KING'S
College
LONDON

Air in and around London - 2018

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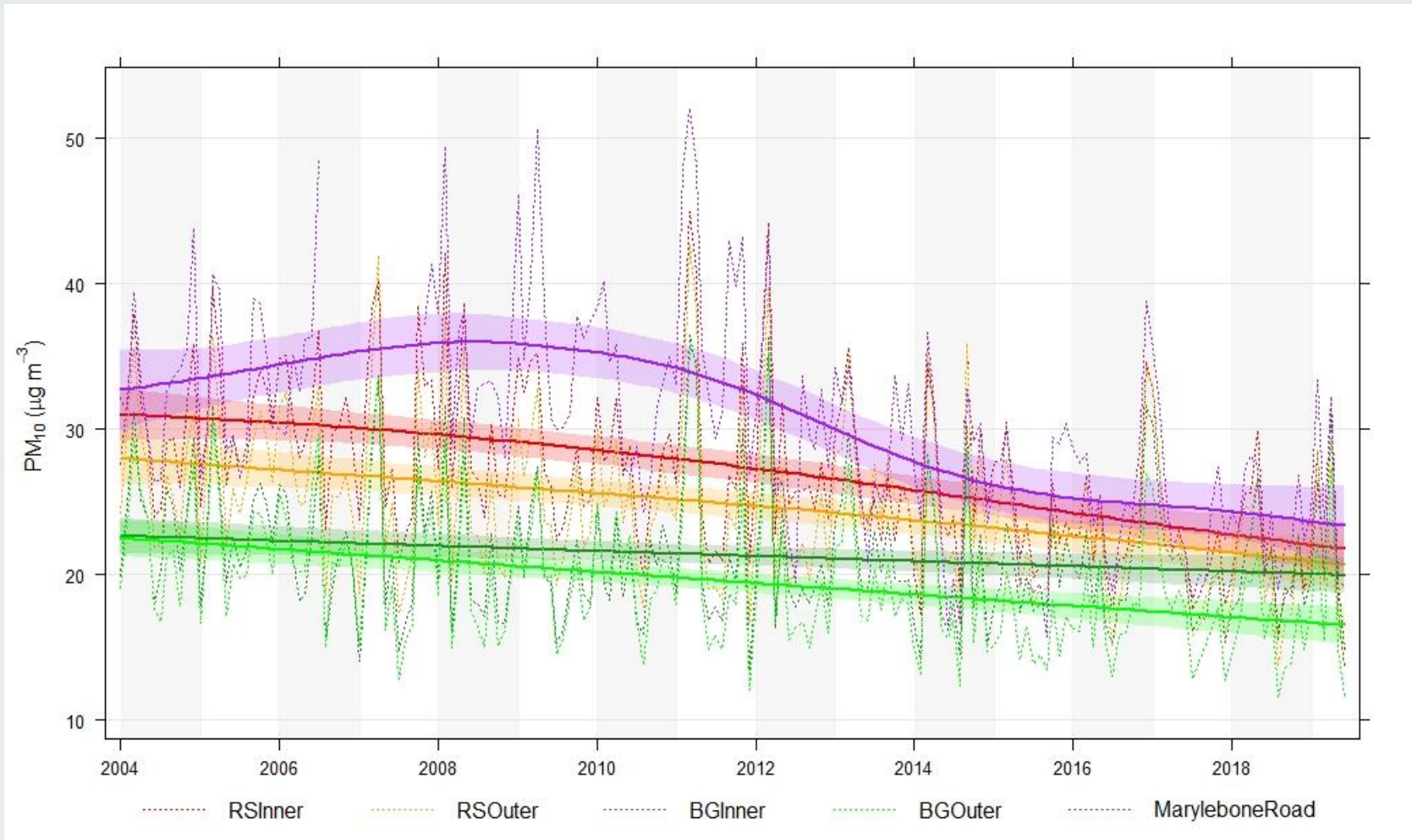June 2019

Contents

- Trends
- AQ objectives in 2018

- Hourly NO_2

- Episodes in 2018

- New Londonair feature

Trends

Includes LAQN and London AURN sites

PM$_{10}$
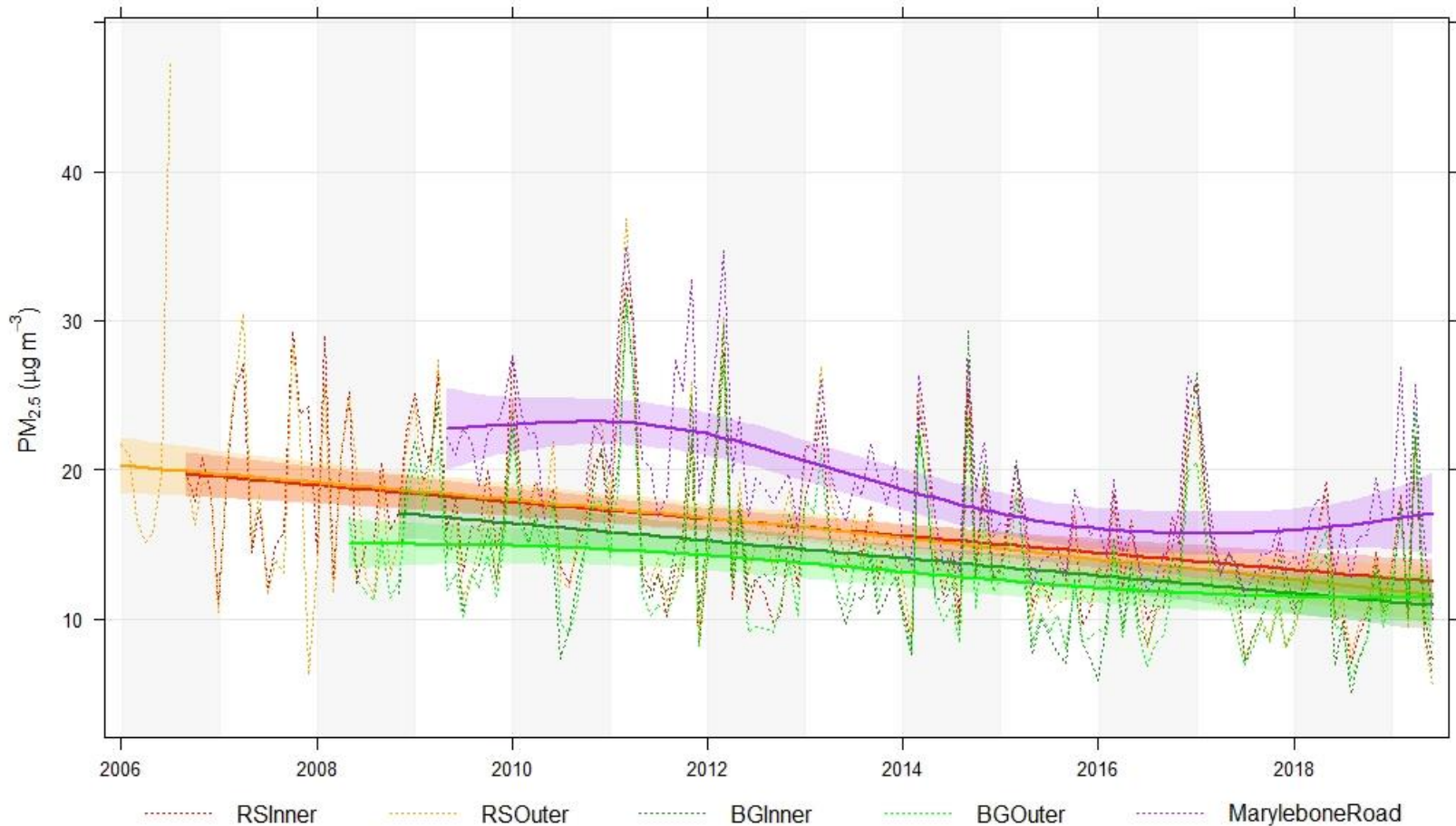
Trends only possible since 2004 – first date that the VCM could be operated.
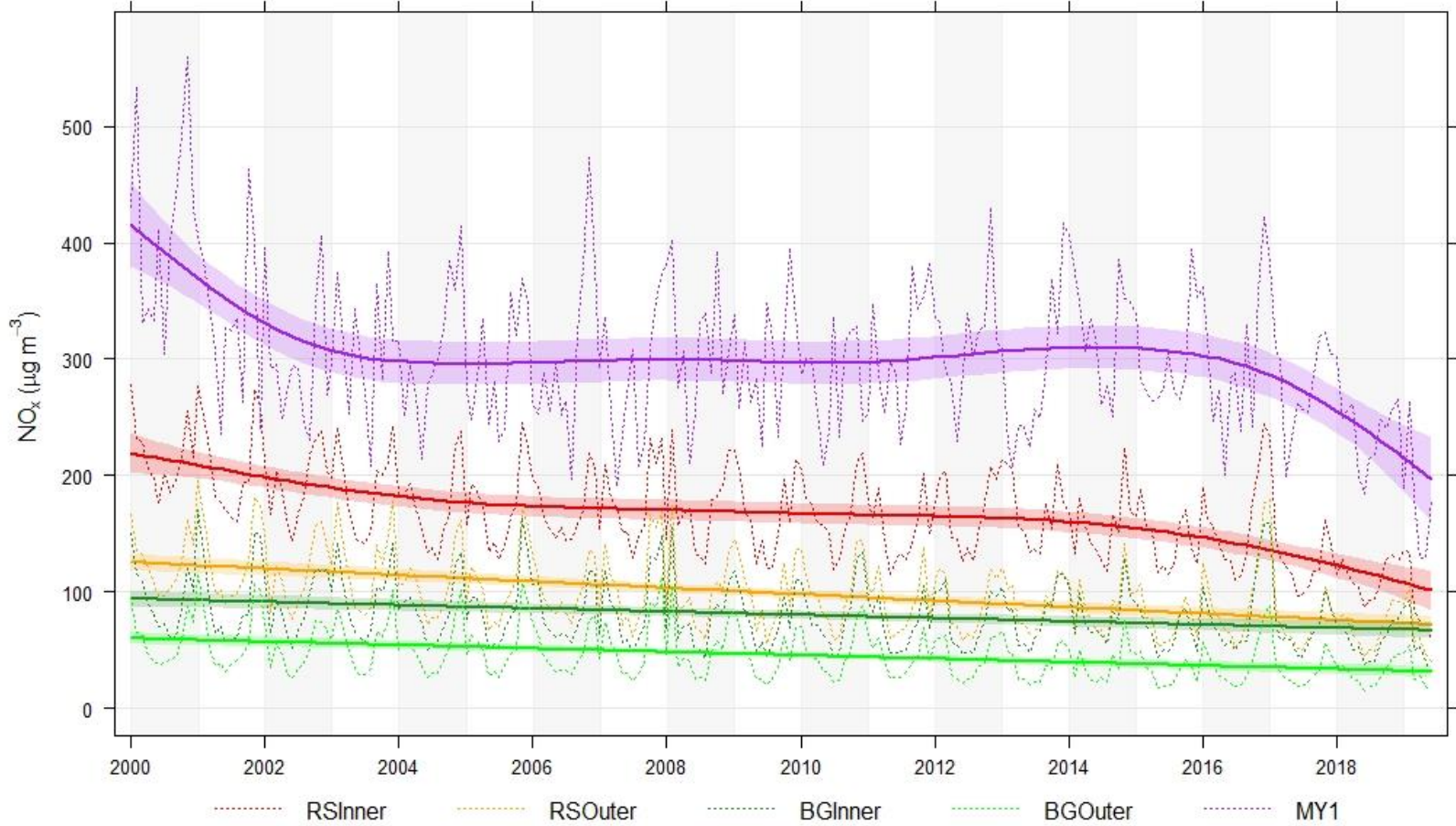Probable that changes in the regional background are driving the apparent decrease in PM across site types.

