Asthma and Air Quality in the Presence of Fires - A Foundation for Public Health Policy in Florida

NASA

UF UNIVERSITY of FLORIDA

FLORIDA DEPARTMENT OF HEALTH

FLORIDA Environmental Public Health Tracking Program

CDC CENTERS FOR DISEASE CONTROL AND PREVENTION

Collaborators:

- Linda Young, Ph.D. (PI) University of Florida
- Sue Estes (Co-PI) NASA/MSFC
- Carina Blackmore, Ph.D (Institutional Co-PI) State of Florida
- Chris DuClos (Co-I) State of Florida
- Carol A. Gotway, Ph.D. (Co-I) CDC
- Xaohui Xu, Ph.D. (Co-I) University of Florida
- Chris DuClos (Co-I) University of Florida
- Greg Kearney, Ph.D. (Co-I) CDC
- Bill Crosson, Ph.D. (Co-PI) NASA MSFC
- Maury Estes (Co-I) NASA MSFC
- Mohammed Al-Hamdan, Ph.D. (Co-I) NASA MSFC
- Jeff Luvall, Ph.D. (Co-I) NASA

Motivation

- Outdoor air quality and its associated impacts on respiratory problems in Florida are of public health significance.

- The outdoor air quality in Florida can be poor during periods of little rainfall or during the extended wildfire seasons, threatening persons with compromised respiratory systems each year.

- During periods of wildfires and for some prescribed burns, increased levels of PM cause respiratory problems in humans.

- Increase levels of PM leads to increased ER visits and hospitalizations, it is not known whether the reduced air quality associated with wildfires and/or prescribed burns is related to increases in asthma cases.

- The wildfire and prescribed burn data will be used to assess whether the presence of these natural environmental hazards are related to the health outcome of asthma as measured by hospitalizations and ER.

Objectives:

The objectives of the proposed research are to:

•Develop high-quality spatial data sets of environmental variables

•Link these environmental data sets with public health data consisting of hospitalization admissions and ER visits

•Develop spatial-temporal models of the relationship between asthma and air quality

•Provide the linked data sets and associated analyses to local, state and federal end-user groups.

Project Components

- Link the MODIS derived $PM_{2.5}$ data with the Florida Division of Forestry's (DOF's) Surface Fuels database and the Live Fuels database to assess the effectiveness in determining the possibility of increased PM and decreased air quality in the presence of fires.

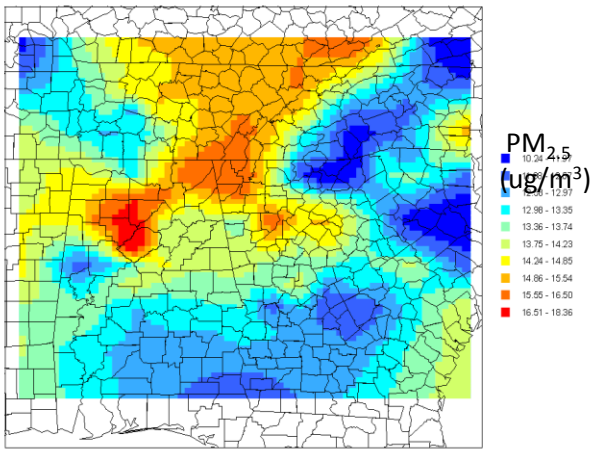
- Link the asthma data with the predicted $PM_{2.5}$ data developed in task (1) and the socio-demographic data from the U.S. Census Bureau and the Behavioral Risk Surveillance Survey (BRSS) and additional meteorological data.

- Investigate the use of hospital and ER cases with asthma as the primary or secondary cause of hospital visits as a health outcome indicator of human response to environmental air quality indicators.

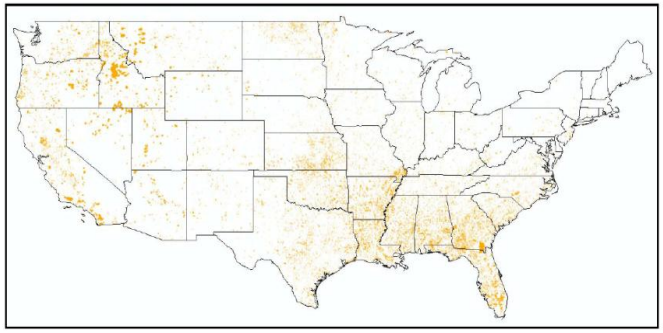
- Assist the State of Florida (FDOH, emergency management) in establishing a public health policy for posting county-level advisories and alerts of poor air quality, with associated steps citizens should take to protect their health based on indicators developed in tasks 1, 2, and 3.

