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Stable Carbon Isotope Ratios, Mixing Ratios, and Average Photochemical Ages of Several Light VOCs including Isoprene, Benzene, and Toluene during May-August, 2005, Measured near Jülich, Germany

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A GCC-IRMS technique has been developed that can accurately determine the stable carbon isotope ratios of isoprene, MACR, and MVK, benzene and toluene (*Iannone et al.*, 2007). It involves the concentration of VOCs and the removal of water for ambient air samples of 140 L volume. This technique is an extension of previous methods (e.g. *Rudolph et al.*, 2000; *Anderson et al.*, 2003). A peak-fitting evaluation was utilized to reduce the bias of $^{12}C/^{13}C$ determinations which can result from incomplete peak resolution common in atmospheric samples.

The procedure was applied to ambient GCC-IRMS measurements taken from late May to early August, 2005, at Forschungszentrum Jülich, Germany, a semi-rural area. Average photochemical ages, $(t{\cdot}[OH])_{av}$, were determined using both VOC concentration ratios and stable-carbon isotope ratios. Combined with HYSPLIT4 wind back-trajectories, likely locations for the major isoprene sources were determined. The $\delta^{13}C$ values for 17 individual measurements of benzene were inversely correlated its mixing ratios (r^2 = 0.5433). This result can be rationalized on the basis that the sampled benzene, due to its long lifetime, is a mixture of highly-processed, background benzene and virtually unprocessed benzene emitted from regional sources.

Literature Cited:

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