

Volatile Organic Compounds (VOCs) emission characteristics responding to light that emitted by *Quercus serrata* and influence on air quality

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1. INTRODUCTION

Tropospheric ozone and secondary organic aerosol are recognized as atmospheric environmental problems. Tropospheric ozone and secondary organic aerosols are generated by photochemical reaction of volatile organic compounds (VOCs) by sunlight. The origins of VOCs are divided into anthropogenic origin by human activity and biogenic origin by photosynthesis of plants.

Some of biogenic origin VOCs(isoprene etc.) are emitted according to the light intensity, so these have light response. It is important to evaluate accurate VOCs emission amount for considering atmospheric environmental problems. In this study, we focused on isoprene emitted from *Quercus serrata*, a dominant tree species in Japan and measured light responsive VOCs emission characteristics.

2. Method

In this experiments, the light intensity was controlled and the temperature was always controlled at around 30°C. Plants were covered using a Teflon bag and placed in the plant chamber. In order to stabilize the VOCs emission by the stimulation of covering operation, plant coverings to the Teflon bag were carried out 1 day before the experiments. 10 L min⁻¹ clean air not containing VOCs was supplied by mass flow controller to the Teflon bag using zero gas generators. Sample gas containing VOCs emitted from plants were obtained by light irradiation of the lamp. The sample gas was pumped through the Teflon tube and introduced to the PTR-MS (Proton Transfer Reaction Mass – Spectrometer) at 0.5 L min⁻¹.

3. Result

As a result of the measurement, there are 2 kinds of emission behavior about isoprene emission from *Quercus serrata*. One is “fast emission” that responds immediately after light irradiation (shows red line in figure) and the other is “slow emission” emitted over time (shows green line in figure).From these behavior, we made a original emission model and applied to the light day change.

We calculated the ozone generation amount from two kinds of emission behavior, so it was suggested that there was difference in the amount of ozone produce by slow emission.

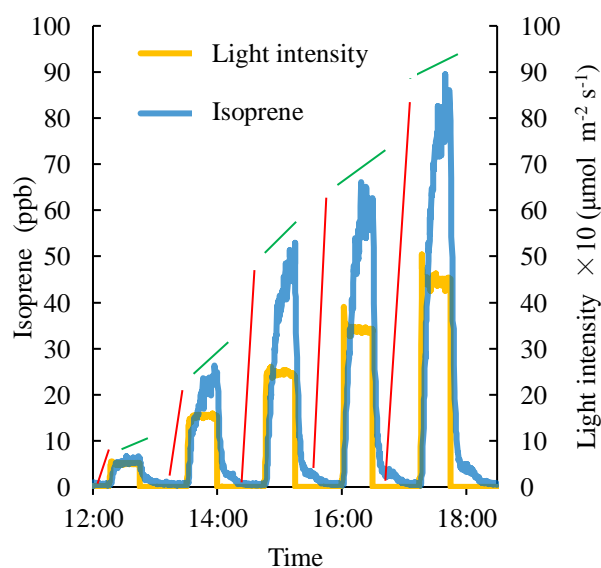


Figure : Isoprene emission characteristics