Summary Model: Submit before December 15th to:
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9th IWA Odour & VOC/Air Emission Conference
26-27 October 2021 Bilbao, Spain

ABSTRACT

IMPROVEMENT OF ODOUR DISPERSION MODELLING PERFORMANCE AND CAPABILITIES USING ADVANCED CONTINUOUS MONITORING

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Dispersion modelling is currently an acknowledged technological resource for a better understanding of the impact range generated by odour-emitting sources in Wastewater Treatment Plants (WWTP).

As dispersion modelling tools can be feed with continuous emission monitoring information, the combination of these two technological resources can provide a very useful methodology to locate, correlate and manage local complaints due to odour nuisance events.

Nevertheless, due to chemical complexity and variety of the odour compounds emitted in WWTPs and the low-sensitivity response limitations of most commercial emission monitoring devices the performance of representative dispersion modelling of low-concentration odoriferous compounds becomes a significant challenge.

To reduce the uncertainty of odour dispersion modelling results and its subsequent complaint management capabilities a different model-monitoring device integration approach has been implemented. A high-resolution forecasting dispersion system, based on CALPUFF and Weather Research and Forecast (WRF-ARW) system, has been coupled to a gas chromatography (GC) based multi-parametric emission monitoring system at San Jeronimo WWTP (Seville, Spain). Vigi e-Nose (Chromatotec, Fr.) monitoring system has been configured to chronological sample and analyse multiple compounds streamed from 5 of the most relevant WWTP emission sources for subsequent CALPUFF modelling.

The integration of Vigi e-Nose analytic results to the WRF-CALPUFF dispersion system has enabled not only to implement a near-real time odour dispersion modelling system, but to build an extensive emission database that enables to define WWTP sources specific emission profiles (hourly, daily, monthly and seasonal) later integrated into an odour impact forecasting system.

A set of 3 independent sampling and analysis campaigns, considering dynamic olfactometry as well as different VOC and H2S analytical techniques, have been implemented to calibrate and validate the modelling system. The results of this independent campaigns, implemented along different climatic seasons, have been integrated to the operational modelling system for San Jeronimo's WWTP odour impact forecasting and related complaint management purposes.

Results show an improvement of the odour dispersion predictions and subsequent local impact range analysis when comparing predefined olfactometric-characterized emission profiles and the use of this specific Vigi e-Nose monitoring-based profiles simulations.

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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.
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