



National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

Trends in NO₂ and PM₁₀ concentration in the Netherlands

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Quality

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Measurement Locations National Air quality network (RIVM)

Rural
Urban Background
Street (traffic)



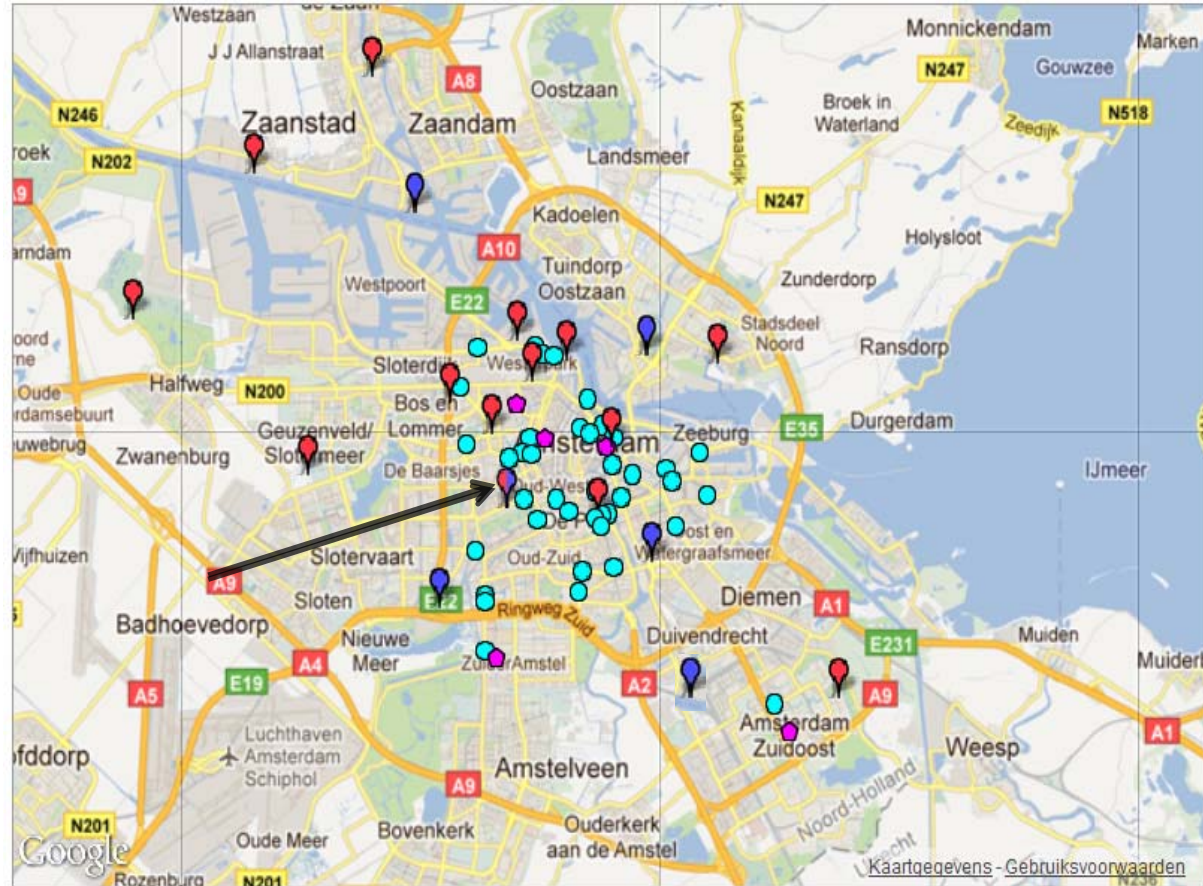


Amsterdam (most populated Dutch city)



