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VOC Emissions by Asphalt Pavements at Service Temperatures: Impacts on Urban Air Quality

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Abstract

Outdoor air pollution is the 4th cause of death worldwide linked to around 4.2 million deaths per year. Air pollution is more severe in urban environments of cities/megacities, due to the high population density and intensive anthropogenic activities. More than 50% of global population lives currently in urban areas and a projected 70% is anticipated by 2050, as for EU the estimation is even higher reaching 84%.

Around 40% of the urban cities area are covered by asphalt pavements, a percentage that keeps increasing with urbanization. Asphalt is a petroleum byproduct composed of a large number of organic species, capable of emitting a wide variety of organic compounds. Although their emissions of pollutants have been investigated at deposition temperatures (120-160°C), data on emissions of asphalt at in-use temperatures (i.e. atmospheric relevant conditions) are lacking.

In this talk, we will discuss about the need to characterize the impact of asphalt pavements on urban air quality. Asphalt pavements can act as source of primary atmospheric pollutants, and especially Volatile Organic Compounds (VOCs), but can also be a source of secondary pollutants (i.e. O_3, atmospheric fine particles) under in use temperatures. Understanding and quantifying these heterogeneous photochemical processes occurring at the surface-air interface is essential, to evaluate the overall impact of asphalt pavements on current and future urban air quality.