



Ambient air/near-field measurements of methane and Volatile Organic Compounds (VOCs) from a natural gas facility in Northern Europe

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Since the 1970's, the natural gas consumption saw a rapid growth in large urban centers, thus becoming an important energy resource to meet continuous needs of factories and inhabitants. Nevertheless, it can be a substantial source of methane (CH₄) and pollutants in urban areas. For instance, we have determined that about 20% of Volatile Organic Compounds (VOCs) in downtown Paris are originating from this emission source (Baudic, Gros et al., in preparation).

Within the framework of the "Fugitive Methane Emissions" (FuME) project (Climate-KIC, EIT); 2-weeks gas measurements were conducted at a gas compressor station in Northern Europe. Continuous ambient air measurements of methane and VOCs concentrations were performed using a cavity ring-down spectrometer (model G2201, Picarro Inc., Santa Clara, USA) and two portable GC-FID (Chromatotec, Saint-Antoine, France), respectively. On-site near-field samplings were also carried out at the source of two pipelines using stainless steel flasks (later analyzed with a laboratory GC-FID).

The objective of this study aims to use VOCs as additional tracers in order to better characterize the fugitive methane emissions in a complex environment, which can be affected by several urban sources (road-traffic, others industries, etc.). Moreover, these measurements have allowed determining the chemical composition of this specific source.

Our results revealed that the variability of methane and some VOCs was (rather) well correlated, especially for alkanes (ethane, propane, etc.). An analysis of selected events with strong concentrations enhancement was performed using ambient air measurements; thus allowing the preliminary identification of different emission sources.

In addition, some flasks were also sampled in Paris to determine the local natural gas composition. A comparison between both was then performed. Preliminary results from these experiments will be presented here.