GGD-Amsterdam
RIVM

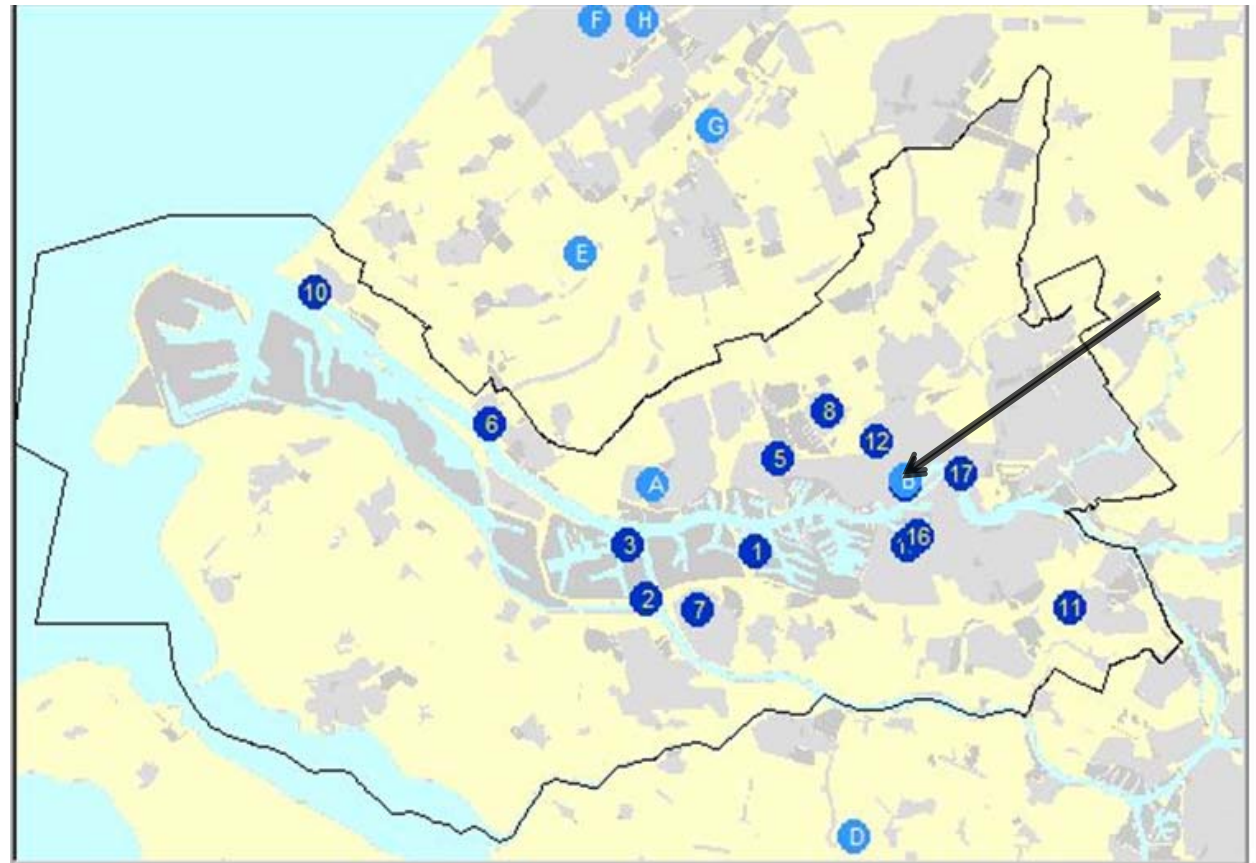
(circles are palmes tubes)





Rotterdam
(Harbour and
industry)

1-17 DCMR
A-H RIVM





Why a combined trend analyses?

- Combining data from different monitoring networks gives larger set
- A combined data analyses prevents confusing results like:

Dutch History

- GGD Amsterdam : “concentrations are **not** decreasing since 1999”
- DCMR Rotterdam : “concentrations are decreasing since 2004 ”
- RIVM (national) : “**no** significant decrease since 2000”

Technical comparabilty assured by paralel measurements and agreements.
This study wants to assure the comparabilty in the statistical analysis.



Number of stations

Type station	NO _x	PM ₁₀
Rural	22 (all RIVM)	17 (all RIVM)
Urban background	11 (6 RIVM, 2 GGD, 3 DCMR)	10 (6 RIVM, 1GGD, 3 DCMR)
Street	17 (10 RIVM, 4 GGD, 3 DCMR)	16 (12 RIVM, 2 GGD, 2 DCMR)
Total	50	43

3 periods (1993-2010, 1999-2010 and 2004-2010)

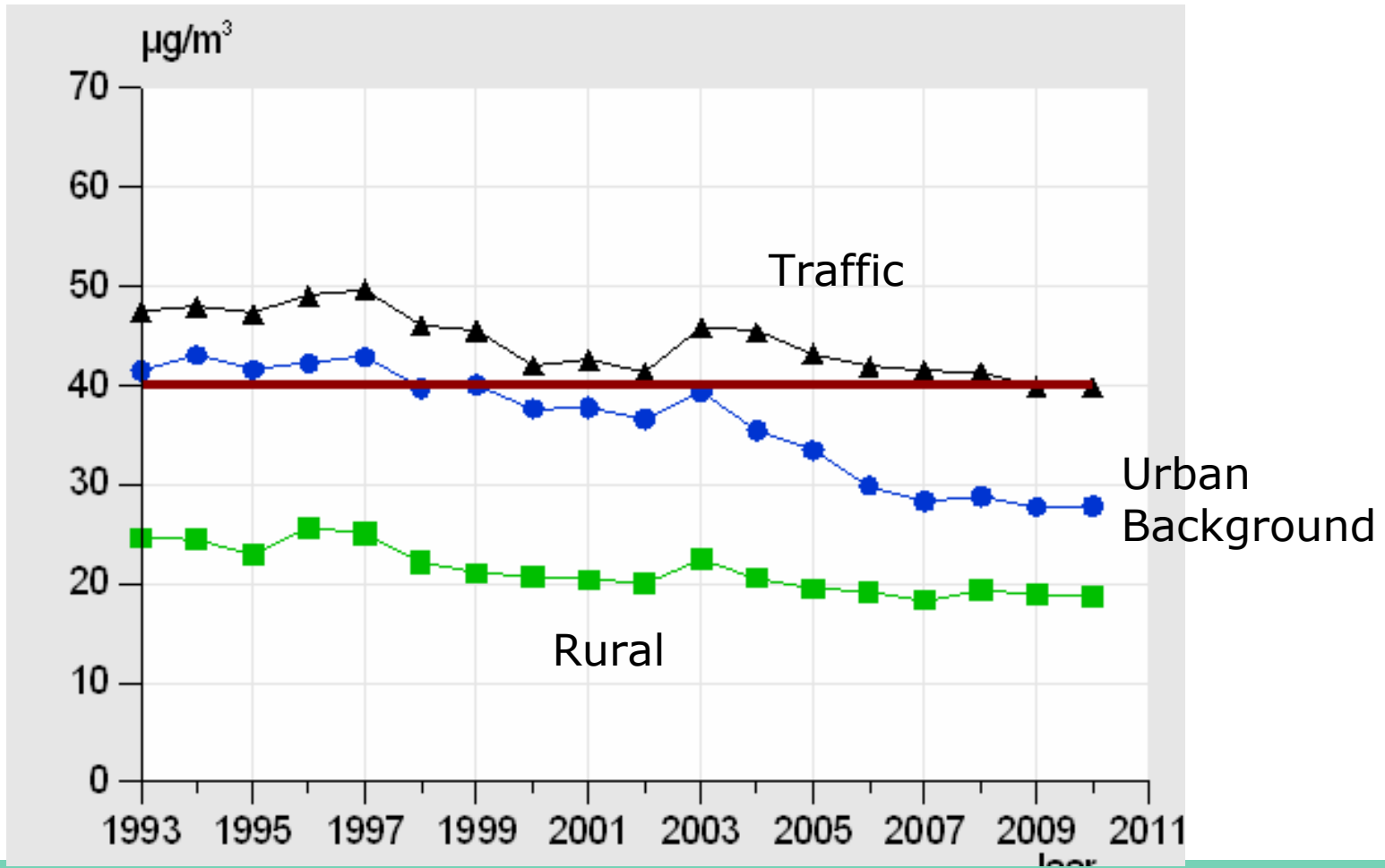
In general smaller periods include more stations

