

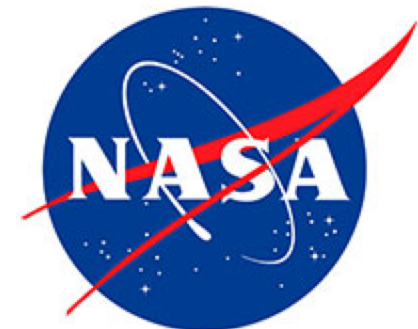
Using Earth observations in prescribed fire, air quality and health management

Talat Odman, Yongtao Hu and Ted Russell

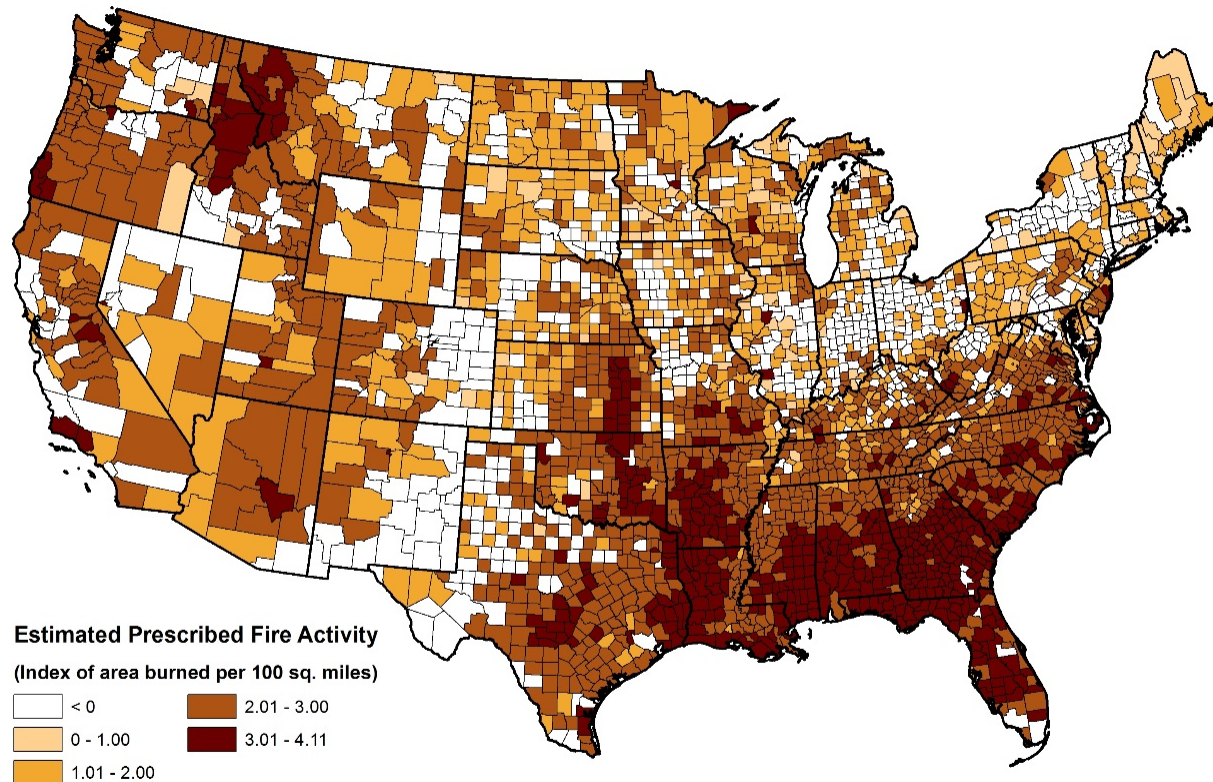


NASA Health and Air Quality Applied Sciences Team
(HAQAST)

Lamont-Doherty Earth Observatory, Columbia University
November 28-29, 2017



Prescribed fire in the Southeast



More information: cohesivfire.nemac.org

Source: National Association of State Foresters (NASF), National Fire Incident Reporting System (NFIRS), Federal Fire Occurrence Dataset, RSAC MODIS Hotspots

According to 2014 NEI, prescribed burning is the largest source of PM_{2.5} (24%) in Southeastern USA.

