Geophysical Research Abstracts
Vol. 13, EGU2011-5030, 2011
EGU General Assembly 2011


# Is forest management a significant source of terpenoids into boreal atmosphere?

Sami Haapanala (1), Hannele Hakola (2), Heidi Hellén (2), Mika Vestenius (2), Janne Levula (3), and Janne Rinne (1)

(1) University of Helsinki, Division of Atmospheric Sciences, Department of Physics, P.O. Box 64, FI-00014 University of Helsinki, Finland (janne.rinne@helsinki.fi, +358-(0)9-19150860), (2) Air Quality Research, Finnish Meteorological Institute, P.O. Box 503, FI-00101 Helsinki, Finland, (3) Hyytiälä Forestry Field Station, University of Helsinki, Hyytiäläntie 124, FI-35500 Korkeakoski, Finland

Volatile organic compounds (VOCs) including terpenoids are emitted into the atmosphere from both stressed and non-stressed vegetation. In European boreal zone the natural VOC sources are known to surpass the anthropogenic ones. Mechanical stress and damage of plants often strongly increases their monoterpene emissions. As the forests in European boreal zone are under intense economic use, forest management operations can be a significant source of terpenes into the atmosphere of this area.

The aim of this study was to estimate the significance of terpene emissions caused by timber felling compared to the emissions from intact forests. We measured the terpenoid emissions from tree stumps and logging residue. The emissions from stumps were studied using enclosures and the emissions from the whole felling area, including stumps and logging residue, using an ecosystem scale micrometeorological method, disjunct eddy accumulation. The compounds analyzed were isoprene, monoterpenes and sesquiterpenes.

Strong emissions of monoterpenes were measured from both the stumps and from the whole felling area. The emission rate fell down rapidly after logging. To evaluate the importance of monoterpenes emitted from cut forests in Finland on annual basis we conducted a rough upscaling based on annually harvested forest biomass. The resulting monoterpene release from forest felling areas was 60 kilotonnes per year which is about half of the monoterpene release from intact forests in Finland.