Only stations included sufficient data availability (>75 %)

Trend analyses on the annual averaged data

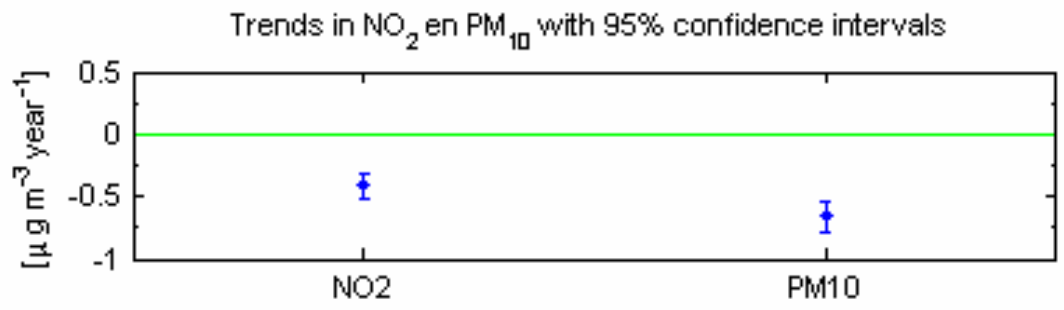
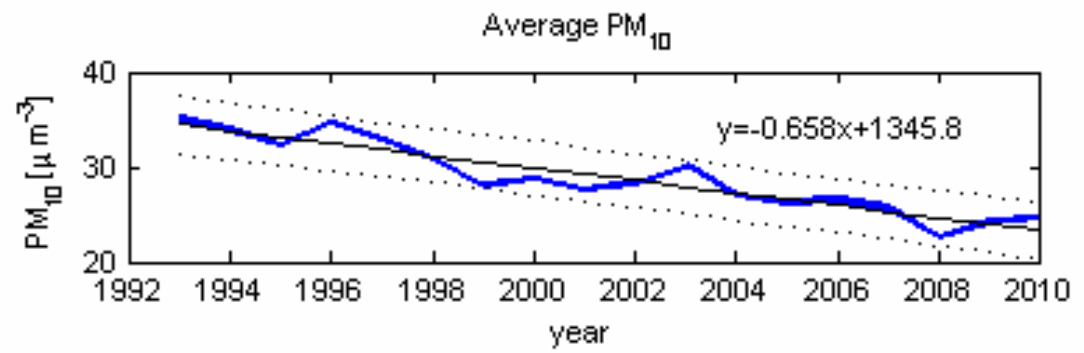
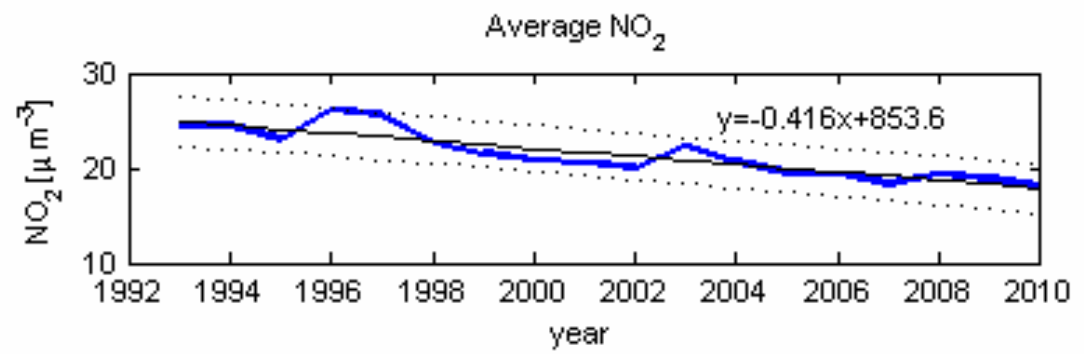


