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## **AN INTEGRATED HIGH TEMPORAL RESOLUTION APPROACH TO MONITOR VOCs CONCENTRATIONS AND ODOUR ANNOYANCE NEAR A PETROLEUM PLANT**

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### **Abstract**

This study aims to monitor Volatile Organic Compounds (VOCs) and odour annoyance perceived by the exposed population living nearby a petroleum plant through an integrated high temporal resolution methodological approach. The area under investigation is considered one of the most critical industrial areas of the South of Italy (Basilicata) because of presence of the largest Italian petroleum plant, called the "Center Olio Val d'Agri" (COVA). In fact, VOCs and odours emitted from extraction processes, storage tanks and/or gas pipelines may have an adverse impact on health and life quality of population living near the plant. Therefore, in order to assess the potential impact on nearby urban settlements, two monitoring campaigns were carried out. The first campaign was conducted during 2011 and allowed to integrate the information about odours, monitored by means of electronic nose (e-nose), with meteorological data (wind speed and direction) and population complaints reported on questionnaires. In the second one (**from 1st January to 30th July 2017**), the previous approach has been improved with an integrated system consisting of photoionization detector (PID) for VOCs monitoring, a video camera and a telephonic system able to systematize in real time the population complaints. Experimental data obtained revealed that there was correspondence between the VOCs concentration peaks, odour events and population complaints. Moreover, this study highlighted that technologies for high temporal resolution monitoring of both VOCs and odours integrated in a unique system are able to provide real time information about the emissive sources and odor annoyance and to promptly evaluate the impact on the exposed population.

**Key words:** electronic nose, gas and oil pre-treatment plant, odours, Photo Ionization Detector (PID), Volatile Organic Compounds (VOCs)

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