

Impact of fugitive emissions in ambient PM levels

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Keywords: Fugitive emissions, particles, re-suspension, harbours

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Significant atmospheric dust arises from the mechanical disturbance of granular material exposed to the air. Dust generated from these open sources is termed "fugitive" because it is not discharged to the atmosphere in a confined flow stream.

Common sources of fugitive dust include unpaved roads, agricultural tilling operations, aggregate storage piles, heavy construction and harbour operations. Fugitive emissions pose problems both for general air quality management as well as for the operational management of the facilities. The objective of the project PMfugitive is to improve the understanding of fugitive emissions by performing their characterization and assessing their environmental and health impacts.

The present work was developed within this project and aims to identify the likeliness and extend of the PM10 and PM2.5 limit value exceedences due to fugitive emissions in a particularly zone where PM fugitive emissions are a core of environmental concerns – Mitrena, Portugal. Mitrena, is an industrial area that coexists with a high-density urban region (Setúbal) and areas with an important environmental concern (Sado Estuary and Arrábida which belongs to the protected area Natura 2000 Network). Due to the typology of industry sited in Mitrena (e.g. power plant, paper mill, cement, pesticides and fertilized productions), there are a large uncontrolled PM fugitive emissions, providing from heavy traffic and handling and storage of raw material on uncover stockyards in the harbour and industries.

Dispersion modelling was performed with the software TAPM (The Air Pollution Model) and results were mapped over the study area, using GIS (Geographic Information Systems).

Air quality simulations were performed considering different scenarios in order to model the contribution of 1) point sources, 2) vehicles, differentiating between exhaust emissions and re-suspension, 3) storage piles and 4) harbour operations. The contribution of each one of these sources for the PM concentrations was estimated.

Results showed that managing local particles concentrations can be a frustrating affair because the weight of fugitive sources, principally the re-suspension

of dust from heavy traffic, is very high comparing with the local anthropogenic stationary sources. In order to ensure that the industry can continue to meet its commitments in protecting air quality, it is essential to warrant that the characteristics of releases from all fugitive sources are fully understood in order to target future investments in those areas where maximum benefit will be achieved.

This work was supported by the Portuguese "Fundação para a Ciência e Tecnologia" under the project PMfugitive - Mitigating the Environmental and Health Impacts of Particles from Fugitive Emissions, PTDC/AAC-AMB/098825/2008 and the PhD fellowship SFRH/BD/78698/2011.