Geophysical Research Abstracts
Vol. 19, EGU2017-14409, 2017
EGU General Assembly 2017

Identification of urban gas leaks and evaluation of methane emission inventories using mobile measurements

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Leakages from the natural gas distribution network, power plants and refineries account for the 10% of national methane emissions in the UK (http://naei.defra.gov.uk/), and are identified as a major source of methane in big conurbations (e.g. Townsend-Small et al., 2012; Phillips et al., 2013). The National Atmospheric Emission Inventories (NAEI) website provides a list of gas installations, but emissions from gas leakage, which in the inventories are estimated on the basis of the population distribution, are difficult to predict, which makes their estimation highly uncertain.
Surveys with a mobile measurement system (Zazzeri et al., 2015) were carried out in the London region for detection of fugitive natural gas and in other sites in the UK (i.e. Bacton, Southampton, North Yorkshire) to identify emissions from various gas installations. The methane isotopic analysis of air samples collected during the surveys, using the methodology in Zazzeri et al. (2015), allows the calculation of the δ13C signature characterising natural gas in the UK. The isotopic value of the natural gas supply to SE London has changed a little in recent years, being close to -34 ‰ over 1998-99 period (Lowry et al., 2001) and close to -36 ‰ since at least 2002.
Emissions from gas installations, such as pumping stations in NE England (-41 $\pm$ 2 ‰) were detected, but some of them were not listed in the inventories. Furthermore, the spatial distribution of the gas leaks identified during the surveys in the London region does not coincide with the distribution suggested by the inventories. By locating both small gas leaks and emissions from large gas installations, we can verify how these methane sources are targeted by national emission inventories.

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