Modelling NO\textsubscript{x} in two street canyons in Copenhagen using an improved version of OSPM

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17\textsuperscript{th} International Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes
1. Introduction to OSPM
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Motivation

The $f_{\text{Roof}}$ parameter:
- In the original OSPM 0.82
Motivation

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- Changed to 0.4 when the COPERT emission model was introduced in OSPM
Motivation

The $f_{Roof}$ parameter:
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- Changed several times since then to reflect better knowledge of model input (e.g. driving speeds, receptor heights, etc.)
The $f_{Roof}$ parameter:

- In the original OSPM 0.82
- Changed to 0.4 when the COPERT emission model was introduced in OSPM
- Changed several times since then to reflect better knowledge of model input (e.g. driving speeds, receptor heights, etc.)
- Very little physical science basis for this number
Introduction to cases

Jagtvej

Legend

- Mast locations

Building Heights

- 0.0m - 2.3m
- 2.3m - 15m
- 15m - 30m
- 30m -

Forest/trees
- Water Bodies
- Cemetery
- Parks
Introduction to cases
H. C. Andersens Boulevard

Legend
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[Map of H. C. Andersens Boulevard with legend showing different colors for building heights and symbols for various locations.]
Model development
Measurements
Results
Median values Jagtvej

Wind direction (°)
Median wind speed (m/s)

- Measurements
- New Model
- Airport
- Original Model
**Results**

Median values H. C. Andersens Boulevard
Impact of new wind speed model in OSPM

Model comparison:

Jagtvej:

![Graph showing wind speed comparison](image-url)
Impact of new wind speed model in OSPM

Model comparison:

H. C. Andersens Boulevard:

![Graph showing mean wind speed comparison between original and new models for different wind directions.](attachment:image.png)
Impact of new wind speed model in OSPM

Concentrations:

Jagtvej:

![Graph showing mean NOx concentration in ppb as a function of wind direction (°) for different models. The graph compares measurements, original model, and new model.](image-url)
Impact of new wind speed model in OSPM

Concentrations:

H. C. Andersens Boulevard:

![Graph](Image)
Summary

- It is to some extent possible to extrapolate the urban wind speed based on a measured wind speed.
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- Modelling the roof-level wind speed is challenging
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- Modelling the roof-level wind speed is challenging.
- Large difference in the sensitivity of the two streets to the roof-level wind speed.
It is to some extent possible to extrapolate the urban wind speed based on a measured wind speed.

Modelling the roof-level wind speed is challenging.

Large difference in the sensitivity of the two streets to the roof-level wind speed.

It is not know whether a more advanced model would perform better.