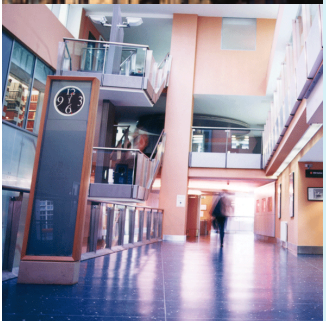


Recent trends in air quality in London

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London**



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The LAQN index 1996 to 2007

The LAQN index

Annual mean concentrations

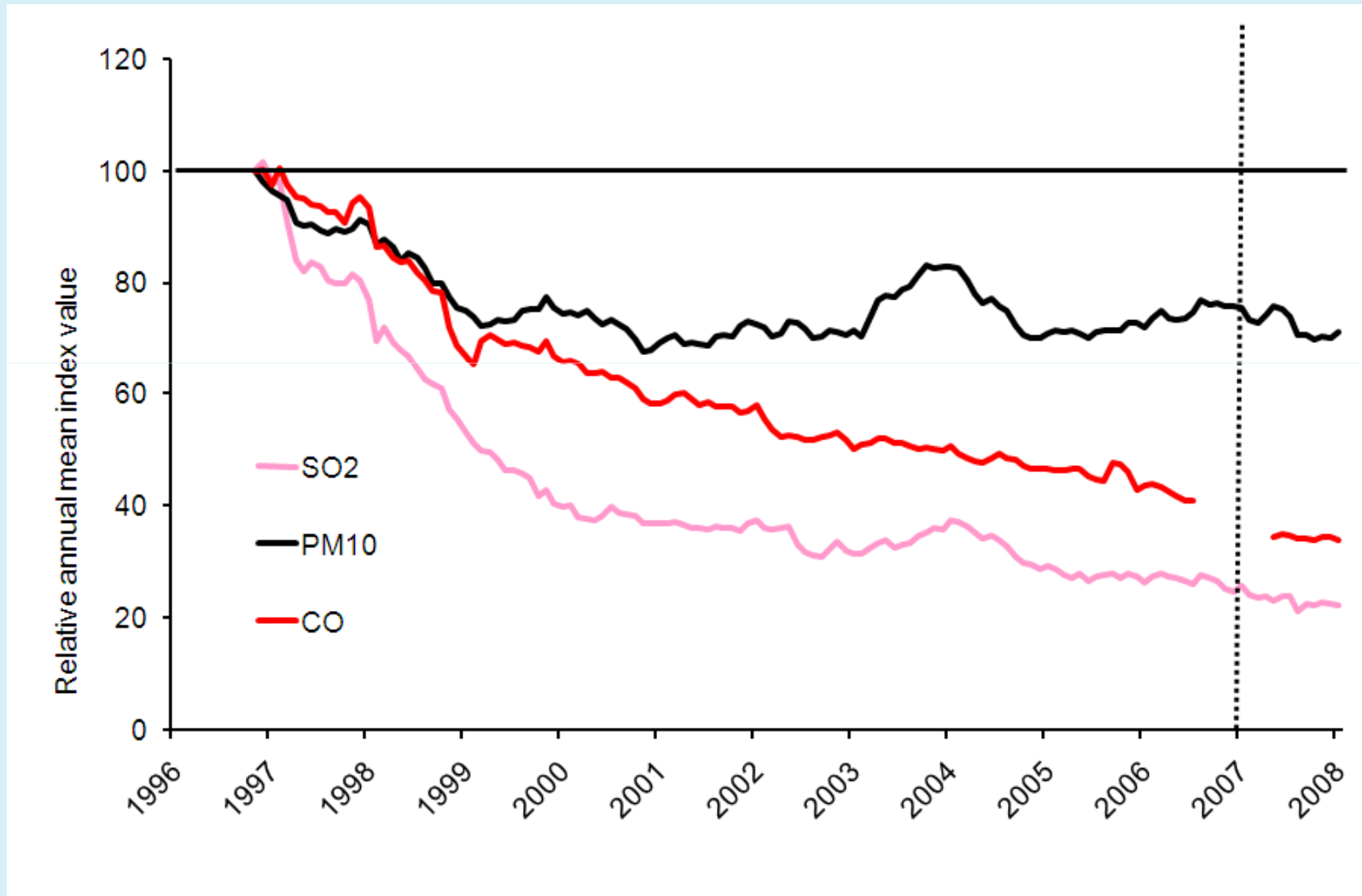
Started at end of 1996 with value of 100 at each site

Long term monitoring sites

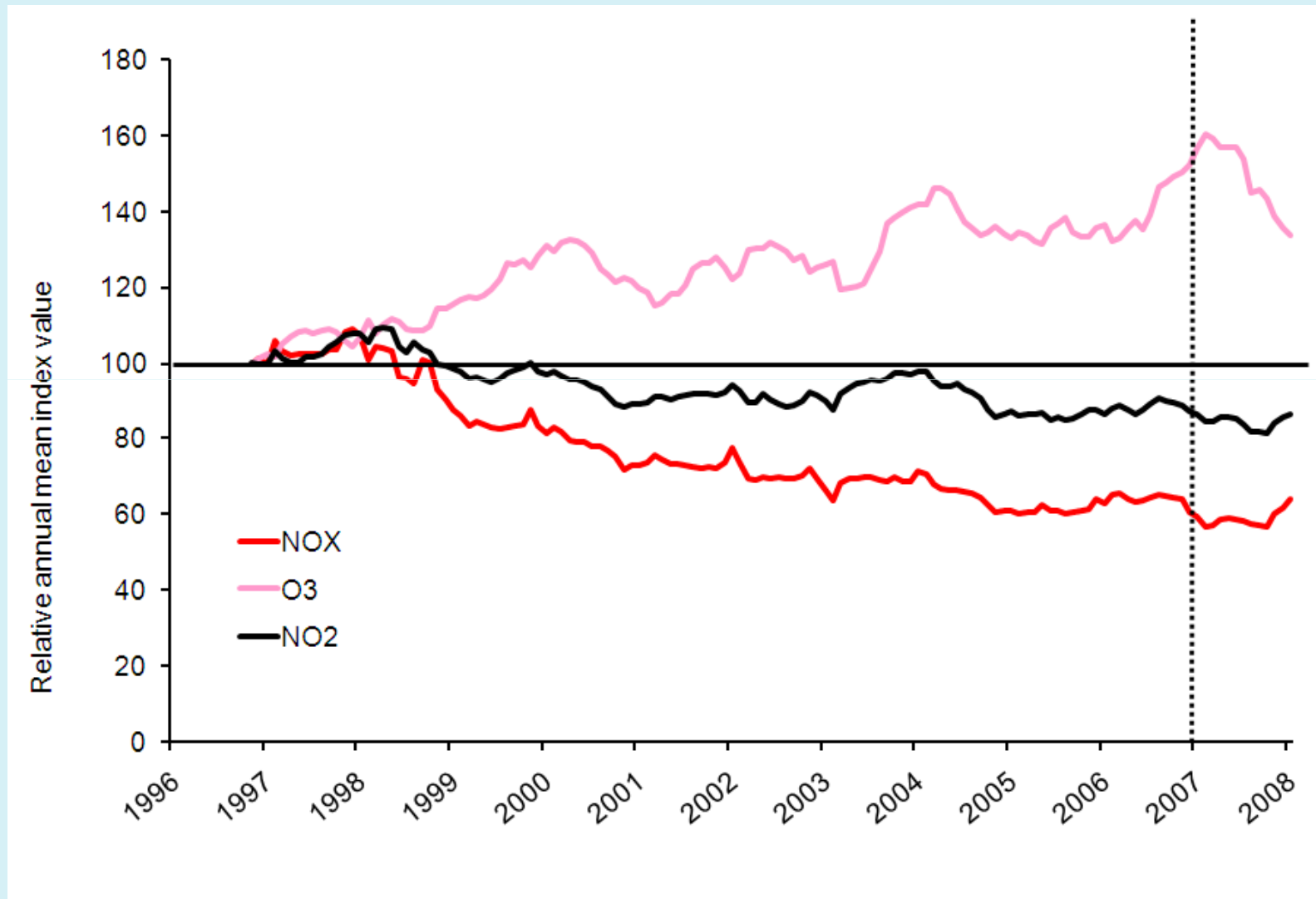
Different sites for each pollutant

- Six sites for PM10, 16 sites for NOX and NO2
- Mixture of roadside and background, inner and outer London

