Geophysical Research Abstracts
Vol. 12, EGU2010-2435, 2010
EGU General Assembly 2010

Methane variability and trend: a multi-year analysis of the sources and sinks

Michiel van Weele and Peter van Velthoven
KNMI, Climate Research, De Bilt, Netherlands (weelevm@knmi.nl, 0031 30 2210407)

A multi-year budget analysis of methane sources and sinks has been performed to better explain the observed inter-annual variability and trends in atmospheric methane over the last 20 to 30 years. Year-to-year variations in the global atmospheric methane growth rate are caused by rather small deviations from near-balance between anthropogenic emissions, net natural fluxes, and chemical loss. Most likely the observed variability in annual growth rates has been caused by a complex combination of mechanisms and trends, which is also indicated by the latitudinal signature of the growth-rate fluctuations.

In the presentation we will give a summary of the latest insights in the methane variability and trends over the two decades. Forward model calculations of the methane distribution are confronted with available satellite and surface observations. As well, results of recent inverse modeling simulations using the improved SCIAMACHY observations of methane in combination with surface observations, are presented. The inversions mainly constrain the geographical and temporal distribution of methane emissions over the years 2003-2005. Finally, satellite tropospheric nitrogen dioxide column observations are used in combination with decadal global atmospheric chemistry-transport simulations to provide evidence for a significant impact of increasing tropical air pollution on methane lifetime.