Study of Personal Exposure to Nanoparticles Considering Meteorological Variables in 4 Streets with Different Types of Vehicles in Bogotá

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Introduction

In Bogota has been estimated that the public transport contribute nearly with 40% of total PM emissions. In order to reduce those concentration levels, a Diesel Particle Filter Program is been developed.

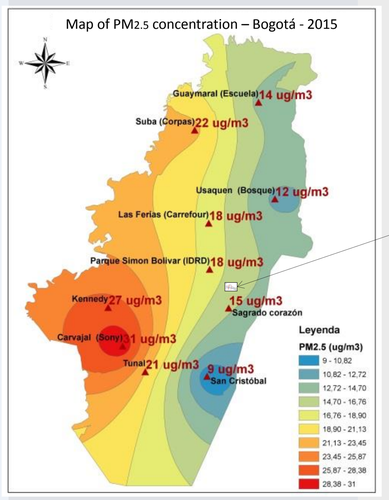
Therefore, since 2015 the District Secretariat of environment has started the measurements of personal exposure to Nanoparticles,

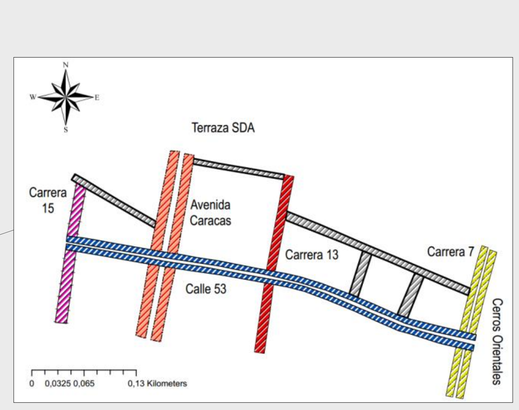
The study compares the particle number concentration PNC in four streets, also the behavior of the mean concentration on the week-days of PNC in relation to PM 2,5 (Height: 14m) measured by the air quality monitoring stations, and the variation associated to the Meteorological variables, mainly wind speed an direction.

Methodology

Considerations:

- The zone where the study was developed has same PM 2,5 concentration.
- Measurement in the rush hour (7:00 am 9:00 am) The typologies of the vehicles transiting in the 4 streets are different.





Diffusion Size Classifier DiSCmini - Testo.

Portable Weather Station Davis

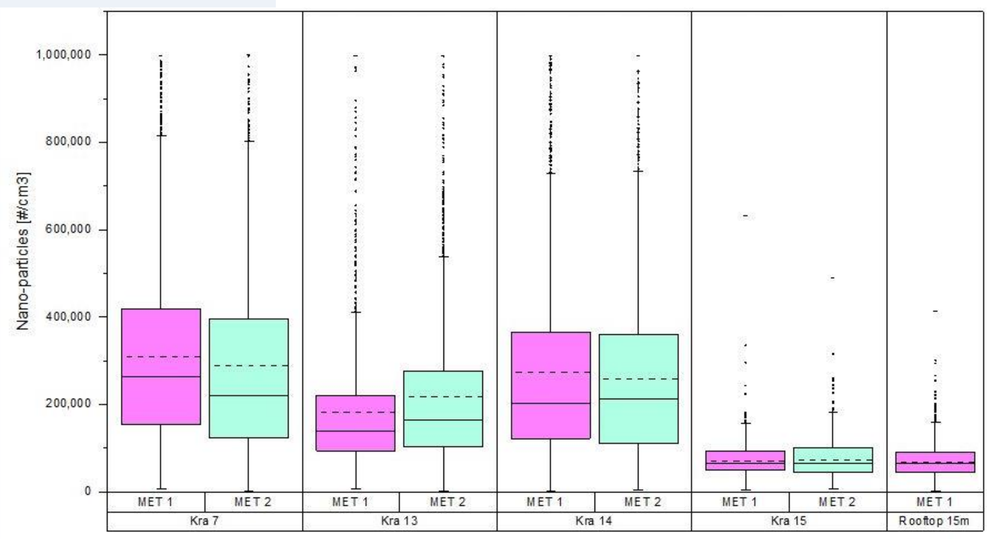
MET1: Measurement at one side of the road

MET 2: Measurement at each side of the road.