NO₂





Rural 1993-2010



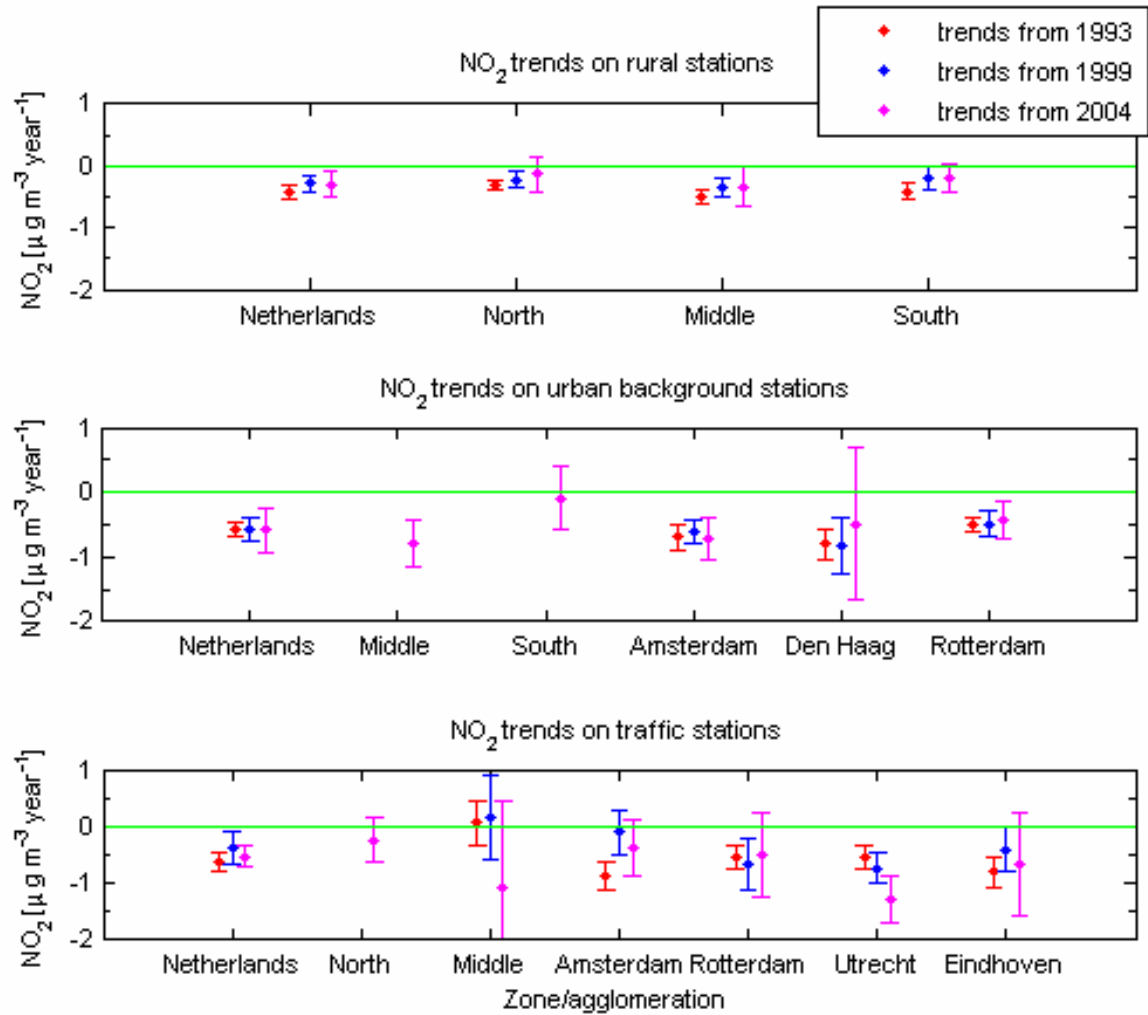


NO₂

Whole set: Small decreasing trend
($0.5 \pm 0.2 \mu\text{g}/\text{m}^3 \text{ /year}$)

