GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Prescribed Fire Data Needs Related to Air Quality

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Southern Integrated Prescribed Fire Information System
Atlanta, GA
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- Manager of Data and Modeling Unit in Planning and Support Program of Air Protection Branch in Georgia Environmental Protection Division

- 2006, Ph.D. in Environmental Engineering at Georgia Institute of Technology
  - Thesis: “Evaluation of Emission Uncertainties and Their Impacts on Air Quality Modeling: Applications to Biomass Burning”

- Emission inventory development and air quality modeling
  - Develop Georgia wildland fire emission inventory in National Emission Inventory (2005, 2008, 2011 and 2014)
  - 2007 Southeastern Modeling, Analysis, and Planning (SEMAP) fire inventory

IMPORTANT PF INPUTS NEEDED TO UNDERSTAND THEIR AIR QUALITY IMPACTS

- **Emissions: Acres, fuel consumption and emission factors**
  - Emission factors
    - High VOC emission factors used in EPA National Wildland Fire Inventory
  - Fuel consumptions varying by fuel type and condition
    - Uncertainties in current fuel consumption estimates (wrong fuel type assignment, years since last burn, log slash burning, etc)
    - Collect fuel consumption data or inputs to improve fuel consumption estimates
    - Develop typical Georgia fuel consumption table to incorporate local knowledge from forest managers
- **Speciation: VOC species, PM2.5 components**
- **Temporal: Start and end date/hour**
- **Spatial: Lat/Lon, or boundaries for large fires**
- **Plume rise: emission split for flaming and smoldering, and different plume characteristics**

USE OF PF DATA

- National Emission Inventory (NEI)
  - National Wildland Fire Inventory, EPA, SMARTFIRE/BlueSky
  - Georgia developed fire inventory for 2005, 2008, 2011 and 2014, and plans to develop our own fire inventory every year since 2015
  - Emission trend
- SIP modeling
  - Fire emissions have large impacts on the AQM performance
  - Future year air quality projection and control strategy development using AQMs need fire emissions representing the typical emission and air quality conditions
- Exceedance report
- Exceptional event demonstration

