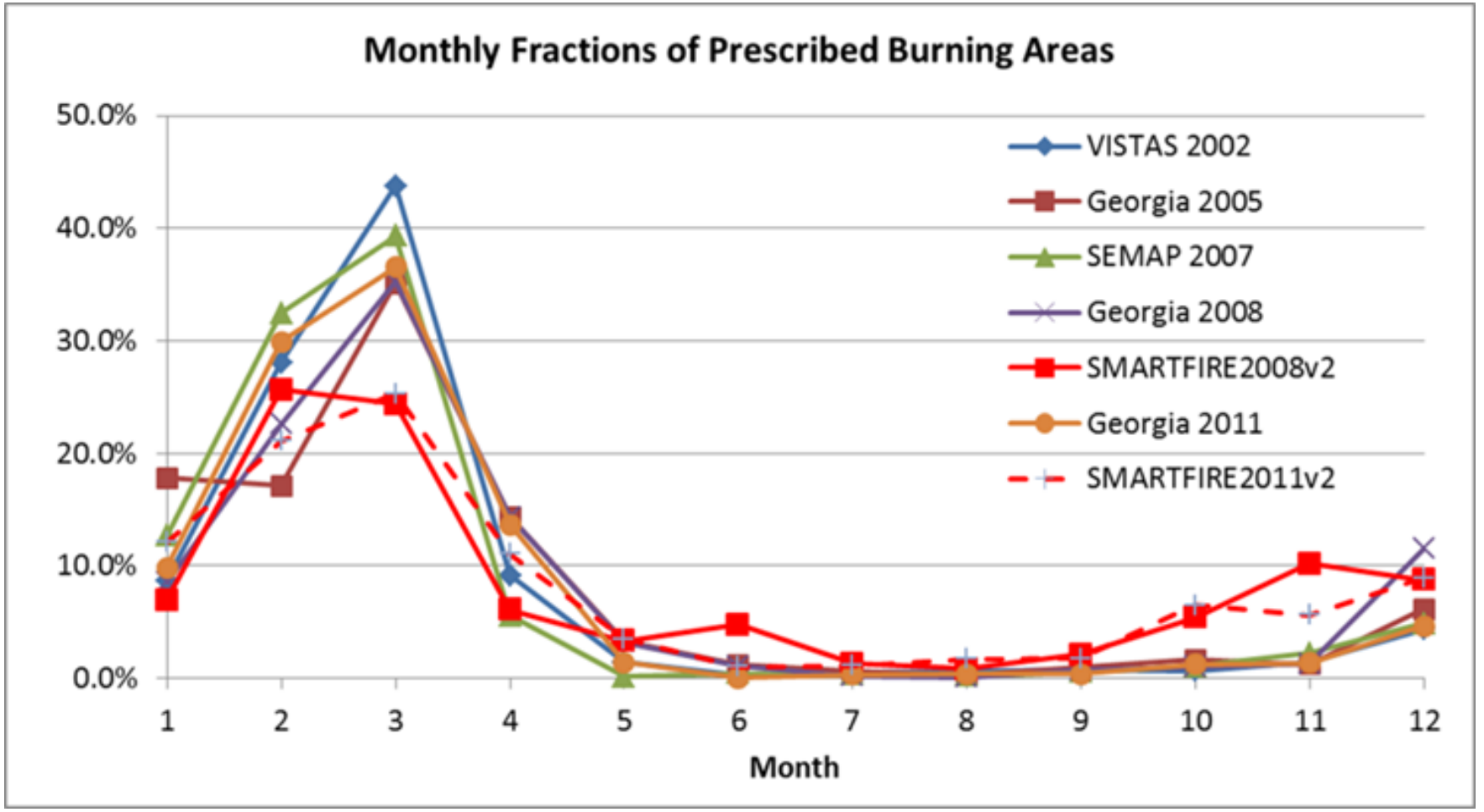
Wildfires





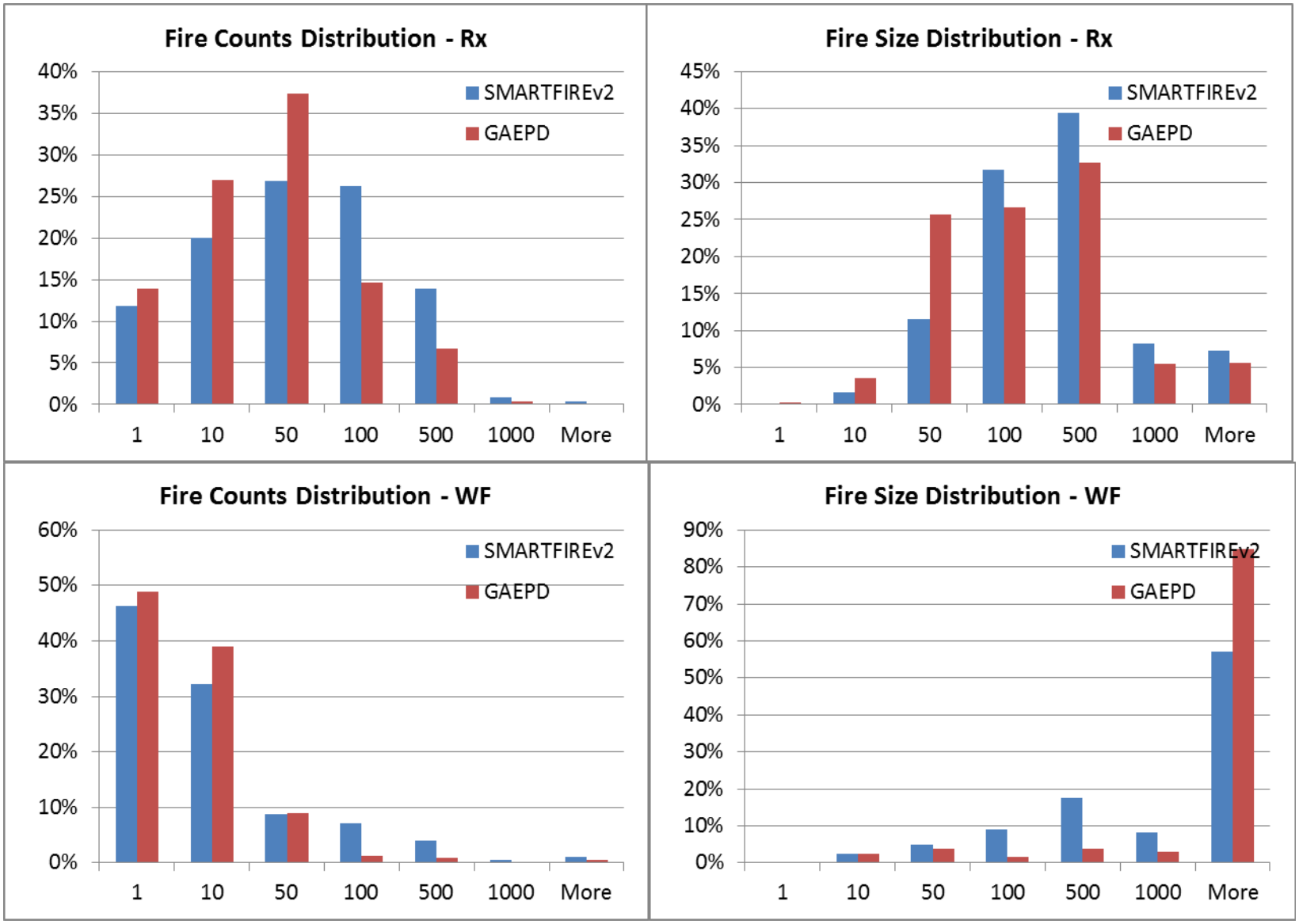


Monthly Fractions of Prescribed Burning Areas



SMARTFIRE_v2 has overestimated prescribed fire activities during October and November and underestimated such activity during March

