Geophysical Research Abstracts
Vol. 20, EGU2018-14063, 2018
EGU General Assembly 2018

Mechanisms of nitrous oxide emissions from tree stems

Edzo Veldkamp (1), Amanda Matson (2), Yuan Wen (3), and Marife Corre (1)

(1) University of Göttingen, Soil Science of Tropical and Subtropical Ecosystems, Göttingen, Germany (eveldka@gwdg.de), (2) Scion, Department of Forest Science, New Zealand , (3) Bangor University, School of Environment, Natural Resources and Geography, UK

Nitrous oxide is a potent greenhouse gas and a major ozone-depleting substance in the stratosphere. The majority of nitrous oxide emissions originate from anthropogenic and natural sources, and is mainly related to microbial processes in soils. However, large discrepancies between top-down and bottom up inventories have revealed major uncertainties that still exist in the global nitrous oxide budget. Traditionally, nitrous oxide fluxes from ecosystems are thought to result mainly from direct emissions from soils, however, it is now recognized that trees can also emit nitrous oxide in substantial amounts. There is an on-going debate on the origin of the emitted nitrous oxide from trees. While there is evidence that nitrous oxide can be generated in leaves, on the leaf surface, or in cryptogamic covers on tree bark, there is also evidence that trees can contribute to nitrous oxide emissions indirectly, functioning as conduits of nitrous oxide produced in soils.
In our presentation, we will give a brief overview of the potential mechanisms of nitrous oxide emissions from tree stems. We will then focus on results from two field studies (one in temperate forests and one in tropical plantations) that provide indirect and direct evidence of the most likely mechanism of nitrous oxide emissions from tree stems.