

How Does In-Canopy Chemistry Affect Above Canopy Concentrations in a Tropical Rainforest?

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Abstract

The forest emits a vast range of biogenic volatile organic compounds (BVOCs) involved in ozone formation, secondary organic aerosol (SOA) formation, and regulation of the atmospheric oxidizing capacity (e.g. OH radical). Chemical transformations are influenced by vertical transport within the canopy and between the canopy and atmosphere, as well as BVOC emissions profiles. Some species, for example sesquiterpenes, can have high reactivity within the canopy, and thus their fate and impact on global atmospheric composition is controlled by these in-canopy processes. The separation between the canopy and the boundary layer is not explicitly resolved in 3D global models. We use a multi-layer canopy model combined with observations of BVOCs and ozone concentrations from the ATTO tower in Manaus, Brazil to elucidate the role of in-canopy chemistry within a tropical forest on forest-atmosphere exchange. Our results are intended to inform 3D global chemistry modelling and improve model-observation comparisons over the tropical forest.

Early Career Scientist

YES, I am an early career scientist.

IGAC Activities

TOAR: Tropospheric Ozone Assessment Report

IGAC Regional Working Groups

Americas Working Group