



Applications of an NMHC isotope analysis system on trace gases from plant and CARIBIC samples

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Isotope analysis can be a useful tool in constraining the budgets (sources and sinks) of atmospheric trace species and is increasingly applied for organic constituents. We present initial results from an automated system for isotope ratio measurements on atmospheric hydrocarbons. The inlet system is flexible and allows analysis of trace gases from medium size to large ambient air samples (5-300L) as well as CO₂-concentrates from samples that have been extracted offline. Long-term testing has shown this system to be stable to 1.5‰ vs. VPDB (or better) across all tested C₂-C₆ compounds, and methyl chloride.

This system has now been utilized to analyze emissions rates and isotopic fractionation of 7 NMHCs from Sequoia leaf litter under conditions of UV exposure. These experiments indicate, for example, ¹³C depletion in methyl chloride (CH₃Cl) in the range of -90 to -113 ‰ vs. VPDB with continuously increasing emission rates reaching to 3.26 ng/h/gdw after constant UV exposure of 7 hours, in a dynamic reactor. Other experiments with variation in UV exposure were also undertaken, indicating variation in emission rates and ¹³C with UV intensity.

In addition, first results from analysis of samples from concentrates taken during the CARIBIC II (<http://www.caribic-atmospheric.com/>) campaign, beginning with flight 26 (return flight, Male, Maldives, to Dusseldorf, Germany, August 2000), which features flight path air originating from over the Atlantic Ocean and the Indian subcontinent, is presented.