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Using GIS tools to assess the urban environment influence on the particle concentration variability in Paris
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**CONTEXT**

Particle is one of the most important megacities’ air pollution problems, with public health issues.
To assess personal exposure in Paris, we made few measurements of particles concentrations by foot and by bike. The results show that particles concentration and size distribution are spatially highly variable due to different emissions and air mass movements.
At the scale of the city, street geometry (orientation, width...), the built-up environment (density, color, materials...) and the green spaces also strongly affect the spatial distribution of pollutant concentrations.

**OBJECTIVES**

- To define urban morphology parameters, which could explain the spatial variability of particles concentration in Parisian street.
- Using GIS analysis to study what urban morphology indexes affect the spatial distribution of particle concentration at local scale.

**POLLUTION DATA**

Measurements of PM10 and PM2.5 concentration in Parisian streets to assess cyclists’ exposure to air pollution:
- In June 2014, between 16 pm and 18 pm during anticyclonic condition, wind speed ± 5 m/s, from north.
- by bike
- with Dustmate sensor (Turnkey Instruments) & GPS (measurement period = 30 seconds)

**PARTICLE VARIABILITY**

Each point represents a mean of particle concentration measurements during 30 seconds. We made different size of buffer (20 m, 50 m, 100 m and 200 m) for each point to combine the PM concentrations average and the urban morphological parameters.

**URBAN DATA**

- BD TOPO® - IGN (digital terrain model ~75m)
- BD ALTI® - IGN
  - Buildings (height)
- Vegetation
- Roads
- + digitization of terrigenous pedestrian roads

**MORPHOLOGICAL PARAMETERS**

- Sky view factor (SVF)
- Land cover
- Street Orientation

**SOME RESULTS**

- Influence of terrigenous road coarser particles
- Correlations between vegetation/street orientation and particle concentration are not significant for these days.

**URBAN DATA**

- Correlation between particle size and SVF
- The correlations with the buffers of 100 m are higher than the other buffers. The results with the buffers of 200 m are not significant.

**PERSPECTIVES**

Automation with different days, and meteorological and emission conditions.
Integration of a large database, existing and with low cost and miniaturized sensors.
Reflexion on spatial scales.

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