Geophysical Research Abstracts
Vol. 13, EGU2011-6034, 2011
EGU General Assembly 2011

Laboratory and field measurements of enantiomeric monoterpenes in plant emissions

Wei Song (1), Michael Staudt (2), Noureddine Yassaa (3), and Jonathan Williams (1)

(1) Max Planck Institute for Chemistry, J.-J.-Becher-Weg 27, D-55128 Mainz, Germany (wei.song@mpic.de), (2) Centre d'Ecologie Fonctionnelle et Evolutive, 1919 Route de Mende, F- 34293 Montpellier cedex 5, France, (3) Laboratoire d′Analyse Organique Fonctionnelle, Faculty of Chemistry, University of Sciences and Technology Houari Boumediene, USTHB, BP 32 El-Alia Bab-Ezzouar, 16111 Algiers-Algeria

Monoterpenes are an important class of biogenic volatile organic compounds in the troposphere. Several monoterpenes exist in two mirror image (enantiomeric) forms e.g. (+)-α–pinene and (-)-α-pinene. These enantiomeric ratios of monoterpenes have been shown previously to be useful in source characterization and to exhibit distinct regional chemodiversity. In this study we investigate the enantiomeric distribution of monoterpenes in the emissions from three different species namely: *Quercus ilex*, *Rosmarinus officinalis*, *Pinus halepensis*. *Quercus ilex* was selected as it generates monoterpenes depending on light, while in contrast the *Pinus halepensis* and *Rosmarinus officinalis* store the monoterpenes in resin ducts and trichomes respectively. The enantiomeric ratio of α-pinene was investigated in the laboratory as a function of temperature (20 to 45˚C) and light (0 to 1600 PAR). *Rosmarinus officinalis* showed predominant (+)-α-pinene emissions, consistent with previous studies. *Quercus ilex* and *Pinus halepensis* species exhibited both (-) and (+) dominant species emission. It was noted generally that for species with predominately (-)-α-pinene emissions, the enatiomeric ratio showed a distinct light dependence. A comparison is made to ambient data collected over a homogeneous *Quercus ilex* forest in Montpellier, France, and to a Boreal forest Hyytiälä, Finland. A clear diurnal cycle in the enantiomeric ratio was observed above the French forest, with (-)-α-pinene predominance in the morning and evening but becoming (+)-α-pinene dominant around midday. However this tendency was reversed in the Boreal forest, the enantiomeric ratio became richer in (-)-α-pinene around midday.