PM$_{2.5}$

Changes in measurement methods and historic small numbers of monitoring sites make long term trends difficult.
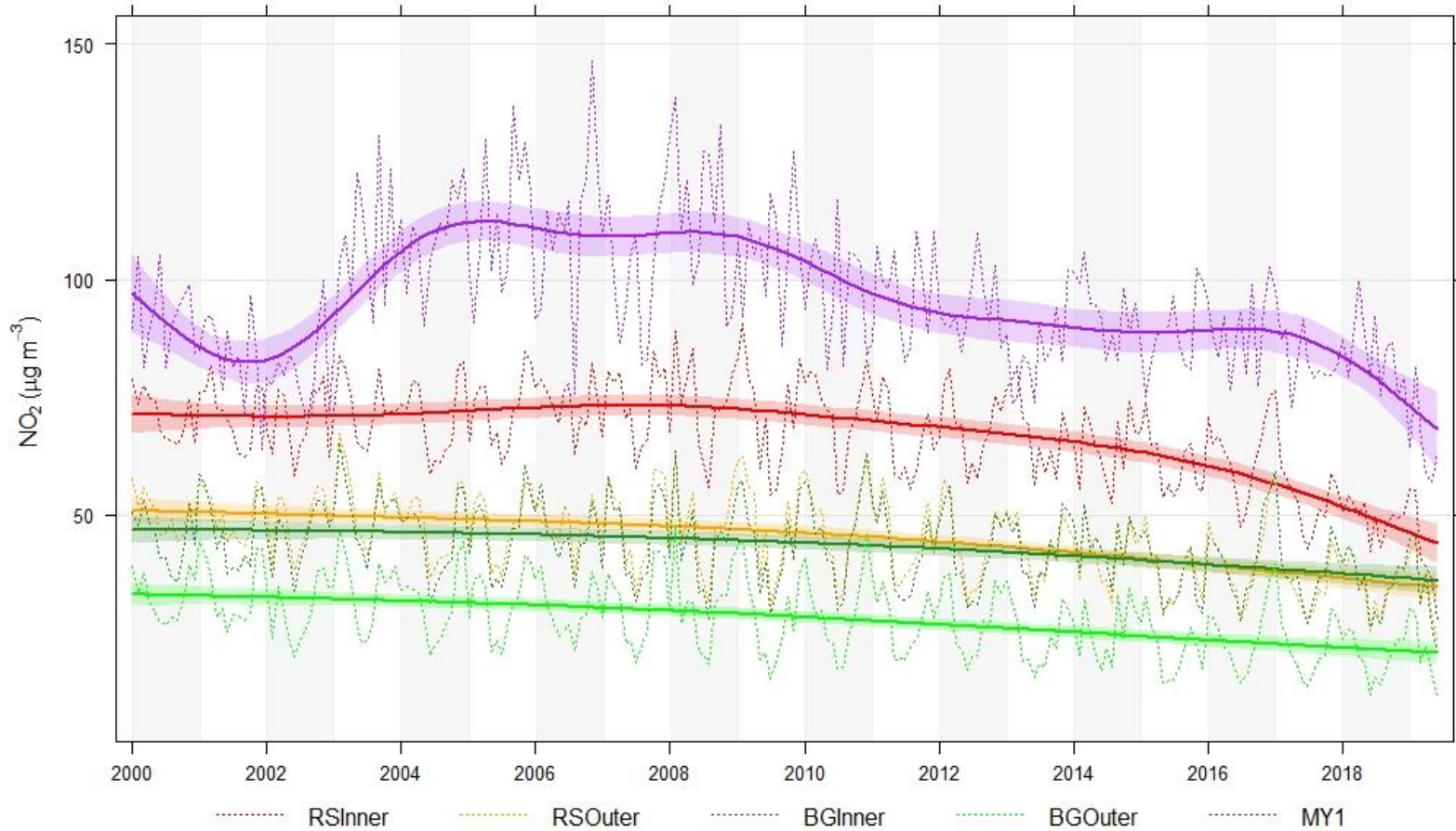
NO$_X$

Primary pollutant (NO+NO$_2$) tells us about emissions related to NO$_2$.

NO$_2$

Ozone

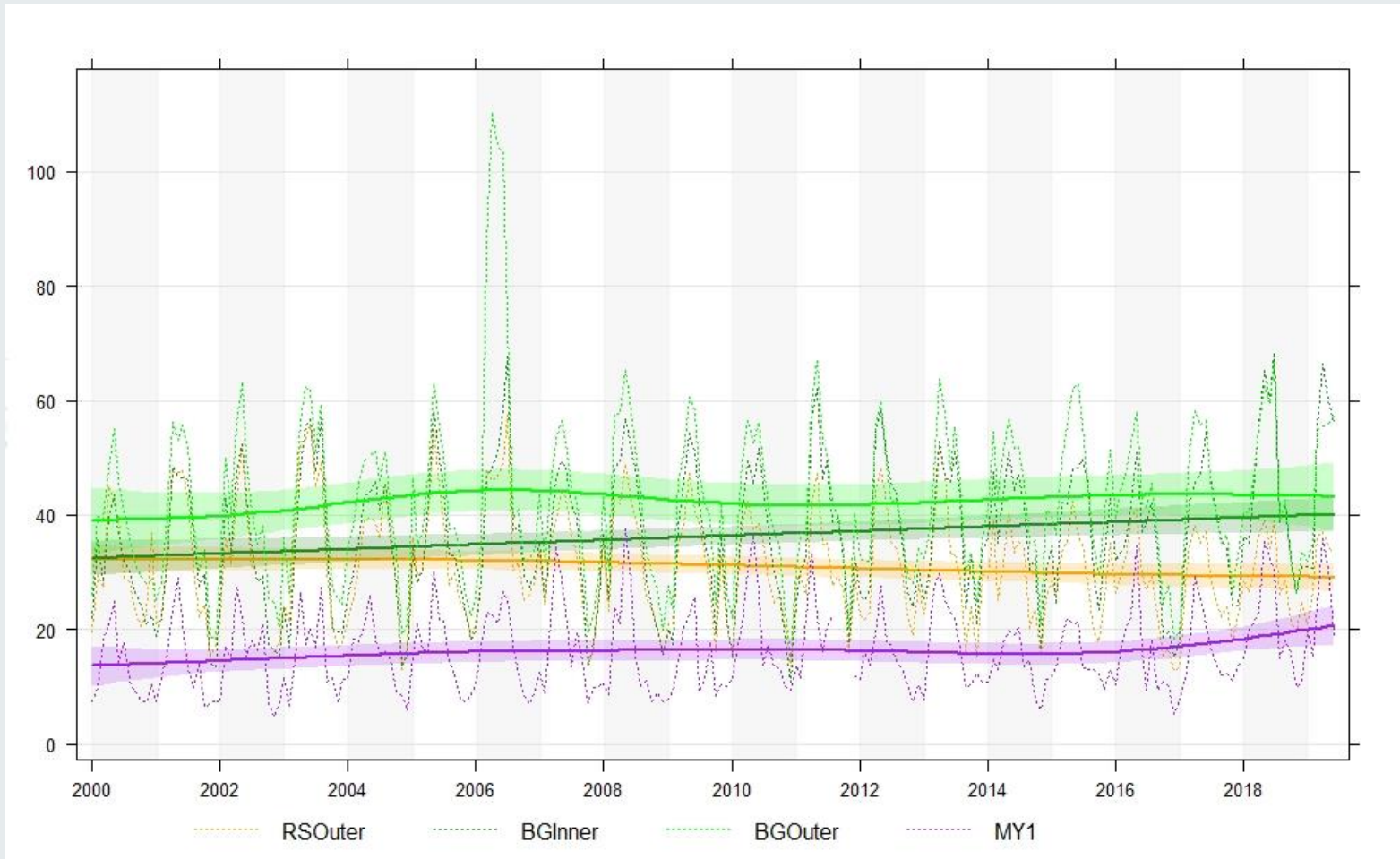$$NO + O_3 \longleftrightarrow NO_2 + O_2$$

Happening all the time but which side dominates is a Day/night cycle driven by sunlight

But NO scavenges/reduces O_3 near roads.

