



Ozone triggers VOC emissions of grassland species

A. Brunner, C. Ammann, M. Jocher, C. Spirig, and A. Neftel

Air pollution and climate group, Agroscope Reckenholz-Tänikon, Research Station ART, 8046 Zürich (aurelia.brunner@art.admin.ch)

A large number of volatile organic compounds (VOC) are emitted by plants. These biogenic VOC are produced as part of the plant metabolism during cell growth and due to several kinds of stress such as drought, freeze and injury. VOC emission can also be triggered by exposure to high ozone concentration as shown in several fumigation experiments. However the applied ozone concentrations were often unrealistically high.

In this study we focused on biogenic VOC emissions from grassland species (*Trifolium repens* and *Lolium perenne*) exposed to realistic ozone levels. The fumigation experiments took place in two climate chambers and each exposure lasted for about two weeks. The ozone concentrations as well as the environmental parameters in the climate chambers (global radiation, air temperature, and relative humidity) followed a diurnal cycle typical for summer conditions in Central Europe. VOC were detected by proton-transfer-reaction mass spectrometry (PTR-MS), gas chromatography (GC) and a combination of these two instruments. In addition, other trace gases were measured (H₂O, CO₂ and O₃) and the leaf area index was determined at the end of each experiment. Gas exchange rates were determined by a dynamic chamber system.

The ozone-exposed plants showed significantly enhanced emissions of various VOC, such as methanol, hexenols and hexenyl acetates. The latter two are known as typical herbal wound compounds. The temporal course of VOC emission-pattern and the amount of VOC emitted depended on the fumigation treatment as well as on the plant species. Also two different clones of *Trifolium repens*, selected for high and low ozone sensitivity, were compared. The sensitive clone showed much higher VOC emissions.