Geophysical Research Abstracts
Vol. 12, EGU2010-4459, 2010
EGU General Assembly 2010

Real-time profiling of organic trace gases in the planetary boundary layer by PTR-MS using a tethered balloon

Ralf Schnitzhofer (1), Armin Wisthaler (2), and Armin Hansel (2)

(1) Ionicon Analytik; Technikerstraße 21a; A-6020 Innsbruck; Austria; (ralf.schnitzhofer@ptrms.com), (2) Ionphysics; Ion-Molecule-Reaction & Environmental Physics; University Innsbruck; Austria

A method for real time profiling of volatile organic compounds (VOCs) was developed combining the advantages of a tethered balloon as a research platform and of proton transfer reaction mass spectrometry (PTR-MS) as an analytical technique for fast and highly sensitive VOC measurements. A 200 m Teflon tube was used to draw sampling air from a tethered aerodynamic balloon to the PTR-MS instrument. Positive and negative artefacts (i.e. formation or loss of VOCs in the tube) were characterised in the laboratory and in the field with a set of 11 atmospherically relevant VOCs including pure hydrocarbons and oxygenated hydrocarbons. The only two compounds that showed a measurable change when sampled through the 200 m long tube were acetone (7% increase) and xylene (6% loss). The method was successfully deployed during a winter field campaign to determine the small scale spatial and temporal patterns of air pollutants under winter inversion conditions. Real-time profiling of organic trace gases in the planetary boundary layer by PTR-MS using a tethered balloon has great potential to bridge the gap between ground based and aircraft measurements which, for safety reasons, cannot be conducted in the lowermost 150 m above ground.