



Long-term Measurements of biogenic VOCs in an Austrian Valley - Discussion of seasonal Fluctuations of Isoprene and Monoterpene Concentrations

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A proton-transfer-reaction mass spectrometer (PTR-MS) was set up at a monitoring station in the river Inn valley (Vomp, Tirol, Austria) for a year-long measurement (February 2004-May 2005) of volatile organic compounds (VOCs) in the local valley air. Measurements of PM_{10} , NO_x and CO, and certain meteorological parameters were additionally made. Together, these data-sets enabled relationships between VOC abundances, meteorological conditions and anthropogenic emissions (primarily from automobile emissions) to be examined. The work presented here focuses on the biogenic VOCs measured under these real-world outdoor conditions.

Initially, data needed to be separated between VOCs of anthropogenic and of biogenic origin. This was achieved by generating a model for the PTR-MS VOC data-set. A clear correlation between benzene and CO concentrations - indicating benzene's predominance from anthropogenic sources - allowed benzene to be used as a tracer for anthropogenic compounds. The model thus allowed a regression to be made whereby the maximum anthropogenic contributions of almost all VOCs could be established relative to benzene. The maximum contribution from biogenic emissions to each VOC could thus be determined as the difference between the total individual VOC signal and the corresponding maximum anthropogenic share.

The two biogenic VOCs of principle interest here were isoprene and the monoterpenes (detected by PTR-MS at masses 69 amu and 137 amu, respectively). As expected, abundances of isoprene and the monoterpenes displayed a late-summer maximum (despite good vertical valley air dilution that acts to reduce VOC levels) when temperatures were high and sunlight hours long.

Preliminary results will be presented and discussed.