R Studio for data statistical analysis

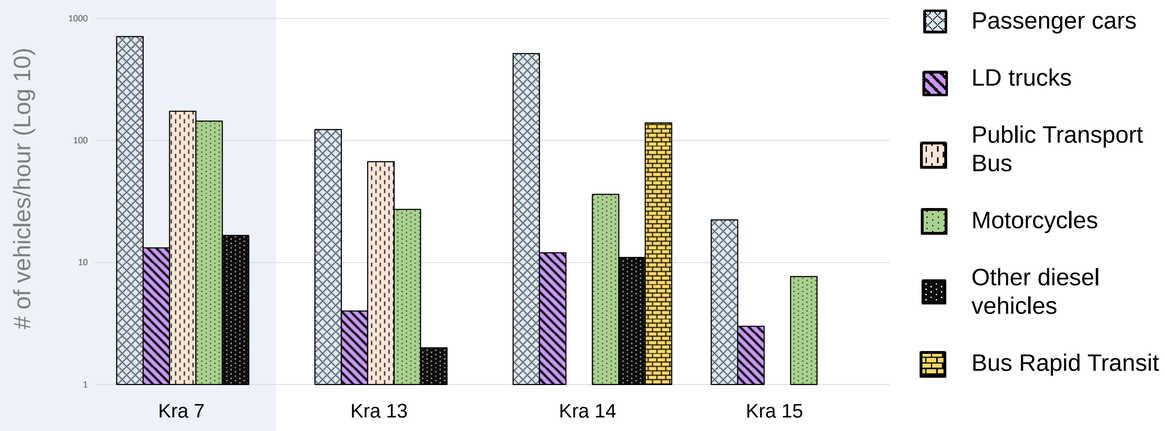
Results

I.- Nano-particles concentration according to methodology and road.

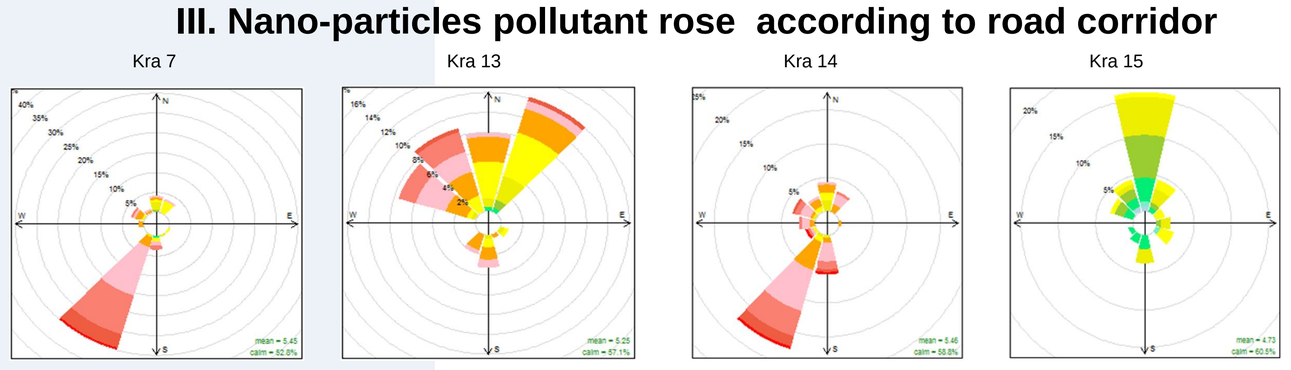


% data > 1'000.000 cm-3	17,8	61,8	30,4	8,4	7,5	8,7	0	0	0

II. Number of vehicles per hour



III. Nano-particles pollutant rose according to road corridor



Conclusion

- The results show that high nanoparticles concentrations are associated with high number of diesel engines present on the fleet of public transport. it means also more dispersion on the data.
- A correlation between number of Nanoparticles and PM2.5 was calculated with R=0.52. However, the weekly behavior from nano-particles and PM2,5 reported by the network of air quality monitoring stations, is not the same. It shows, an influence of the proximity to the source in the nanoparticles counting.
- The obtained results indicate there is not any strong correlation between the meteorological monitored variables an the nano-particle concentration

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