

Regular GC-TOF observations at Taunus Observatory and Mace Head

A.Engel, J.Hoker, M.Denner, F.Obersteiner u. H. Bönisch

The measurement technique classically used for the detection of halogenated trace gases is gas chromatography with mass spectrometric detection. The mass spectrometers used for this purpose so far were mainly quadrupole mass filters, which need to be tuned to a specific mass to charge ratio in order to achieve sufficient sensitivity. Compounds not targeted during the analysis may pass the mass spectrometer without being detected. The method of time-of-flight (TOF) mass spectrometry, which has recently become available for small and affordable instrumentation combines very good sensitivity with full mass scanning capabilities. As all masses are detected and recorded simultaneously, the GC-TOF chromatogram provides information about all species, for which the atmospheric concentrations are sufficiently high and the species are in the range of boiling points accessible to the analytical system, even though they were not targeted during the first data analysis. The TOF mass spectra of the chromatograms thus provide a digital air archive for such species.

We present such a set-up, which has been started in late 2013 with samples collected at the University of Frankfurt Taunus Observatory and on samples collected at Mace Head observatory since March 2014. We discuss the sampling, the analysis and present some first results from atmospheric observations.