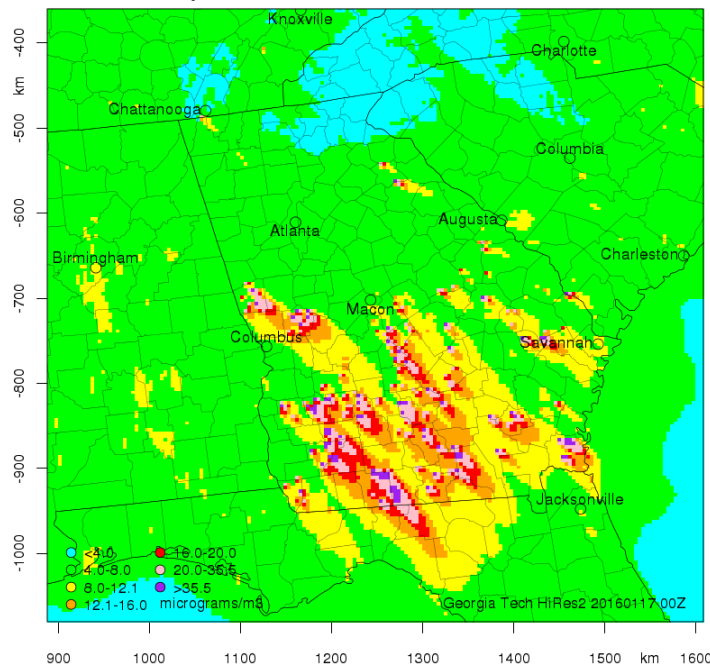
Operational forecasting of prescribed fire impacts for dynamic management

- Daily forecasts of prescribed-fire related air quality impacts to state agencies for prescribed burn and air quality management
- Prescribed-fire related exposures to CDC and its partners for public health tracking and source-specific epidemiological assessments

