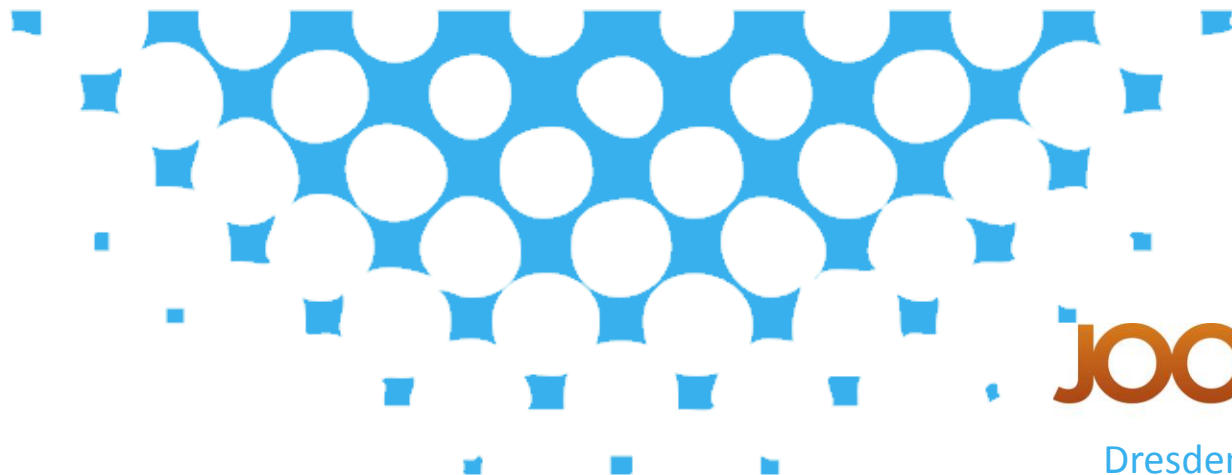


Joaquin

Air quality in Western European cities

Christophe Stroobants & Jeroen Staelens



JOAQUIN

Dresden, 28/11/2014

Outline

- Importance of air quality in cities
- Joaquin project
- Joaquin's cities
- Air pollution in Joaquin's cities
- Conclusions

Importance of air quality in cities

Hans Bruyninckx, EEA executive:

“Air pollution is still high in Europe. It leads to high costs: for our natural systems, our economy, the productivity of Europe’s workforce and most seriously, the general health of Europeans.”

Importance of air quality in cities

Table ES.1 Percentage of the urban population in the EU-28 exposed to air pollutant concentrations above EU and WHO reference levels (2010–2012)

Pollutant	EU reference value	Exposure estimate (%)	WHO AQG	Exposure estimate (%)
PM _{2.5}	Year (25)	10–14	Year (10)	91–93
PM ₁₀	Day (50)	21–30	Year (20)	64–83
O ₃	8-hour (120)	14–17	8-hour (100)	95–98
BaP	Year (1 ng/m ³)	24–28	Year (0.12 ng/m ³)	85–89
NO ₂	Year (40)	8–13	Year (40)	8–13
SO ₂	Day (125)	< 1	Day (20)	36–43
CO	8-hour (10)	< 2	8-hour (10)	< 2
Pb	Year (0.5)	< 1	Year (0.5)	< 1
Benzene	Year (5)	< 1	Year (1.7)	10–12

Colour coding:	< 5 %	5–50 %	50–75 %	> 75 %
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Source: Air Quality in Europe 2014, EEA

41 % of population in predominantly urban region
 On average, PM_{2.5} rural and urban background
 concentrations have remained at the same level from 2006 to
 2012, while a small decline has been observed in
 23 % of population in predominantly rural region
 stations.

Urban + intermediate regions = 77 % of population

Outline

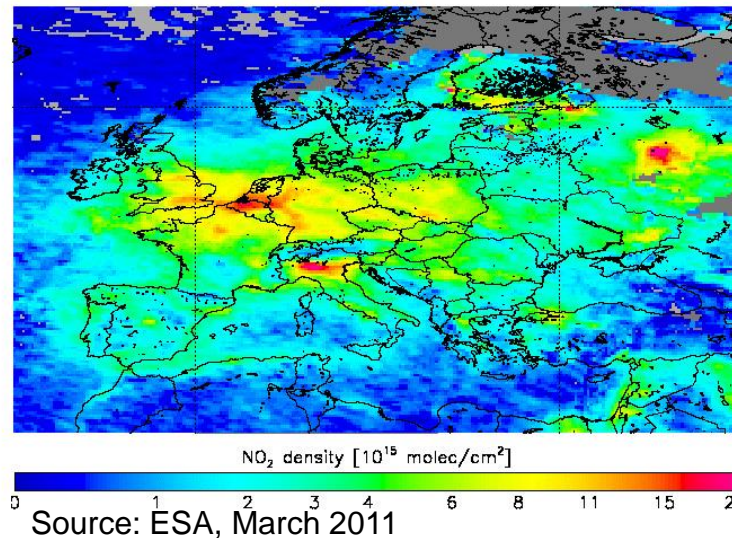
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Joint Air Quality Initiative

4 Belgian partners:	VMM, IRCELINE, Flemish Agency for Health and Care, City of Antwerp
4 Dutch partners:	GGD Amsterdam, Province of North-Holland, RIVM, ECN
6 British partners:	University of Brighton, University of Leicester, Leicester City Council, AirTEXT London, Greater London Authority, Transport for London
2 French partners:	Ecole des Ingénieurs de la Ville de Paris, ATMO Nord-Pas-De-Calais

Joint Air Quality Initiative

- NWE-region is European **hot spot** for air pollution: **PM and NO₂**.



- 430 000 **premature deaths** in EU-28 by **long-term exposure** to PM_{2,5}
- 180 000 premature deaths in **Belgium, France, Germany, The Netherlands and United Kingdom**

Joint Air Quality Initiative

- **UFP, PN, EC/BC** are believed to be better indicators towards health than NO_2 and PM_{10} .
- **These pollutants are currently not monitored systematically** in the NW European region
 - Data on the **spatial distribution** of UFP, PN, BC/EC is missing