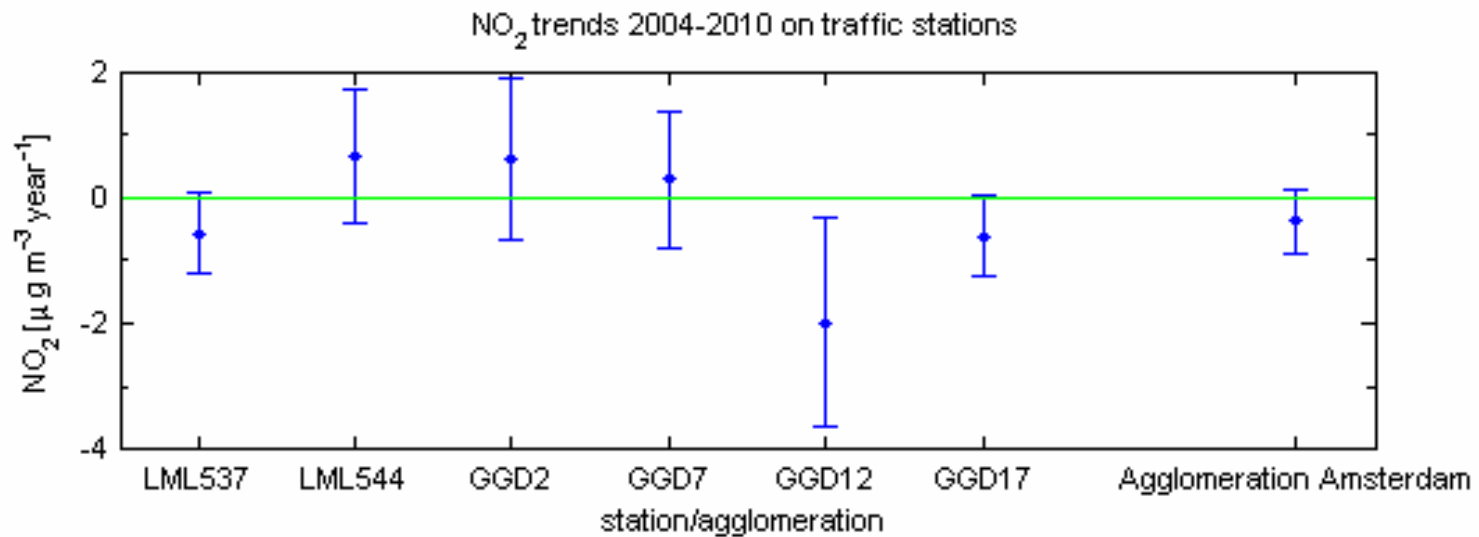
2010: 7 stations > 45 $\mu\text{g}/\text{m}^3$
In 2015, this decrease > 40 $\mu\text{g}/\text{m}^3$

No proof for different trends for different zones/agglomerations





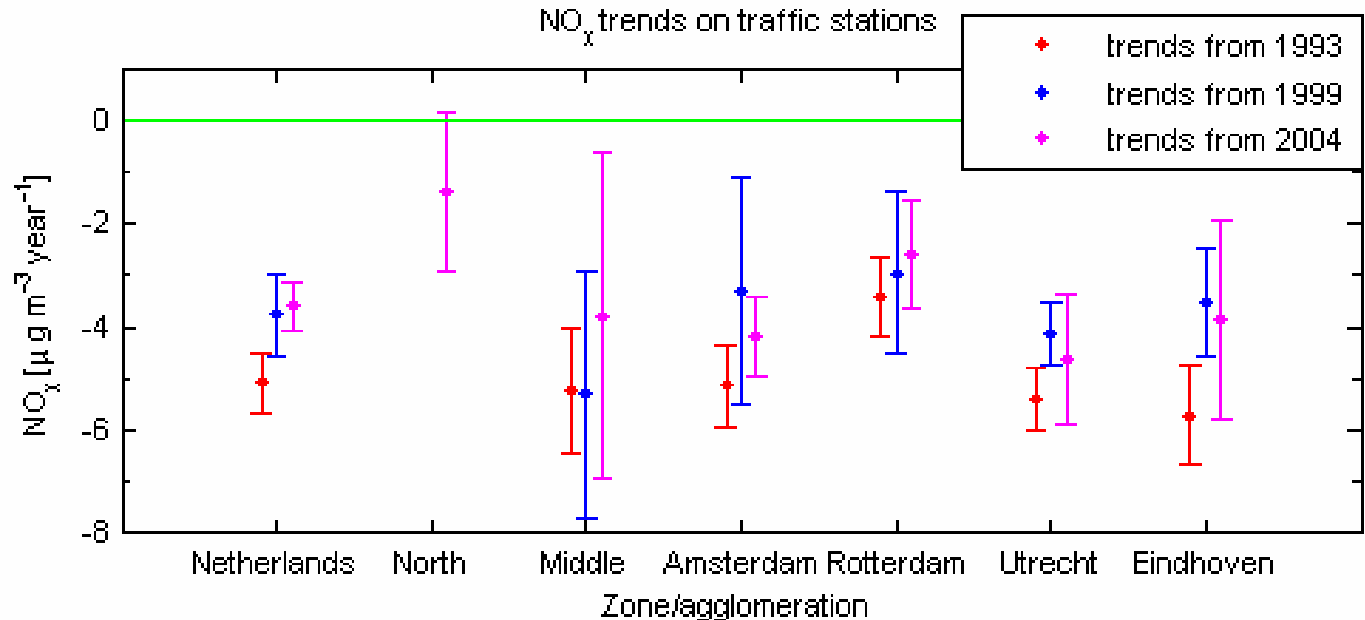
Amsterdam



Local differences in one city. May be due to differences in the traffic development etc.