<https://forecast.ce.gatech.edu>

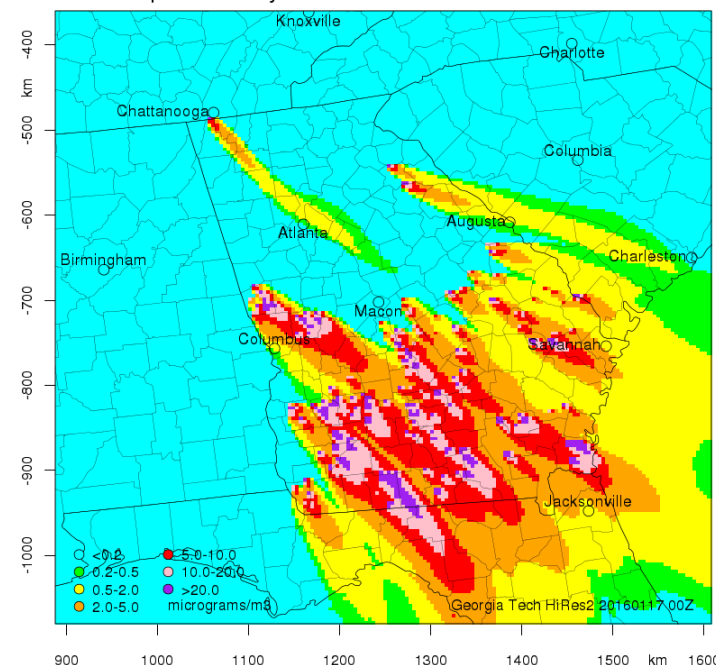
PM_{2.5} Forecast

Daily 24hrPM2.5 Concentration on 20160118



Burn Impact Forecast

PB Impact on Daily 24hrPM2.5 Concentration on 20160118

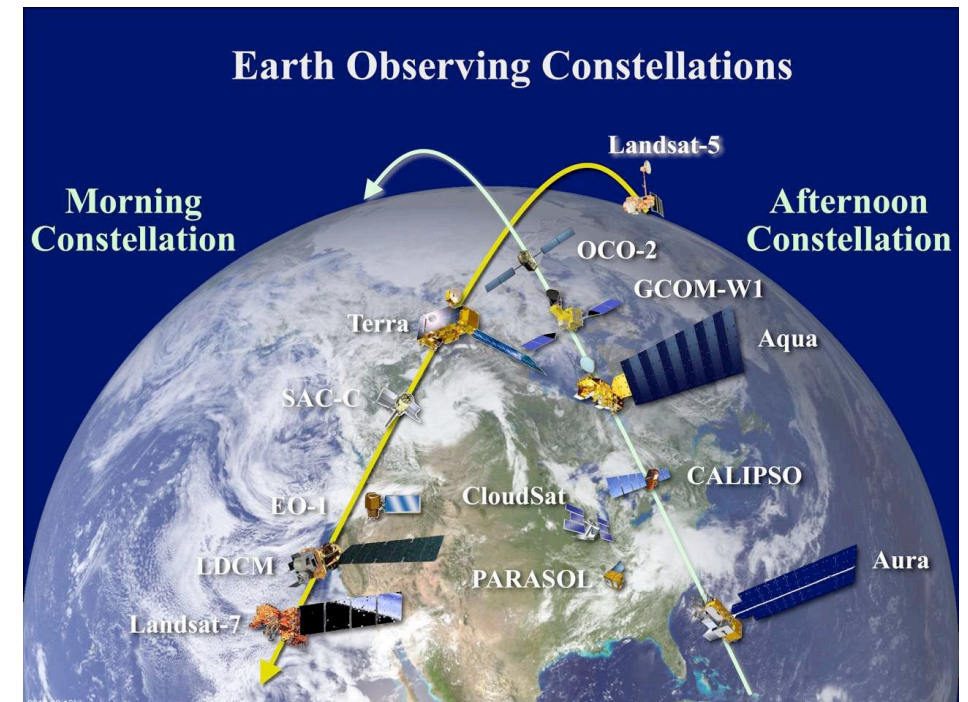
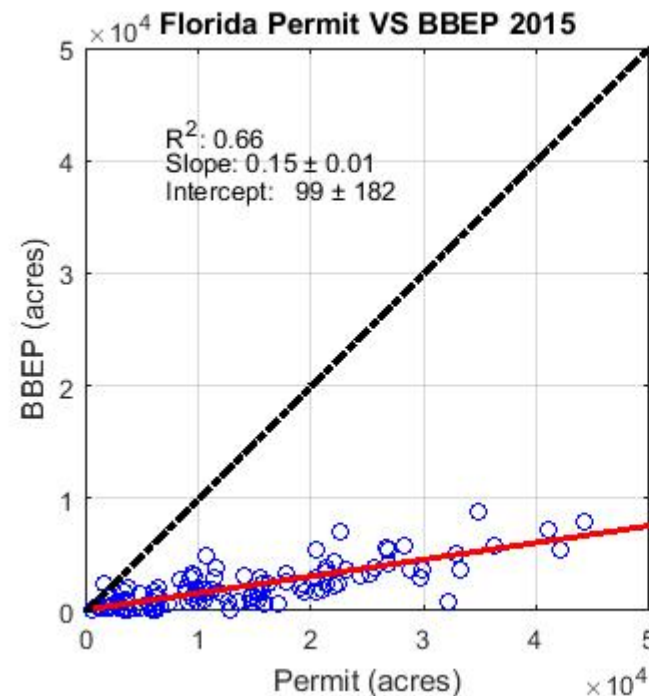
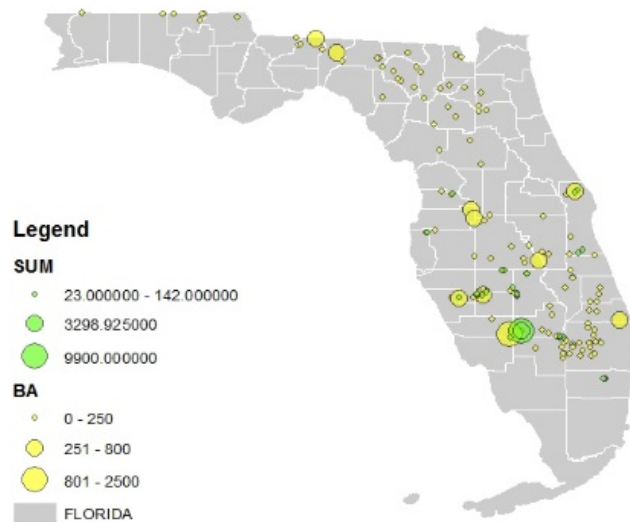


