

## Exposition des citoyens aux polluants atmosphériques au cours de leurs déplacements dans l'agglomération parisienne - nouvelle évaluation dix ans après

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This study aims at establishing the exposure levels of the Ile-de-France inhabitants when they commute in Paris between their dwelling and workplace, during morning and afternoon rush hour periods, using various modes of transport. A significant number of contrasted situations is retained; twenty routes are chosen implementing the main modes of transport: car, bus, subway, tramway, cycle and walking. Each route has been reproduced 30 times (15 round trips). The measurement campaign took place during the winter period of 2007 and 2008.

The results are compared with the values obtained in similar conditions during the study led between 1996-1998, but also with data collected at the same moment of the day by the Parisian air quality survey network. Moreover, they are compared with continuous measurements inside the Parisian subway system realised by RATP.

For nitrogen dioxide, results show that levels are higher in cars and in buses than in other modes of transport. Median concentrations vary between 36 µg/m<sup>3</sup> measured in the train of a subway line (RER B line) and 218 µg/m<sup>3</sup> inside the car circulating on the ring road around Paris.

The exposure in cars is the most important for carbon monoxide, monocyclic aromatic hydrocarbons, PM<sub>2.5</sub> absorption coefficient and formaldehyde. The formaldehyde concentrations are the lowest for the pedestrian walking in a pedestrian district of Paris. They are the highest for the vehicle circulating on the ring road around Paris. The comparison with results provided by Parisian air quality survey network indicates that measurement stations, even though situated on sidewalks in border of road, are not fully representative of the real exposure of the car passengers on Paris ring road.

PM<sub>2.5</sub> mass concentration is higher in the underground lines of the Parisian subway system, where a specific particles source is observed (particles emitted by the rolling stock during braking).

Generally speaking, for measured pollutants, pedestrians, tramway passengers and cyclists are the least exposed.

A significant decrease of benzene and carbon monoxide levels is observed between the studies of 1998 and 2008.

**Key words:**

exposure, city-dweller, transport, pollution, air, nitrogen dioxide, carbon monoxide, monocyclic aromatic hydrocarbons, PM<sub>2.5</sub>