



First Measurements of Stable Carbon Isotope Ratios of VOC in the UT/LMS aboard HALO

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Measurements of stable carbon isotope ratios of VOC with GC-C-IRMS is a sensitive tool to identify the origin of VOC, study their atmospheric processing, investigate the impact of transport processes on their distribution, infer transport pathways, differentiate between impacts of mixing and chemical processes, as well as to estimate the degree of mixing and the residence times of the compounds in the atmosphere.

Today, the coverage of data and atmospheric observations of stable isotope ratios in VOC is not sufficient. Modellers covet for data to support model studies in order to assess and improve emission inventories. For this purpose, stable isotope data from different sites and atmospheric regions are absolutely essential. Certainly, the few data and studies available demonstrate their great value for the understanding of photochemical and dynamical processes in the atmosphere. However, those studies were all limited to surface sites or the lower troposphere.

An automated high volume air sampling system (MIRAH) has been deployed on the first HALO-campaign in October-November 2010. During each of the four TECHNO-flights up to 24 whole air samples were taken between 3 km and 14 km, i.e. covering the region from the lower troposphere to the lowermost stratosphere. The air samples were analysed for stable carbon isotope ratios in VOC with GC-C-IRMS in the laboratory later on. We determined the stable carbon isotope ratios and mixing ratios of several aldehydes, ketones, alcohols, and aromatics. First results of this valuable and unique data set are presented.