The LAQN index



The LAQN index



Detailed analysis

Detailed analysis

LAQN index does not show changes at different site types and in different areas of London

Does not compare readily to EU Limit Values

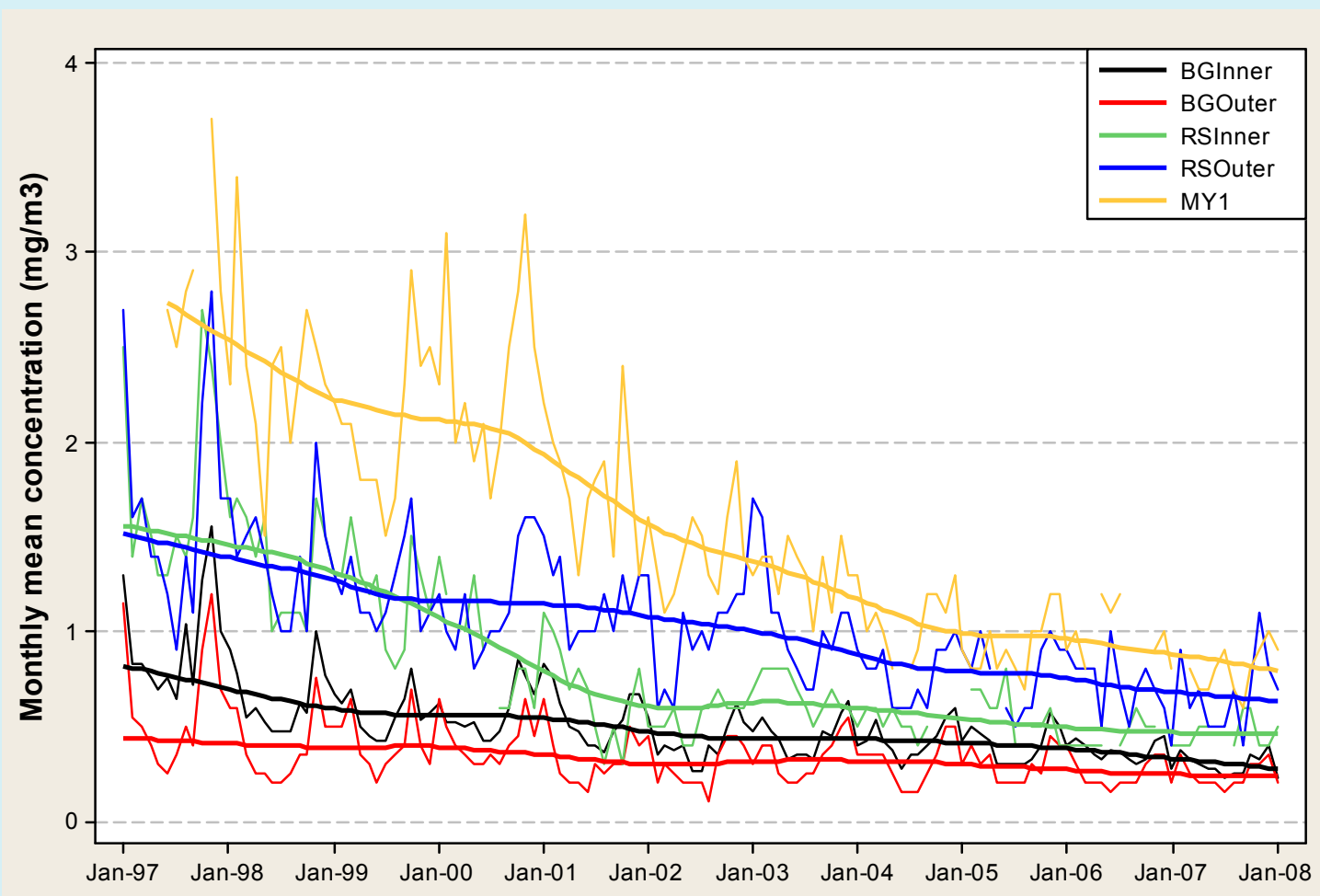
Detailed analysis

- Monthly and smoothed concentrations
- Site types and location
- Background inner and outer London
- Roadside inner and outer London
- Marylebone Road too

CO

EU Limit Value achieved in London since 2000.

