This research has allowed us to understand the chemical makeup of PM and improve the accuracy of PM emission and risk assessments.

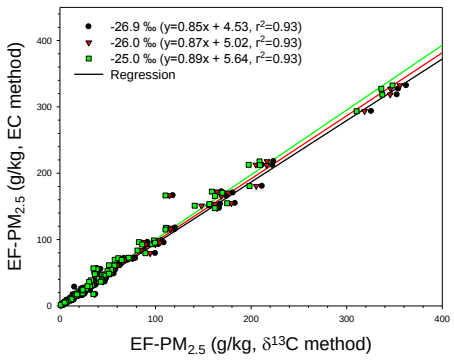
# Accuracy of Particulate Matter (PM) Emission Factor Determinations from Prescribed Burns and Forest Fires

## Who cares and why?

Prescribed burn is a widely used forest management practice in the United States. It is used to reduce wildfire risk, prepare sites for tree planting, and promote fire-dependent species and natural communities. Up to 1.7 million hectares of forest may be burned each year just in the southeastern U.S. alone. However, particulate matter (PM) emission from prescribed burns has caused air quality and public health concerns in the affected areas. Fire-emitted PM now represents a significant fraction of emission inventory in places where such emissions are concentrated. $PM_{2.5}$ (particulate matter with aerodynamic diameter less than 2.5 µm) is of particular concern because of its longer suspension time, associated health problems, and the black carbon content that may be important to the global carbon sink and solar radiation heat budget.

## What has the project done so far?

We developed innovative methods to characterize and trace the source of PM and evaluated the accuracy of current PM emission factors, which is the basis for PM emission estimation at regional, national and global levels. The results of our research help us to understand the chemical makeup of PM, improve the accuracy of PM emission and risk assessments.




## Impact Statement

Many areas of the U.S. are planning to increase prescribed burns in the future, raising additional concerns. Adequate science-based knowledge of the impact of PM on air quality and the environment is indispensable for guiding sound fire management policy.

Restriction on prescribed burns where it is not warranted may place the public at greater risk of wildfires, which usually emit many times the PM of prescribed burns. Also, insufficient prescribed burning threatens the health and biodiversity of fire-dependent ecosystems and species protected under the Endangered Species Act.

In response to non-attainment of air quality standards in many cities, federal and state environmental agencies are currently considering measures to greatly restrict the use of prescribed burning, although the actual contribution of burning to total PM loads is poorly understood and presumably small. Conversely, underestimation of PM emission from prescribed burning may allow public health risks to go undetected. Our research helped FAMU to establish a significant agricultural air quality research programs in the SE US.

### What research is needed?

We need accurate PM emission factors of prescribed burning to estimate the impact of that practice in air quality. The current PM emission factor values are biased due to the incorrect assumptions used for the determination of PM emission factors. We still need to find a means to overcome the bias caused by differential diffusion of $CO_2$ and $PM_{2.5}$ in the measurements of PM emission factors.

### Want to know more?

Please contact Dr. Y. Ping Hsieh
yhsieh@famu.edu, 850-599-3065

Strategic Priority:
Natural Resources and the Environment

Additional links:
http://www.umes.edu/ard/Default.aspx?id=46285

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