

Road surface dust load is dependent on road surface macro texture

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Emission of road dust into the air is negatively dependent on the road surface macro texture (Blomqvist *et al.*, 2011; China and James, 2012). That statement is, however, based on controlled experiments where equal amounts of dry dust were applied on clean road surfaces.

This abstract concludes that the actual dust load in city streets are positively related to the road surface macro texture and also strongly related to the season (Figure 1). The amount of vehicle induced emission of the road dust suspended into the air will, however, not only be dependent on the dust load amount on the road surface, but also to its emission availability, which to a very large degree depends on the road surface wetness. The large seasonal variation of the dust load is to large extent due to the studded tire wear of road surfaces, and winter sanding material spread on roads and sidewalks.

The road dust was sampled with the VTI Wet Dust Sampler (Jonsson *et al.* 2012) on four test sites, representing different city streets, at eight different occasions from October 2011 to January 2013. The road surface macro texture (Table 1) was measured at each sampling site by the sand patch method (CEN-standard EN 13036-1). The macro texture was also measured along the entire road lengths of the sampled streets using the VTI Laser Road Surface Tester, RST.

Table 1. Road lengths and texture at sampling sites.

Testsites (Street name)	Road length (km)	Road surface macro texture (mean texture depth) (mm)	
		Wheel track	Between tracks
Hornsgatan	2.4	1.5	2.0
Folkungagatan	0.6	1.7	1.0
Sveavägen	1.6	1.3	1.1
Norrlandsgatan	0.3	1.2	0.9

The mode and standard deviation of the road surface macro texture histograms differ largely between and within the four studied city streets (Figure 2). This points out that the geographic variation of the road surface texture and, hence, the amount of road dust load can be very large.

Together with the fact that the road dust load also shows a large seasonal variation, this knowledge could be used from an abatement strategy point of view as it gives information regarding the questions of *when* and *where* abatement activities such as street cleaning should take place. That will, however, require knowledge of the road surface texture along the city road network.

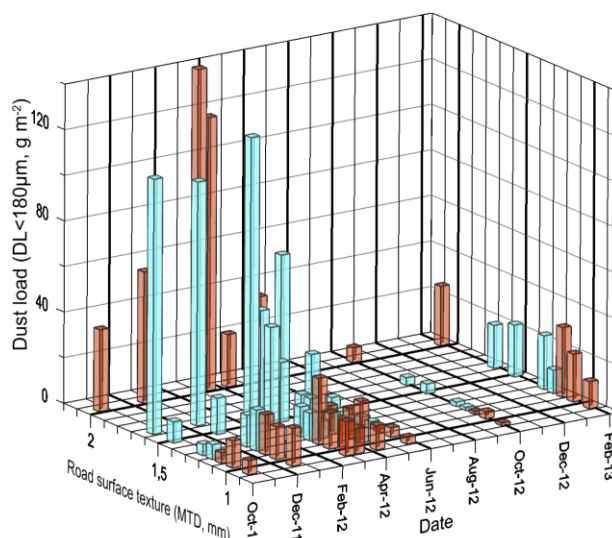


Figure 1. Road surface dust load as related to road surface macro texture and time of year. Red = between wheel tracks, Blue = in wheel tracks. Data partly from Gustafsson *et al.* (2012).

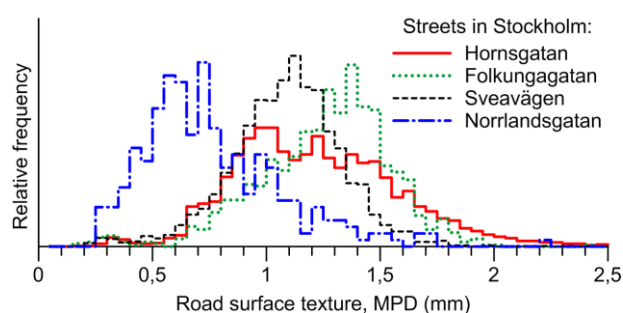


Figure 2. Histogram of road surface macro texture (mean profile depth) in the left wheel track in four city streets.

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