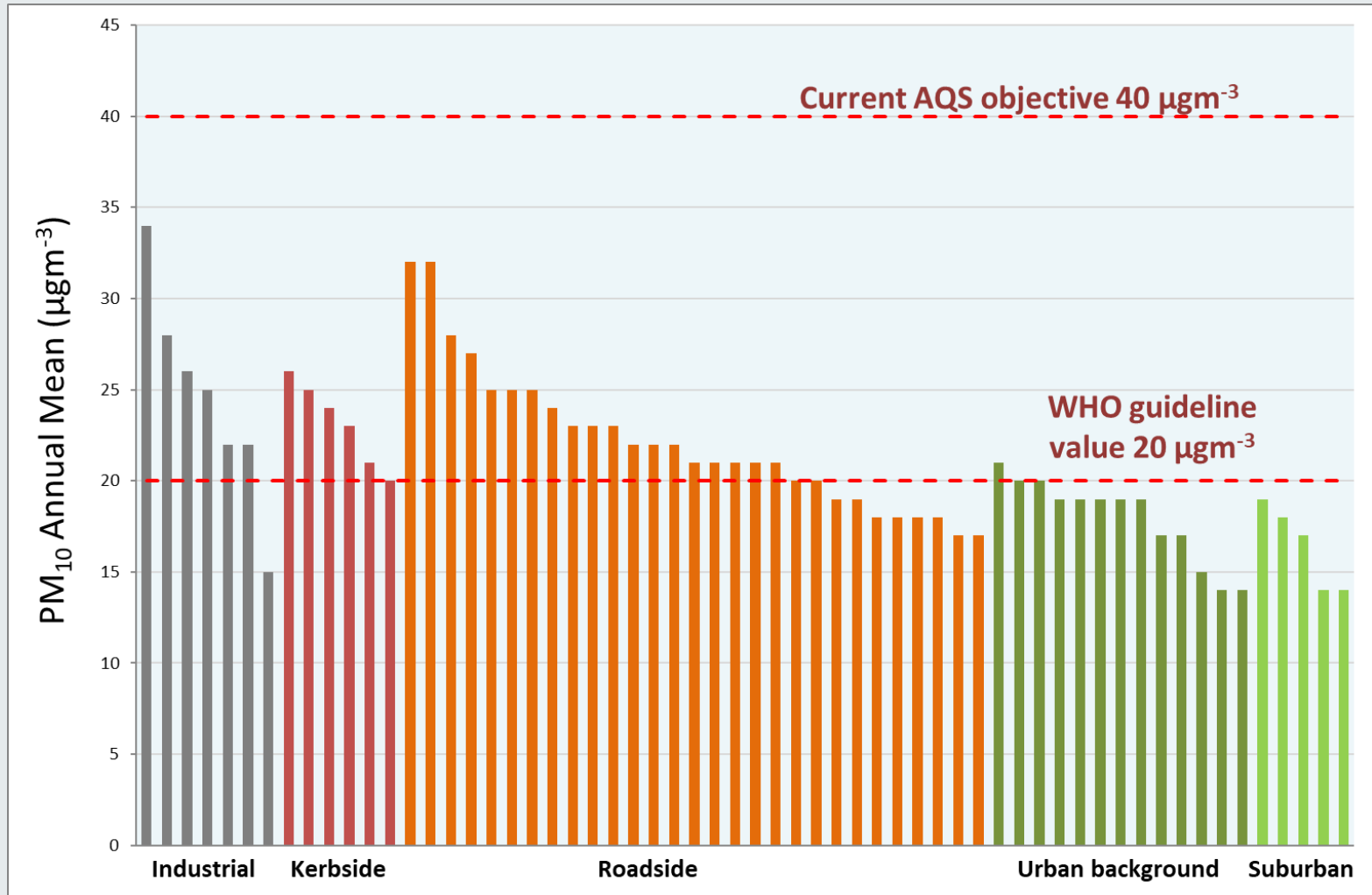NO_X is what comes out of exhausts ($NO_X = NO + NO_2$)
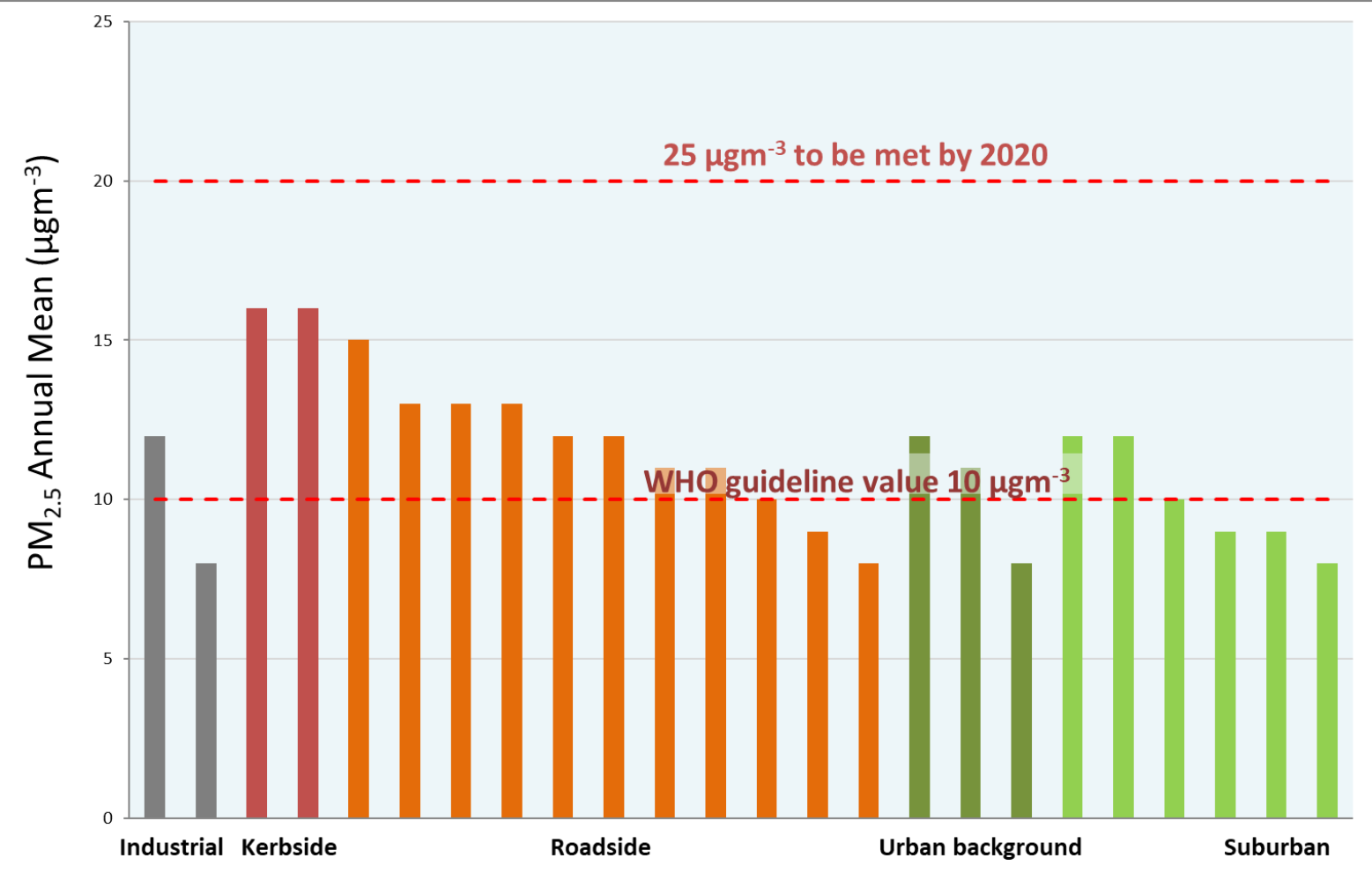
O₃

Decrease in London decrement as observed by AQEG (2009)

