Soil temperature drives nitric oxide emission

July 8 2022, by Li Yuan

Credit: Pixabay/CC0 Public Domain

Nitric oxide (NO) is a major contributor to atmospheric pollution, and forest soil is an important source of NO emission. However, there are great uncertainties in global forest soil NO emission due to lack of high-frequency NO emission measurements.

During the period of augmented nitrogen (N) deposition, forest soil NO emission has been ignored in the past few decades in Northeast China.

To quantify the NO emission from forest soils and to find out its controlling factors, Prof. Fang Yunting's team from the Institute of Applied Ecology of the Chinese Academy of Sciences has conducted a long-term and automated soil NO measurement experiment in Qingyuan Forest, Northeast China.

They found the mean annual soil NO emission was 0.42 ± 0.04 kg N ha^{-1} from the study forest.

Through the compilation of four empirical models (Temperature model, soil water-filled pore space model, Q_{10}=2 theoretical model and the interactive model of temperature and WFPS), they demonstrated that temperature was the most important factor in the daily emission scale. Temperature regulated NO emission with a significant exponential relationship and explained more than 70% variation of daily NO emission with the apparent temperature sensitivity of 3.67.

They also found that NO emission was also promoted by soil moisture (WFPS) after longer drought in the growing seasons.

This study provides a better mechanistic understanding of forest soil NO emission in Northeast China, which can help develop more accurate N biogeochemical models and improve the accuracy of soil NO emission in global estimation.

The study entitled "A strong temperature dependence of soil nitric oxide emission from a temperate forest in Northeast China" was published in *Agricultural and Forest Meteorology*.

More information: Kai Huang et al, A strong temperature dependence

of soil nitric oxide emission from a temperate forest in Northeast China, *Agricultural and Forest Meteorology* (2022). DOI: 10.1016/j.agrformet.2022.109035

Provided by Chinese Academy of Sciences

Citation: Soil temperature drives nitric oxide emission (2022, July 8) retrieved 6 May 2024 from https://phys.org/news/2022-07-soil-temperature-nitric-oxide-emission.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.