Modelling NO_x in two street canyons in Copenhagen using an improved version of OSPM

Thor-Bjørn Ottosen[1] Matthias Ketzel[2] Ole Hertel[2] Jørgen Brandt[2] Henrik Skov[2,3] Konstantinos Kakosimos[4]

[1]Institute of Science and the Environment, University of Worcester

[2]Department of Environmental Science, Aarhus University

[3]Department of Chemical Engineering, Biotechnology and Environmental Technology, University of Southern Denmark

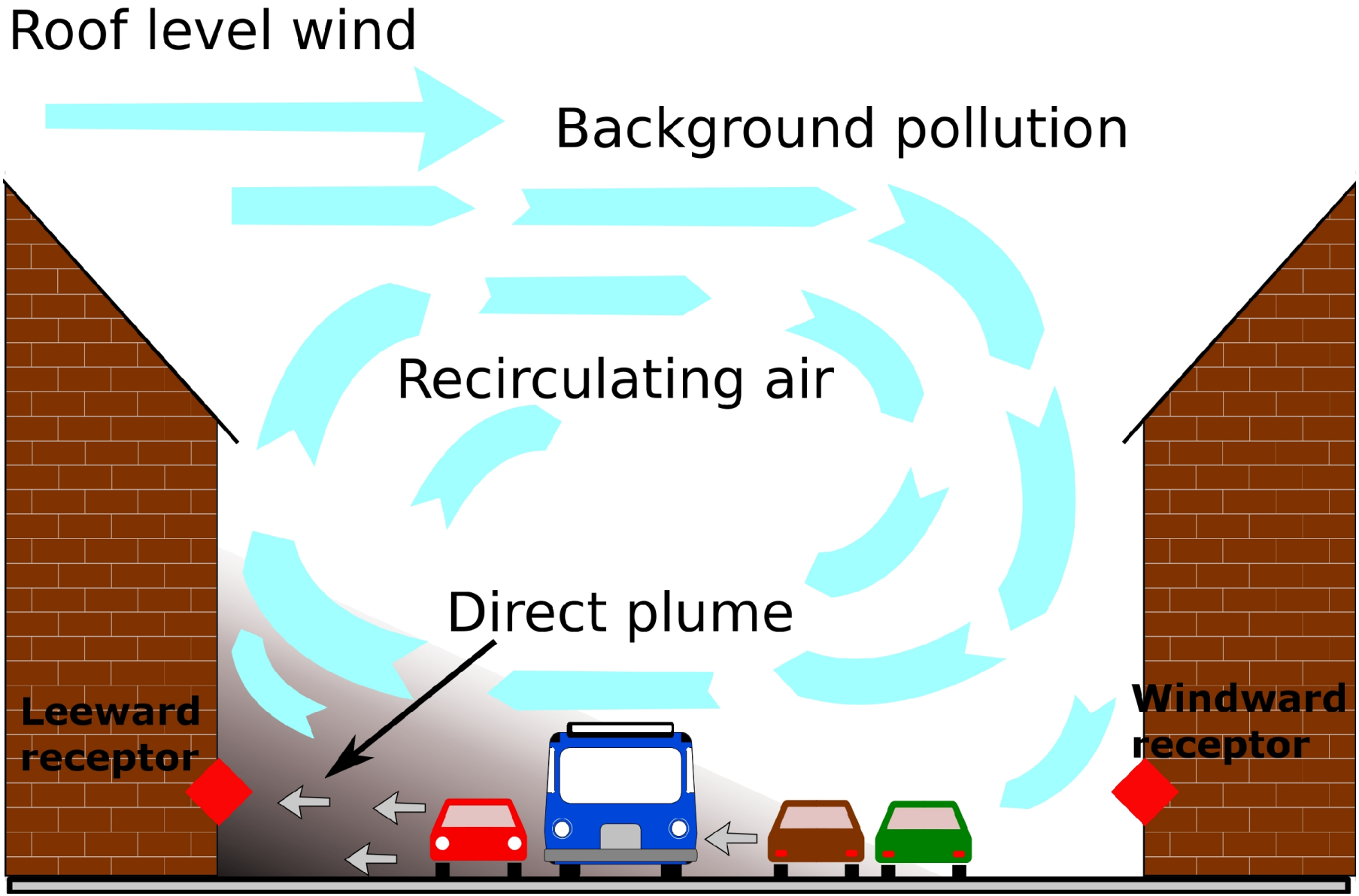
[4]Department of Chemical Engineering, Texas A&M University at Qatar

17th International Conference on Harmonisation within Atmosperic Dispersion Modelling for Regulatory Purposes

Outline

1. Introduction to OSPM
2. Motivation
3. Introduction to cases
4. Summary of paper by Ottosen el. al. (2016)
5. Impact of new wind speed model in OSPM
6. Summary

Introduction to OSPM



Motivation

The *fRoof* parameter:

- In the original OSPM 0.82

Motivation

The *fRoof* parameter:

- In the original OSPM 0.82
- Changed to 0.4 when the COPERT emission model was introduced in OSPM

Motivation

The *fRoof* 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.)

