Lateral gas transport in soil adjacent to an old landfill: factors governing emissions and methane oxidation

Field investigations of lateral gas transport and subsequent emissions in soil adjacent to an old landfill in Denmark have been conducted during a one-year period. A significant seasonal variation in the emissions with high carbon dioxide and low methane fluxes in the summer (May to October) was observed. This was attributed to methane oxidation. Diurnal measurements during a drop in barometric pressure showed that the fluxes of landfill gas changed dramatically within a very short time. The concentrations and the soil moisture content in the upper part of the soil profile had significant influence on the fluxes, as did the distance from the landfill border, temperature, barometric pressure and the pressure gradient. Statistical analyses proved that soil moisture described the largest part of the variation. No methane at all emitted during the summer. Calculations and isotope analyses showed that very high fractions of the laterally migrating methane were oxidised.

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