Geophysical Research Abstracts
Vol. 21, EGU2019-11317, 2019
EGU General Assembly 2019

Methane emission related to the oil and gas sector in the Netherlands with emphasis on exploration and production

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Besides carbon dioxide, methane is the most important greenhouse gas particularly at a short-time scale. Knowledge on methane emissions is mostly derived from “bottom-up” emission inventories. These inventories contain detailed source-specific information needed to implement effective mitigation measures. However, recent studies, e.g. in the US, have shown that reported emissions have to be underpinned with “top-down” assessments based on atmospheric in-situ and/or satellite measurements to improve their accuracy.

The Netherlands is one of the largest producers of natural gas in Europe, with one of the most extensive infrastructures for the transfer of natural gas. In December 2017, as a results of the current political interest on methane emissions, the Dutch Parliament requested an abridge inventory on methane emission from the Oil and Gas (O&G) sector. The inventory was made using publicly available data, which we present here. The O&G sector in the Netherlands reported about 26 kilotons (kt) of methane emissions in 2015. This 26 kt comes from the Exploration & Production (12.4 kt), gas transport (7.2 kt), gas distribution (5.7 kt) and others (0.5 kt). Remarkably, this is only 3% of the total annual Dutch methane emission of 760 kt/yr. The agricultural sector (especially animal husbandry) dominates emissions with 520 kt (70%). A recent flyby over the largest gas field in the Netherlands (Groningen) confirmed the relatively low methane emissions (Yacovitch et al., 2018). However, the large uncertainty associated to the ratio between O&G emissions and other sources warrants further research.

The inventory and assessment further shows: a) the implied methane emissions factors from the O&G sector in the Netherlands are among the lowest in the EU. The largest methane emissions occur from onshore and offshore venting (12.2 kt/year), yet large uncertainties in the offshore estimates warrants further validation. b) Little information is known about leakage of methane from abandoned O&G wells. Only circa 200 out of the 1303 wells in the Dutch onshore have been subject of study, suggesting no major leakage. c) There is a large uncertainty in the estimates of methane flux from shallow biogenic methane in the North Sea. Estimates of methane leakages due to off-shore O&G drilling are listed as another important uncertainty (e.g., Vleidstadte et al., 2017). The assessment we present was officially made public by the Dutch Ministry of Economic Affairs and Climate and sparked considerable interest and initiatives, which we will here briefly present.

Yacovitch, T., et al. (2018). Methane Emissions in the Netherlands: The Groningen Field, Elem Sci Anth, 6: 57. DOI: https://doi.org/10.1525/elementa.308, 2018.
Vielstadte, L., et al. (2017). Shallow gas migration along hydrocarbon wells – An unconsidered, anthropogenic source of biogenic methane in the North Sea. Env. Sci. Technoil. (51), 10262-10268.