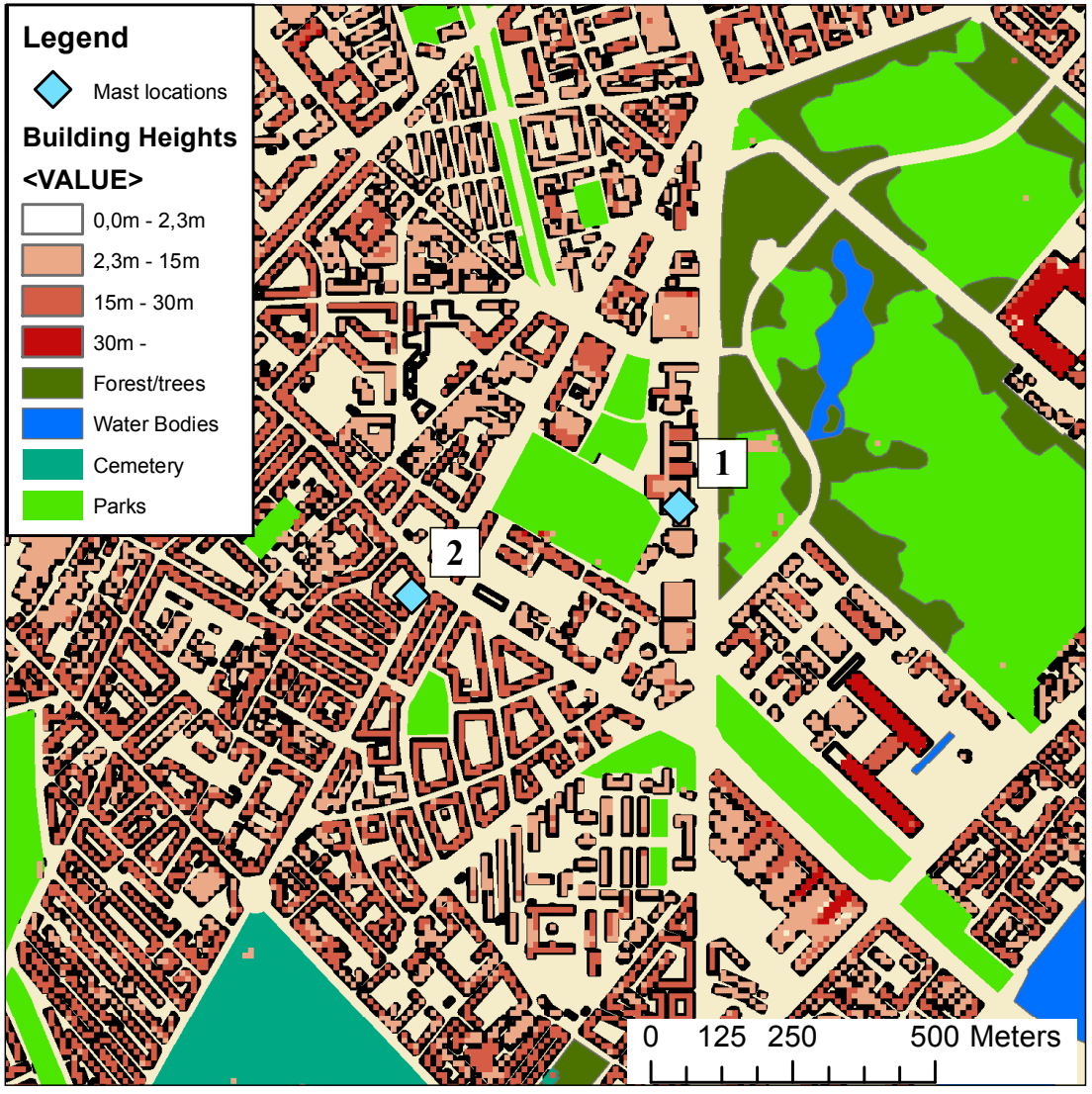
Motivation

The *fRoof* 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