<https://ephtracking.cdc.gov>

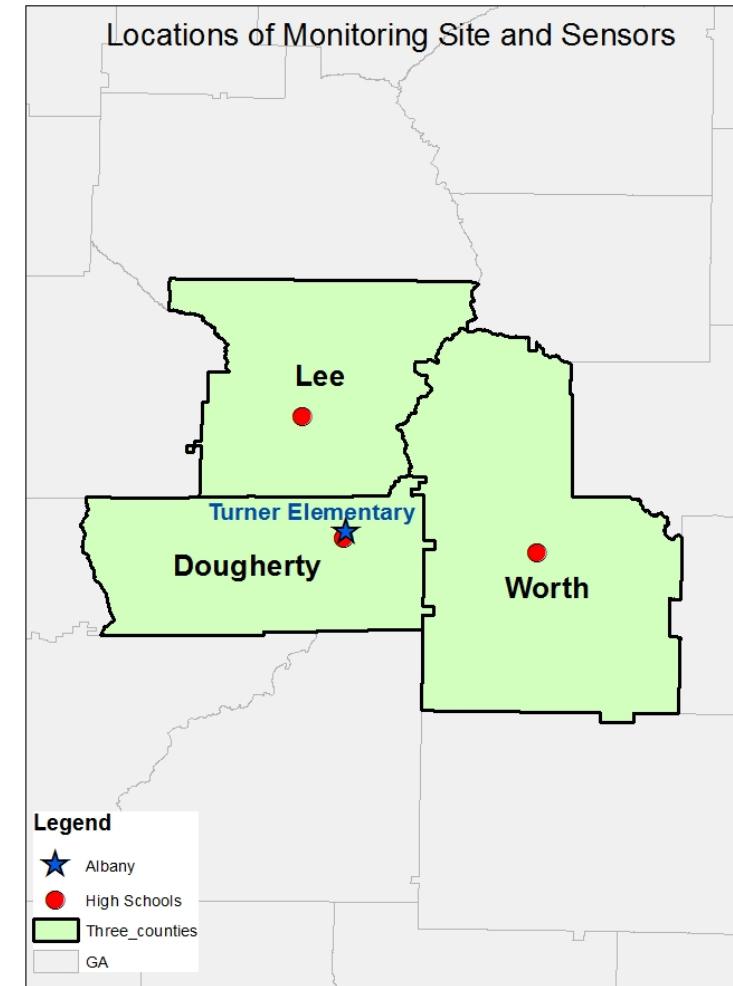
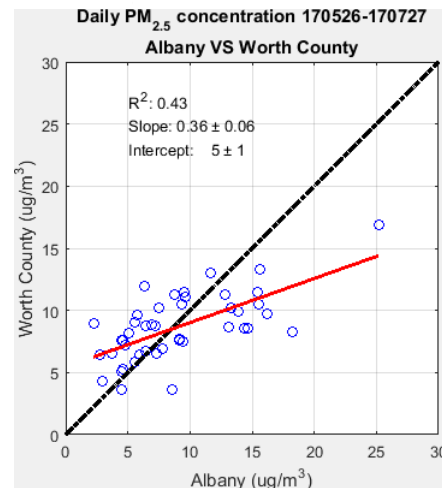
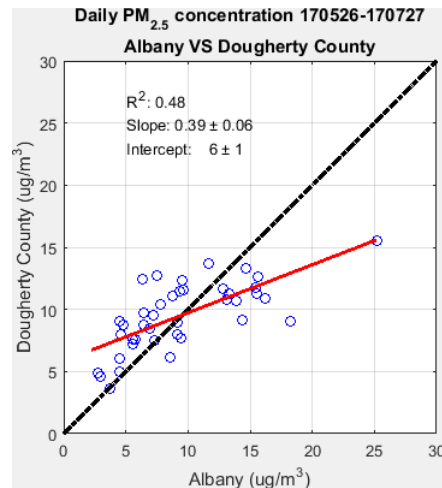