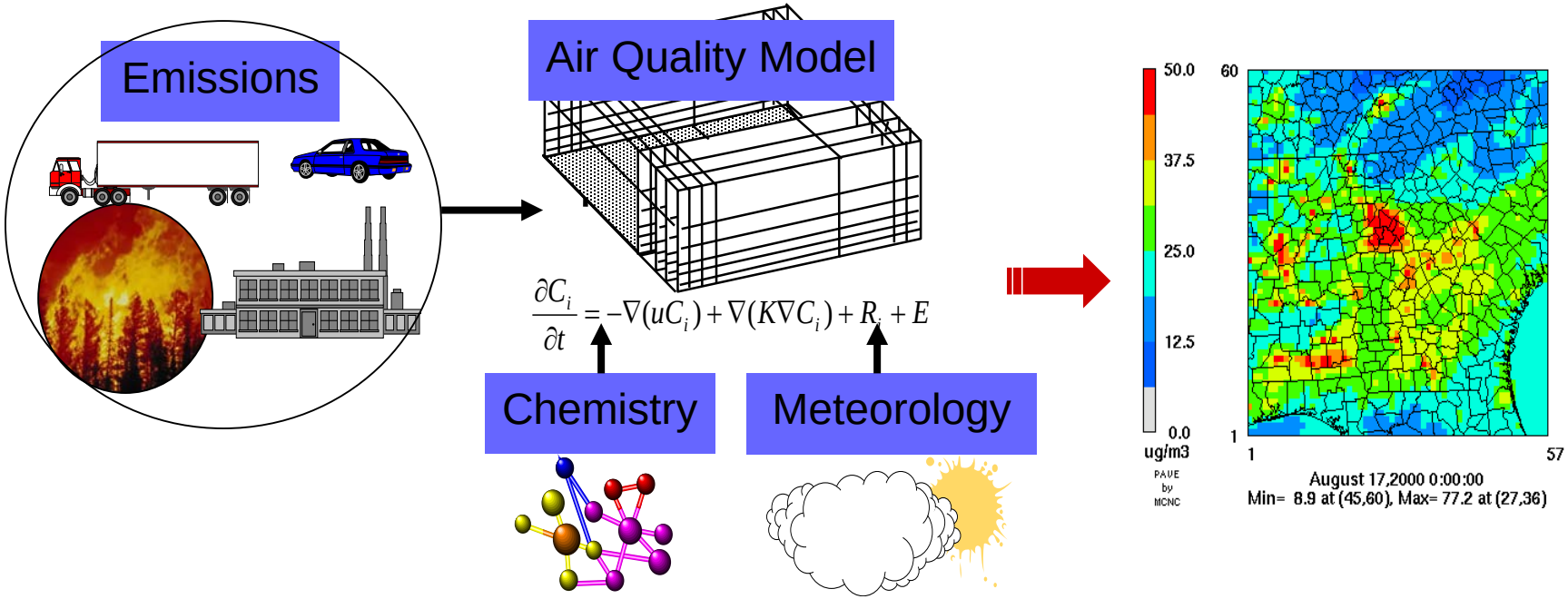
AERR AND NEI

- **Air Emissions Reporting Requirements (AERR)**
  - 72 FR 76539 (2008) and 80 FR 8787 (2015)
- **National Emissions Inventory (NEI)**
  - Actual Annual Emissions
    - SO_2, NOx, VOCs, $PM_{2.5}$, PM_{10}, CO, NH_3, Pb
  - Developed every three years for all source sectors
    - 1999, 2002, 2005, 2008, 2011, 2014, 2017,…
    - Large point sources report annually
  - Due to EPA on December 31 of the following year
    - 2016 large point sources are due December 31, 2017
    - 2017 NEI is due December 31, 2018

STATE IMPLEMENTATION PLAN DEVELOPMENT

- **Ozone, PM2.5 and Regional haze**
- **Regional modeling efforts for the southeast**
  - AL, FL, GA, KY, MS, NC, SC, TN, VA, WV
  - SouthEastern Modeling, Analysis, and Planning (SEMAP)
  - Association for Southeastern Integrated Planning (ASIP)
  - Visibility Improvement State and Tribal Association of the Southeast (VISTAS)
  - Southern Appalachian Mountains Initiative (SAMI)
- **SIP modeling includes:**
  - Quantifying emissions from both natural and anthropogenic sources
  - Evaluating performance of the air quality modeling system
    - AQM reveals how air pollutant concentrations change with source emissions
  - Projecting future year air quality
    - Attainment demonstrations
    - Informing control strategy development

AIR QUALITY MODELING SYSTEM



Emissions inventory

- Point, nonpoint, mobile onroad and nonroad, fires

Meteorology: WRF

Emission processing: SMOKE

Air quality model: CMAQ

FIRE PERMIT TRACKING SYSTEM

- GFC applied for the 2017 National Environmental Information Exchange Network Grant together with Georgia EPD
- Develop a new web-based Prescribed Burn Permit Tracking System
- Collect detailed/accurate prescribed burn information that was not available before
  - Burned area, timing, location (latitude and longitude), fuel type and conditions, post-burn information such as actual burned area and burned percentage of shrub for each prescribed burn permit issued by GFC.
  - Improve quality of wildland fire emission inventory and understanding of their air quality impacts without significantly increasing prescribed burn permit issuance time
  - Enable data sharing among GFC, forest managers/land owners, GA EPD, EPA, U.S. Forest Service, communities of interest, and the public
  - Enhance services to the regulated community (i.e. forest managers/land owners)
  - Enable better decisions through timely, accessible and useful information to minimize adverse air quality and health impacts from prescribed fires.

FUEL TYPES AND FUEL CONSUMPTION

- **Fuel types**
  - The inferred fuel type based on fire location and fuel maps is often not correct
  - Collect fuel type information in the new Prescribed Burn Permit Tracking System
  - Log slash burning or not?
- **Develop Georgia typical fuel consumption tables**
  - 5-10 major fuel types will be identified for each county/district using FCCS fuel map and local knowledge by local forest managers
  - GA EPD will calculate fuel consumption by fuel types and conditions using FCCS/CONSUME
  - GFC local forest managers in district offices will review the calculated fuel consumption values and adjust the values according to their local knowledge on fuels
  - Include impacts from fuel conditions (e.g. years since last burn, fuel moisture levels, burned percentage of shrub, etc)

CONTACT INFORMATION

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