No_x in the street



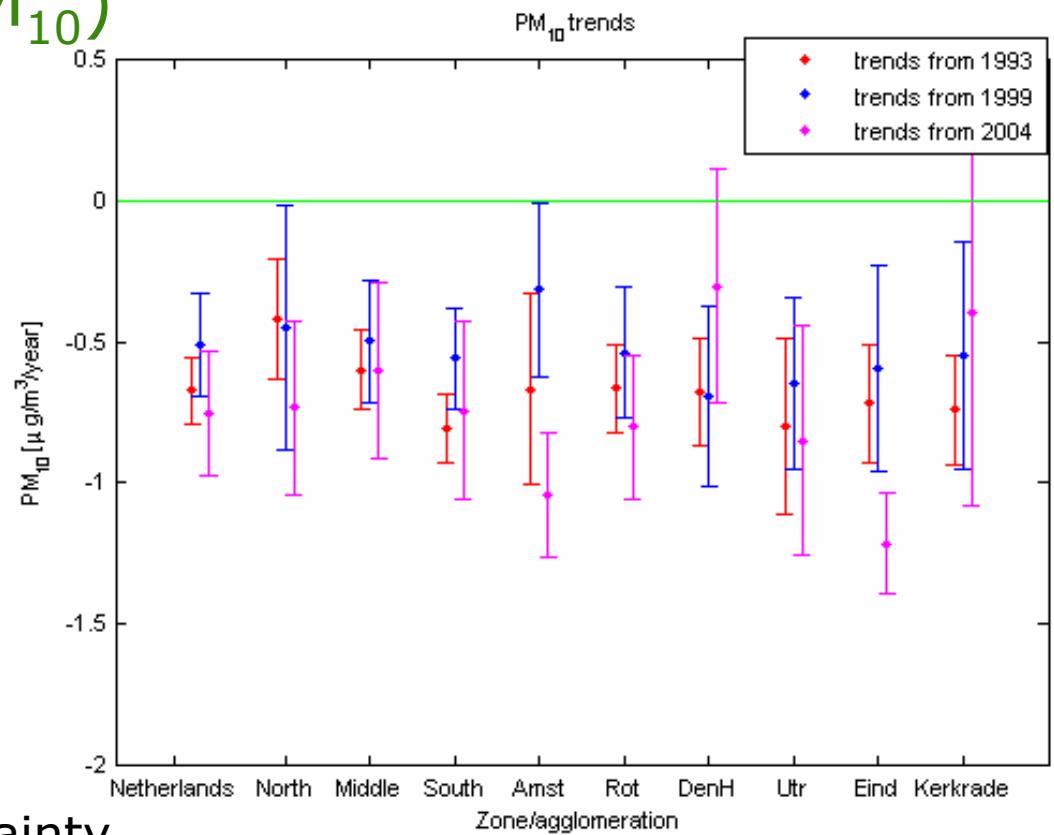
Decrease NO_x >> decrease NO₂

Explanation: traffic emission used to be NO/NO₂ = 95/5

Today more like 80-90/10-20



Particulate matter (PM₁₀)



Longer period: smaller uncertainty
More stations: smaller uncertainty
Regional differences not significant



PM10 situation 2010

- no exceedances measured (both for annual average as for the number of exceedance days)
- downward trends
- PM10 problem solved?

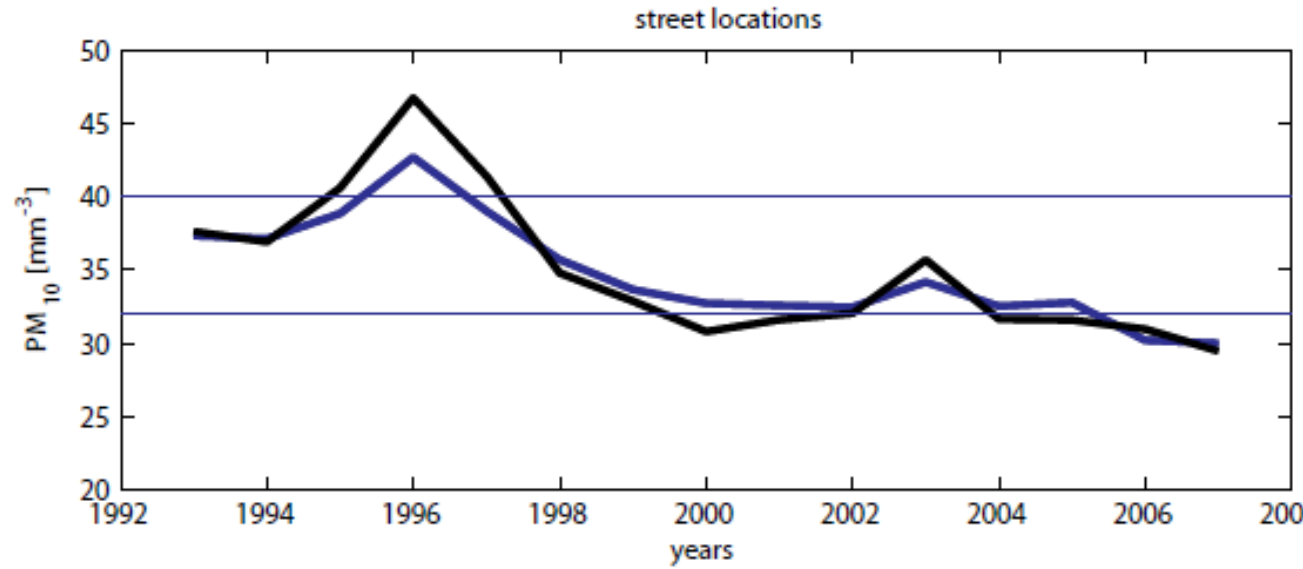
2 remarks

- In model calculations much more locations (> 300000) with a few exceedances
- Large yearly variation due to the weather conditions (note 2011 levels up to now are higher)

