

7.5 FA Medizinische Physik, Biophysik und Umweltphysik

P-MBU01 : Comparison of VOC measurements in Nashville, TN, during the Southern Oxidants Study (SOS) 1999

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During the Southern Oxidants Study (SOS) 1999 Nashville campaign ambient air samples were analyzed at Cornelia Fort Airport (CFA) for organic compounds by two independent methods: 1) a gas chromatographic systems operated by NOAAs Aeronomy Laboratory, which performed immediate analysis of collected samples and 2) an in situ proton transfer reaction mass spectrometer (PTR-MS) system operated by the Univ. of Innsbruck. The sample protocols were quite different for the different methods. The GC system sequentially collected and analyzed air samples each 60 minutes for VOCs. The in-situ PTR-MS system measured more than 20 VOCs on a time shared basis for 5 to 15 seconds respectively, once each 5 minutes. The PTR-MS system is not able to distinguish between isobaric species, therefore acetone and propanal (MVK and MACR) values measured by NOAAs GC were added up prior to comparison with the respective PTR-MS values. For all species mentioned above the different measurement methods show good agreement.

P-MBU02 : Tropospheric VOC measurements by PTR-MS

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O₃ is formed photochemically from the photolysis of NO₂, and because O₃ reacts rapidly with NO these reactions result in a photoequilibrium between NO, NO₂ with no net formation or loss of O₃. However, in the presence of volatile organic compounds (VOCs), the degradation reactions of VOCs lead to the formation of intermediate peroxy radicals which react with NO, converting NO to NO₂, which then photolyze to form O₃. Thus, in order to understand quantitatively tropospheric ozone chemistry, it is necessary to know the VOC distribution within the troposphere as well as VOC fluxes from individual sources. Examples will be presented how the use of Proton Transfer Reaction Mass Spectrometry (PTR-MS) has enhanced our understanding of anthropogenic VOC emissions, biosphere-atmosphere exchange processes, and photochemical processing of both anthropogenic and biogenic VOCs in the troposphere.

P-MBU03 : An Intercomparison of Airborne VOC Measurements

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During the Texas Air Quality Study (TexAQS) 2000 ambient air samples were analyzed on-board the NSF/NCAR ELECTRA research aircraft by two VOC measurement techniques: 1) an in-situ gas chromatograph named TACOH (Tropospheric Airborne Chromatograph for Oxy-hydrocarbons and Hydrocarbons), operated by NOAA' Aeronomy Laboratory, and 2) a chemical ionization mass spectrometer named PTR-MS (Proton-Transfer-Reaction Mass Spectrometer) and operated by the University of Innsbruck. The sample protocols were quite different for the two methods: the TACOH system collected air samples for 15-60 sec (depending upon altitude) every 15 min, the PTR-MS system monitored selected VOCs on a

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