AQ objectives in 2018

Only showing sites that achieved 90% data capture.
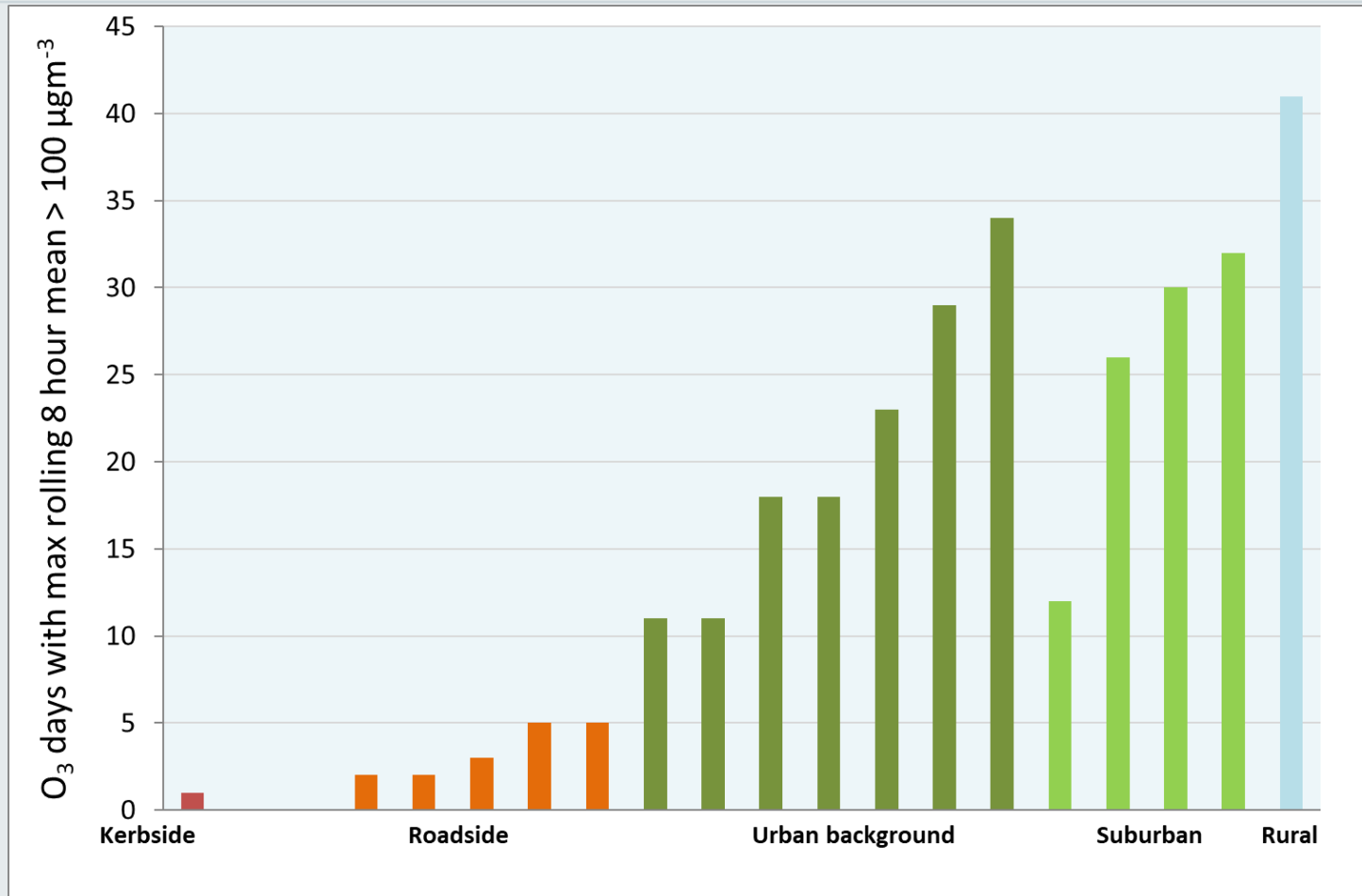Includes LAQN and London AURN sites

PM₁₀ Annual Means

PM₁₀ Days >50 µgm⁻³
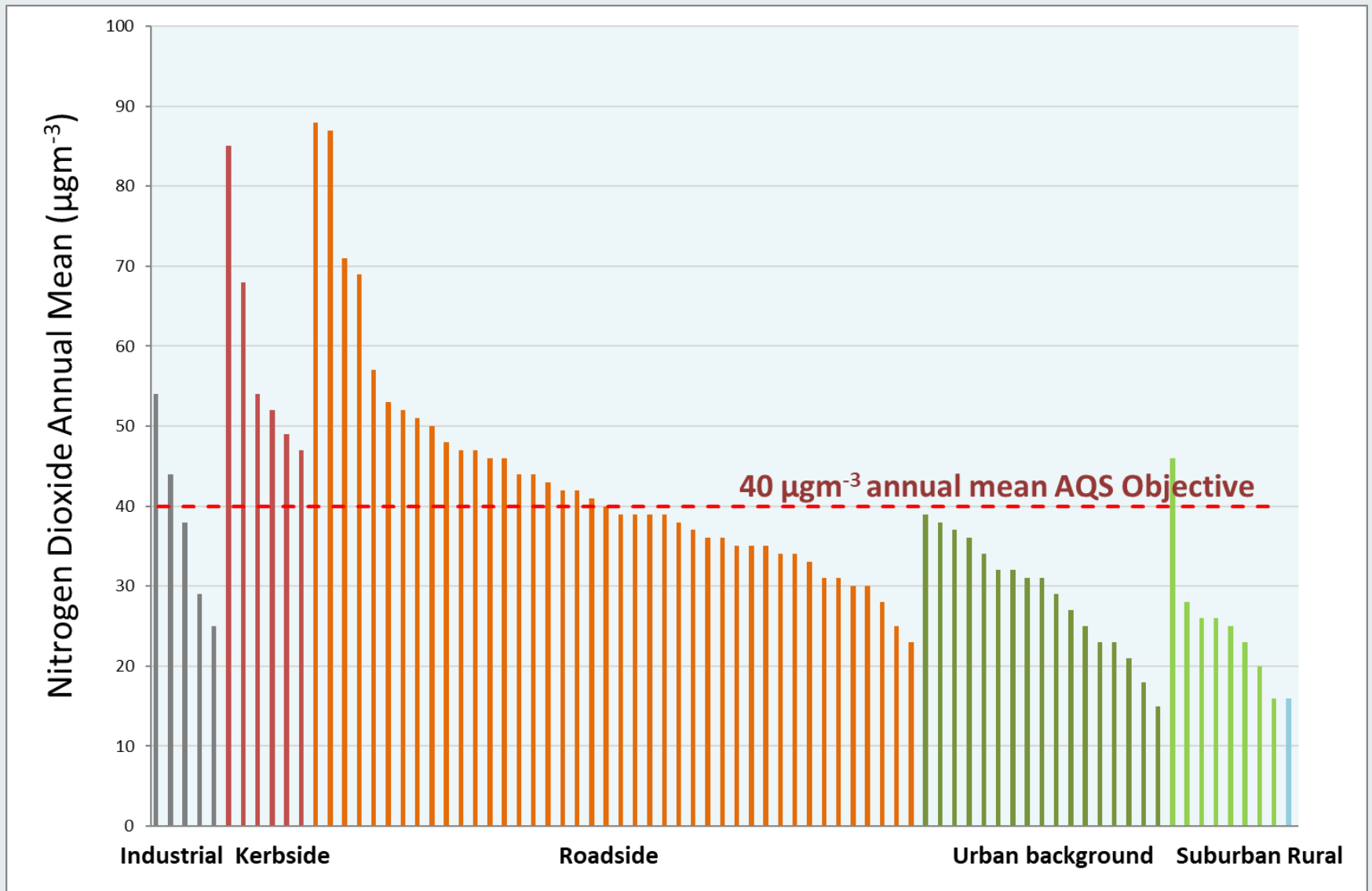
PM$_{2.5}$ Annual Means
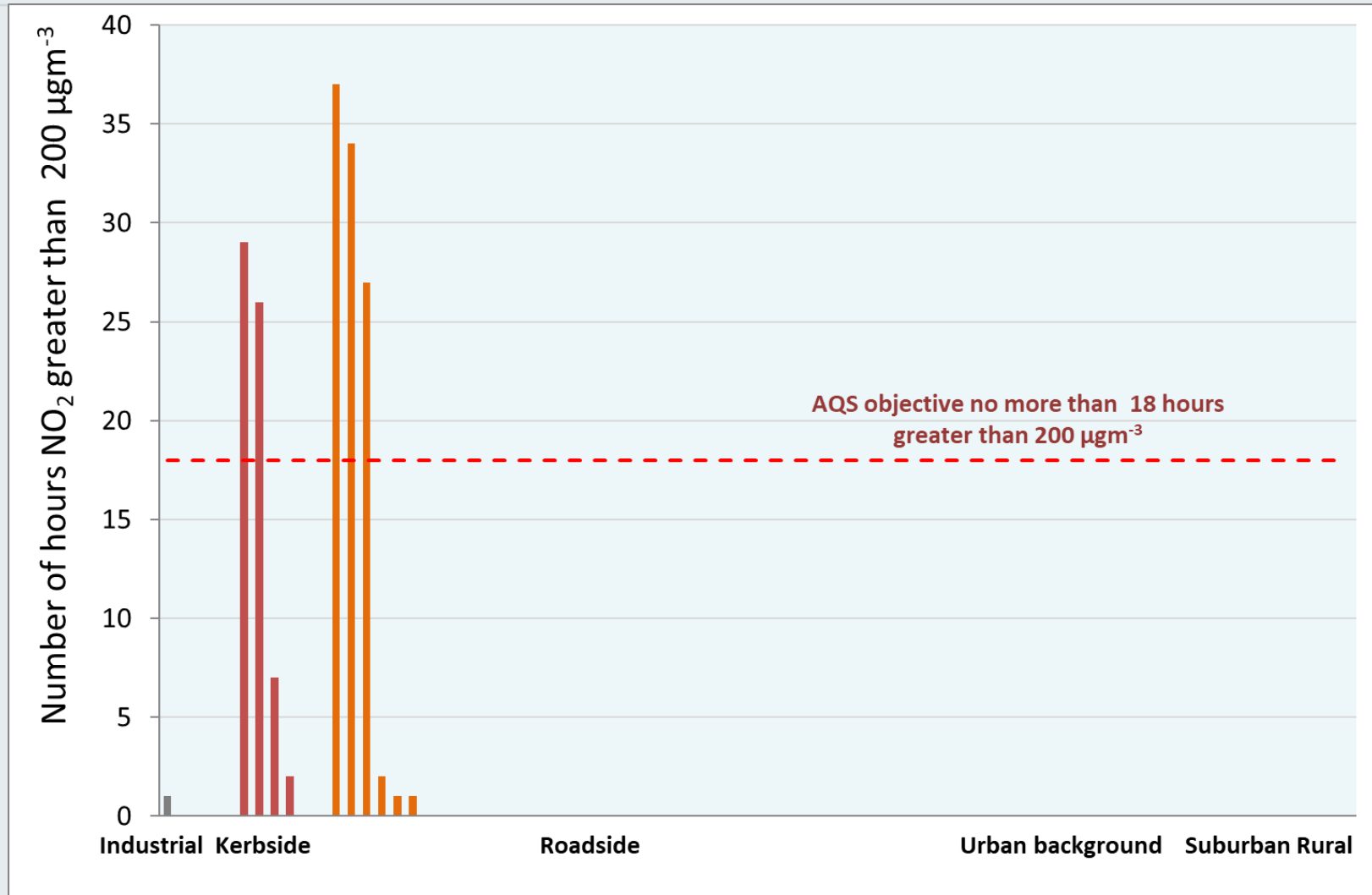
Ozone days Max 8 hour mean >100µgm

