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CHEMICAL CHARACTERIZATION OF BIOMASS BURNING ORGANIC AEROSOL COLLECTED ABOVE AND BELOW FOREST CANOPY

Skyler Simon

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We present chemical speciation of biomass burning organic aerosol produced by a prescribed forest fire on March 20, 2017 at Tyson Research Center. It is important to understand the behavior of these aerosols because they contribute to impaired visibility and human health complications such as respiratory problems. Additionally, atmospheric aerosols are responsible for uncertainty in the global energy balance. Biomass burning organic aerosol varies based on the type of fuel that is burned as well as the fire conditions. In this project, samples were collected on quartz filters at ground level by pump samplers and above the forest canopy by a drone equipped with a pump. Collection occurred at regular time intervals at both levels, so compound evolution over time could be studied in addition to varying compound abundance. The samples were then analyzed using thermal desorption gas chromatography-mass spectrometry with a Filter Thermal Desorption Aerosol Gas Chromatograph (Filter TAG). Individual compounds were identified and integrated using the TERN software package in Igor Pro. Individual compounds behave differently in the atmosphere and are produced in variable quantities, so conclusions are generally drawn on a per species basis. Overall, drone samples tended to show evidence of more aged aerosol, evident in both the higher vanillin and higher m/z 44 signal, which is associated with more oxidized aerosol in TAG data. High abundance compounds included aromatic compounds, which are characteristic of lignin pyrolysis.