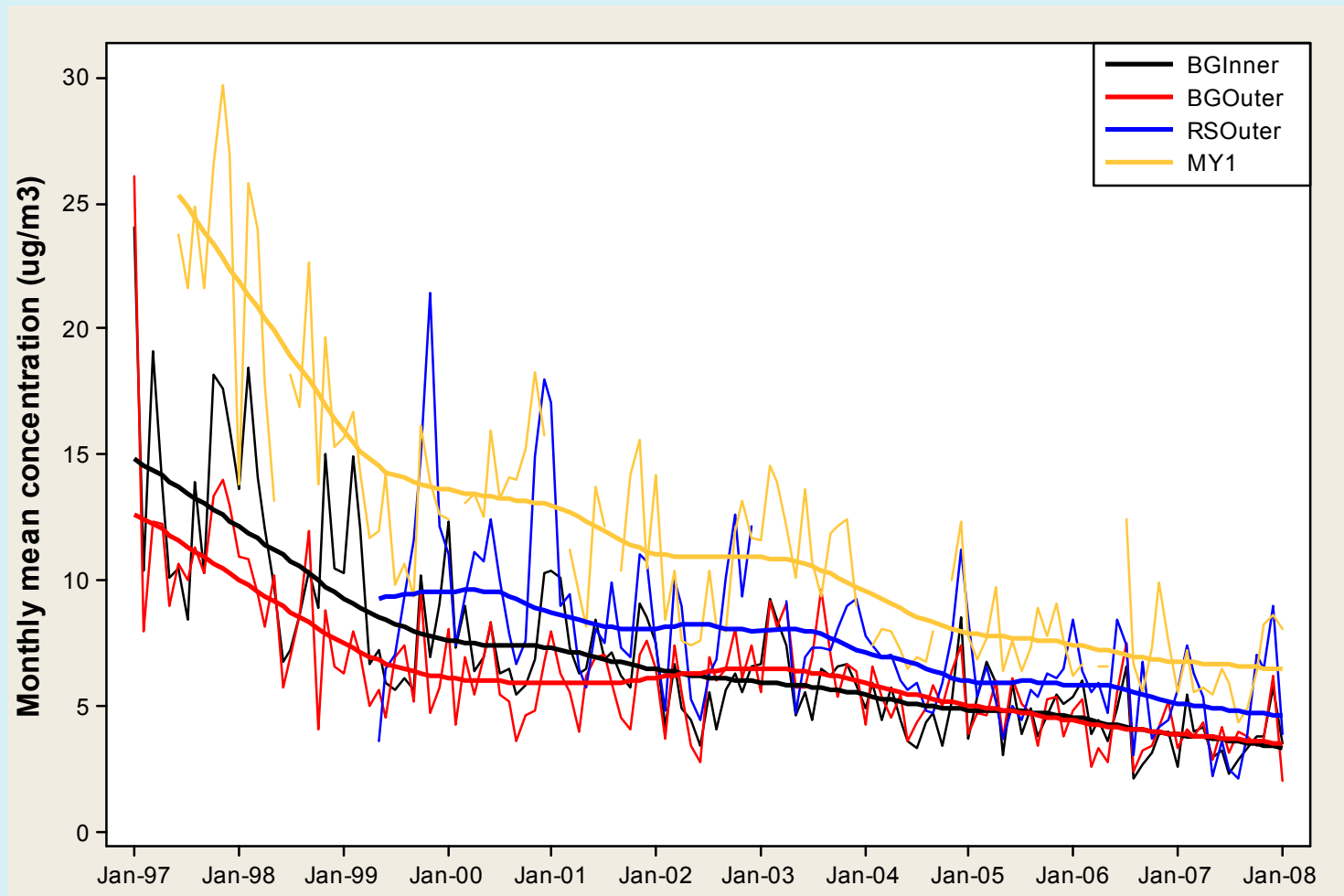
CO still important in O₃ formation



SO₂

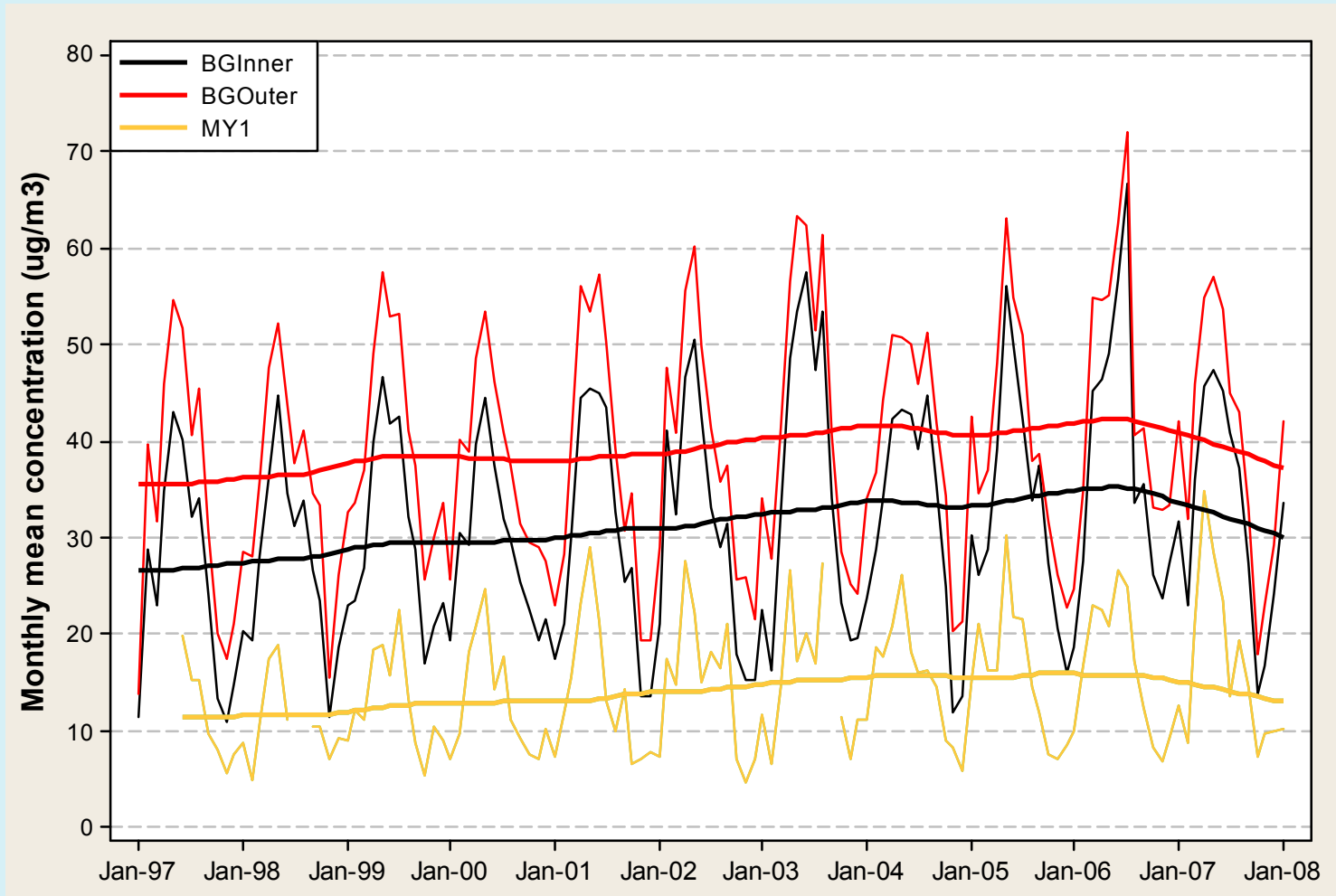
AQS achieved in London since late 1990s

Many sites above WHO guideline and SO₂ important for PM formation

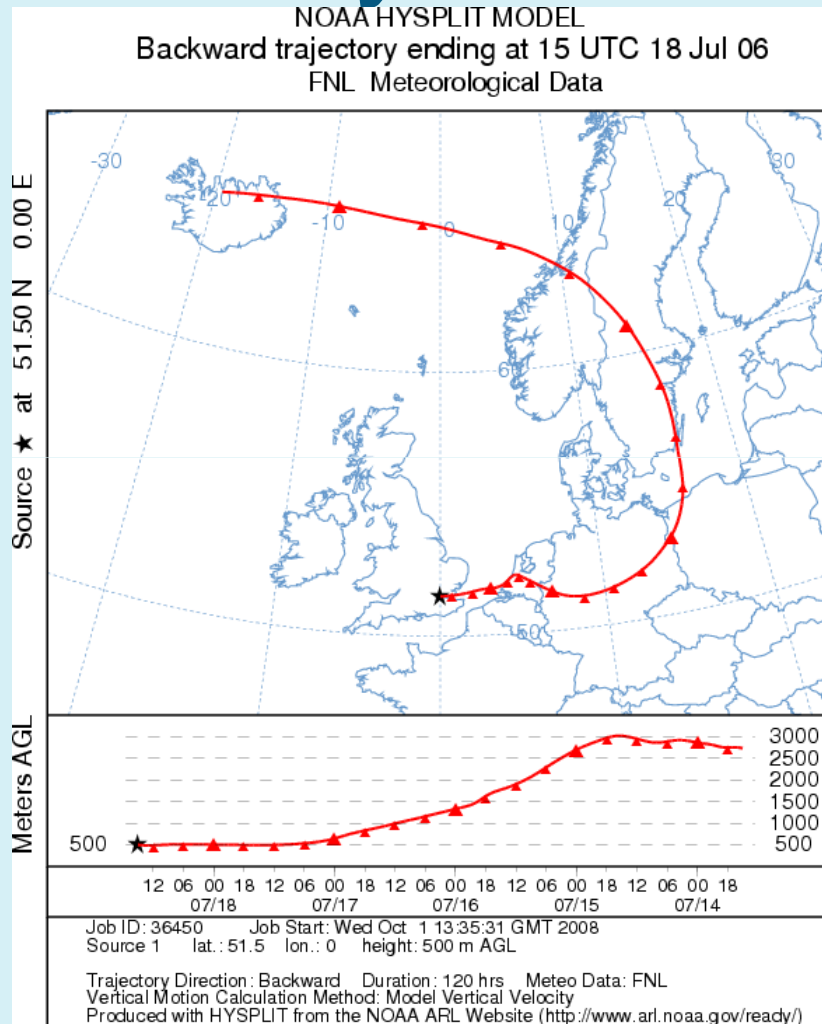


O3

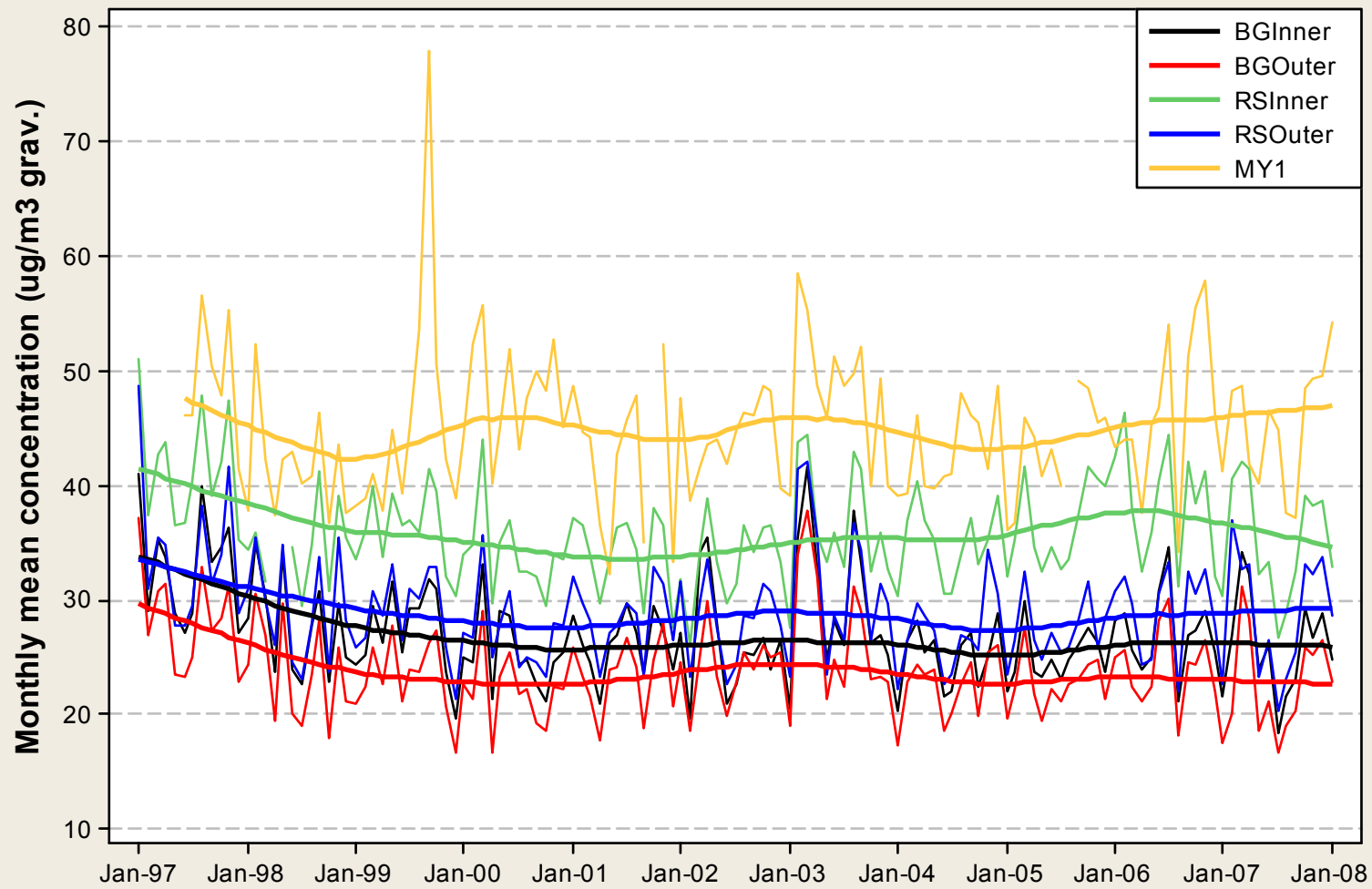