Much worse than 2017 (maximum 13 days):- we had a summer !

Sevenoaks, the highest ranking position (52 days) , fell below 90% data capture this year so not shown.

Nitrogen Dioxide Annual Means

Nitrogen Dioxide Hours >200μgm⁻³

Kept in same order as previous annual mean side.

NO$_2$ Hourly Exceedances

Includes LAQN and London AURN sites

LondonAir Data visualisations

Our visualisation pages allow you to look at

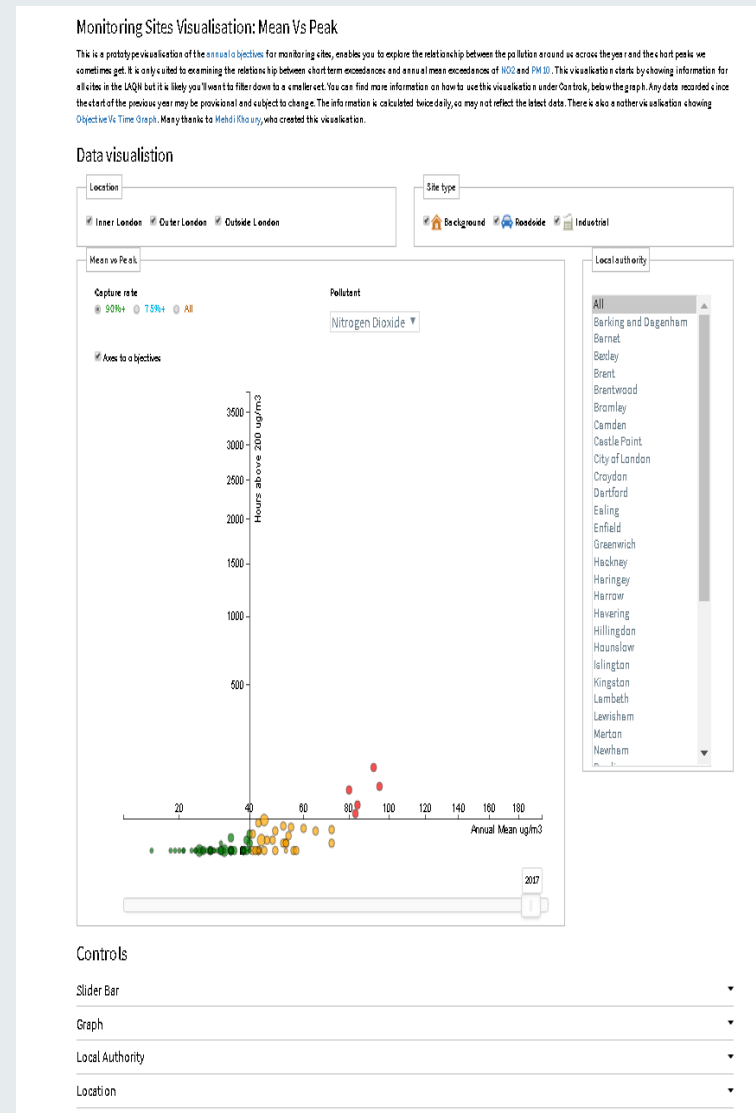- both annual mean and peak exceedances simultaneously. http://www.londonair.org.uk/LondonAir/Data-Visualisations/meanVSpeak.aspx
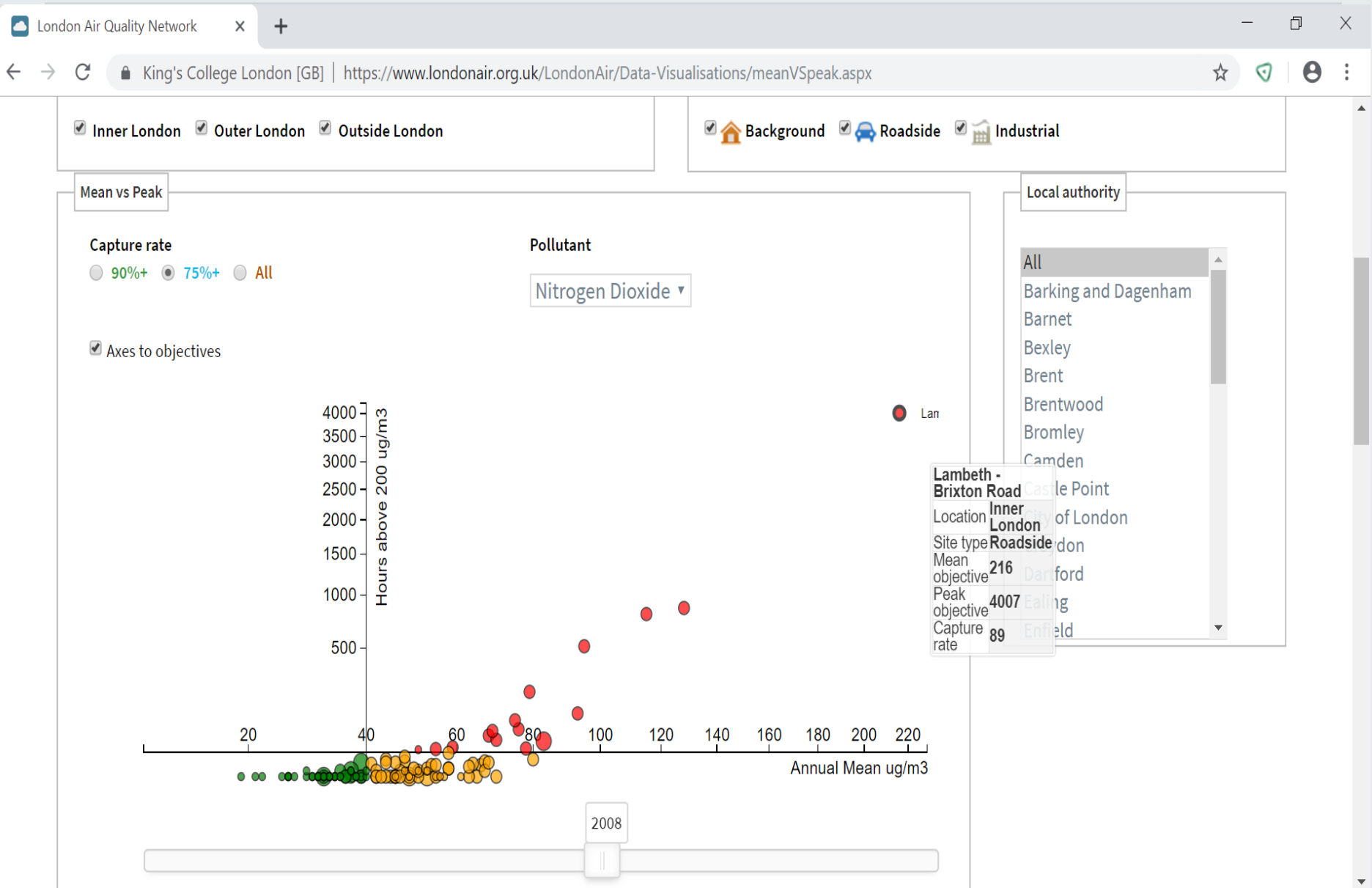
- Or either over time http://www.londonair.org.uk/LondonAir/Data-Visualisations/objectiveVStime.aspx

2008 – 4007 hours of exceedance (NO$_2$)