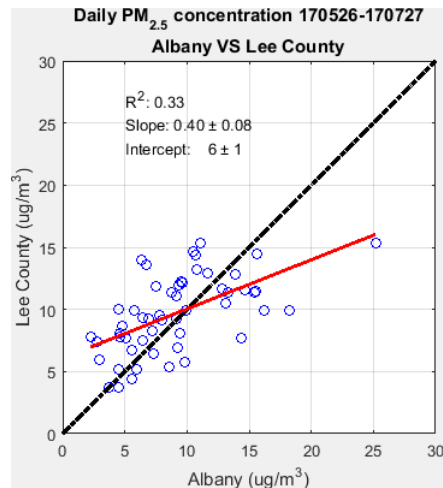
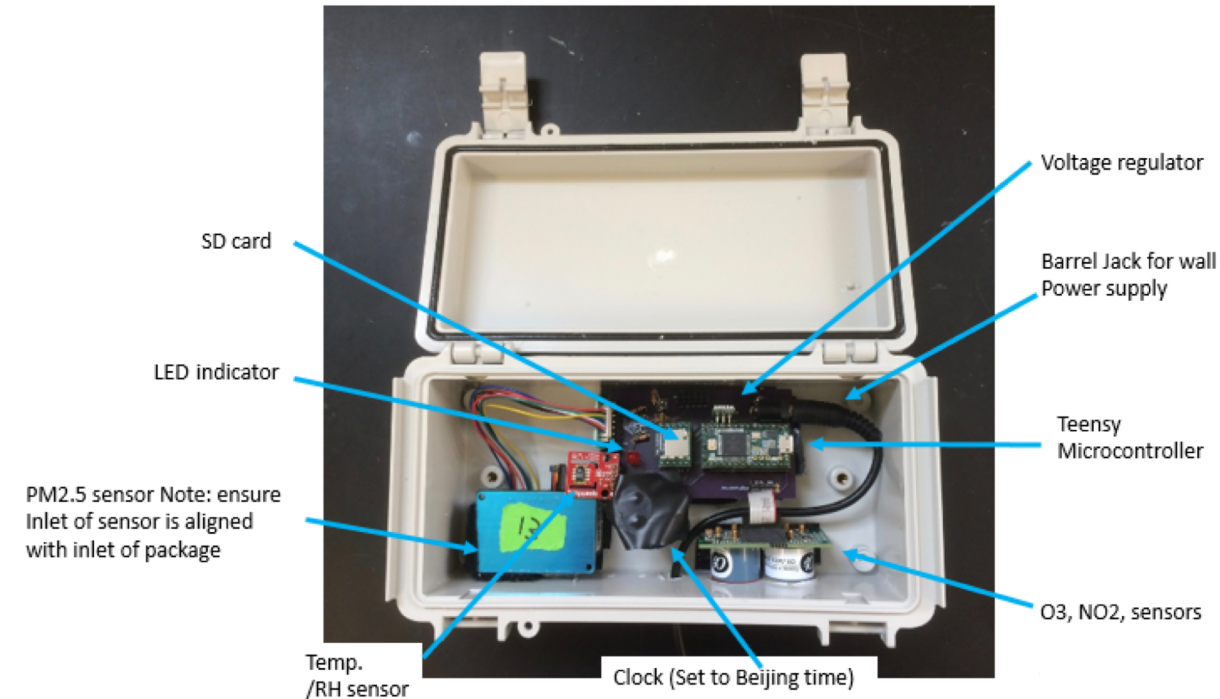
Public Health Tracking Network

