



Stable carbon isotope ratio measurements of VOC over various source regions in Southern Germany aboard a Zeppelin

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On emission volatile organic compounds (VOC) contain a carbon isotope ratio specific to its origin. Chemical processing alters the isotope ratio in the atmosphere. In summer 2007 air samples were taken aboard a Zeppelin NT as part of the TRACKS campaign. The airship was equipped with a comprehensive set of sensing instruments to enable the characterization of the troposphere from 100 m to 1000 m above ground. VOC samples were analyzed offline by gas chromatography / isotope mass spectrometry. A sample volume of about 15 l of ambient air allowed the determination of isotopic carbon ratios with an accuracy of about ± 1 at ambient mixing ratios. Isotope ratio data of different compounds were found to vary for different source regions and altitudes. Aromatic compounds showed $\delta^{13}\text{C}$ values between -20 and -30 per mil. Methanol exhibited particularly low $\delta^{13}\text{C}$ values over regions with pronounced biogenic emission, where $\delta^{13}\text{C}$ values up to -44 per mil were measured. Comparing isotope data with online VOC measurements enables to evaluate the extent of air mass processing.