Further information see AQEG, 2009



O3 July 2006 episode

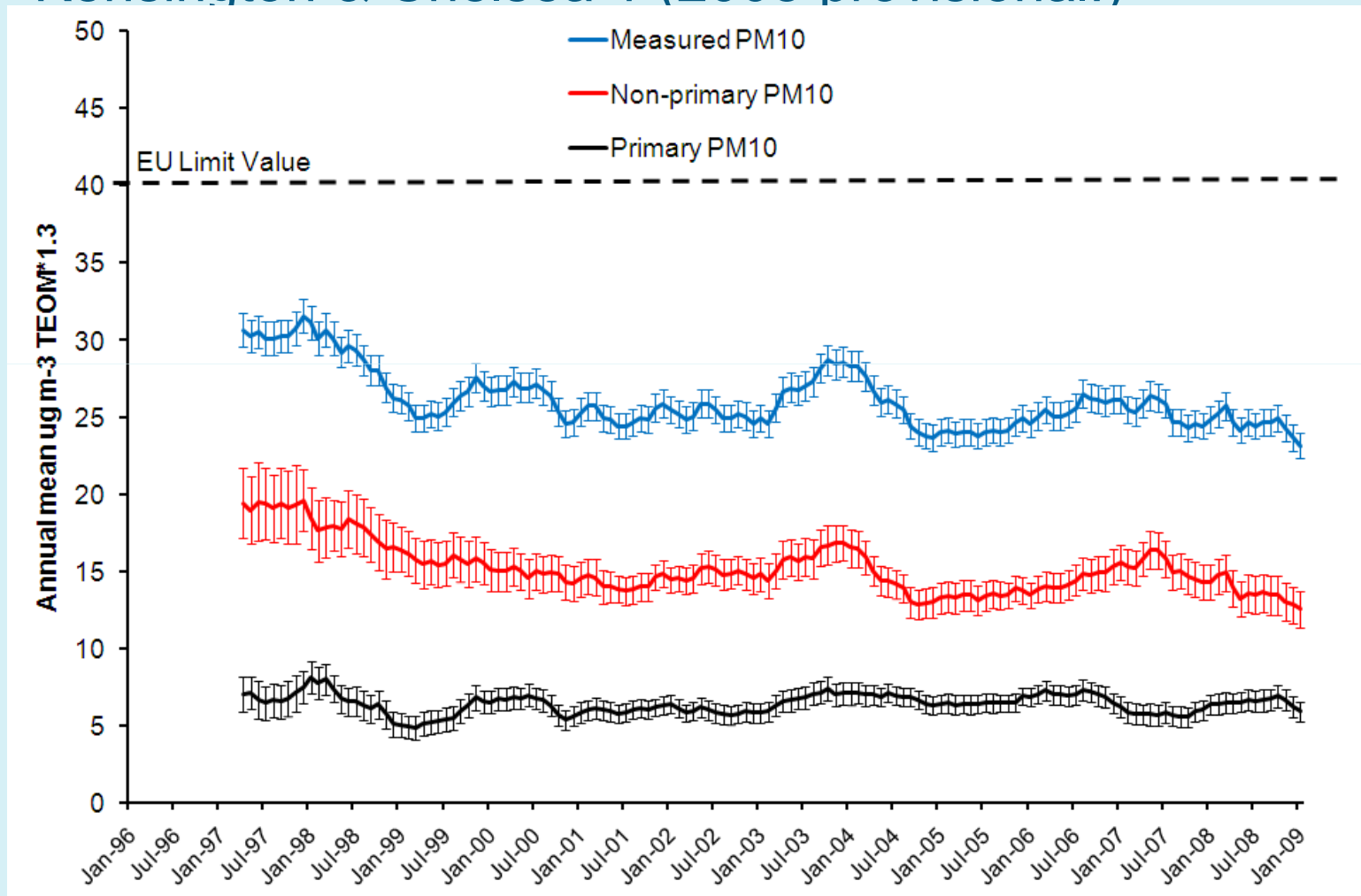


PM10



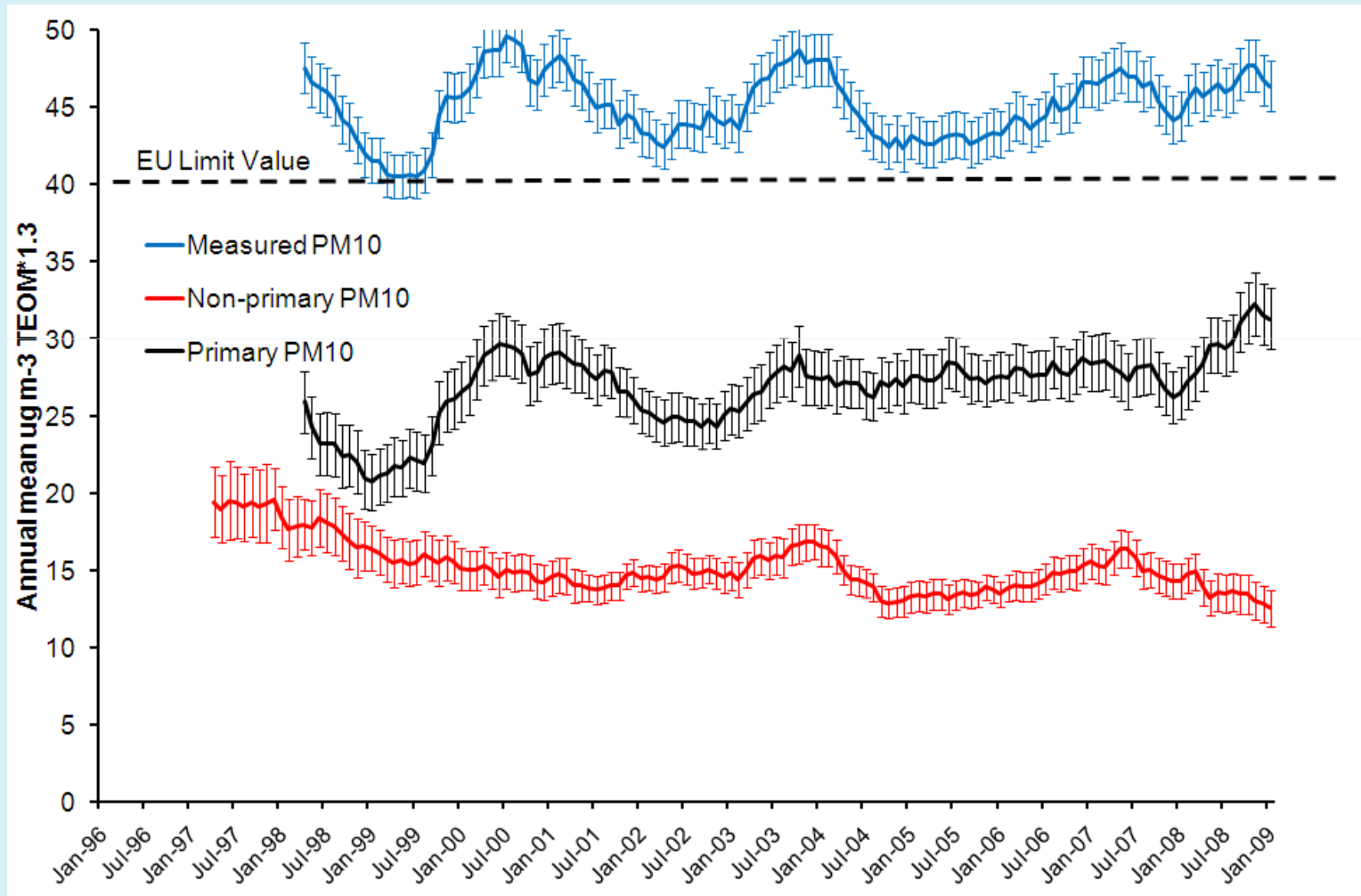
PM10 – source apportionment

Kensington & Chelsea 1 (2008 provisional!)



PM10 – source apportionment

Marylebone Road (2008 provisional!)



VCM

Corrects TEOM PM10 measurements to be equivalent to the EU reference method.