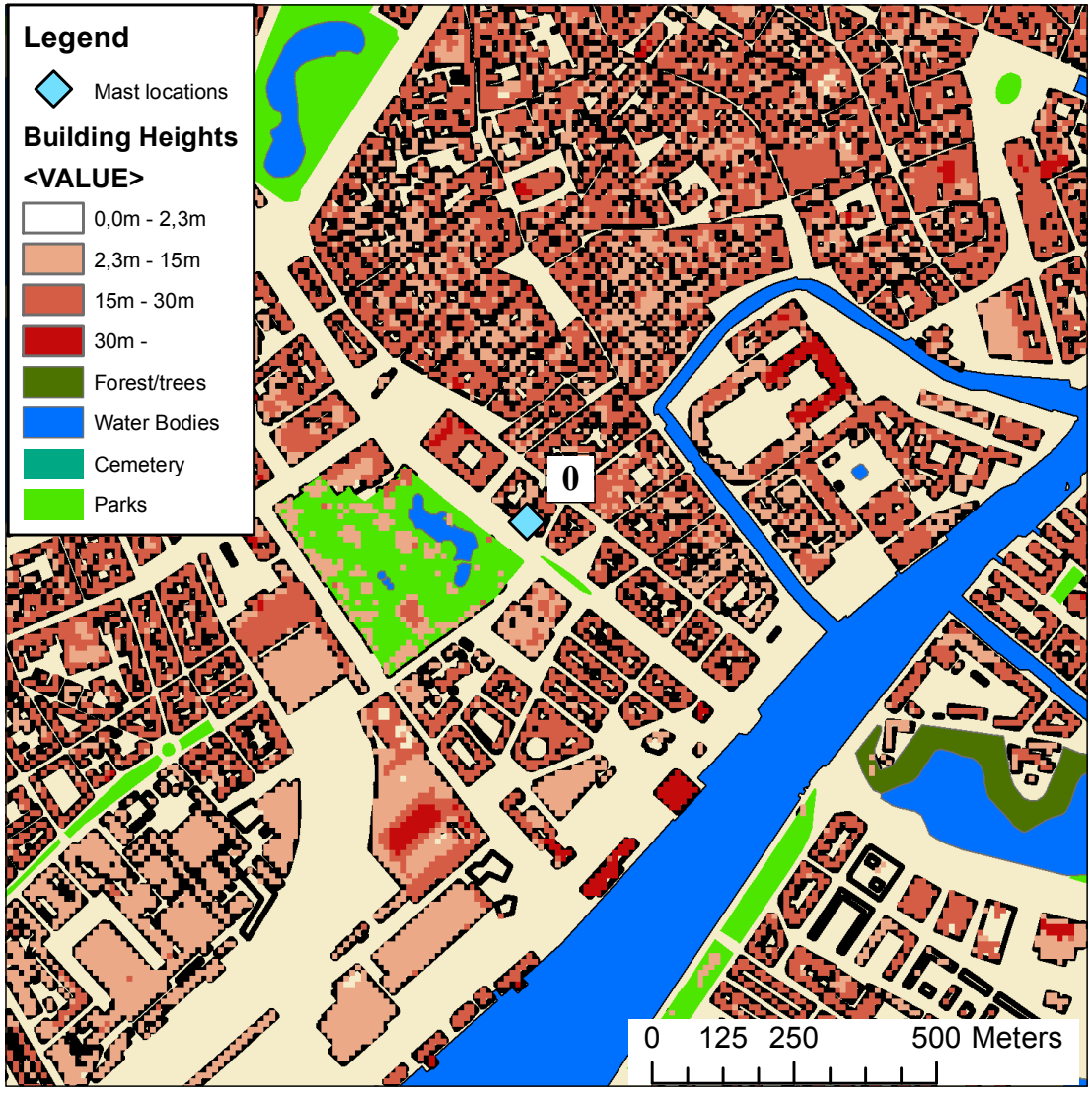
Introduction to cases

Jagtvej

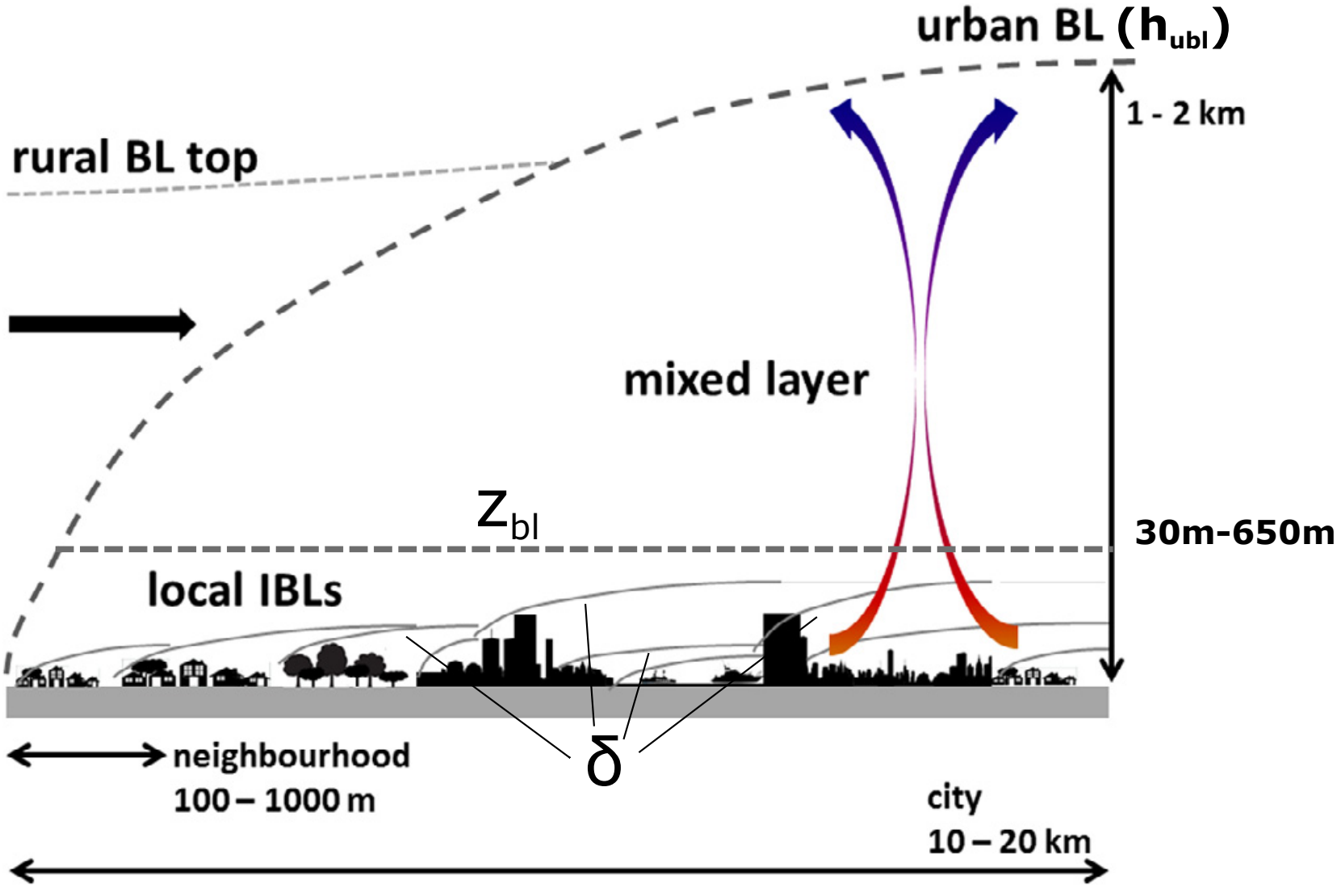