Joaquin project

Joaquin

Measurements

Data & information

Increase knowledge

Provide evidence

Measures

Identify, pilot & evaluate

Rank measures

Best practices

Communication

Stakeholder consultation

Raising awareness

Support base

Joaquin project - Joaquin's cities

Leicester

London

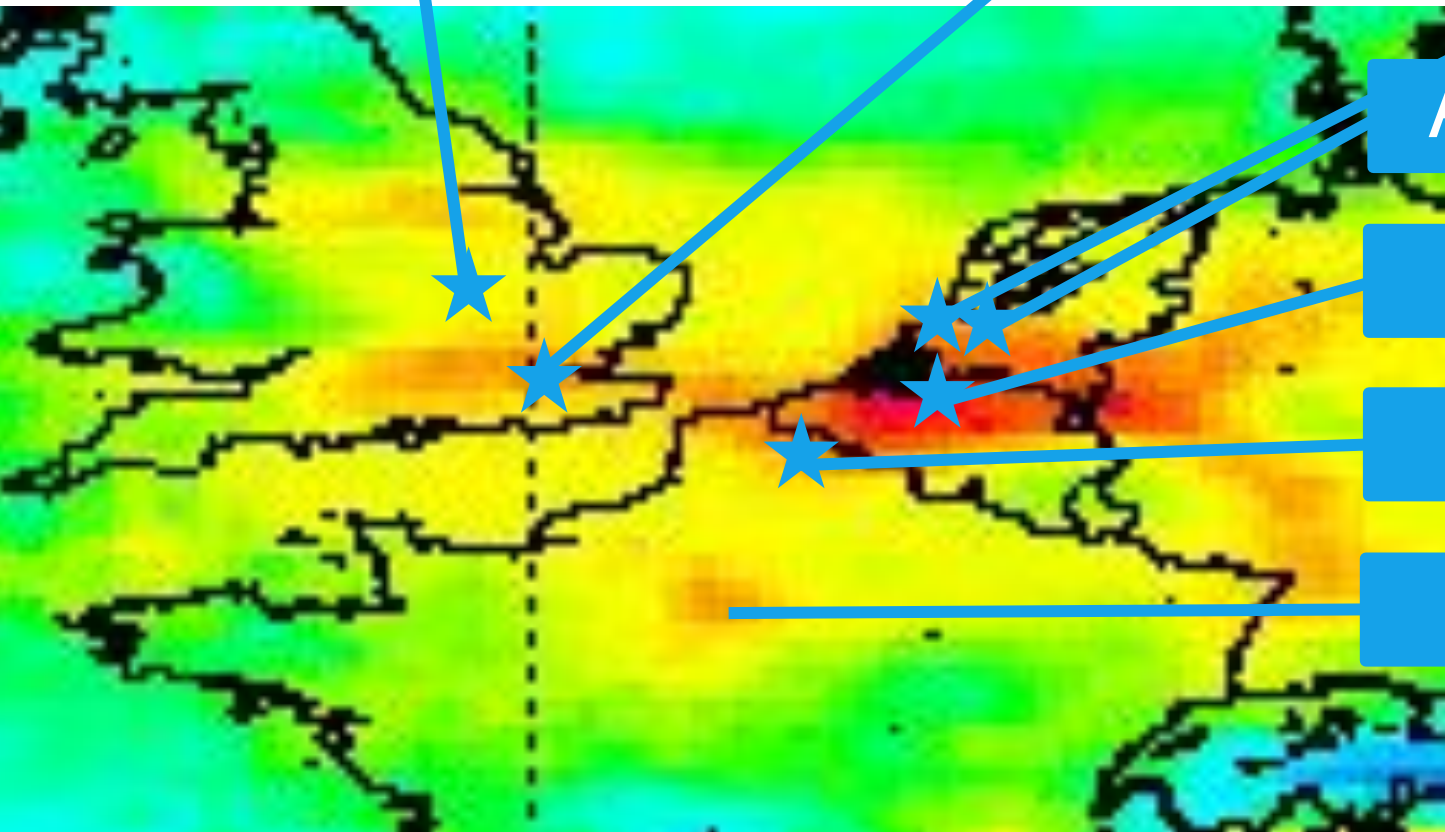
Wijk aan Zee

Amsterdam

Antwerp

Lille

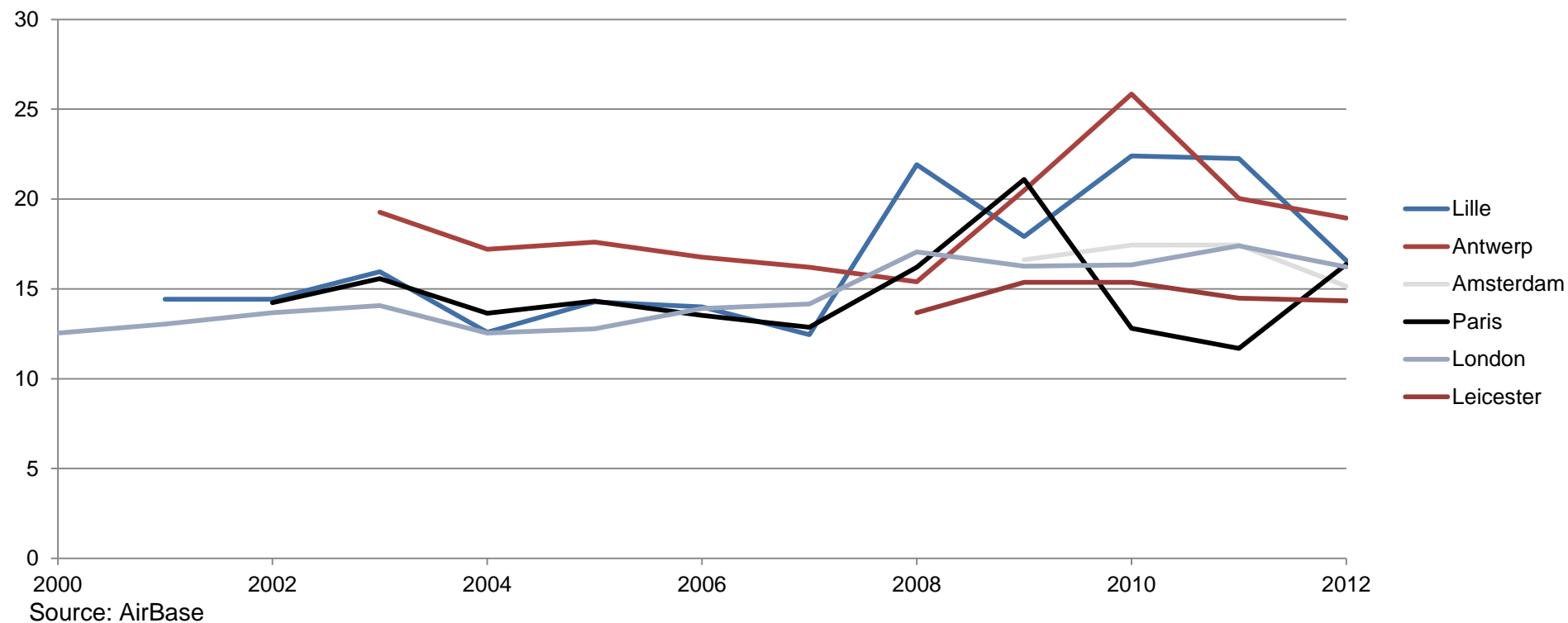
