



Landfills as critical infrastructures: analysis of observational datasets after 12 years of non-invasive monitoring

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This work presents the results of more than ten years of observations, performed on a regular basis, on a municipal solid waste disposal located in Italy. Observational data are generated by the combination of non-invasive techniques, involving the direct measurement of biogas release to the atmosphere and thermal infrared imaging. In fact, part of the generated biogas tends to escape from the landfill surface even when collecting systems are installed and properly working. Thus, methodologies for estimating the behaviour of a landfill system by means of direct and/or indirect measurement systems have been developed in the last decades.

It is nowadays known that these infrastructures produce more than 20% of the total anthropogenic methane released to the atmosphere, justifying the need for a systematic and efficient monitoring of such infrastructures. During the last 12 years, observational data regarding a solid waste disposal site located in Tuscany (Italy) have been collected on a regular basis. The collected datasets consist in direct measurements of gas flux with the accumulation chamber method, combined with the detection of thermal anomalies by infrared radiometry.

This work discusses the evolution of the estimated performance of the landfill system, its trends, the benefits and the critical aspects of such relatively long-term monitoring activity.