In general this leads to lower PM10 concentrations (cf TEOM*1.3) at roadside sites.

EU Limit Value VCM still breached on residential roads near waste sites and alongside major trunk roads

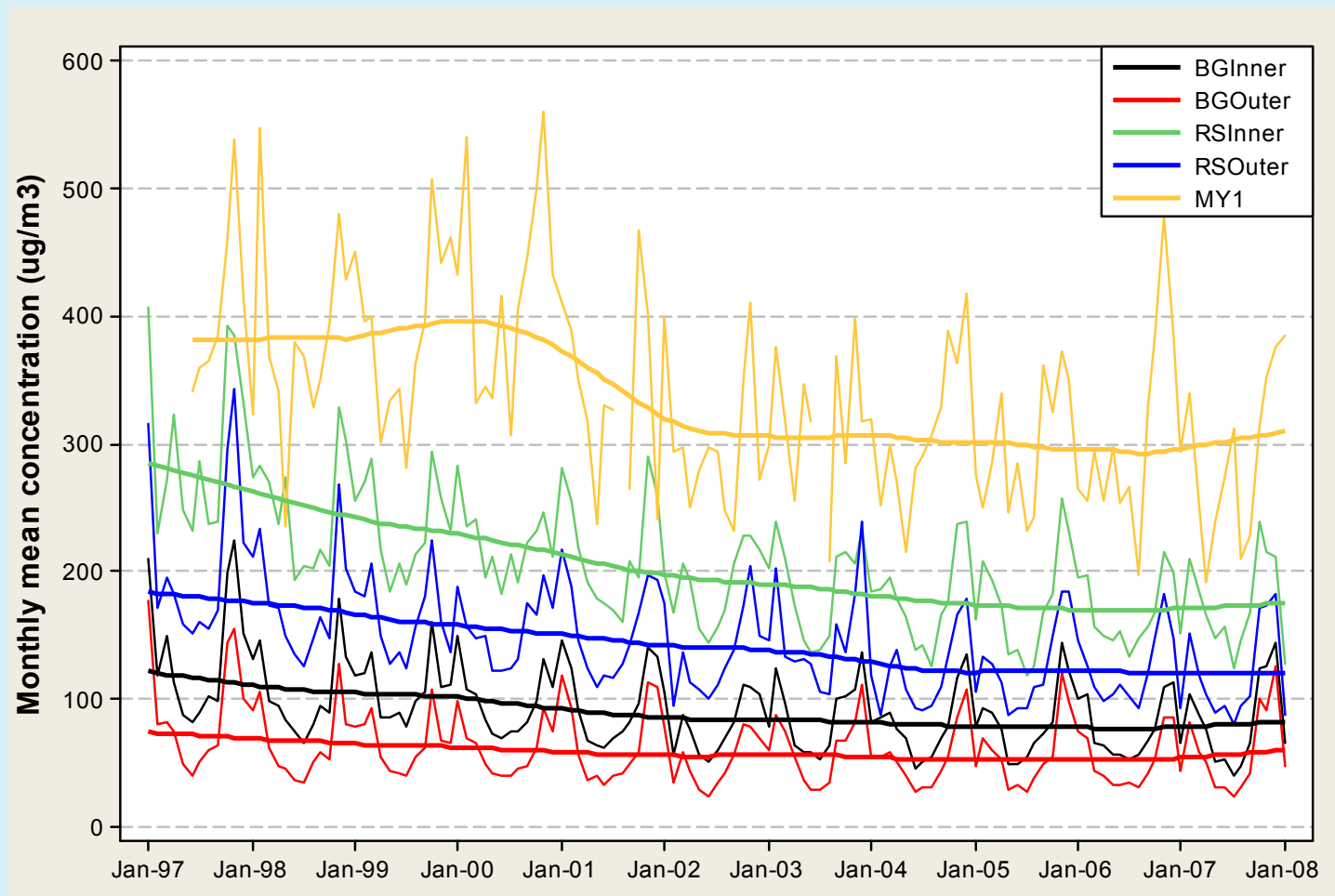
2006 - 21 sites (TEOM*1.3) → 11 sites (VCM)

2007 – 20 sites (TEOM*1.3) → 14 sites (VCM)

