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ABSTRACT

APPLICATION OF AN ADVANCED SYSTEM FOR THE MONITORING OF WWTP ODOUR EMISSIONS AND BENEFITS TO USE IT

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Odour emissions from Wastewater Treatment Plants (WWTP) are often a cause of nuisance and complaints from the neighbours. These odour emissions are in most cases associated to sulphur compounds, most significantly H_2S and volatile sulphur compounds (VSCs) such as mercaptans or thioethers.

Numerous immission and/or emission monitoring systems have been described with the goal of correlating the emissions of odoriferous compounds with the corresponding odour levels. Likewise, to perform continuous on-line estimation of the emissions and model their dispersion and forecast future episodes. These monitoring systems are most often based on networks of multiple low-cost sensors and electronic noses which are not capable of reliable determination of the odoriferous compounds at sufficiently low levels.

To overcome these sensitivity shortcomings of the systems that have been described to date we propose adopting a different approach, by using a Vigi eNose system (Chromatotec, Fr.). This Gas Chromatography (GC) based system includes two detectors: a custom sulphur detector (TRS-MEDOR) that can reliably measure H_2S+14 VSC with detection limits in the range of 0.5-8 ppb, and a PID (photoionization detector) which is used to measure the total volatile organic compound (VOC) concentration. The sum of VSC concentrations is calculated from the TRS-MEDOR results, and a SOAV (sum of odour activity values) is calculated by means of an odour threshold table of the individual compounds.

A Vigi eNose system has been installed at the San Jeronimo WWTP (Seville, Spain) analysing gas streams from six different points. Five of them analyse emission sources and one of them measures in a location not affected directly by emission sources. Emissions are used to feed the CALPUFF dispersion model. Data generated by the Vigi eNose, as well as the results of near-real time odour dispersion modelling and forecast results, can be visualized in a web-platform visualization system developed by Meteosim.

In this project 3 sampling and analysis campaigns will be carried out at the WWTP (in autumn, spring, and summer respectively) to check the applicability of this system to the monitoring of odour emissions. Each campaign will include: emission odour

concentration samples, emission and immission samples for VOC analysis by TD-GC-MS, a Jerome J605 H2S analyser and colorimetric H2S and mercaptans (RSH) tubes, and 3-day passive H2S and VSC samples taken with Radiello tubes. The samples will be also analysed with the Vigi eNose system to compare the results with the other methods and assess its applicability.

Indicate preference of kind of presentation

■ Oral Communication
☐ Poster

Indicate topic of your work for the conference:

☐   Policy and associated regulations for odour and air quality.
■ Odour/VOC measurement, monitoring&sensor technologies.
☐ Odour/VOC perception, impact, formation and dispersion.
☐ GHG emissions particulate matter and industrial emissions.
☐ Source characterization and odour/VOC mapping.
☐ Odour/VOC abatement, mitigation and neutralization.
☐ Odour/VOC from waste water, sewer systems and livestock.
☐ Air emissions and sustainable solutions for waste handling
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Send the abstract December 15th to: iwaodours2021@olores.org