**Context**

Fine particles are a major source of health problems. Lung deposited surface area (LDSA) is one of the most used pollution indicators in health monitoring. The OpenSense Project gathers LDSA measurements over the city with instruments (Partectors) from Naneos mounted on buses.

**Goal**

The project’s main objective is to create a temporal LDSA model for every street in Lausanne using the bus network. A further development could be the generation of air pollution maps as a function of atmospheric conditions.

**Methodology**

**Spatial distribution**

- **Take raw measurements**
  - LDSA measurements
  - Available Streets

- **Assign them to a street**
  - Map with streets and LDSA measurements

Log LDSA = α₀ + ∑ αᵢ · log(parameterᵢ (t - τᵢ))

*with α being the fitted coefficient and τ the time lag*

- **Find relations to Parameters**
  - Measured LDSA
  - Find Coeff.
  - Modeled LDSA

**Results**

1. *Fit model on continuous serie*
   - LDSA [µm² cm⁻⁵] of air
   - Time [dd.mm HH]
   - R²: 0.74  RMSE: 5.57

2. *Verify model on entire set*
   - LDSA [µm² cm⁻⁵] of air
   - Time [dd.mm HH]
   - R²: 0.22  RMSE: 13.67

**Linear Model**

1. Rain
2. Radiation
3. Humidity
4. Temperature
5. NO₂
6. CO
7. O₃
8. PM₁₀
9. HPBL
10. Traffic

**Model Output**

- Sensitivity Analysis
  - Normalized contribution of each parameter to generate the most suited model

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rain</th>
<th>Rad</th>
<th>RH</th>
<th>HPBL</th>
<th>NO₂</th>
<th>Wind</th>
<th>CO</th>
<th>O₃</th>
<th>Temp</th>
<th>O₄</th>
<th>PM₁₀</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.00</td>
<td>0.98</td>
<td>0.94</td>
<td>0.81</td>
<td>0.80</td>
<td>0.79</td>
<td>0.78</td>
<td>0.77</td>
<td>0.76</td>
<td>0.71</td>
<td>0.41</td>
</tr>
</tbody>
</table>

**Conclusion**

The model fits the observed LDSA measurements with a satisfying precision. Fluctuations are well reflected. However the amplitude is inaccurate, extreme values seem to be less well estimated and the night is not modeled (no measurements available to fit the model). Rain, radiation and humidity seem to be crucial parameters, although their relevance may change for different streets. This model may be the base to create pollution maps for the whole city.