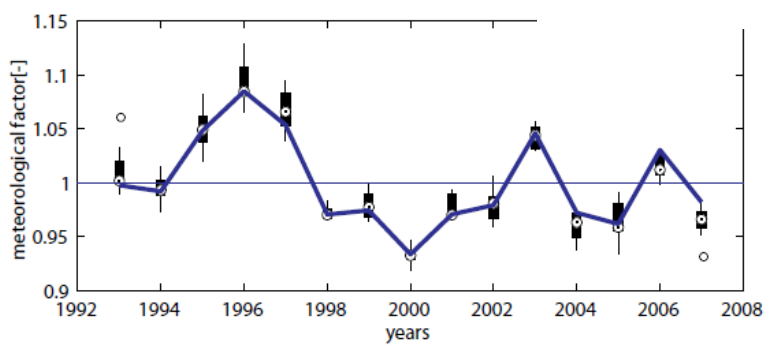


Metrological effects on PM₁₀

Normalisation by multivariate model reduces the uncertainty in the trend with 36%



— Uncorrected data
— Meteorologically normalised data



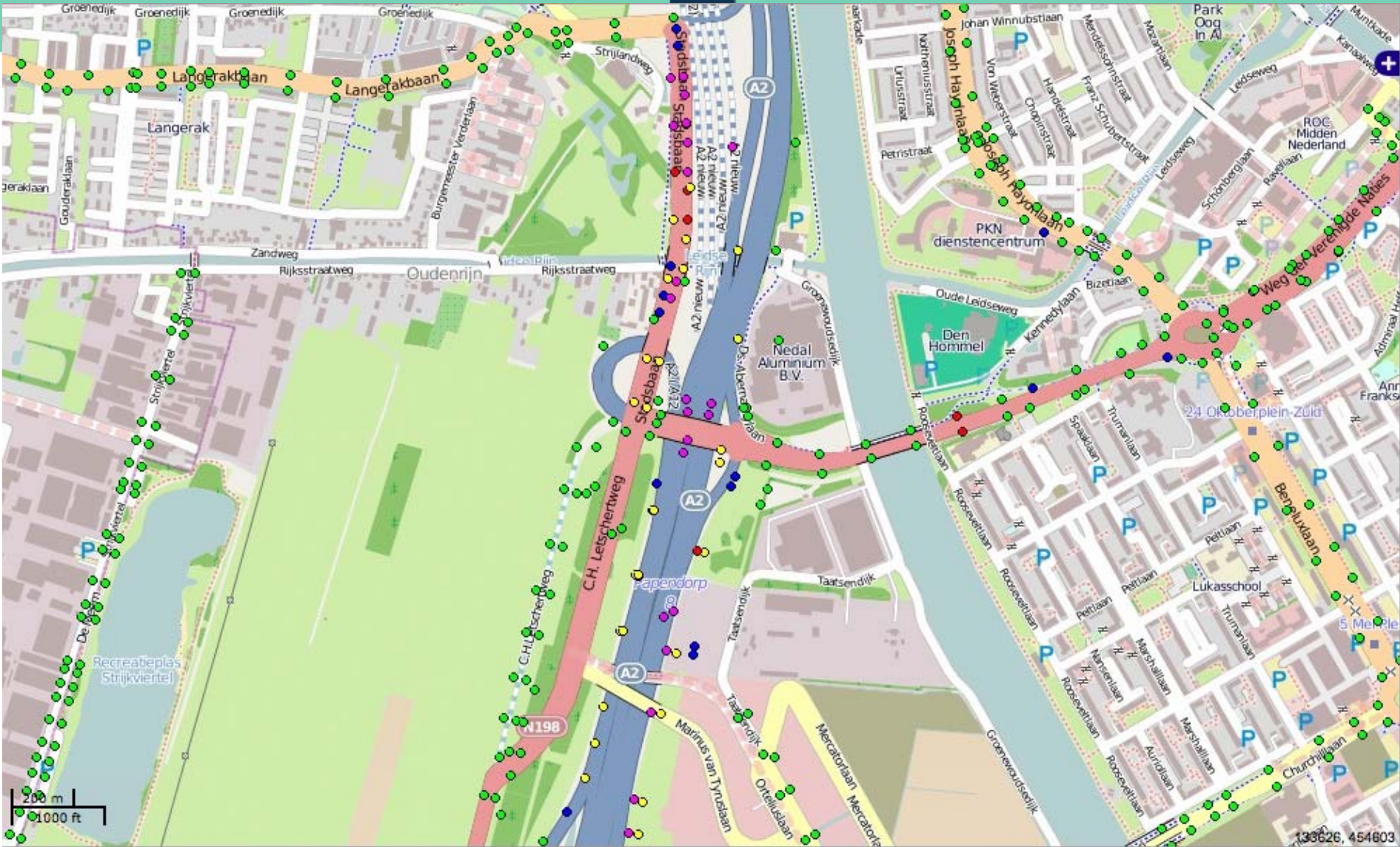


National Air Quality Cooperation Programme (NSL)

- Detailed Air quality calculations for last year and 2011 (PM10) and 2015 (NO2)
- If exceedances occur -> action plan (measures) by local authorities
- Yearly national monitoring of progress in calculated concentrations and the agreed measures by RIVM & Infomil (report will be discussed in parliament next week)

- Based on this programme EC allowed the Netherlands a time extension for the limit value for PM₁₀ (june 2011) and NO2 (2015).

