Title: Seasonal variations in N_2O emissions in a subtropical forest with exogenous nitrogen enrichment are predominately influenced by the abundances of soil nitrifiers and denitrifiers

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General Introduction

This dataset contains data collected during field and laboratory experiments at South China Botanical Garden, Chinese Academy of Sciences, as part of Xiaoge Han's research project.

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It is being made public both to act as supplementary data for publications and the research project of Xiaoge Han and in order for other researchers to use this data in their own work.

The data of this dataset were collected from October 2014 to December 2018. The dataset includes four separate files:

(1) Precipitation and air/soil temperature of each gas sampling day (named as **Data1_precipitation and air-soil temperature _Han et al**).

(2) N_2O efflux of each sampling time (named as **Data2_N2O efflux of each sampling time _Han et al**).

(3) Abundance of nitrifying and denitrifying functional genes (named as **Data3_nitrifying-denitrifying functional gene abundance _Han et al**).

(4) Physiochemical properties of the wet and dry season soils (named as **Data4_soil physiochemical properties _Han et al**).

Methodological information

Methods for all the relevant data have been described in the Materials and Methods of the paper. Briefly:

Data of file (1): the precipitation and air temperature of the study site were collected from the Dinghushan Forest Ecosystem Research Station, CAS. Data of soil temperature was recorded in situ using a TDR soil water measurement system.

Data of file (2): the forest soil N_2O efflux was measured using closed chamber method. After collection, the N_2O concentration was determination using an Agilent 7890A gas chromatography. The N_2O efflux was calculated based on the values of eight indicators: 1) N_2O density in the standard conditions, 2) gas volumes in the chamber, 3) chamber coverage area, 4) atmosphere pressure of sampling site, 5) absolute temperature of sampling time, 6) the liner slope of gas concentration changes within time, 7) standard atmosphere pressure and 8) absolute temperature in the standard conditions.

Data of file (3): the functional gene abundance was quantified by absolute real-time polymerase chain reactions with an ABI 7500 CFX96 Optical Real-Time Detection System. Standard plasmids of the functional genes were constructed by the authors using the chosen primers and the soil samples of the study site.

Data of file (4): the soil properties were determined using the standard methods.

Data specific information

Units of measurement:

Data of file (1): Precipitation (mm); Air temperature (°C); Soil temperature (°C)

Data of file (2): N_2O efflux ($\mu g.m^{-2}.h^{-1}$)

Data of file (3): functional gene abundance (copies g^{-1} dry soil)

Data of file (4): soil moisture (% WHC (water holding capacity)), NH_4^+-N (ammonium nitrogen, mg kg^{-1}); NO_3^--N (nitrate nitrogen, mg kg^{-1}); TOC (total organic carbon, %); Total N (total nitrogen, %); C:N ratio; N_{org} (organic N, mg kg^{-1}); MBC (microbial biomass carbon, mg kg^{-1}); MBN (microbial biomass nitrogen, mg kg^{-1})

4. Access information