2010 – 2677 hours of exceedance (NO₂)
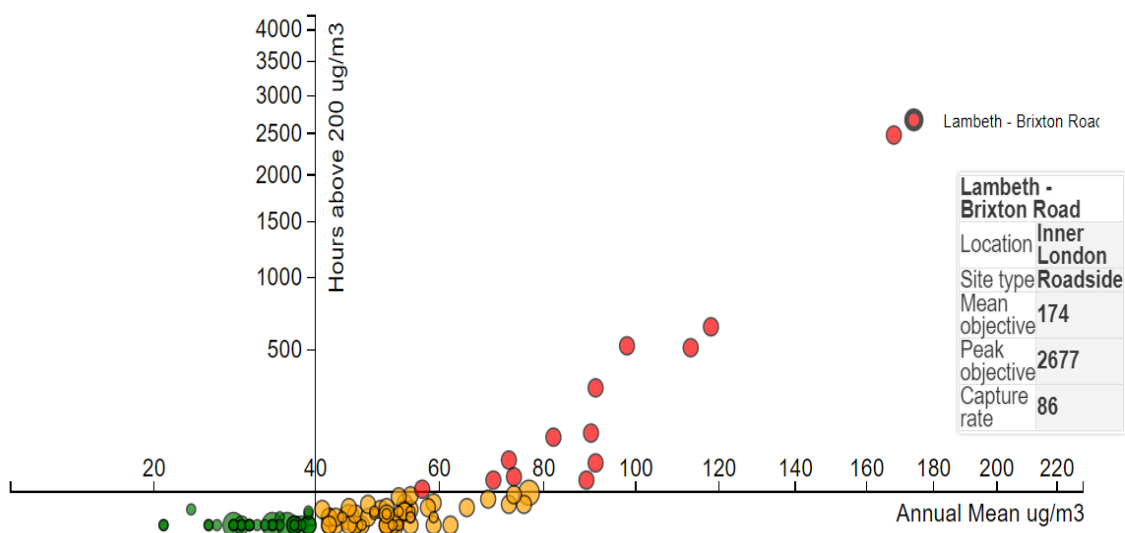
2012 – 2740 hours of exceedance (NO$_2$)
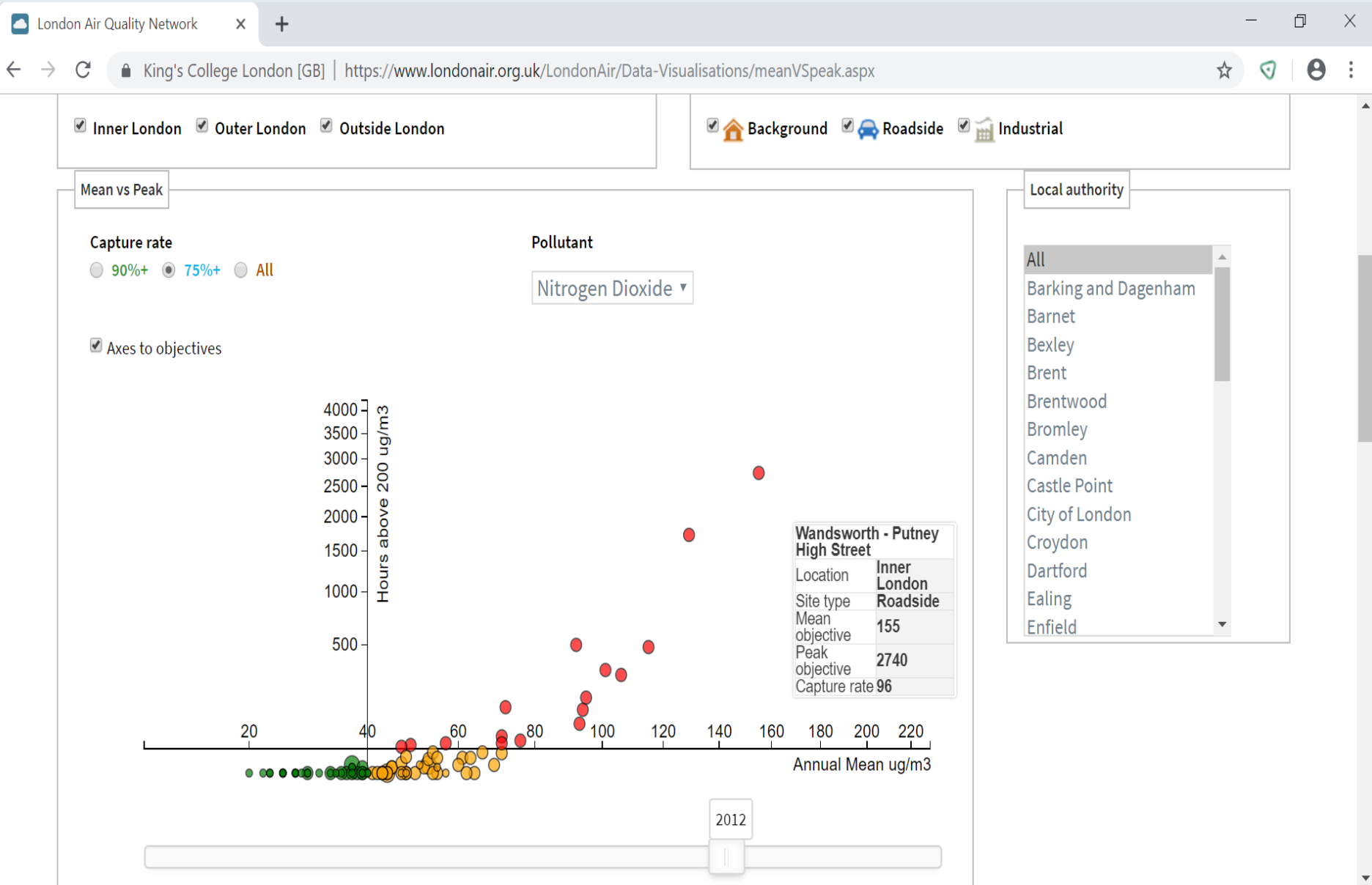
2014 – 2001 hours of exceedance (NO$_2$)
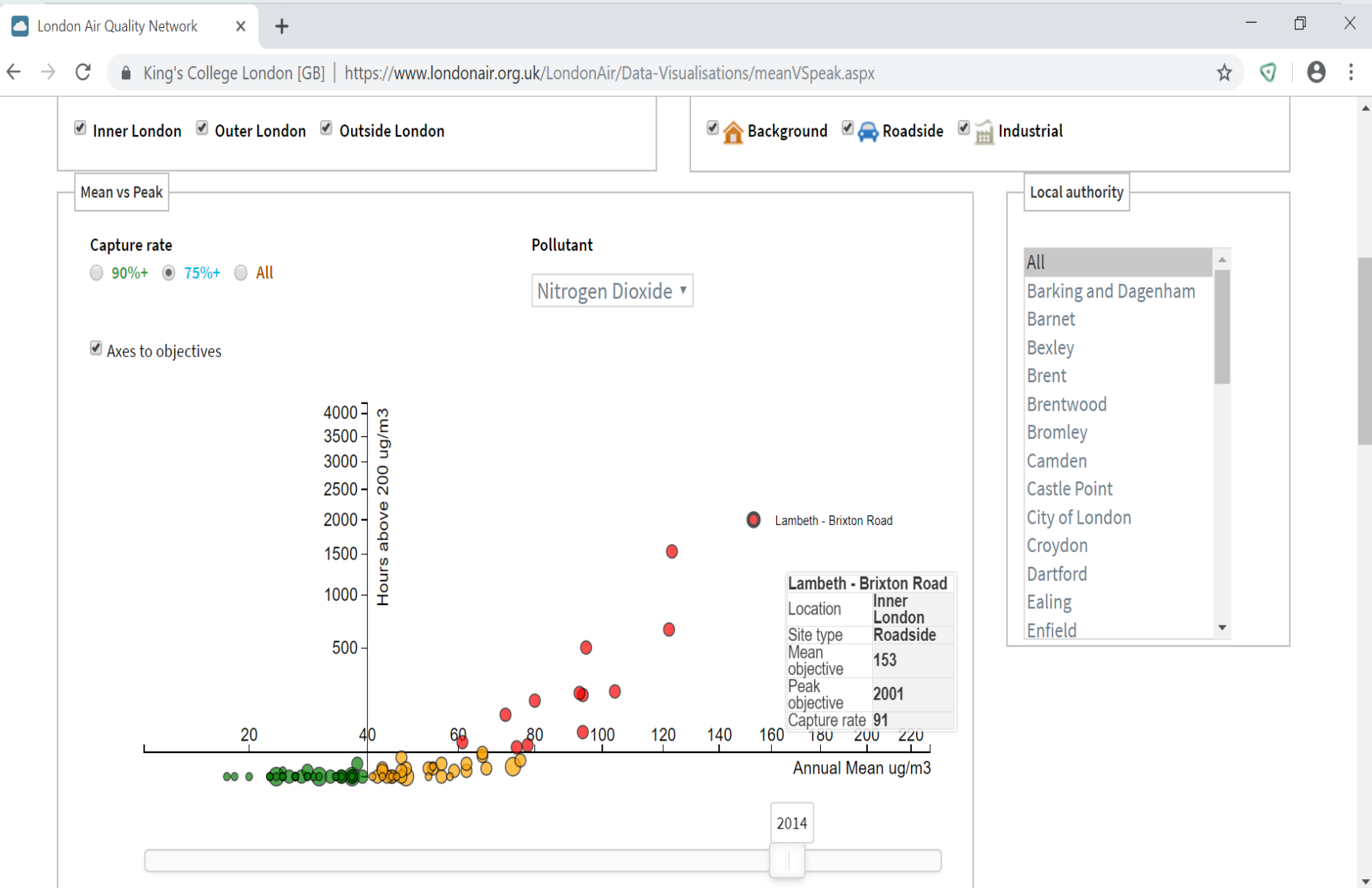
2015 – 1391 hours of exceedance (NO$_2$)