Earth observations in prescribed fire impact forecasting

- Fire detection
- Fuel loads
- Emissions
- Plume heights
- Smoke dispersion
- Model evaluation



Sensor packs to detect burn impacts in unmonitored areas





Southern Integrated Prescribed Fire Information System

Prescribed Fire and Air Quality Information for the South

Home About Advance Functions Log in

Choose a date: 3/8/2017 Displaying: 03/08/2017 at 12:00AM PM2.5 (ug/m3)

Good Moderate Unhealthy for Sensitive Groups Unhealthy Very Unhealthy

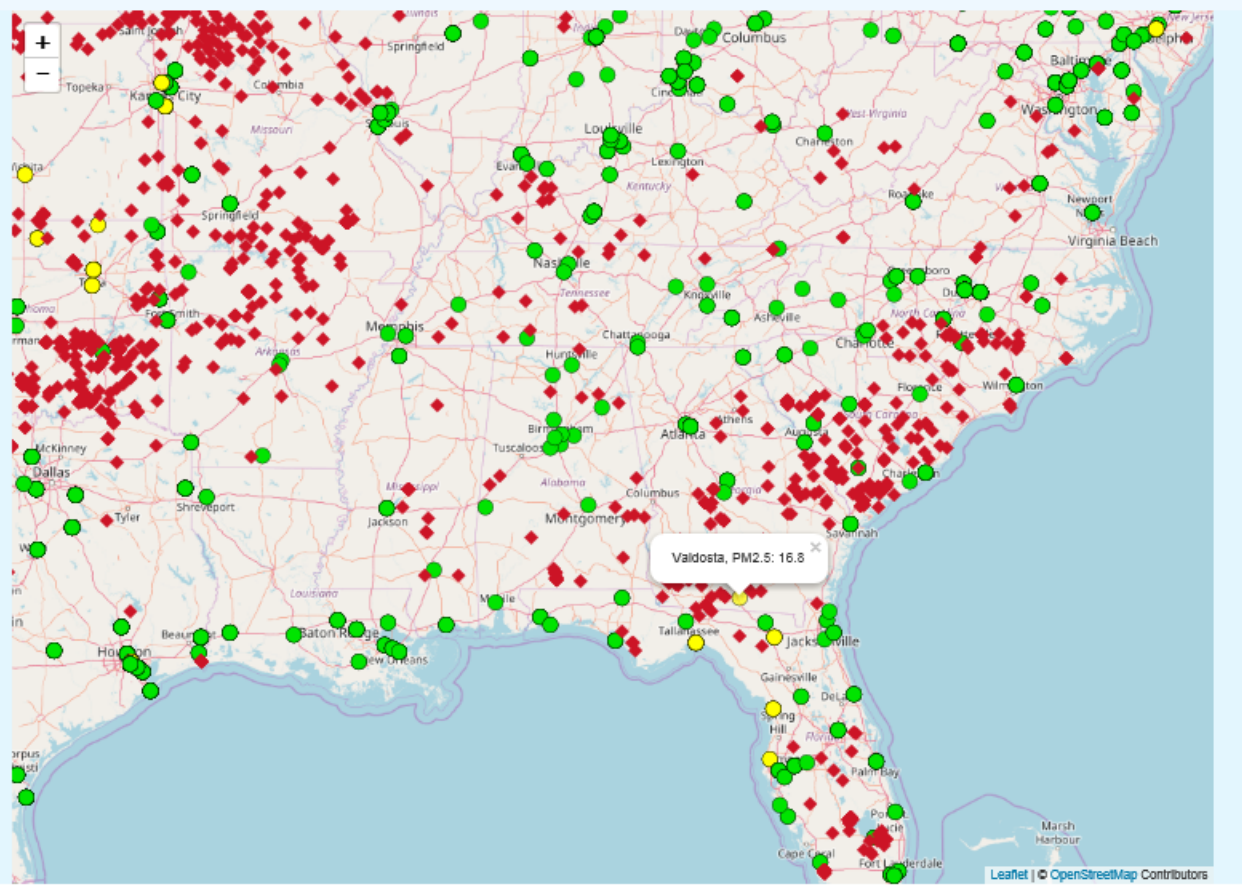
POLLUTANT PM2.5

AIR QUALITY

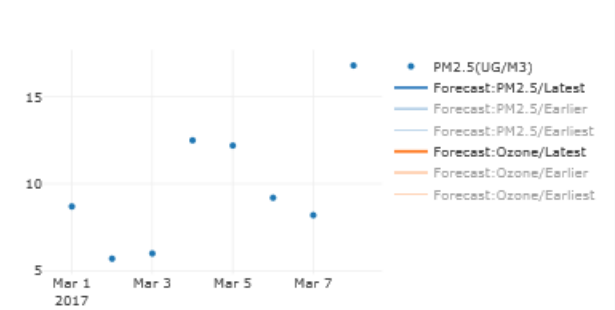
- ☒ Observations
- Forecasts
- ☐ PM2.5 sites
 - ☐ PM2.5 forecast
 - ☐ Latest
 - ☐ Earlier
 - ☐ Earliest

