

Publication

Theoretical and practical limitations of the acetylene inhibition technique to determine total denitrification losses

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 1464068

Author(s) Felber, R.; Conen, F.; Flechard, C. R.; Neftel, A.

Author(s) at UniBasel [Conen, Franz](#) ;

Year 2012

Title Theoretical and practical limitations of the acetylene inhibition technique to determine total denitrification losses

Journal Biogeosciences

Volume 9

Number 10

Pages / Article-Number 4125-4138

The loss of N₂ from intensively managed agroecosystems is an important part of the N budget. Flux monitoring of N₂ emissions at the field scale, e. g., by eddy correlation or aerodynamic gradient method, is impossible due to the large atmospheric N₂ background (78%). The acetylene (C₂H₂) inhibition technique (AIT) is a rather simple and frequently used, albeit imperfect, method to determine N₂ losses from intact soil cores. In principle, AIT allows an estimation of total denitrification at high temporal resolution and on small spatial scales, with limited workload and costs involved. To investigate its potential and limitations, a laboratory system with two different detection systems (photoacoustic IR spectroscopy and gas chromatography) is presented, which allowed simultaneous measurements of up to 7 intact soil cores in air-tight glass tubes in a temperature controlled cabinet (adjusted to field conditions) with automated C₂H₂ injection. A survey of total denitrification losses (N₂ + N₂O) over 1.5 yr in soil cores from an intensively managed, cut grassland system in central Switzerland supports previous reports on severe limitations of the AIT, which precluded reliable estimates of total denitrification losses. Further, the unavoidable sampling and transfer of soil samples to the laboratory causes unpredictable deviations from the denitrification activity in the field.

Publisher Copernicus Publ.

ISSN/ISBN 1726-4170

URL <http://www.biogeosciences.net/9/4125/2012/bg-9-4125-2012.pdf>

edoc-URL <http://edoc.unibas.ch/dok/A6056095>

Full Text on edoc Available;

Digital Object Identifier DOI 10.5194/bg-9-4125-2012

ISI-Number WOS:000310471800030

Document type (ISI) Article