Paris



Source: ESA, March 2011

Air pollution in Joaquin's cities

Annual mean PM_{2,5} concentration

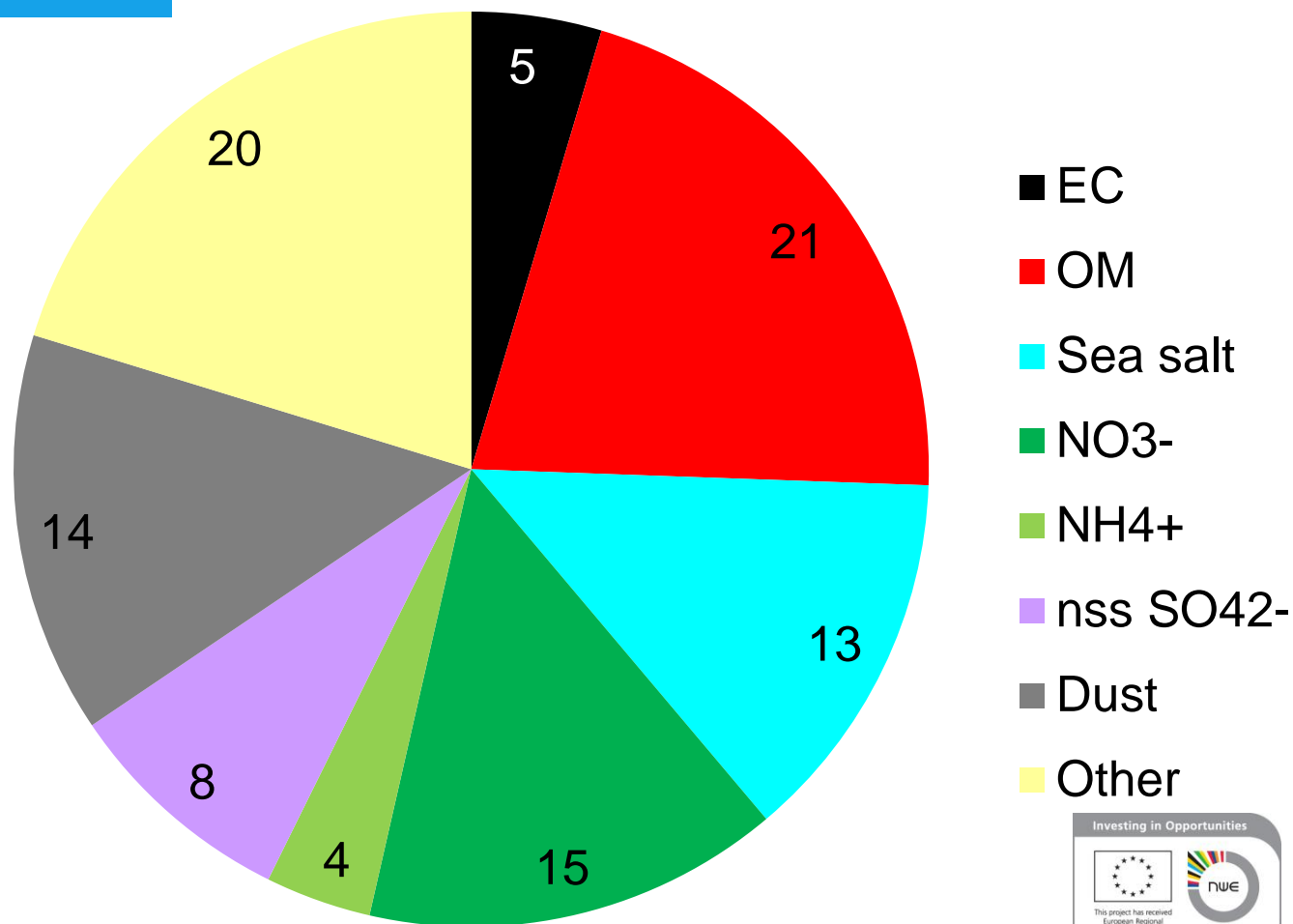


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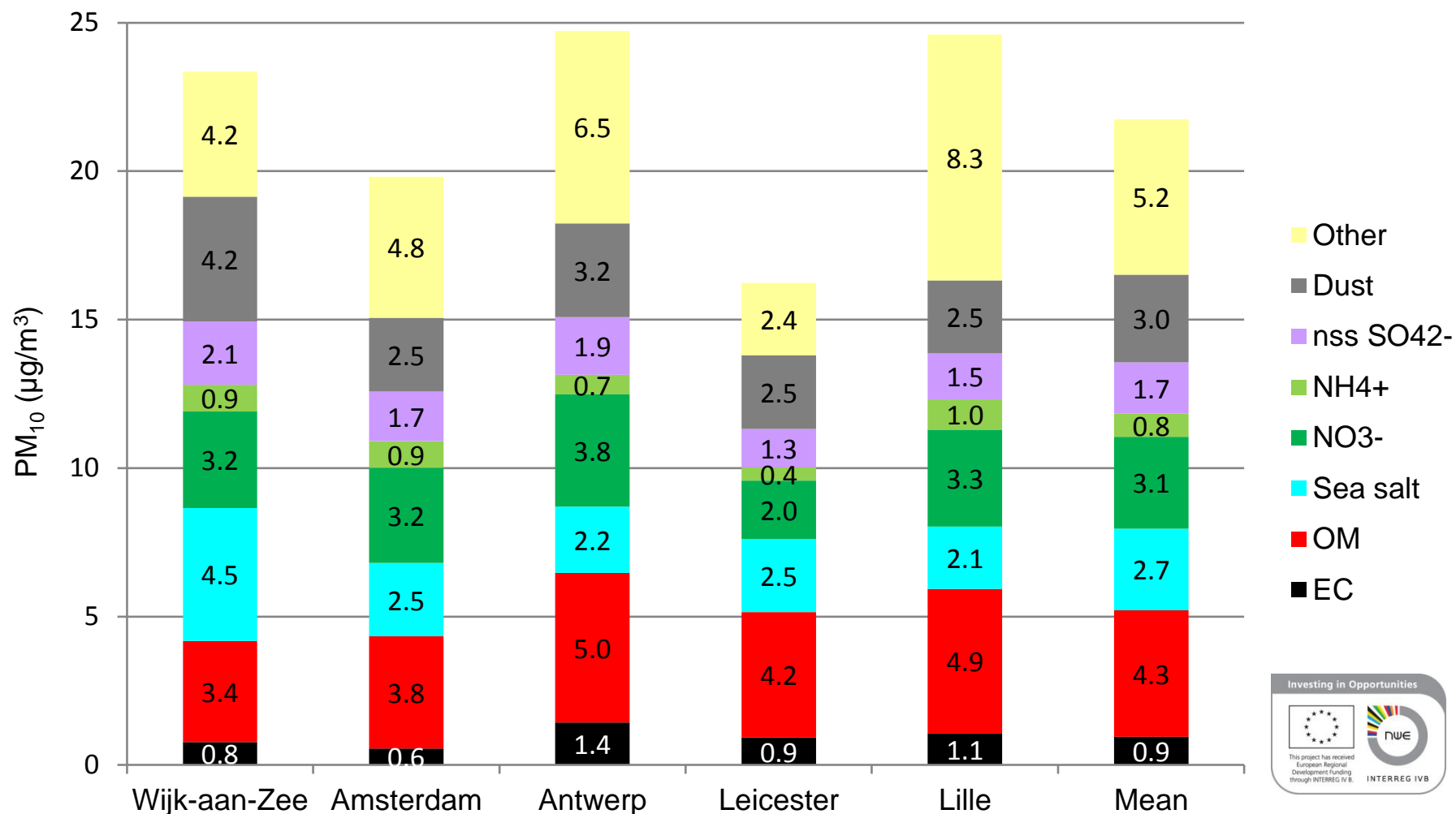
Air pollution in Joaquin's cities – General

Mean PM₁₀ composition



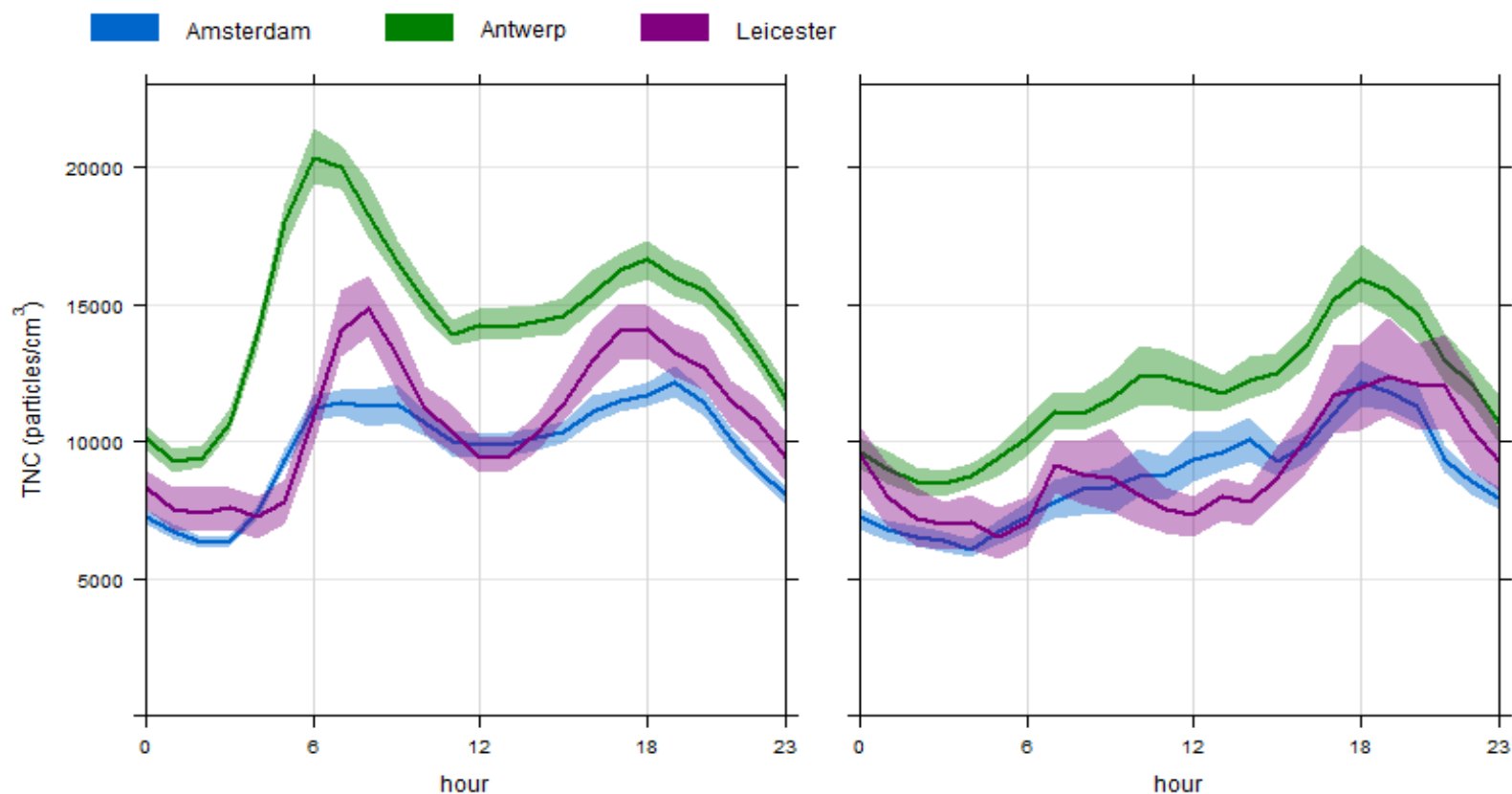
Air pollution in Joaquin's cities – General

