埋立処分場最終覆土における降雨時のメタンガスの挙動
Methane transport in landfill final cover soils during precipitation

*伊豆本 聡[1]、濱本 昌一郎[1]、井本 博美[1]、川本 健[2]、西村 拓[1]
*Satoshi Izumoto[1], Shoichiro Hamamoto[1], Hiromi Imoto[1], Ken Kawamoto[2], Taku Nishimura[1]

1.東京大学大学院農学生命科学研究科、2.埼玉大学大学院理工学研究科
1.Graduate school of Agricultural and Life sciences, The University of Tokyo, 2.Graduate School of Science and Engineering, Saitama University

It has been reported that landfill sites are significant sources of atmospheric methane, which is known as one of the greenhouse gases. A part of methane produced in the landfill waste layer is emitted to the atmosphere through the landfill final cover soils. Therefore, it is important to understand how methane moves through the final cover soils in order to accurately estimate the methane emission from the landfill sites. High intensity precipitation events likely induce methane eruption due to a soil-gas compression following water infiltration. However, the effects of precipitation on the methane transport in the final cover soils are not fully understood.
In this study, one-dimensional column transport experiments were conducted to examine the effects of intensity of precipitation, different dry bulk density of the cover soils, and methane production rate on the methane eruption. The disturbed soil sample (sandy loam) used as landfill final cover soils was collected. A 5% of methane was injected with different gas fluxes to the soil column (dia. 10 cm, height 30.5 cm) packed with different dry bulk densities (1.4, 1.5, 1.6 g / cm^3) from the bottom. The precipitation with different intensities was applied from the top of the column. Gas concentrations inside the column and outlet chamber placed at the top of the column were measured. Soil gas pressure, water content, and temperature inside the column were also monitored during the experiments. It is noted that batch experiments performed for the same soil sample showed methane oxidation has a little effect on eruption of methane in this study.
Main results are: (1) under higher intensity of precipitation, increase and decrease in soil-gas pressure repeated intermittently, showing the occurrences of soil-gas compression and methane eruption. (2) Higher pressure was required for the eruption events at the soil repacked with higher bulk density. (3) When the applied methane gas flux was higher, which denoted much production of methane in the waste material layer, fluctuation in the soil-gas pressure was small and occurred frequently, suggesting that eruption occurred continuously at short intervals.

キーワード：埋立処分場最終覆土、メタンガス、噴出
Keywords: landfill final cover soils, methane gas, eruption