- Improve the FEPHT program's state portal in cooperation with CDC's national EPHT program.

Environmental Data Methods

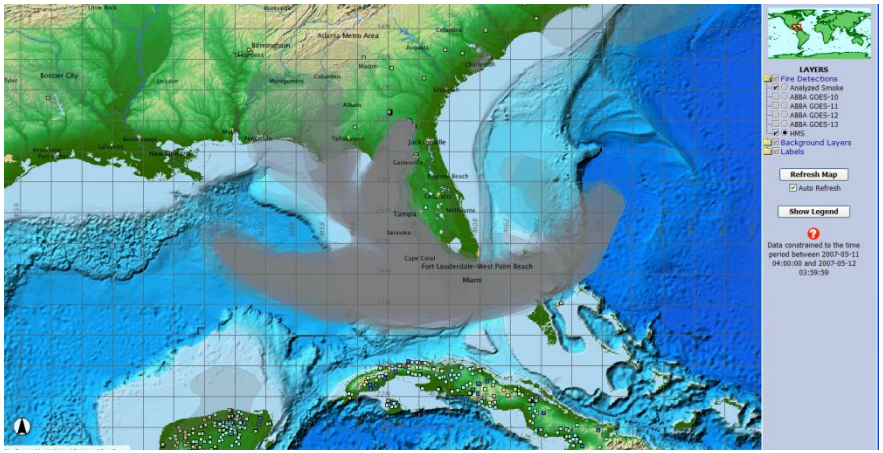


$PM_{2.5}$ spatial surfaces for the year 2003 in the Southeast US (Al-Hamdan et al., 2009).



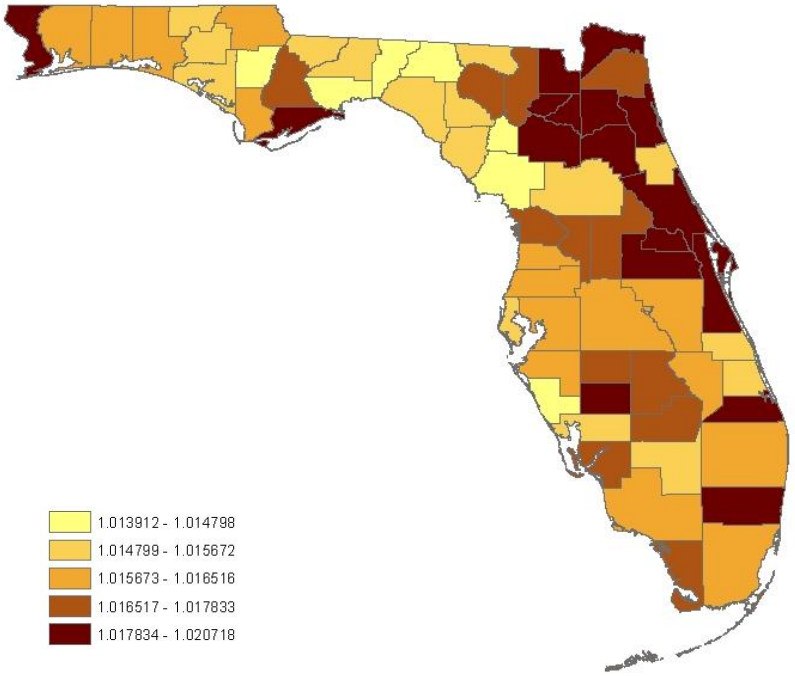
Map Prepared By: Dr. Mohammad Al-Hamdan
USRA at NASA/MSFC
mohammad.alhamdan@nasa.gov
June 18, 2008
Data Source: USDA Forest Service Remote Sensing Applications Center

Locations of MODIS fire detections in 2007



Map of analyzed smoke from satellite fire detections from the National Geophysical Data Center

Study Domains



Florida County Map of Relative MI SER for August 2005 (see Young, et al. 2008)

Project Timeline

Study Task Numbers and Description		First Year				Second Year			
		1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
1	Production of Environmental Data Sets								
2	Linkage of Health, Socio-demographic and Environmental Data								
3	Investigate Use of Hospital and ER cases of Asthma as Health Outcome Indicator								
4	Assist in the develop Public Health Policy Based on the Health Outcome Indicator								
5	Integrate with the FEPHT Program's State Portal								