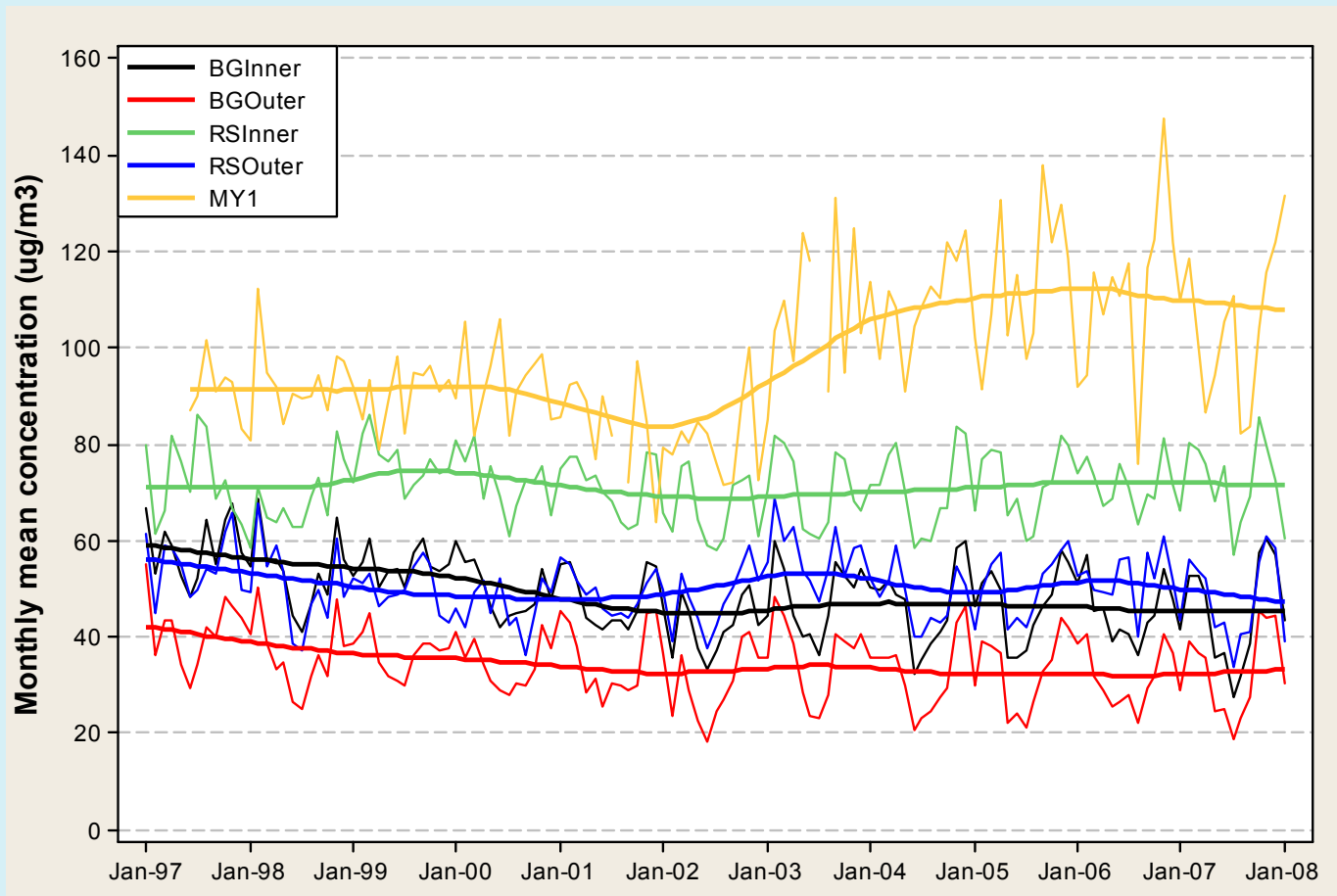
(2003 VCM maybe greater than TEOM*1.3)

NOX

NOX emissions control is the main tool to control NO2



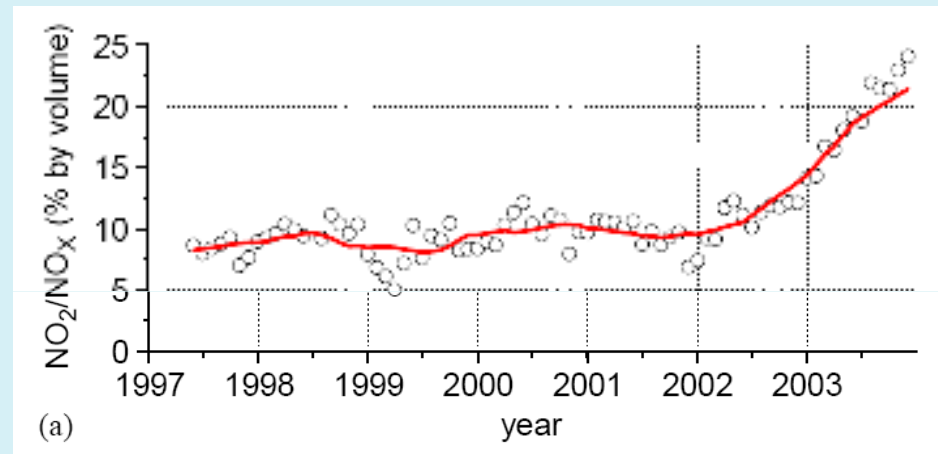
NO₂



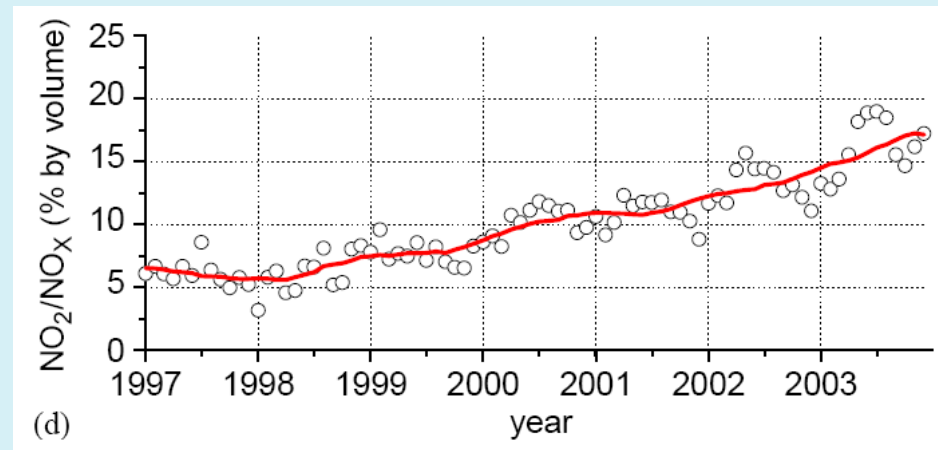
% primary NO₂

Carslaw 2005, Atmos Env 39 4793–4802

Marylebone Rd

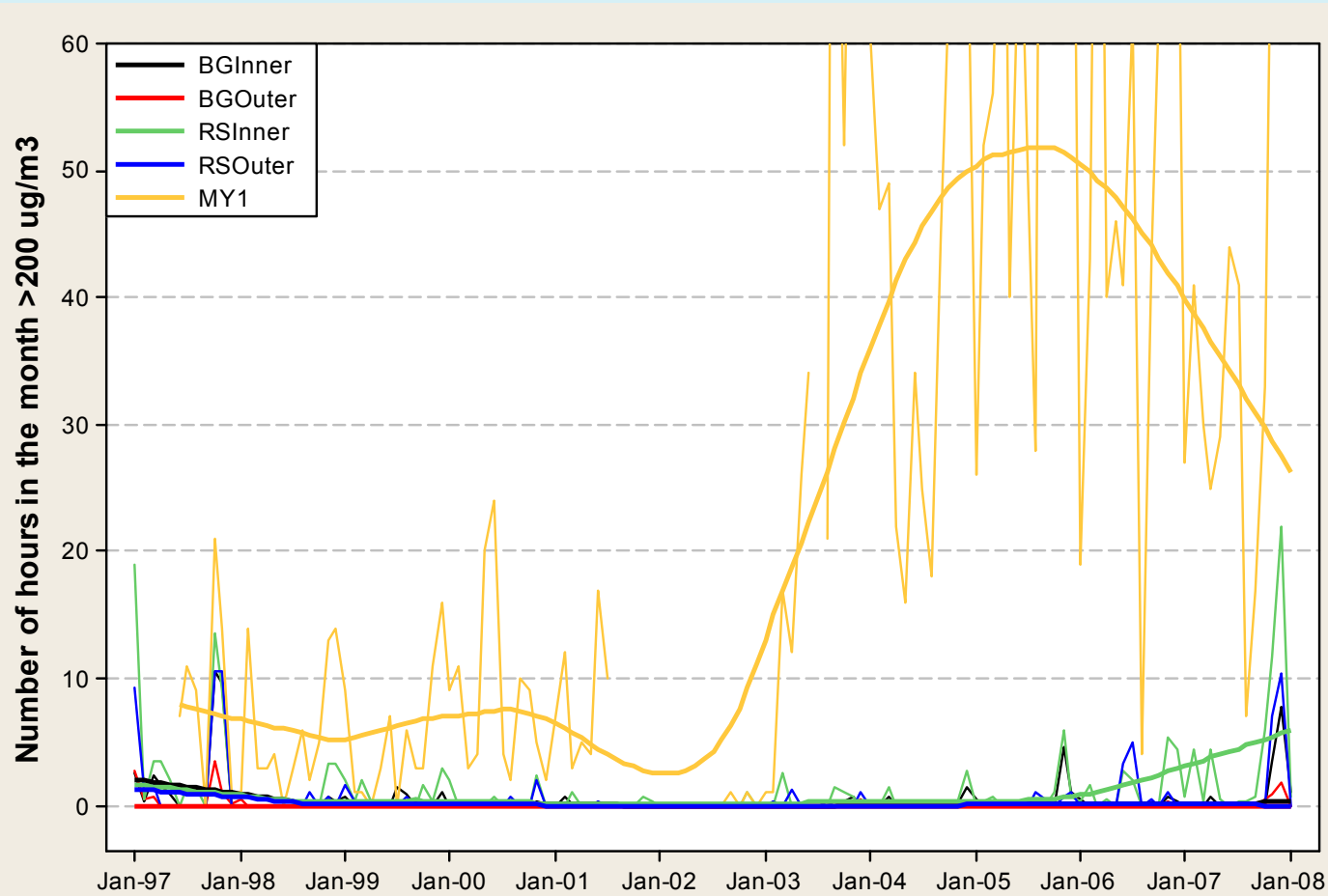


36 London sites



NO2 (Breaches of 1h LV)

