

VOC Measurements at T1: diurnal variations, emissions fingerprint and photochemical production.

Joost de Gouw, Dan-Welsh-Bon, Carsten Warneke and William C. Kuster

Measurements of volatile organic compounds (VOCs) were conducted at T1 using an in-situ GC-FID instrument and a novel proton-transfer ion-trap mass spectrometer (PIT-MS). The results showed a very strong diurnal variation, with high mixing ratios during the night and early morning when VOCs built up in a shallow nocturnal boundary layer and in the absence of chemical removal. During the day, the mixing ratios reduced rapidly due to chemistry and dilution in the expanding boundary layer. The nighttime results are well suited to determine VOC emission ratios versus carbon monoxide (CO), and the results are compared with those from cities in the U.S. Acetonitrile (CH₃CN), a good tracer for biomass burning (BB), was measured using PIT-MS, and the results are used to estimate the contribution of BB emissions to the VOC mixture at T1. Finally, photochemical production of aldehydes and ketones was observed during several days, and the production yields are determined and compared to those observed in the U.S.