

## Feedbacks and Trends in Isoprene Flux Dataset from UMBS

REU advisor: Shelley Pressley

### ***Project Description***

Volatile organic compounds (VOCs) are emitted into our atmosphere from man-made (anthropogenic) sources such as vehicle exhaust or power plant emissions, and also from natural or biogenic sources, such as vegetation. Over 90% of the VOCs globally come from biogenic sources, thus biogenically emitted VOCs can be very important in tropospheric chemistry. By quickly reacting with the hydroxyl (OH) radical, biogenic



VOCs impact boundary layer HO<sub>x</sub> concentrations and contribute to the formation of tropospheric ozone (O<sub>3</sub>) and secondary organic aerosols (SOAs). At the PROPHET site, flux measurements of isoprene (one of the more ubiquitous biogenic VOCs) have been made each summer (2000-2007).

In addition, ambient concentrations and flux measurements of O<sub>3</sub> were made above the canopy and hourly ozone stomatal fluxes ( $F_{s\_O_3}$ ) were calculated from June 15 to September 15 for each year from 1999 to 2004. Previous research used the  $F_{s\_O_3}$  to investigate the effect O<sub>3</sub> exposure might have on Net Ecosystem CO<sub>2</sub> Exchange (NEE). A second project investigated the relationship between soil moisture and isoprene emissions, by employing the use of the Model of Emissions for Gases and Aerosols in Nature (MEGAN).

A student working on this project will investigate the biological controls on the emission rates, biosphere-atmosphere links between isoprene emissions and energy fluxes (i.e., sensible and latent heat fluxes), or links between isoprene emissions and pollution levels at the site (i.e., clean northerly transport of air vs. more polluted air masses from the south). In particular, using the calculated ozone stomatal fluxes and the isoprene flux measurements, a student could determine how exposure to atmospheric ozone affects the emission of isoprene by plants.