

MASS SPECTROMETRIC ANALYSIS OF VOLATILES FROM AUSTRALIAN EUCALYPTS

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Considerable recent attention has been directed to the analysis of biogenic volatile organic compounds (VOCs) and their important roles in atmospheric and environmental sciences [1, 2]. Biogenic VOCs include atmospheric trace gases other than carbon monoxide and dioxide, and are comprised primarily of the isoprenes and monoterpenes, as well as alcohols, esters, ethers and acids. Plants are a major contributor of biogenic VOCs and their estimated annual emission is about 1100 tera-grams ($Tg = 10^{12}$ g) of carbon. We are investigating the environmental effects of VOCs emitted from Australian vegetation, especially native trees in the genus *Eucalyptus*. Our studies are focused on characterizing environmental controls of VOC emissions, including the effects of plant phenology and fire emissions. The temperature range of interest thus includes temperatures such as those found during bushfires as well as the more commonly studied ambient temperature range.

When VOCs are present at low levels on the order of parts-per-million to parts-per-trillion by volume (ppmv to pptv), electron ionisation analysis requires that samples be pre-concentrated. This additional procedure may bias detection of some compounds due to variation in efficiency of trapping and concentrating of compounds that differ widely in vapour pressures and molecular weights. More recently, proton-transfer-reaction mass spectrometry (PTR-MS) has enabled the on-line monitoring of VOCs in air without pre-concentration [3]. This presentation provides detailed PTR-MS analysis for a series of reference compounds and VOCs emitted from *Eucalyptus grandis* (F. Muell.) at temperatures ranging from ambient to 300 °C.

References:

1. Atkinson R, Arey J (2003) *Chem. Rev.* 103, 4605 – 4638.
2. Tholl D, Boland W, Hansel A, Loreto F, Rose USR, Schnitzler J-P (2006) *Plant J.* 45, 540 – 560.
3. Hansel A, Jordan A, Holzinger R, Prazeller P, Vogel W, Lindinger W (1995) *Int. J. Mass Spectrom. Ion Processes* 149-150, 609 – 619.