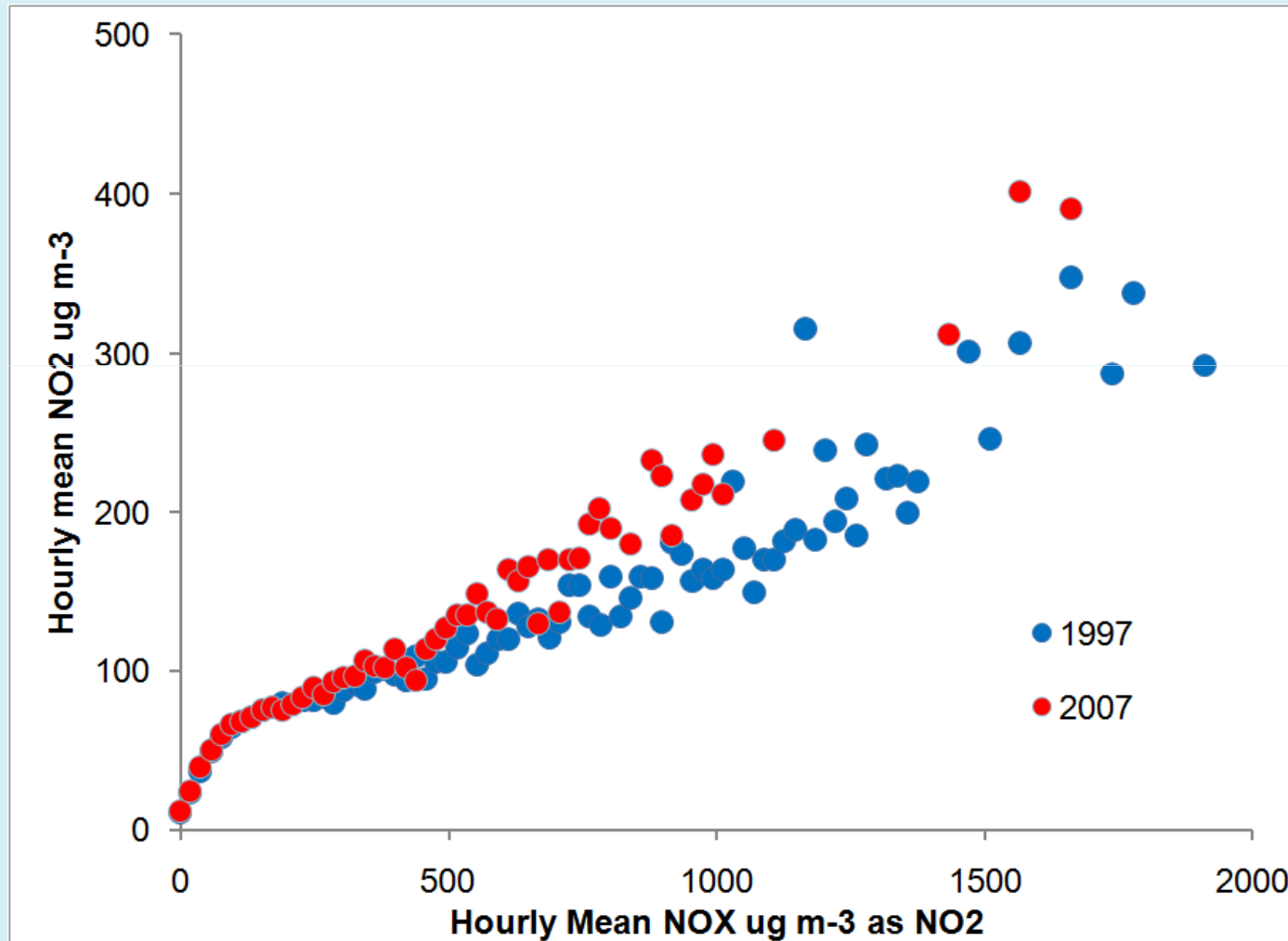
Lambeth 4 (A23) (not shown) measures ~3600 – 4200 hours per year



NO₂

December 2007 incident was the most severe to affect London since 1997

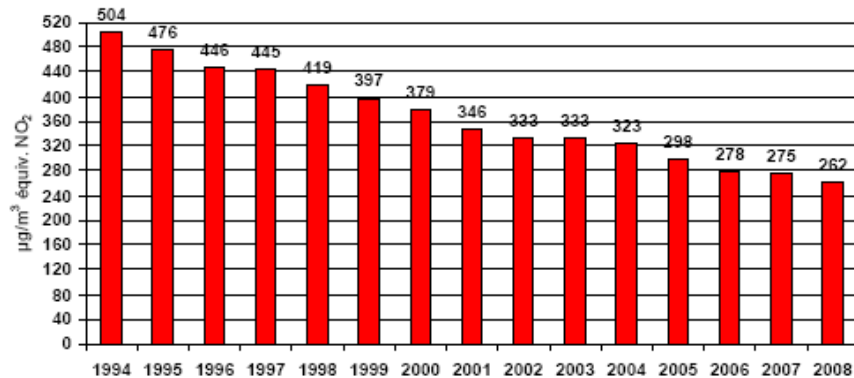
(Method from Derwent and Middleton 1996 and Carslaw et al 2001)



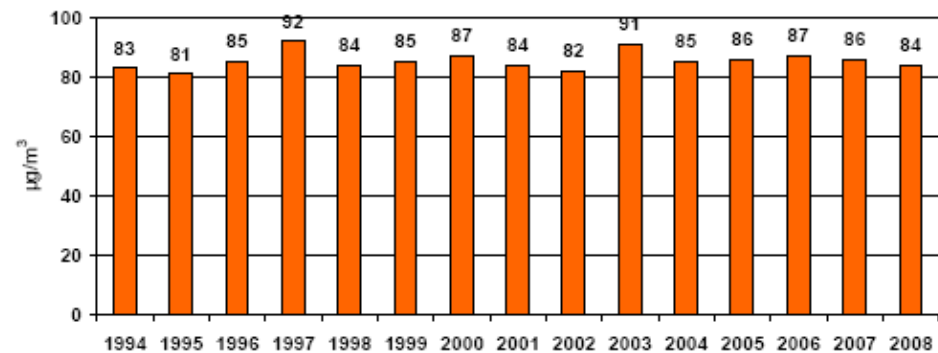
Let's see how the neighbours are doing...

