



Continuous measurements of nitrous oxide isotopomers during incubation experiments.

Malte Nordmann Winther (1), David Balslev-Clausen (1,2), Thomas Blunier (1), Bo Elberling (3), and Søren Christensen (4)

(1) Centre for Ice and Climate, Niels Bohr Institute, University of Copenhagen, Denmark, (2) DFM - Danish National Metrology Institute, Kgs. Lyngby, Denmark, (3) Department of Geosciences and Natural Resource, University of Copenhagen, Denmark, (4) Department of Biology, University of Copenhagen, Denmark

Nitrous oxide (N_2O) is an important and strong trace greenhouse gas in the atmosphere; it is part of a feed-back loop with climate. N_2O is produced by microbes during nitrification and denitrification in the terrestrial and oceanic realm where today 1/3 of the production is estimated to stem from oceanic sources. The position of the isotope ^{15}N in the linear $N=N=O$ molecule can be distinguished between the central or terminal position (the isotopomers of N_2O). It has been demonstrated that nitrification and denitrification have a relative preference for the terminal and central position, respectively. Therefore it is claimed that measuring the site preference in N_2O allows to determine the responsible production process i.e. nitrification and denitrification.

Our recent instrument development in collaboration with Picarro Inc. allows for continuous position dependent $\delta^{15}N$ measurements. We present results from incubation experiments with nitrification and denitrification bacteria. The results generally confirm previous experiments. However with full denitrifier strains, where nitrous oxide is also consumed during denitrification, we observe a clear difference in the site preference for the production and the consumption steps.