PM₁₀ composition per site



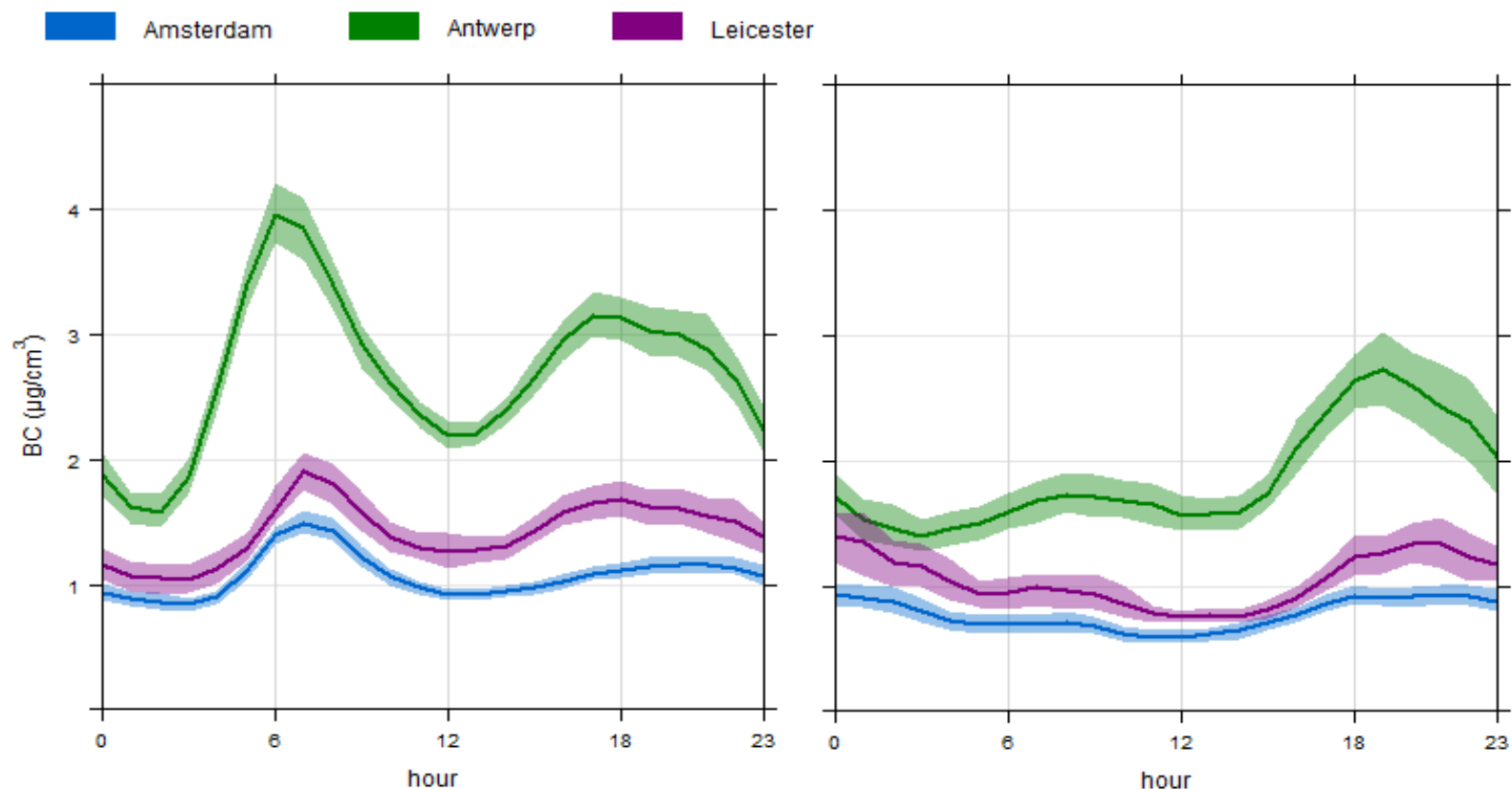
Air pollution in Joaquin's cities – General

Day profile Total Number Concentration



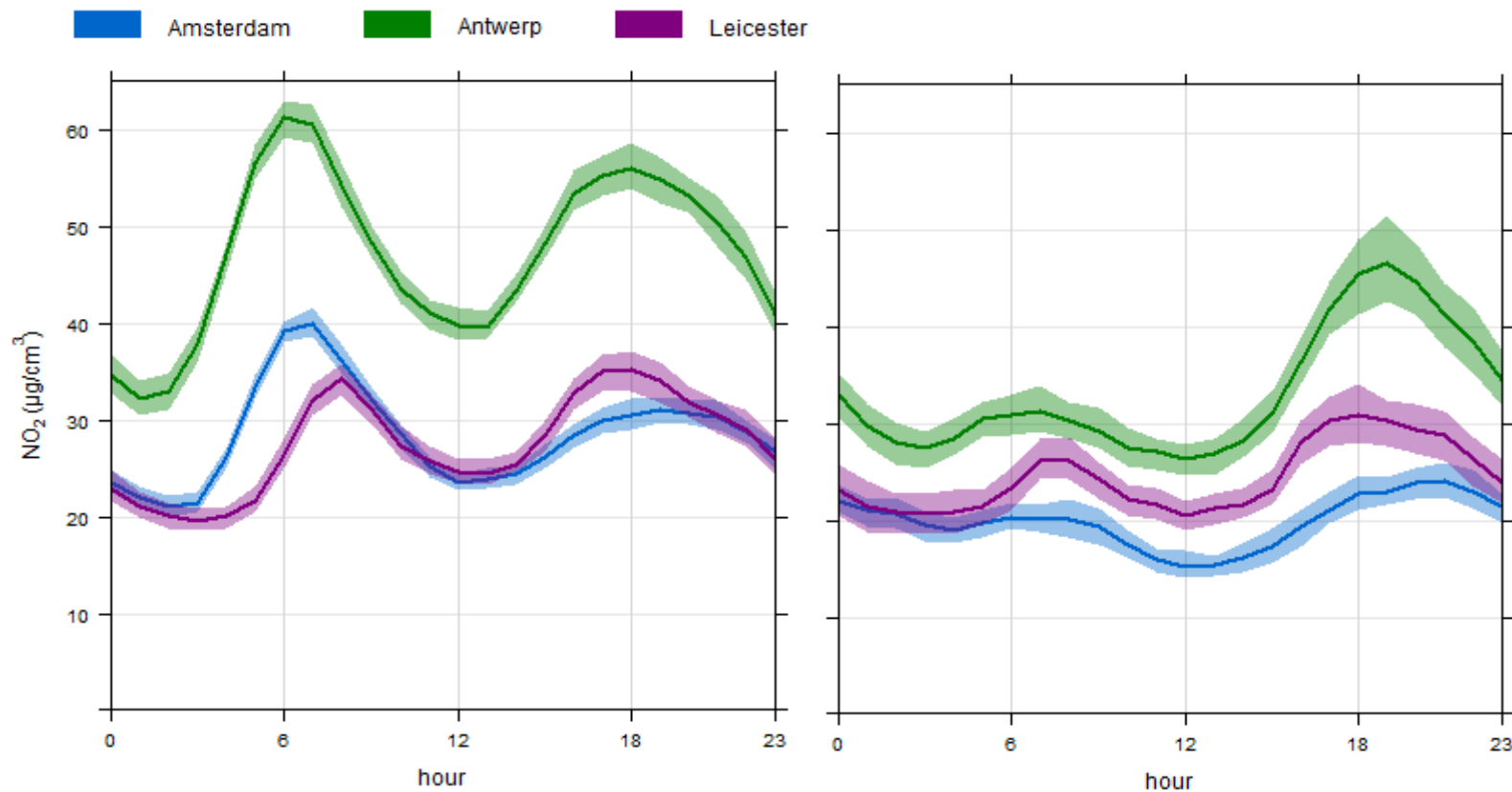
Air pollution in Joaquin's cities – General

