

Open Research Online

The Open University's repository of research publications and other research outputs

Trees are important conduits for emission of methane from temperate and tropical wetlands

Conference or Workshop Item

How to cite:

Gauci, Vincent; Pangala, Sunitha; Gowing, David and Hornibrook, Edward (2013). Trees are important conduits for emission of methane from temperate and tropical wetlands. In: European Geosciences Union General Assembly, 07-12 Apr 2013, Vienna.

For guidance on citations see [FAQs](#).

© 2013 The Authors

Version: Version of Record

Link(s) to article on publisher's website:

<http://meetingorganizer.copernicus.org/EGU2013/EGU2013-13283.pdf>

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk



Trees are important conduits for emission of methane from temperate and tropical wetlands

Vincent Gauci (1), Sunitha Pangala (1), David Gowing (1), and Edward Hornibrook (2)

(1) Centre for Earth, Planetary, Space and Astronomical Research (CEPSAR), Department of Environment, Earth and Ecosystems, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK (v.gauci@open.ac.uk; sunitha.pangala@open.ac.uk; d.j.gowing@open.ac.uk), (2) University of Bristol, School of Earth Sciences, Bristol, United Kingdom (ed.hornibrook@bristol.ac.uk)

Methane produced in wetland soil generally is thought to be emitted to the atmosphere primarily via diffusion through pore water, release of gas bubbles (i.e., ebullition), and gas phase diffusion through the aerenchyma of herbaceous plants. The role of trees as a conduit for methane export from soil to the atmosphere has received limited attention despite evidence from mesocosm experiments showing that seedlings and saplings of wetland trees have a significant capacity to transport soil-produced gases. Notably ~60% of global wetlands are forested.

We present *in situ* measurements of methane flux from a temperate carr (swamp) composed of alder (*Alnus glutinosa*) and birch (*Betula pubescens*) situated in the United Kingdom and a tropical forested peat swamp located in Borneo. The *in situ* data are complemented by a mesocosm experiment in which methane emissions were measured from alder saplings subjected to two water-regime treatments. In both the *in situ* and mesocosm studies, emissions from trees are compared to methane flux from the ground surface, the latter occurring via pore water diffusion, ebullition or the aerenchyma of herbaceous plants. We show that tree stem emissions are controlled by a number of factors including tree species, soil pore-water concentration and stem lenticel density. Our results demonstrate that the omission of tree-mediated methane fluxes from measurement campaigns conducted in forested wetland can significantly underestimate total ecosystem flux of methane.