Introduction to cases

H. C. Andersens Boulevard



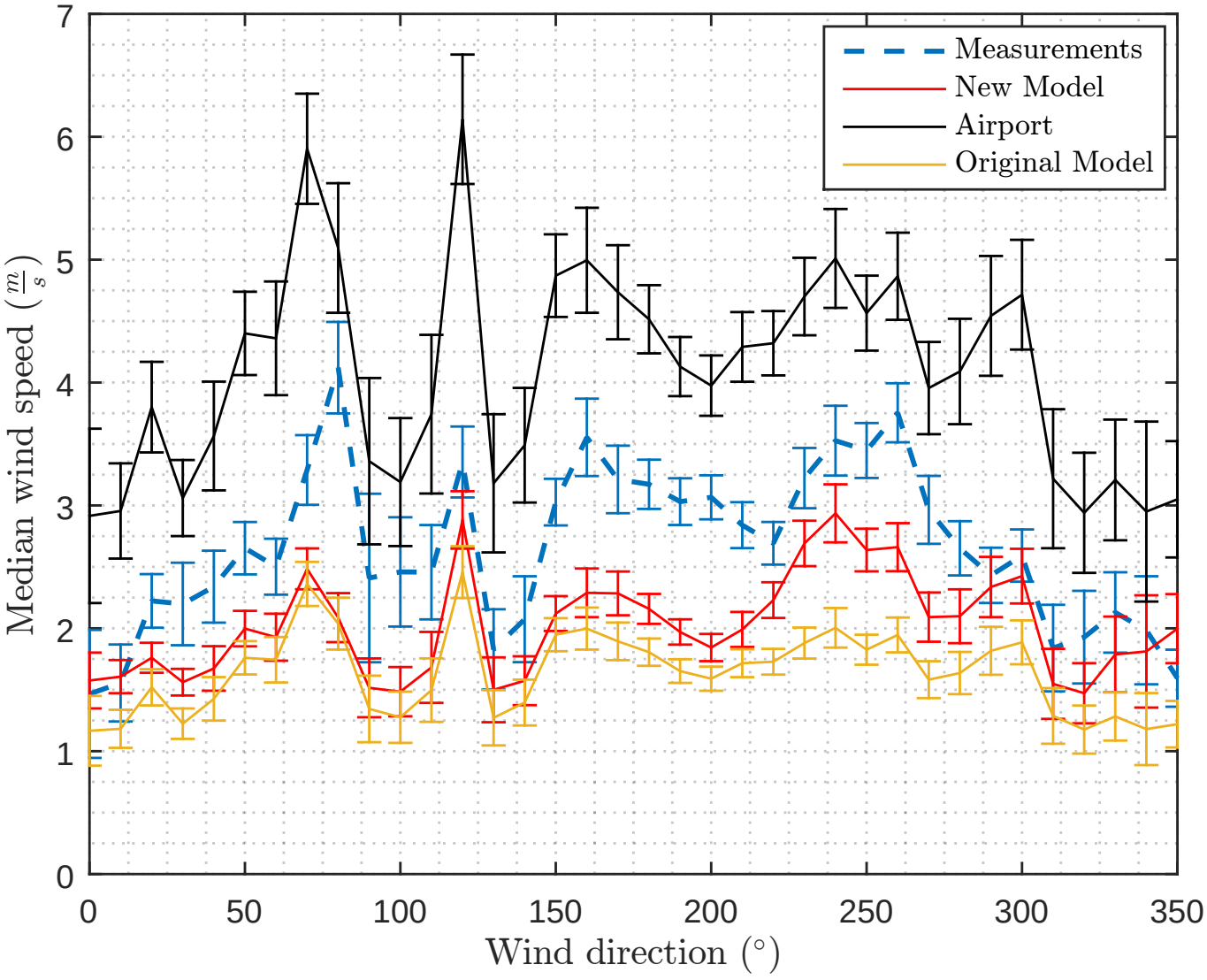
Model development