Day profile BC concentration



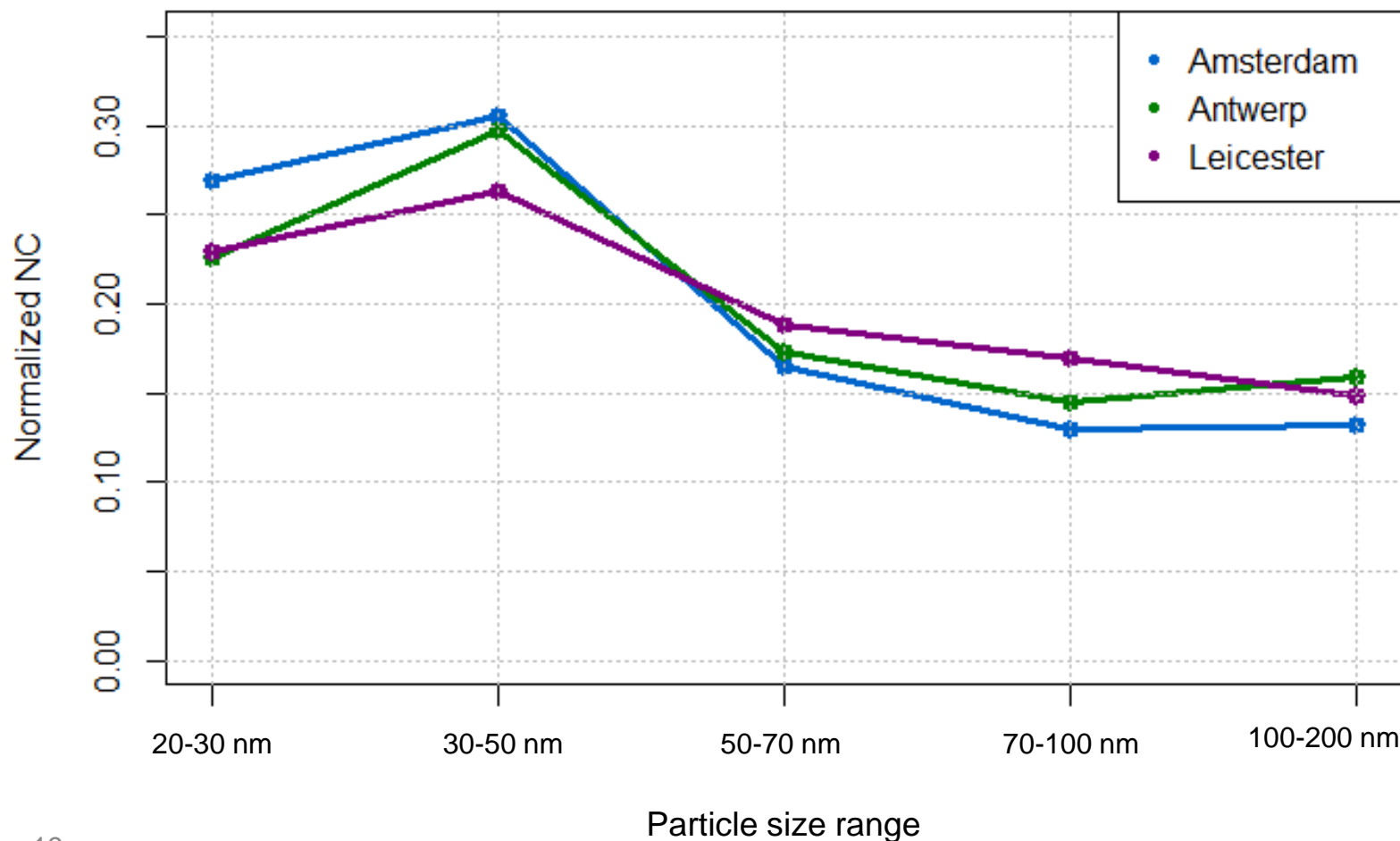
Air pollution in Joaquin's cities – General

Day profile NO₂ concentration



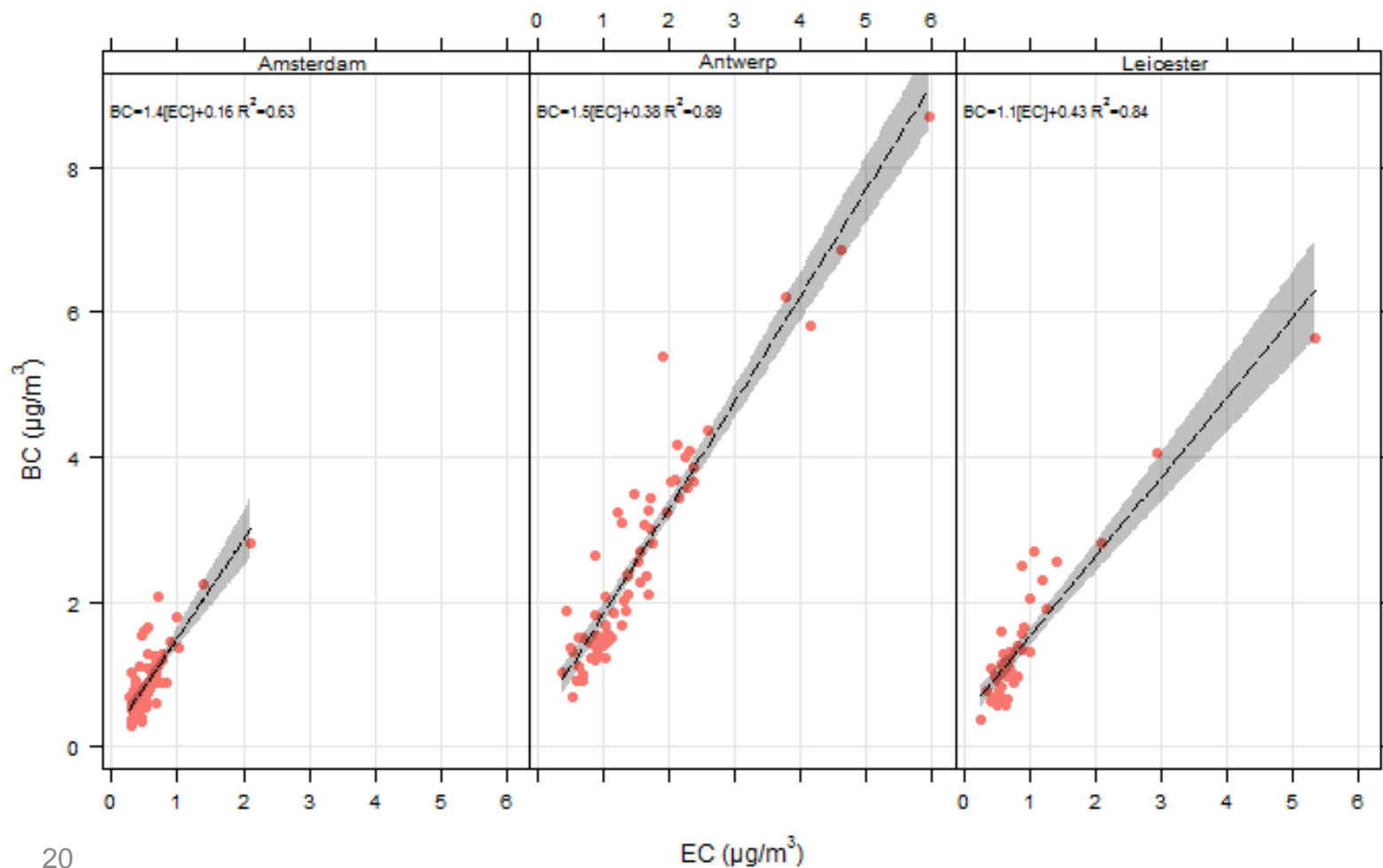
Air pollution in Joaquin's cities – General

