
RECENT RESEARCH ACTIVITIES

Do Japanese cypress trees emit methane significantly into the atmosphere ?

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Recent experiments conducted by Keppler *et al.* [1] suggested that CH₄ emissions from terrestrial plants under aerobic conditions could be a significant source of atmospheric CH₄. However, since the mechanisms underlying CH₄ emission are still largely unknown, any extrapolations to the global scale are highly speculative. In Japan, artificial plantations of Japanese cypress (*Chamaecyparis obtusa* Sieb. et Zucc) cover up to 10% of the total Japanese forest area. Investigating whether *C. obtusa* emits CH₄ significantly is thus important to develop an emission inventory of CH₄ in Japan and to understand its impact on the atmospheric CH₄ budget.

In this study, we for the first time made an attempt to estimate CH₄ fluxes from intact leaves and trunk, which are rather than detached tissues, of *C. obtusa* over the whole season using an automated, closed-chamber system coupled to a laser-based instrument that allowed in situ real-time detection of CH₄ [2]. Continuous *in situ* measurements of methane (CH₄) fluxes were conducted in the Kiryu Experimental Watershed in Shiga Prefecture, from August 2009 to August 2010. The closed-chamber system, which was used to evaluate CO₂ exchange between the atmosphere and forest ecosystems, was coupled to a laser-based instrument to monitor CH₄ concentrations. Temporal changes in CH₄ concentrations from the foliage and trunk were measured at one-second intervals during chamber closure to determine CH₄ fluxes between the leaf and trunk surfaces and the atmosphere. While recent studies have suggested that some plants emit CH₄ under aerobic conditions (References are cited in [2]), emission or uptake of CH₄ in detectable amounts with our experimental system, by intact leaves or the trunk of *C. obtusa*, was not significantly observed throughout the measurement period. We note that at KEW CH₄ exchange between the atmosphere and forest has also been measuring based on a relaxed eddy accumulation technique coupled to the laser spectroscopy instrument, indicating that CH₄ emission from leaves and trunk are insignificant, as consistent with the results of the closed chamber study [3].

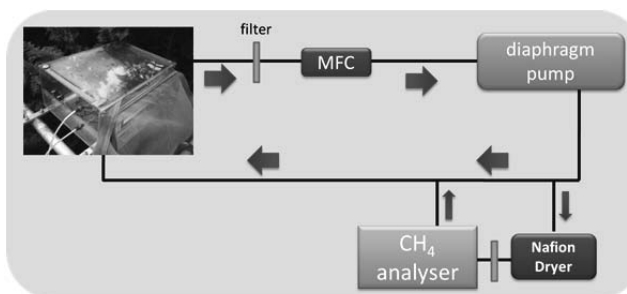


Figure 1. An automated closed chamber system for measuring the CH₄ exchange flux between plant leaves and the atmosphere.

References

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