Measurements

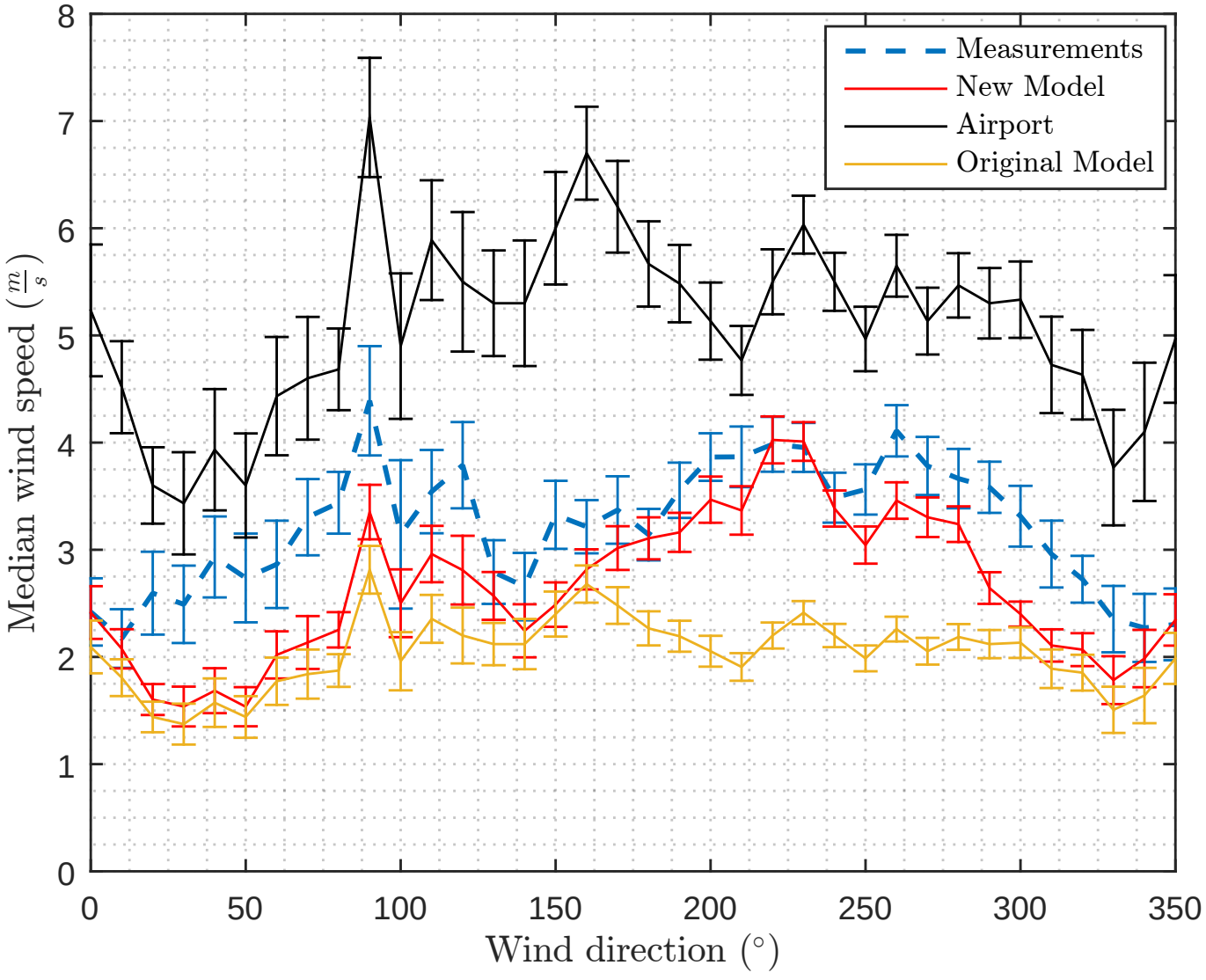
Results

Median values Jagtvej



Results

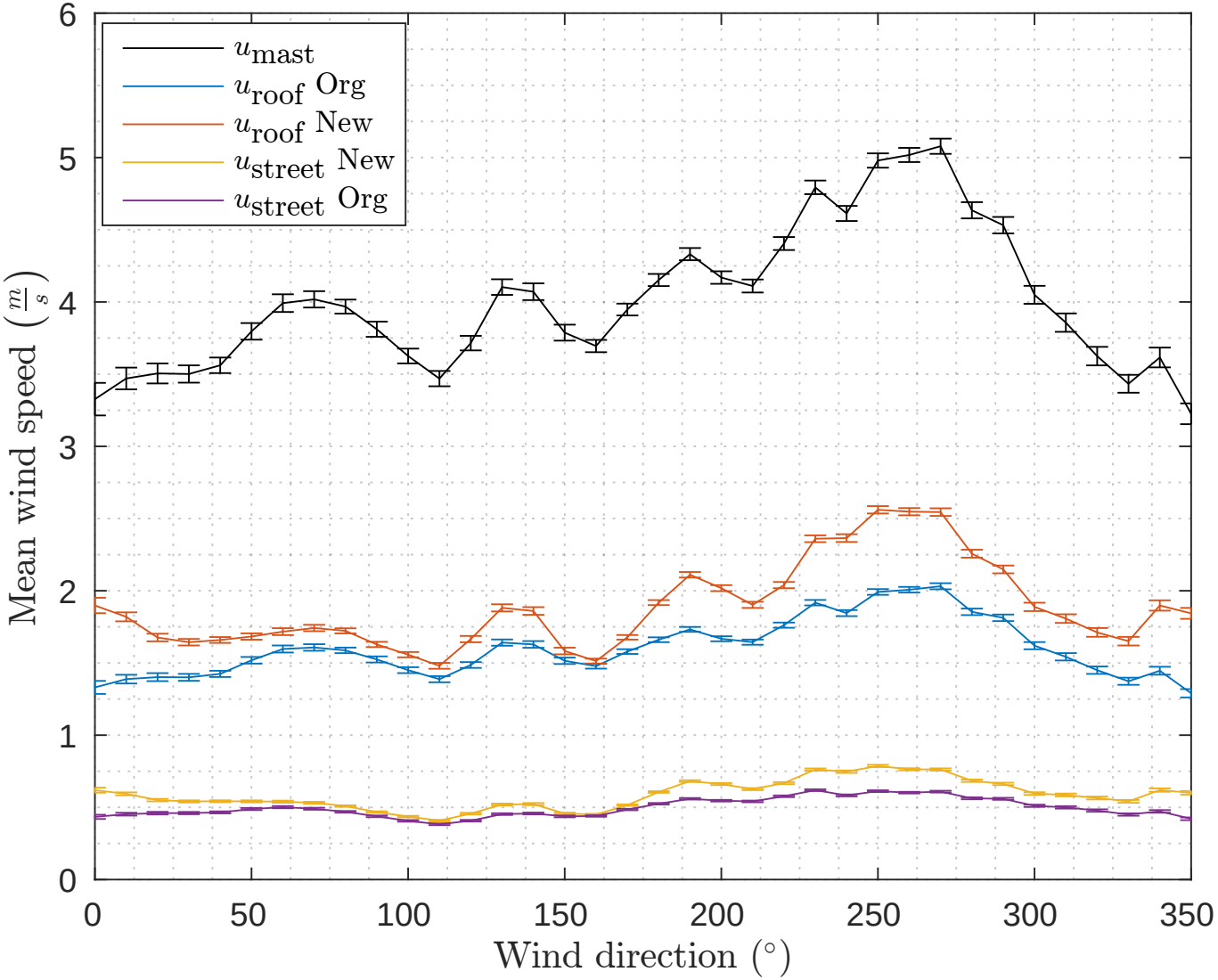
Median values H. C. Andersens Boulevard



Impact of new wind speed model in OSPM

Model comparison:

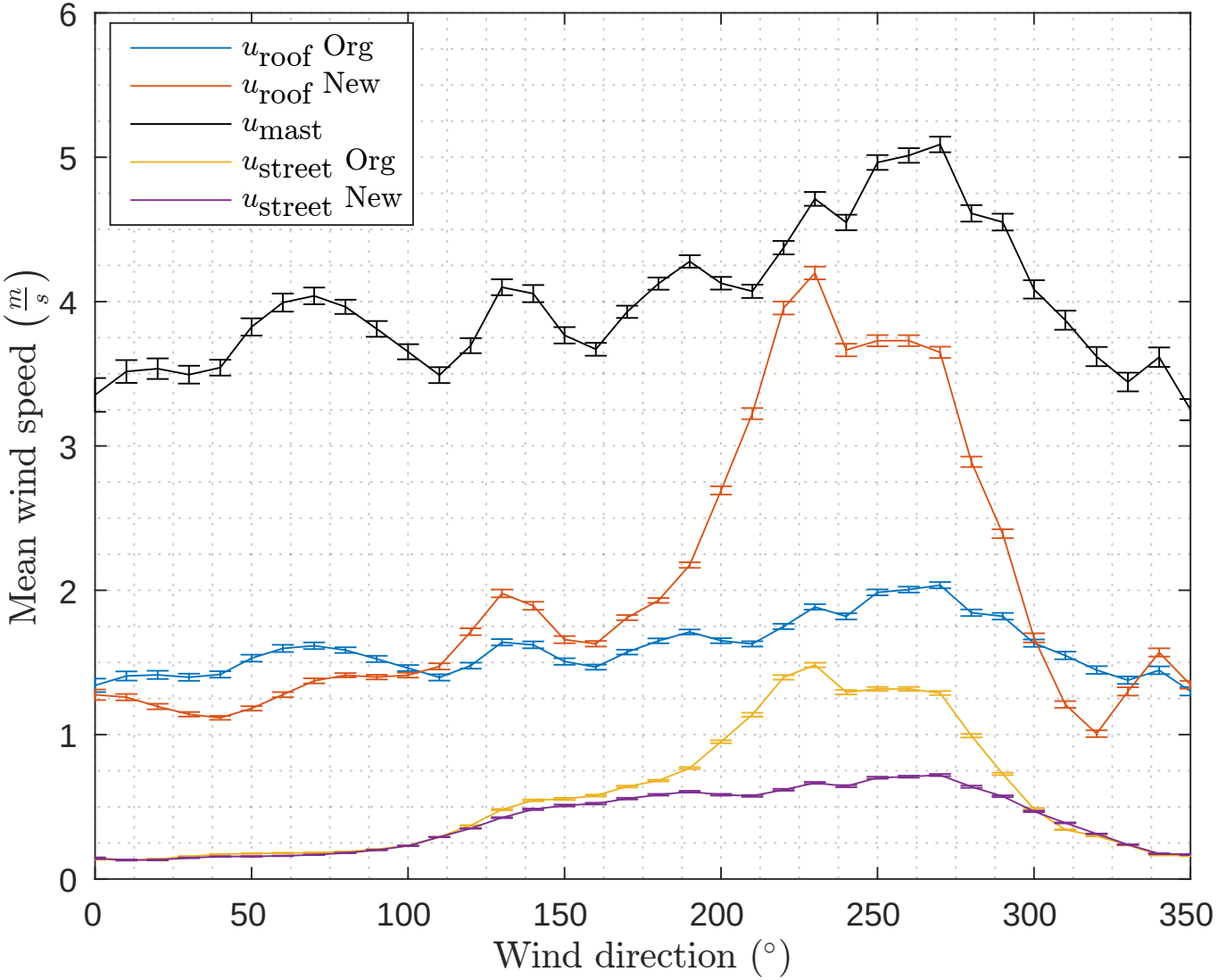
Jagtvej:



Impact of new wind speed model in OSPM

Model comparison:

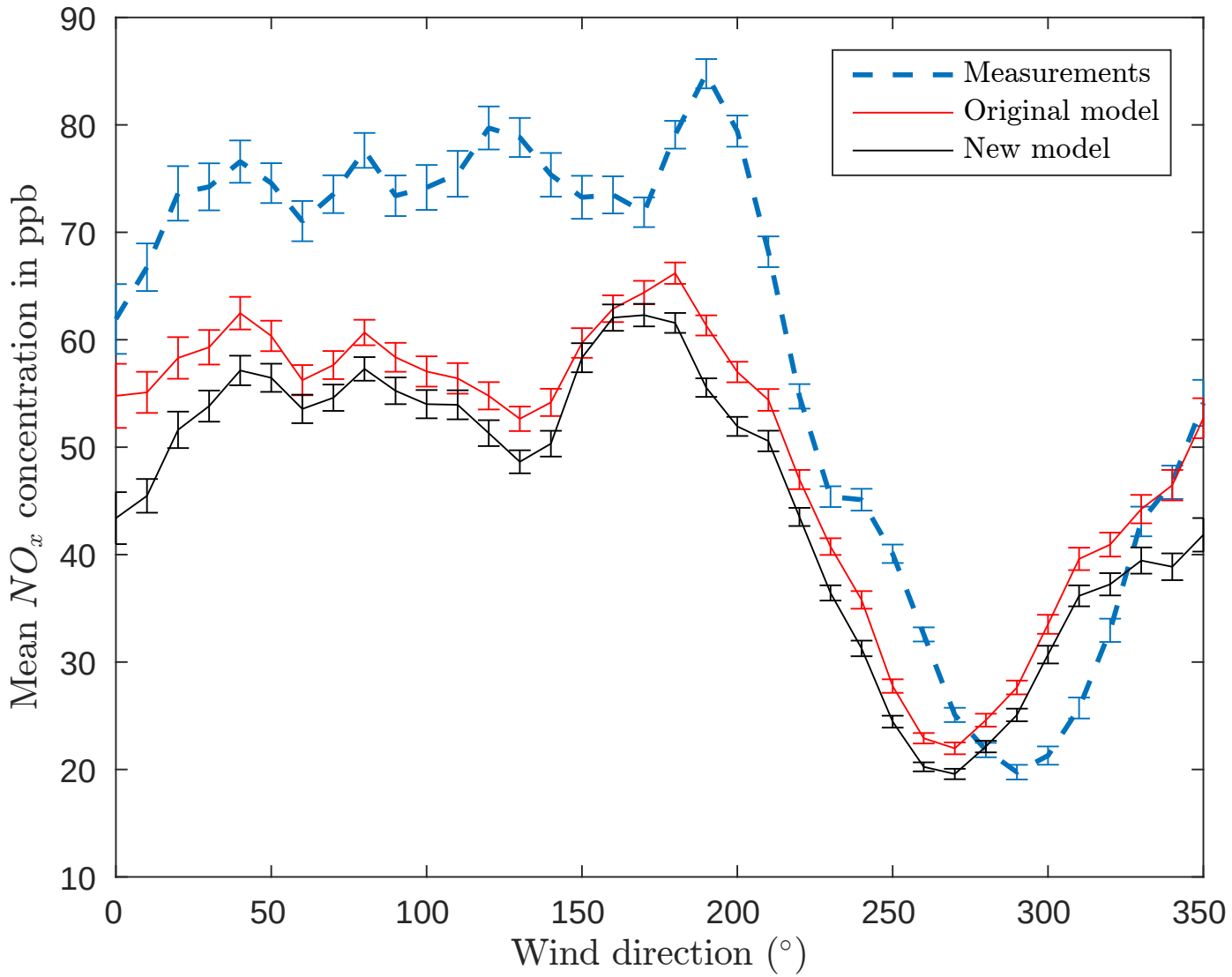
H. C. Andersens Boulevard:



Impact of new wind speed model in OSPM

Concentrations:

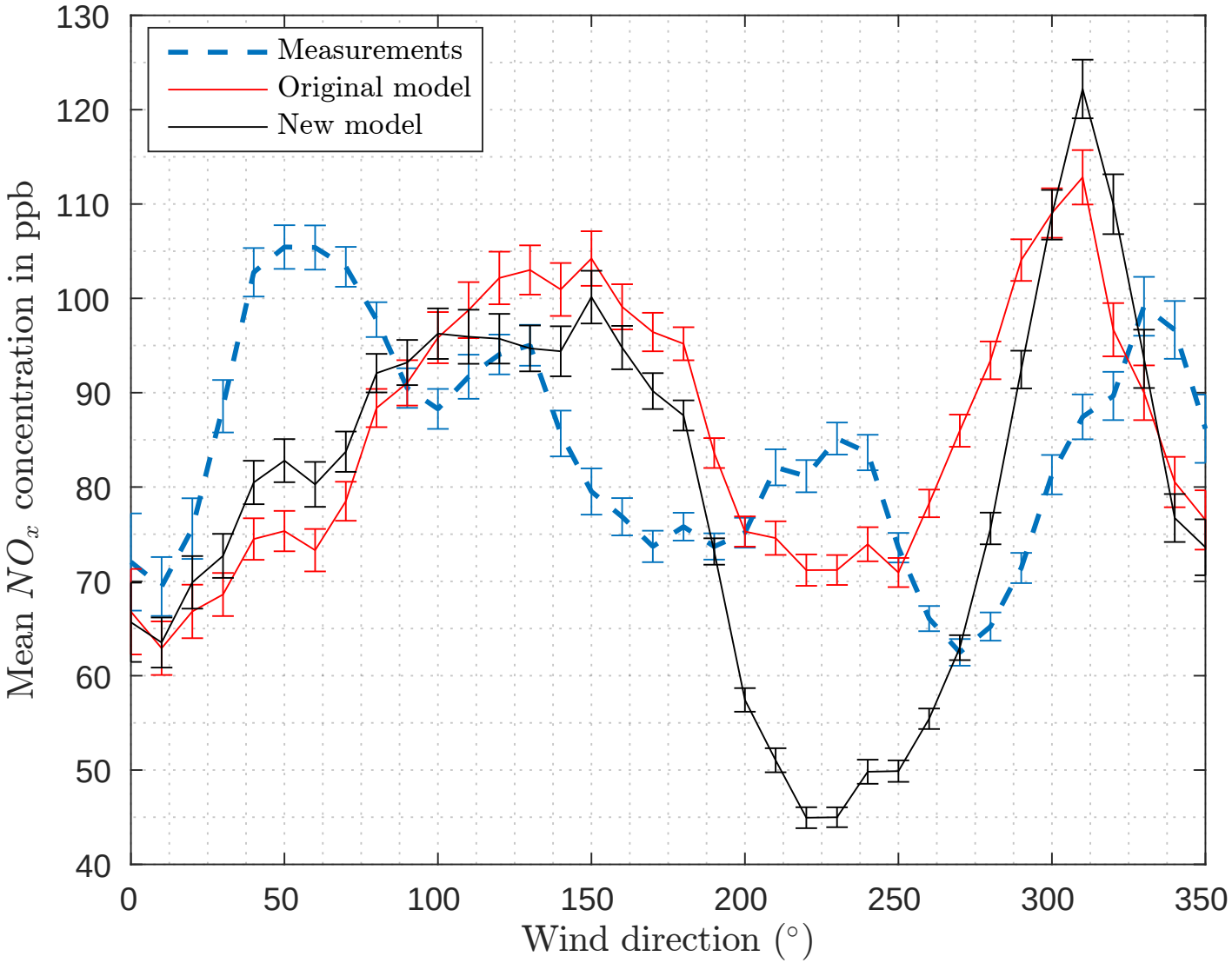
Jagtvej:



Impact of new wind speed model in OSPM

Concentrations:

H. C. Andersens Boulevard:



Summary

- It is to some extent possible to extrapolate the urban wind speed based on a measured wind speed

Summary

- 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

Summary

- 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

Summary

- 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