Mean size distribution



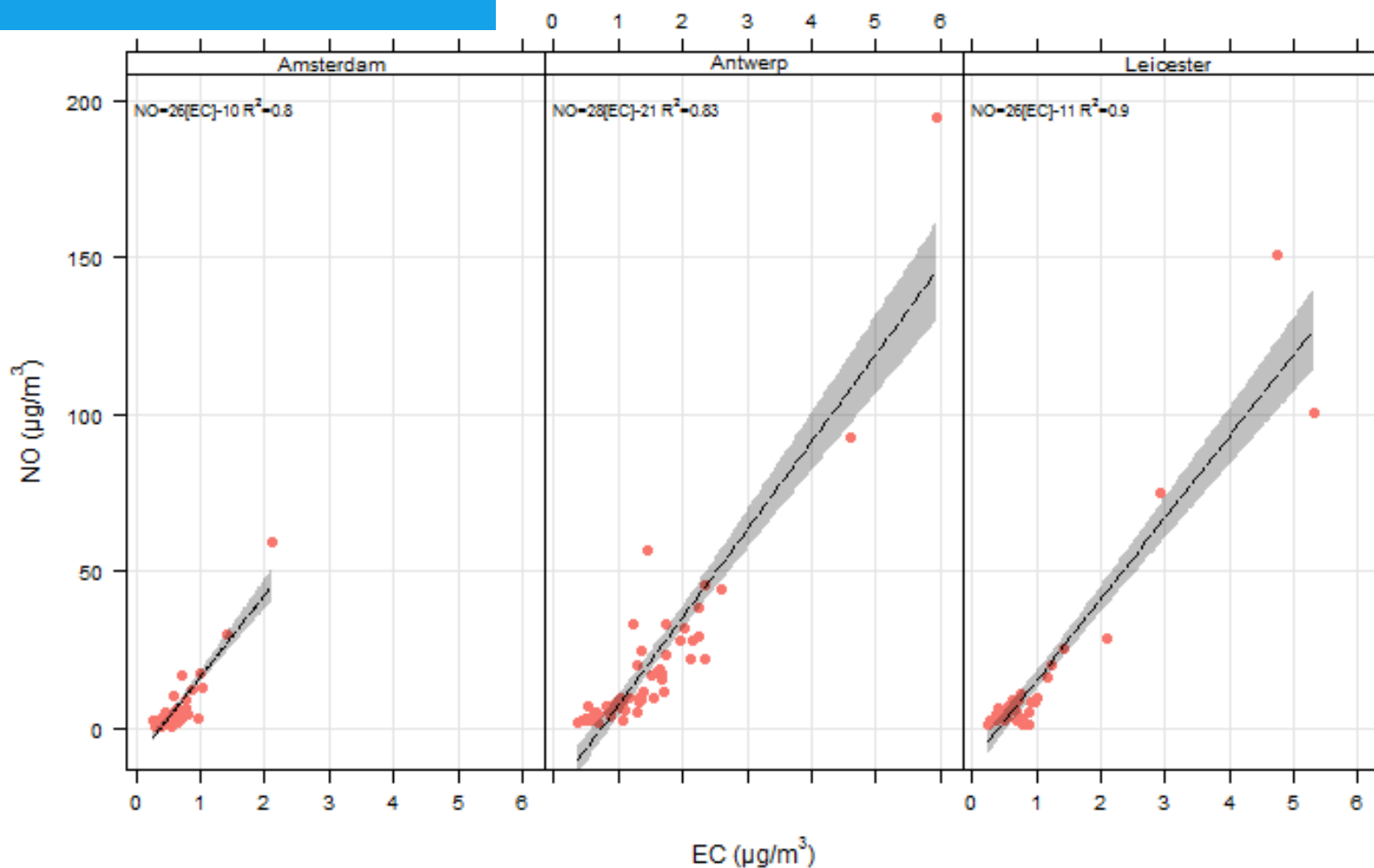
Air pollution in Joaquin's cities – Correlations

EC vs. BC



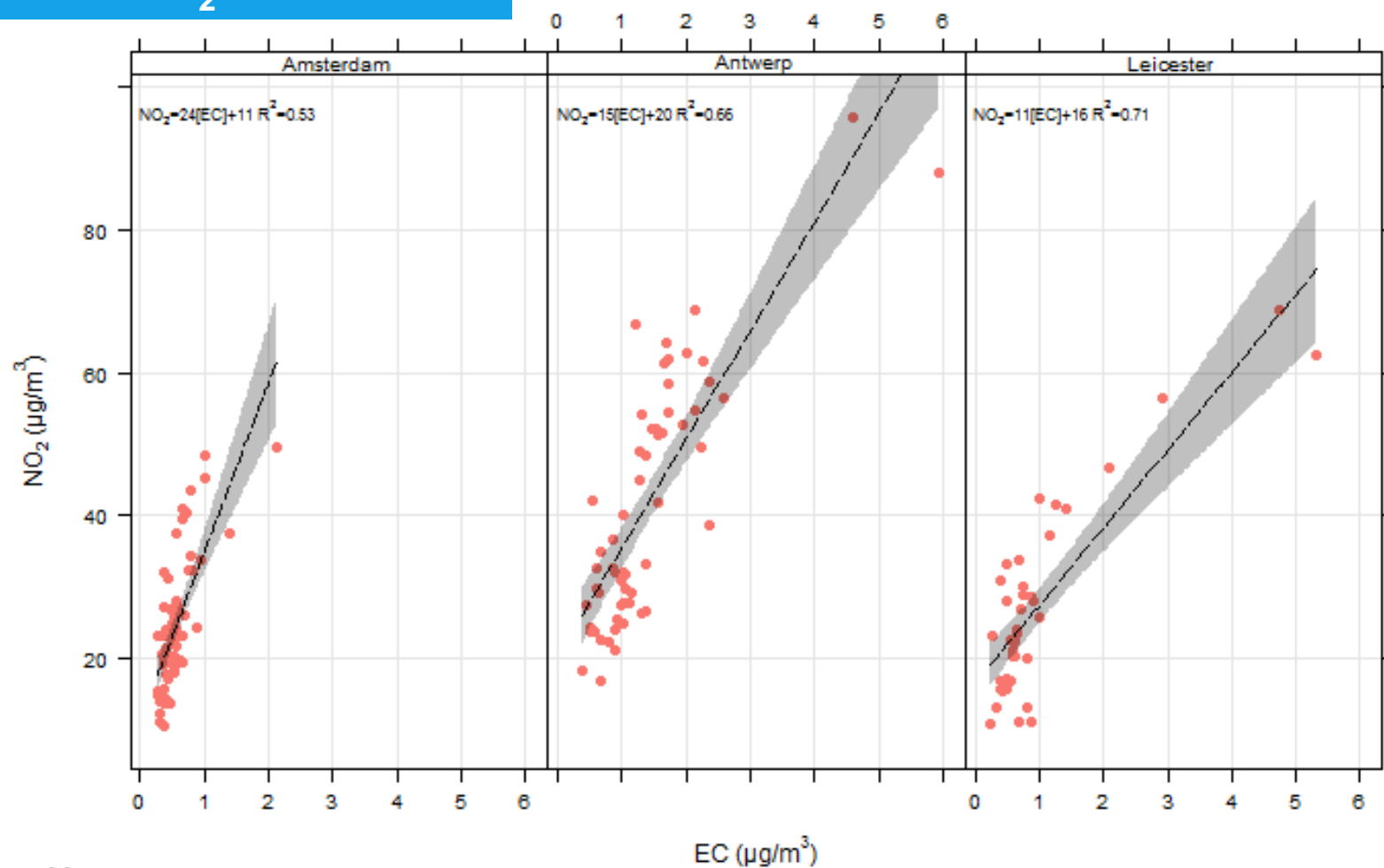
Air pollution in Joaquin's cities – Correlations