2016 – 1272 hours of exceedance (NO$_2$)

2017 – 126 hours of exceedance (NO$_2$)
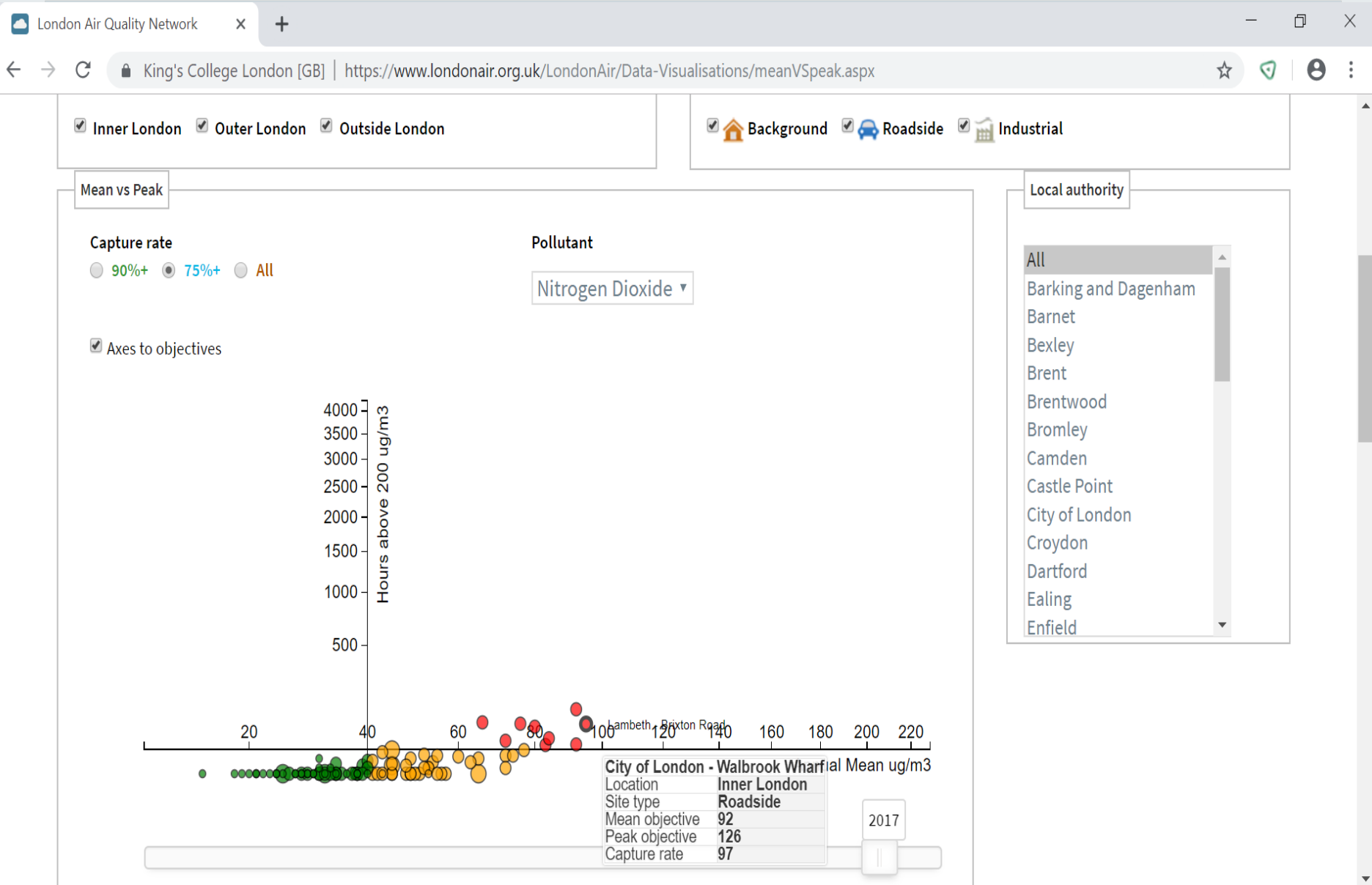
2018 – 34 hours of exceedance (NO$_2$)
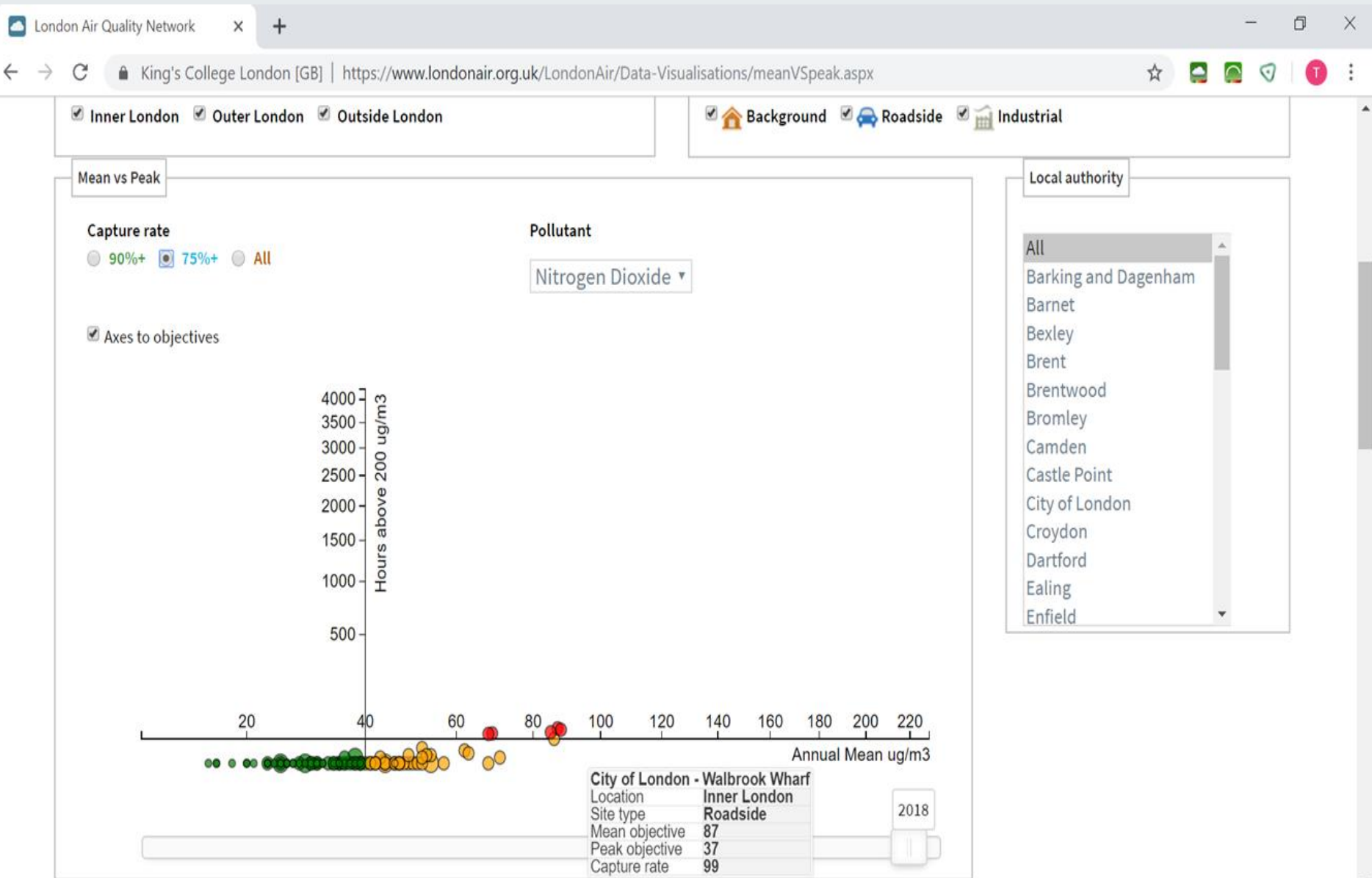
2019 – year to date
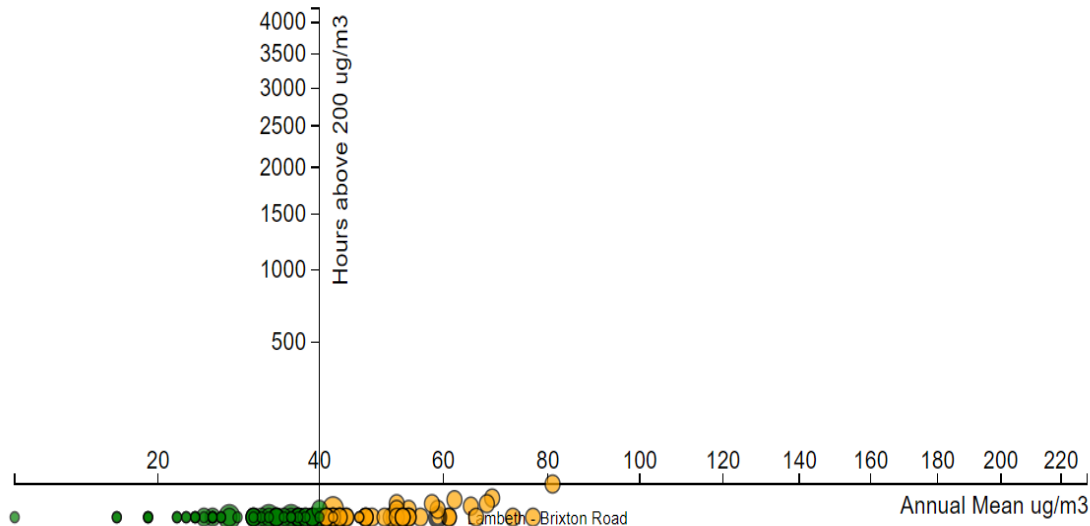
Episodes in 2018