> 300000 calculation points

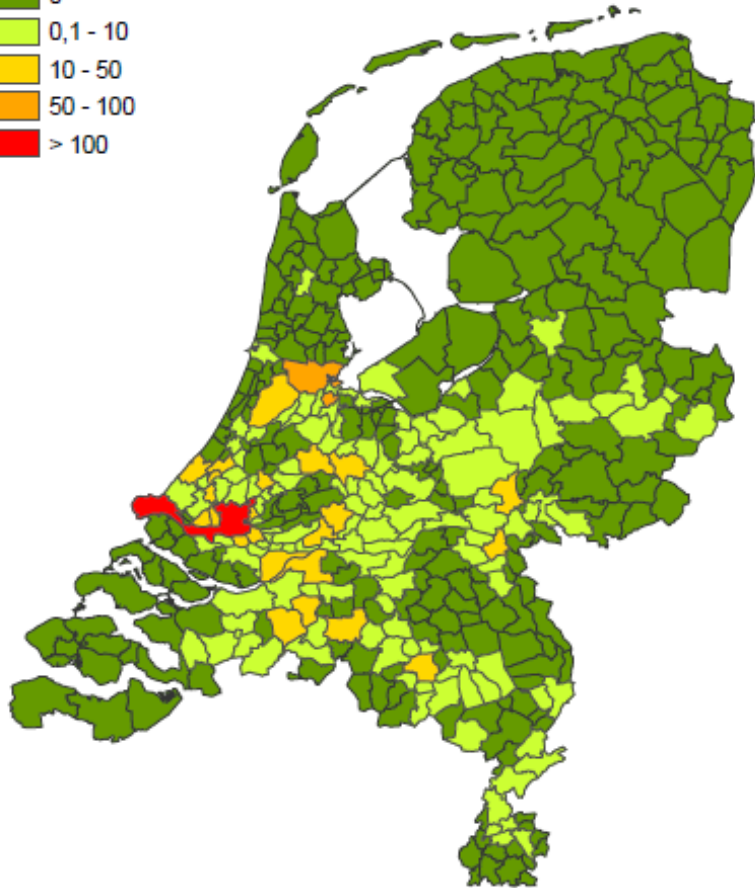




Kilometers of exceedences per municipality

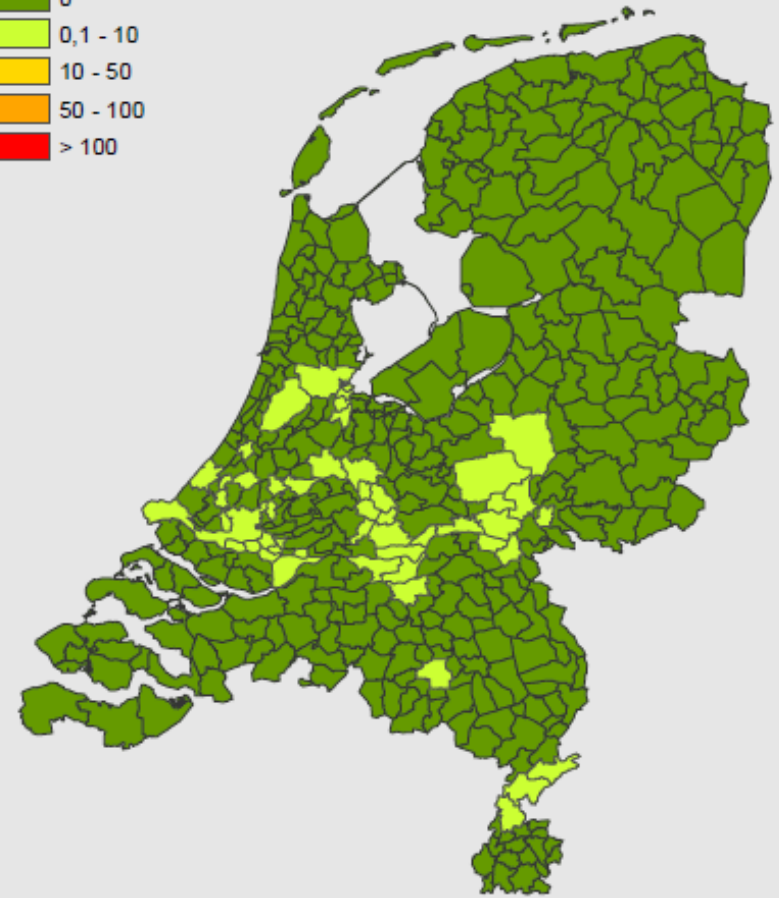
NO₂ > 40.5 µg/m³ in 2009

Aantal km
0
0,1 - 10
10 - 50
50 - 100
> 100



NO₂ > 40.5 µg/m³ in 2015

Aantal km
0
0,1 - 10
10 - 50
50 - 100
> 100





Results at all addresses -> exposure population





Conclusions

- **PM₁₀** on average a decrease of 0.7 $\mu\text{g}/\text{m}^3$ for the 1993-2010 period
 - In 2010 no exceedances on measurement locations.
 - May be different in years with unfavourable weather conditions.
 - Some exceedances present on model calculations.
-
- **NO₂** moderate decrease since 1993 (0.5 $\mu\text{g}/\text{m}^3$).
 - Decrease to small to achieve compliance in 2015 on all **traffic** measurement locations.
 - Additional measures are necessary and foreseen.
 - Decrease for NOx is much larger (difference due to traffic emission).
 - Levels on urban background and rural stations comply with limit value