EC vs. NO



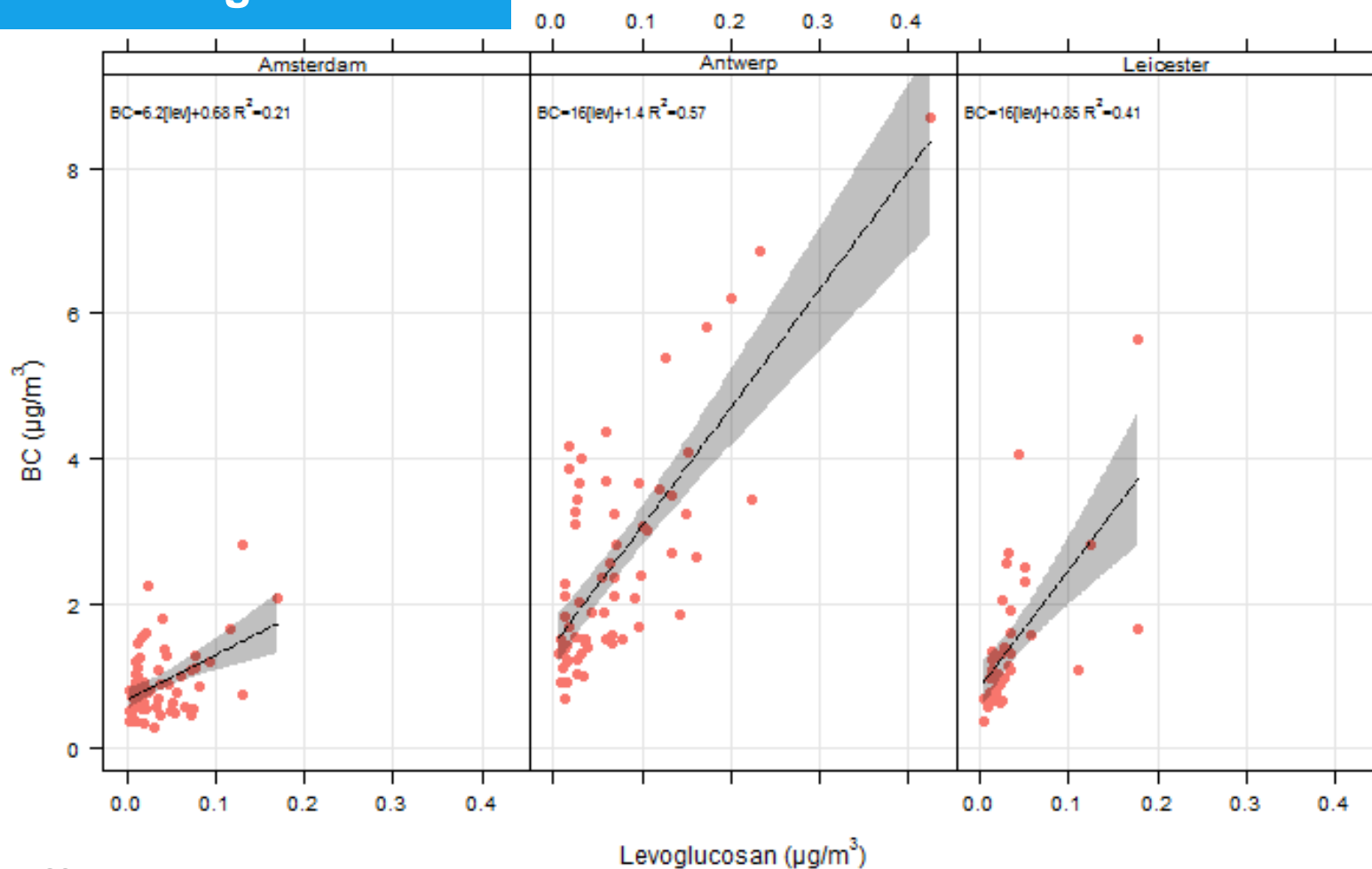
Air pollution in Joaquin's cities – Correlations

EC vs. NO₂



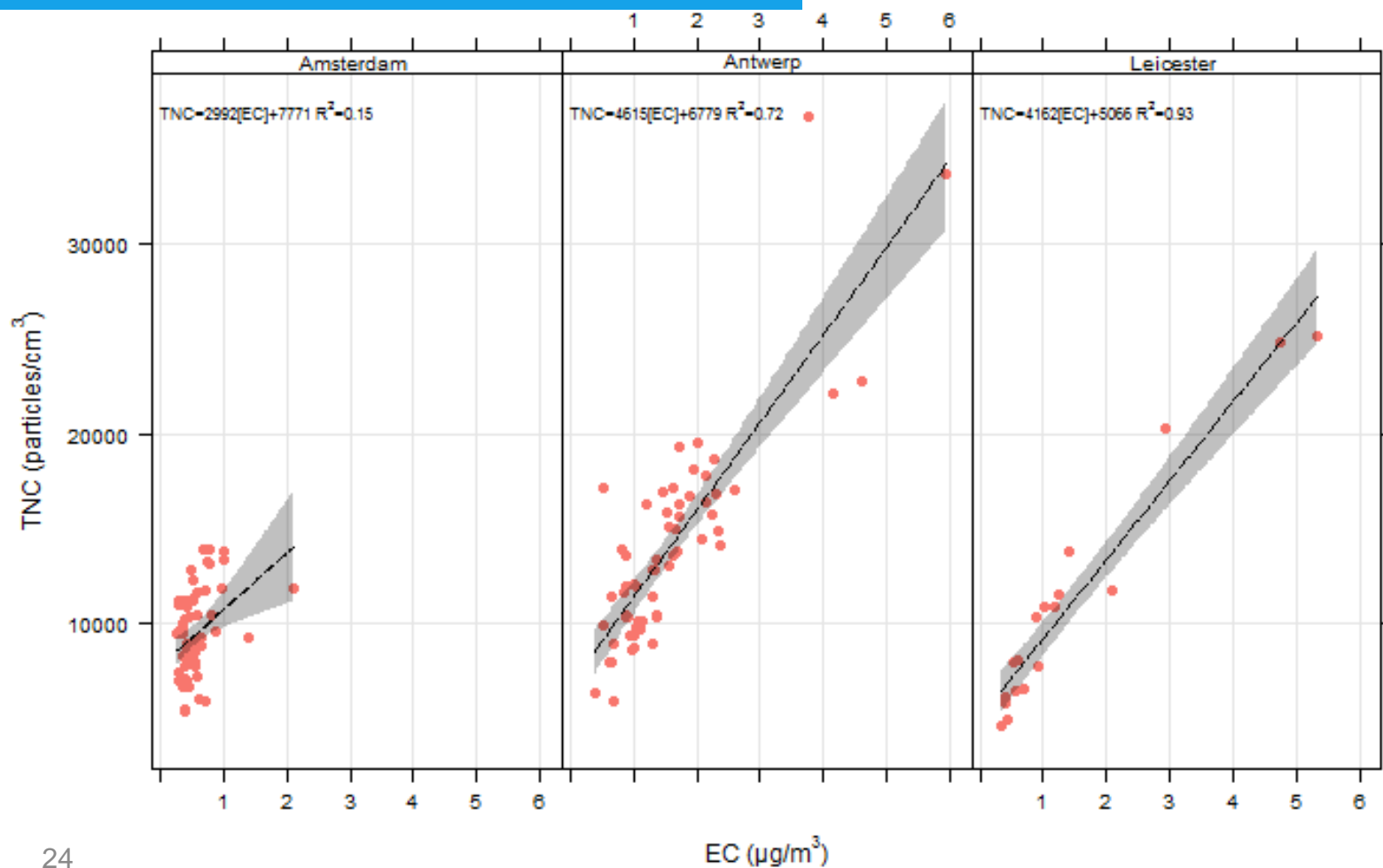
Air pollution in Joaquin's cities – Correlations