FIRES

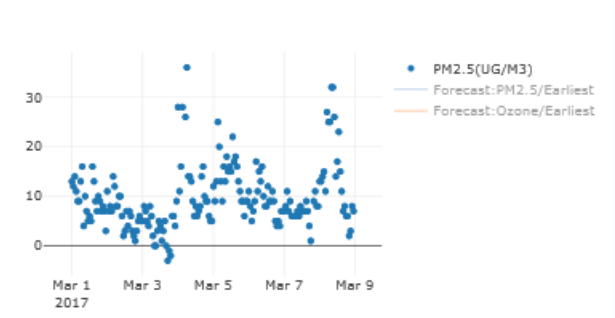
- Observations
- ☒ HMS detections
 - ☐ Permit
- Forecast
- ☐ Burns
 - ☐ Burn Impact



Valdosta - Daily

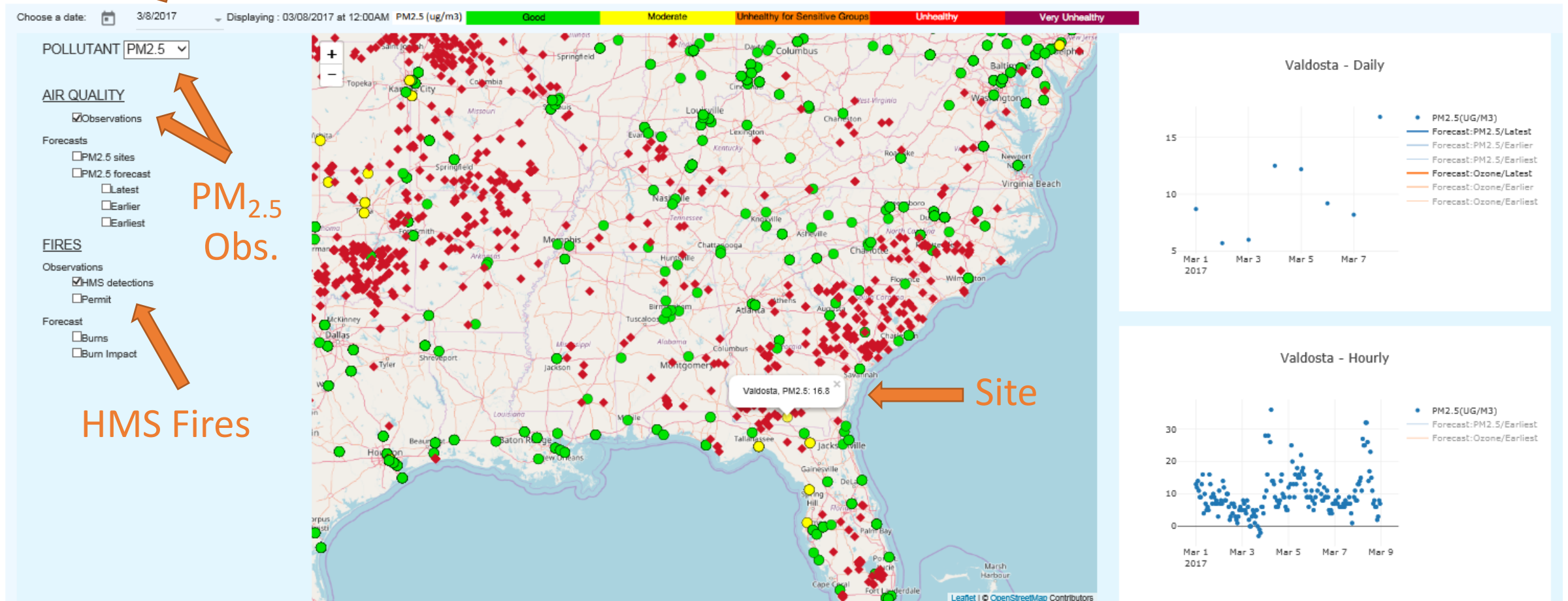


Valdosta - Hourly



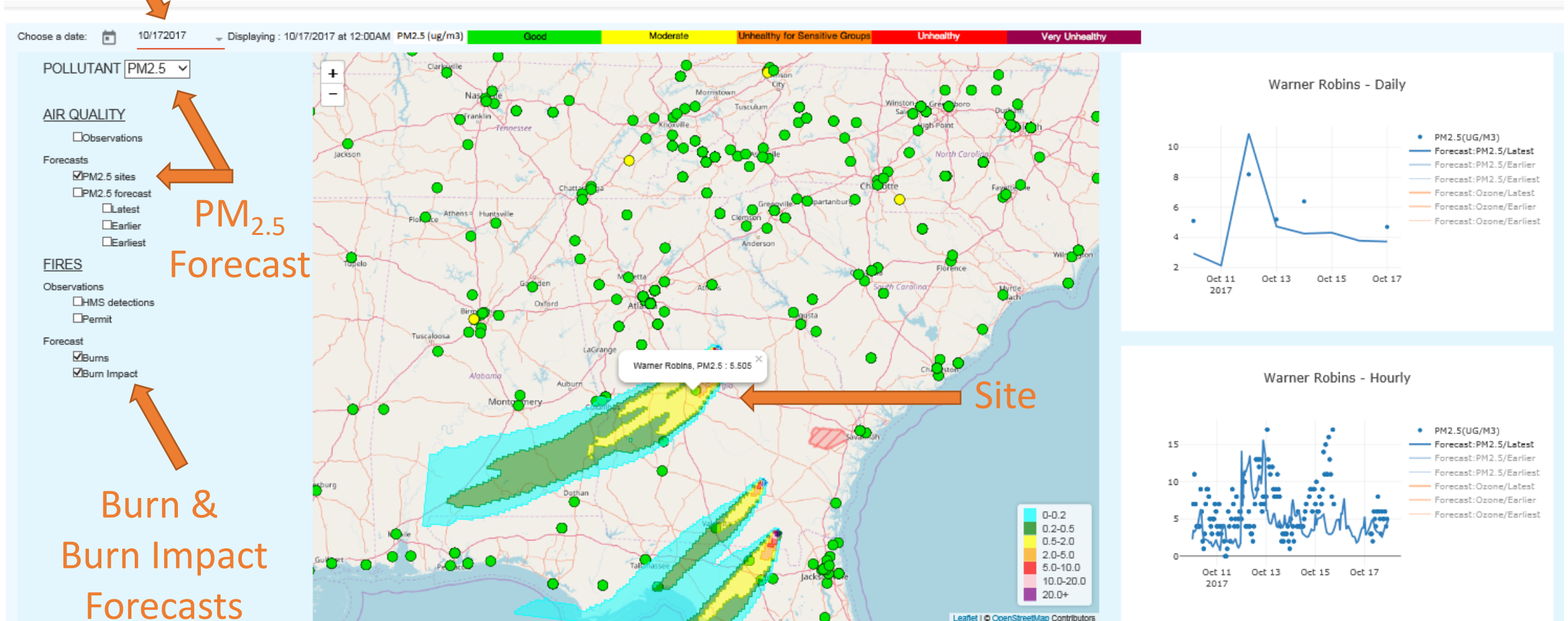
Date

Fire Detections and Air Quality Observations



Date

Air Quality, Burn and Burn Impact Forecasts



Summary

- Prescribed fire impacts forecasting being expanded
 - Extending to other states
 - Using satellite fire products in states with no prescribed fire data
- Combining information from satellites, air quality models, inexpensive sensors, routine monitors and burn permits
 - Inexpensive sensor packages deployed at schools in southern Georgia
 - Limited other monitoring in region
 - No one system capturing all the burns and burned acreage correctly
 - Working on approaches to more fully integrate available information
- Disseminating prescribed fire information for fire, air quality and health management
 - Web portal opening soon