Fire counts and acres distribution by fire

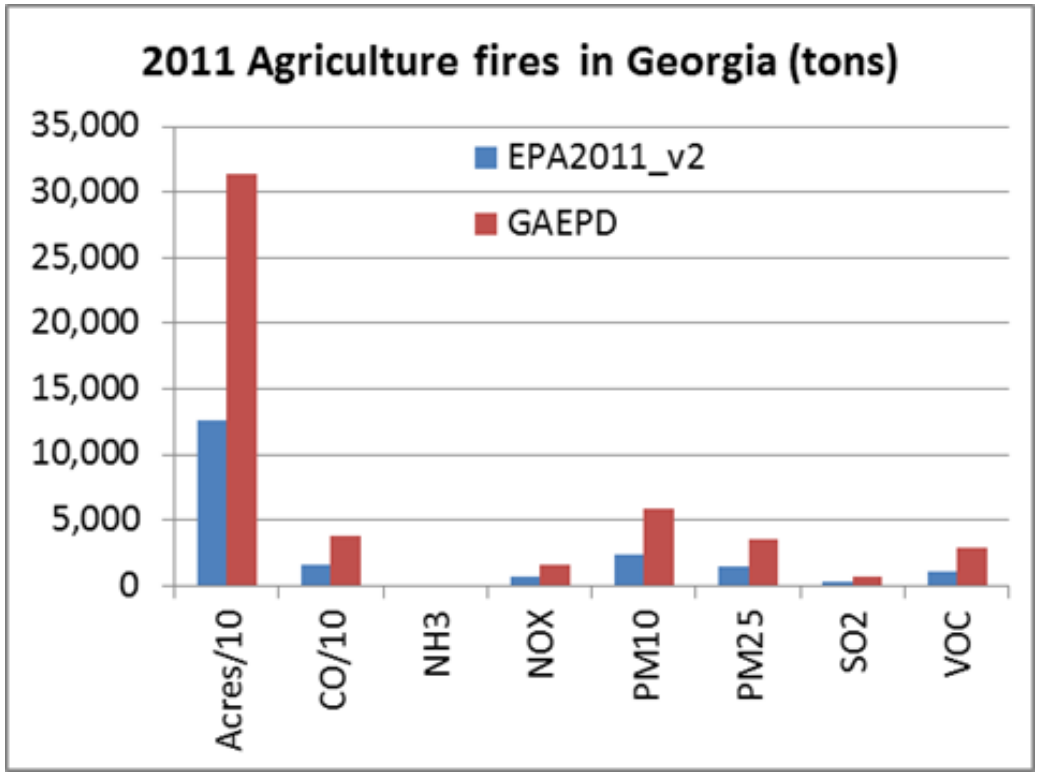


Fuel Consumption Values Used in 2011 SMARTFIRE_v2 for Prescribed Fires in Georgia

VEG	fccs_ number	Total Burned Area (acres)	Percent of Burned Area	Total number of fires	Fuel consumption (tons/acre)	
					min	max
Urban	0	361,816	23.4%	7585	4.8	5.6
Loblolly pine - Slash pine forest	161	231,459	15.0%	3085	3.0	6.2
Longleaf pine / Turkey oak forest with prescribed fire	185	206,316	13.4%	2300	0.9	1.0
Southern Coastal Plain dry upland hardwood forest	407	205,125	13.3%	2790	4.9	7.4
Turkey oak - Bluejack oak forest	186	128,370	8.3%	1932	2.1	2.6
Willow oak - Laurel oak - Water oak forest	283	121,851	7.9%	1647	5.2	6.4
Chestnut oak - White oak - Red oak forest	275	118,266	7.7%	1351	10.1	17.7
Red maple - Oak - Hickory - Sweetgum forest	180	80,854	5.2%	720	5.5	19.8

- Most fuel consumption values look reasonable
- Strange fuelbeds assigned in SMARTFIRE (e.g. urban) likely due to poor quality of lat/lon data for some fire records
- Should set maximum fuel consumption value by fuel types
  - Prescribed fires are usually conducted every 2~5 years in the southeast
- GA EPD 2011 /SEMAP2007 Fire inventory
  - NFDRS fuel type
  - 0.6~8.1 tons/acres for Georgia prescribed fires

Agriculture Burning Emissions in Georgia



- Reviewed EPA agriculture burning emissions in Georgia
- Burned area is less than that in GFC records
- Developed GA EPD estimates using the same EFs used in EPA estimates
- Submitted new estimates to EPA

Summary

- SMARTFIRE_v2 estimates which include state/local fire burning records are better than SMARTFIRE_draft
- VOC, CO and NH3 emissions for Georgia wildland fires are overestimated in SMARTFIRE_v2
  - VOC emissions in SMARTFIRE are almost 5 times of the GA EPD estimates
- Satellite fire detection data are not recommended to be used to develop wildland fire inventories in the southeastern U.S. when detailed local wildland fire data are available
  - Southeastern wildland fires are usually small and under canopy prescribed fires with short duration
  - Fire size/temporal/spatial distributions
- Fuel consumption calculation should be updated for the southeastern U.S.
- Emission factors for VOC, CO and NH3 should be examined
- Local records for agriculture fires should be used