BC vs. levoglucosan



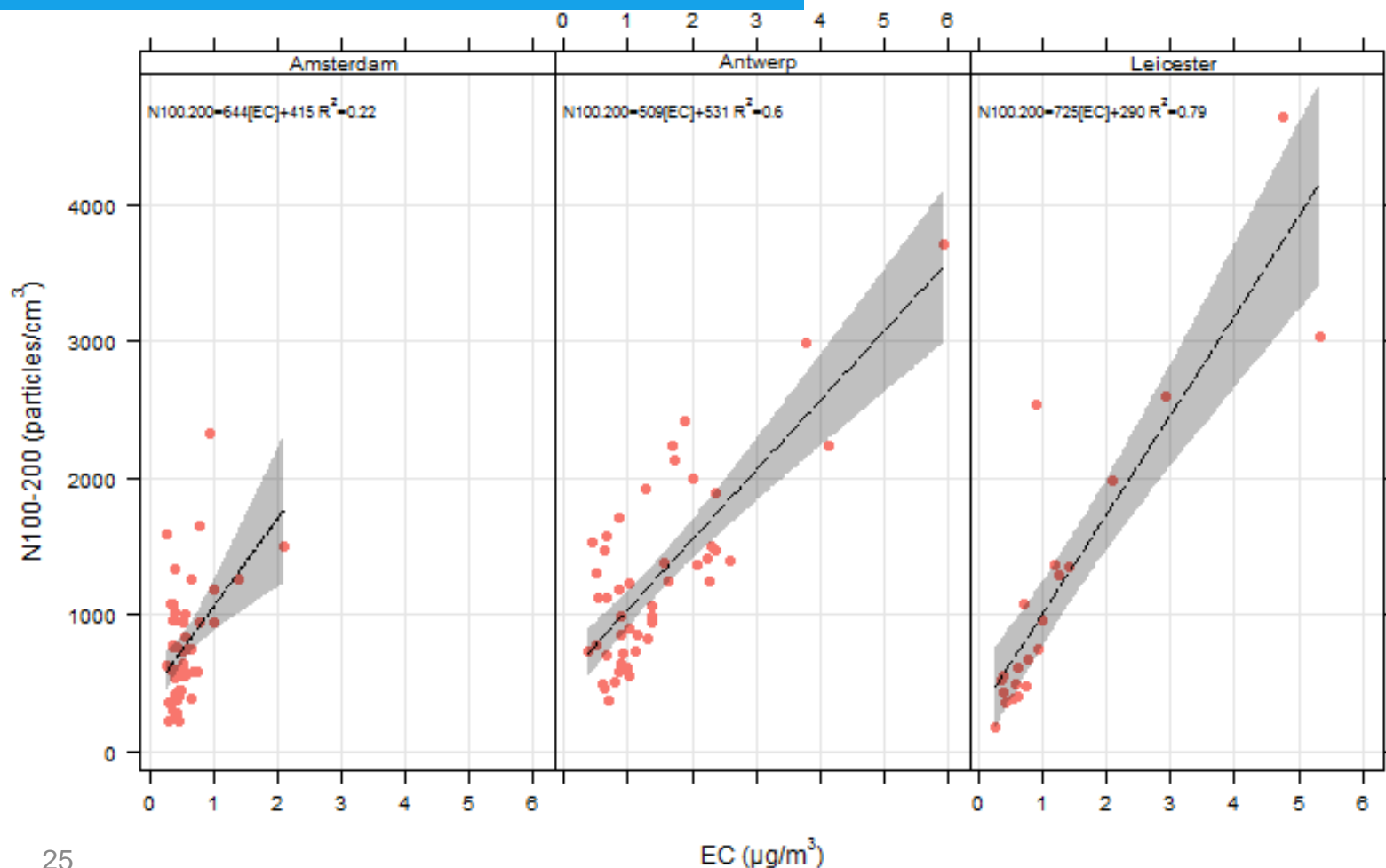
Air pollution in Joaquin's cities – Correlations

EC vs Total Number Concentration



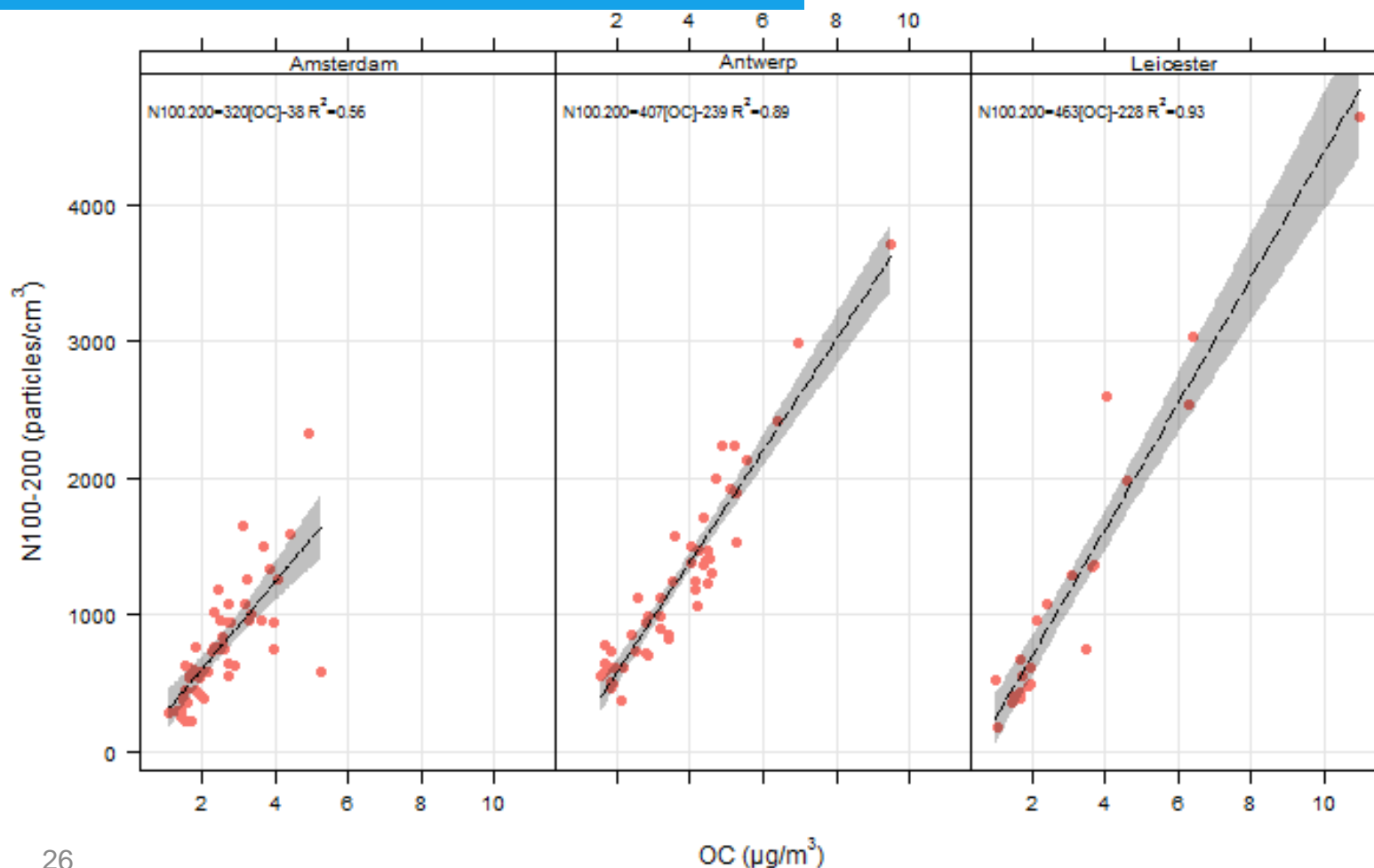
Air pollution in Joaquin's cities – Correlations

EC vs size class 100-200nm



Air pollution in Joaquin's cities – Correlations

OC vs size class 100-200nm



Conclusions

1. Working ultrafine particle monitors integrated in networks
2. Strong correlation between EC-BC; EC and larger particles
3. Valuable information in variation between cities
4. Unique possibility to combine PM composition and UFP data in source apportionment
 - ➔ clear statements on sources and relative contributions in near future
5. Basis for policy makers to make better informed choices
6. High added value of transnational cooperation to obtain these results
7. **Joaquin end conference in Amsterdam first two weeks of June**

**Thank you for your
attention!**