Geophysical Research Abstracts
Vol. 14, EGU2012-13401, 2012
EGU General Assembly 2012

Measurements of methane emissions from landfills using mobile plume method with trace gas and cavity ring-down spectroscopy

J. Mønster, P. Kjeldsen, and C. Scheutz
Department of Environmental Engineering, Technical University of Denmark, Lyngby, Denmark

Methane is emitted to the atmosphere from both anthropogenic and natural sources. One of the major anthropogenic sources is methane produced by bacteria in anaerobic environments such as rice pads and landfills. Land filling has for many years been the preferred waste disposal method, resulting in a large methane production with a large contribution to the global increase in atmospheric green house gas concentration. Several steps have been taken to reduce the emission of methane from landfills. In order to validate the effect of these steps, a measurement method is needed to quantify methane emissions with a large spatial variation.
One method is to use a highly sensitive and fast analytical method, capable of measuring the atmospheric concentration methane downwind from emission areas. Combined with down-wind measurements of a trace gas, emitted at a controlled mass flow rate, the methane emission can be calculated. This method is called the mobile plume method, as the whole plume is measured by doing several transects.
In the current study a methane/acetylene analyzer with cavity ring-down spectroscopy detection (Picarro, G2203) was used to estimate methane from a number of Danish landfills. We measured at both active and closed landfills and investigated the difference in methane emission. At landfills where the emissions could have more than one origin, the source strength of the different emission areas was determined by accurate trace gas positioning and choosing appropriate wind speed and measurement distance. To choose these factors, we addressed the uncertainties and limitations of the method with respect to the configuration of the trace gas bottles and the distance between the emission area and the measurement points. Composting of organic material in large piles was done at several of the investigated landfills and where possible, the methane emission from this partly anaerobic digestion was measured as a separate emission.