Geophysical Research Abstracts,
Vol. 11, EGU2009-8489-1, 2009
EGU General Assembly 2009


# Methane and Nitrous oxide emissions in The Netherlands: ambient measurements compared to the national inventories

S. van der Laan, R.E.M. Neubert, and H.A.J. Meijer

University of Groningen, Centre for Isotope Research, Groningen, Netherlands (r.e.m.neubert@rug.nl, 31 50 3634738)

The partners of the United Nations Framework Convention on Climate Change (UNFCCC) commit themselves to annually report their greenhouse gas emissions. These reports are based on inventories (i.e. by counting sources and sinks with certain estimated emission factors), but the UNFCCC also demands for parties to develop and implement an independent validation system based on atmospheric measurements.

We present results of an independent observational study on $CH_4$ and $N_2O$ emissions and compare them to the reported inventories. We focus on the net emissions from The Netherlands during the period 2006 to 2008, and how they compare to the surrounding countries.

To answer these questions we apply $^{222}$Radon as a reference tracer for vertical mixing and long-range air mass transport. $^{222}$Radon is a radioactive noble gas (radioactive half-life time 3.8 days) which is produced at a constant rate from $^{226}$Ra, and is relatively uniformly distributed in all soils. When released to the atmosphere, $^{222}$Radon experiences the same atmospheric circumstances (e.g. transport and dilution) as any other constituent. This makes it an ideal atmospheric tracer to 'translate' ambient concentrations of $CH_4$ and $N_2O$ to their ground-based fluxes, given the $^{222}$Radon soil exhalation rate is known. The method used in this study is purely observationally based and therefore independent from inventories or models.

Our preliminary results indicate emissions for the period May 2006 – June 2008 of: 15.0 $\pm$ 0,5 t/km$^2$ for $CH_4$ and 1000 $\pm$ 120 kg/km$^2$ for $N_2O$. These values are slightly lower than the inventory-based emissions of 18,3 t/km$^2$ (2006-2008 averages) for $CH_4$, and 1260 kg/km$^2$ (2006-2008 averages) for $N_2O$.