Measurements from 5 roadside sites in Paris
(www.airparif.assco.fr)

Moyennes d'oxydes d'azote (NO_x)
des stations trafic de 1994 à 2008
(échantillon constant de cinq stations)



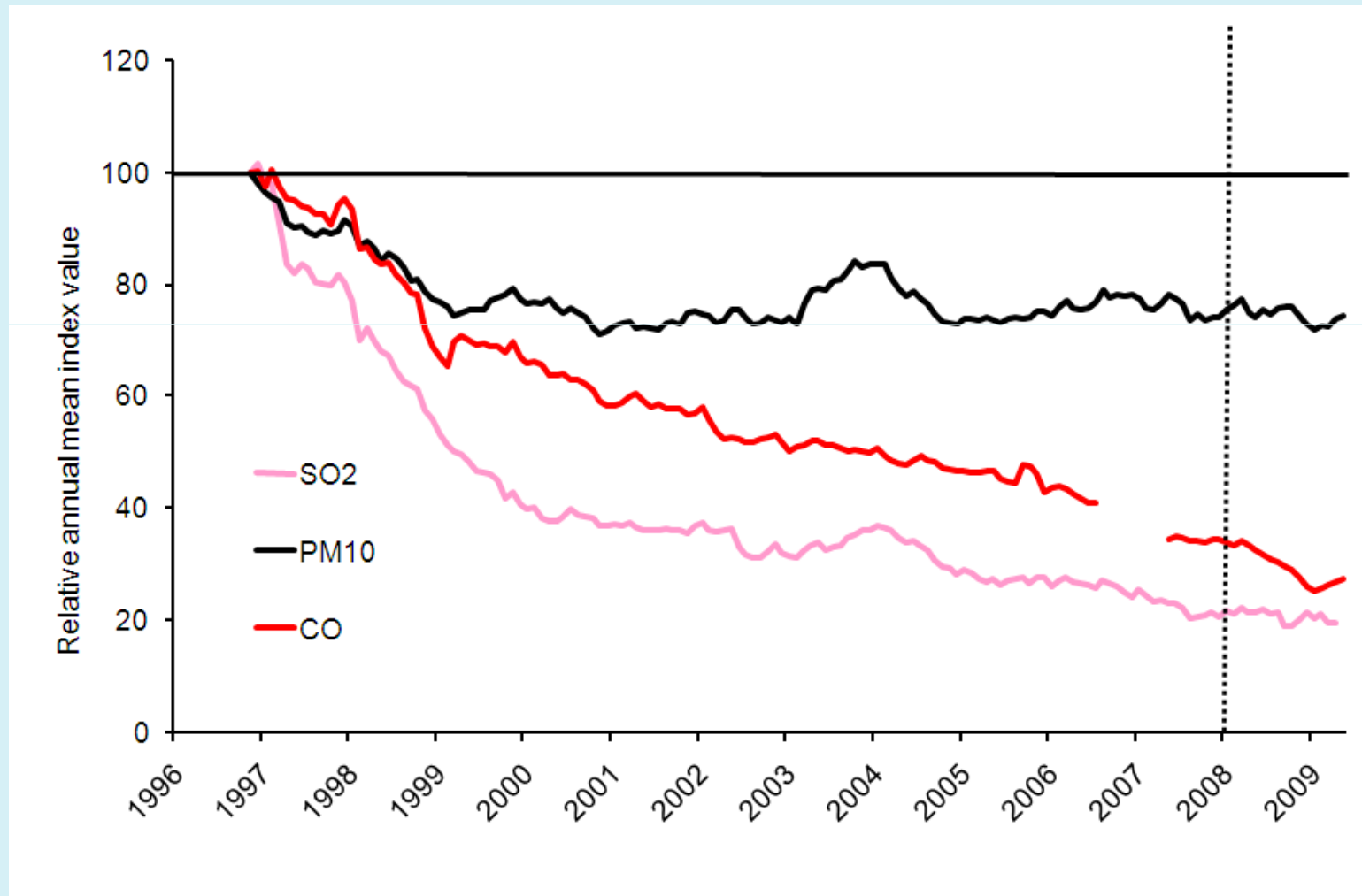
Moyennes de dioxyde d'azote (NO₂)
des stations trafic de 1994 à 2008
(échantillon constant de cinq stations)



LAQN index provisional 2008 and 2009

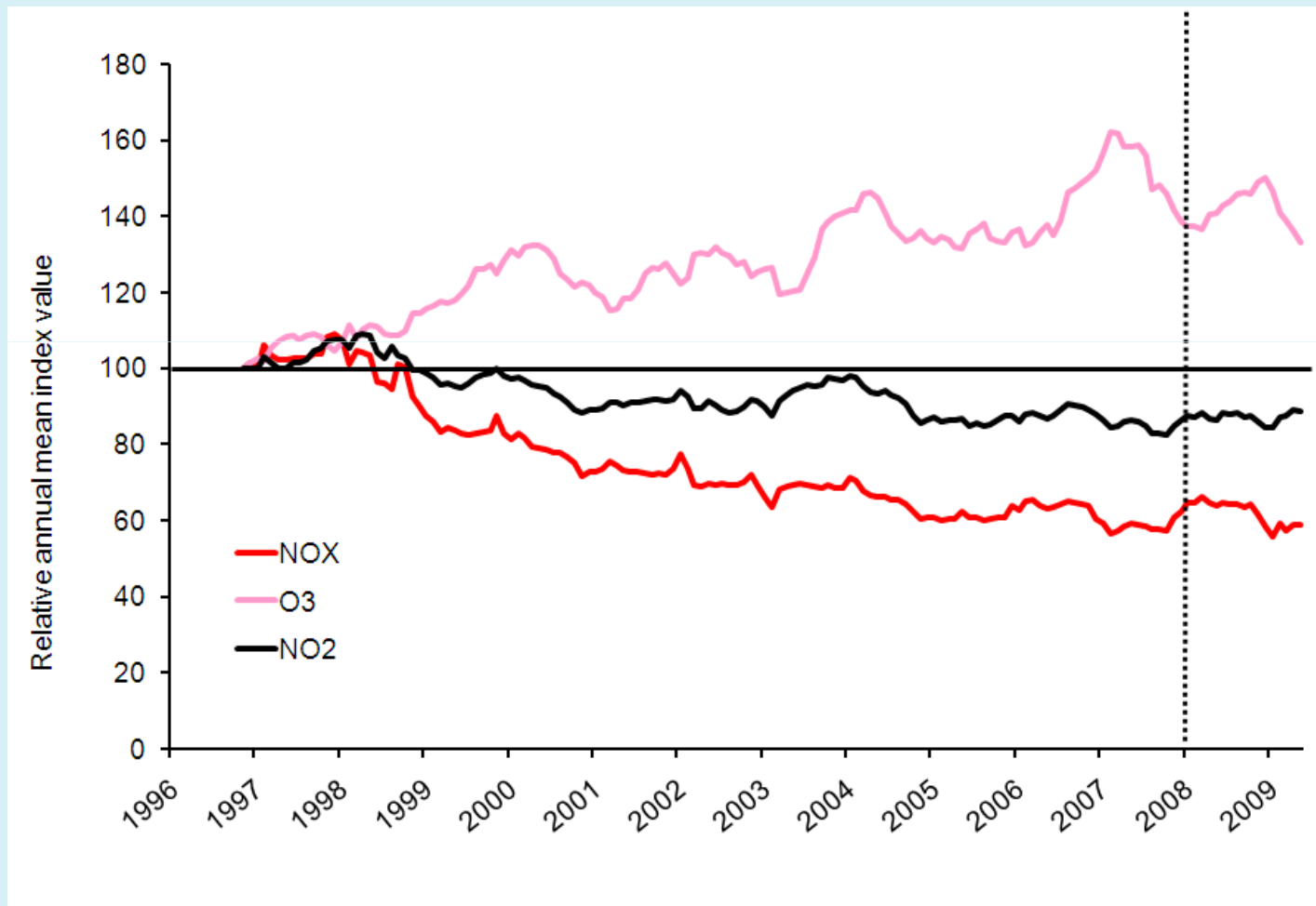
The LAQN index

(2008 and 2009 provisional)



The LAQN index

(2008 and 2009 provisional)



Summary

Summary – LAQN index

Mean CO decreased by 56% to end 2007

Mean SO₂ decreased by 78% to end of 2007

Mean O₃ increased by 37%

Summary – PM10

Concentrations decreased to the turn of the century but have trended slightly (~ 0.4% per year) upwards since.

Roadside PM10 in London is dominated by emissions from within London.

Primary PM10 in London has increased since 1998, in contrast with emissions inventory projections. This has been partially masked by a decrease in background secondary and natural PM10

Investment in emissions abatement may not be yielding the predicted health benefits.

Summary – NO₂

Increases in primary NO₂ emissions have offset decreases due to NO_x control at many roadside sites

Recent NO_x concentrations stable despite turnover in vehicle fleet in contrast with emissions inventory projections.

More details...



Thanks to London Boroughs, local authorities outside London, Defra and TfL who fund the London Air Quality Network.

Thanks also to Ben Barratt for assistance with analysis.