Episodes 2018

21st Feb –PM (Mixed)

2 - 4th March – High PM (secondary + local, significant wood burning)

24 - 25th March – PM (secondary + local)
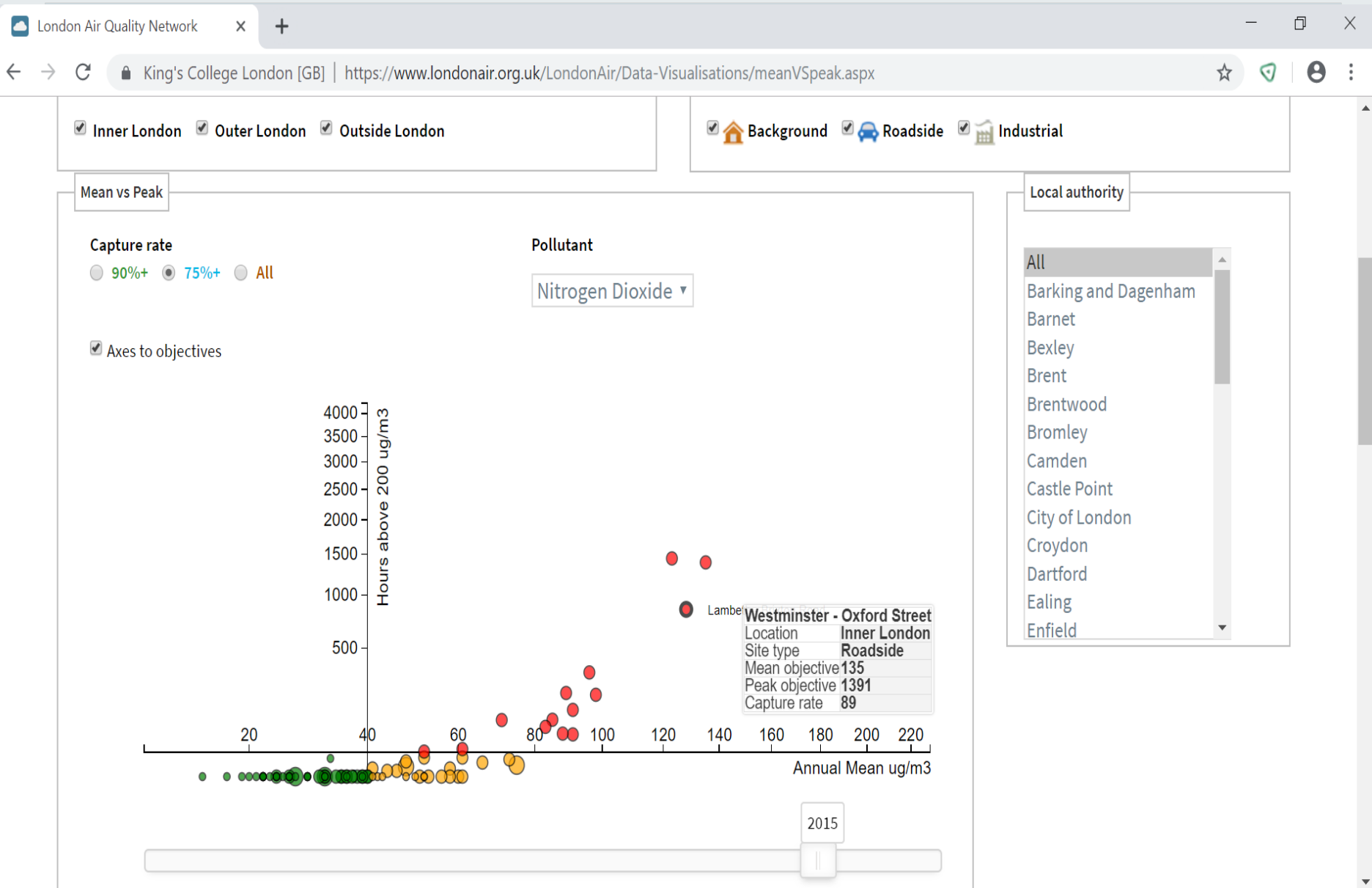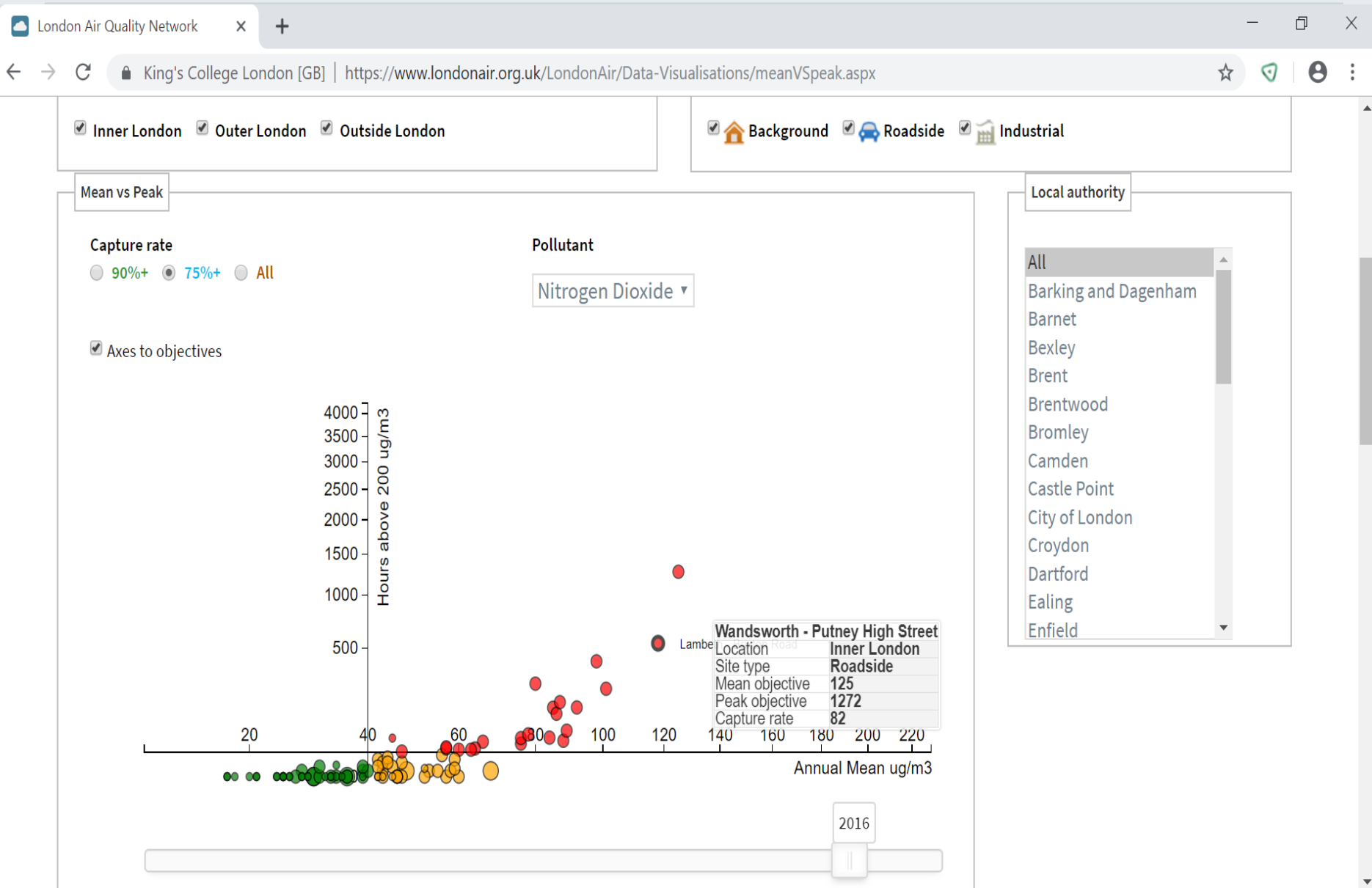
11th April – PM (secondary + local)

19th April –PM,O_3,NO2 (started import ,including agricultural, then local)

21st-22nd April – High PM , O_3 (recirculation of local emissions + import)

5-8th May – PM, O_3 *

23th Jun- 25th Jul – O_3*

10th Oct – PM (mixed)

5th Nov – PM (local)

22- 23rd Nov – PM (secondary)- local took one site Very High

5-8th May (PM & O3)

Ozone

Sevenoaks almost reached High O3

Several roadside sites reached moderate

- Not normal for a secondary pollutant not directly emitted

PM

Lower than expected

Only 10 sites reached Moderate

NOAA HYSPLIT MODEL
Backward trajectories ending at 1400 UTC 08 May 18
GDAS Meteorological Data

Job ID: 17137   Job Start: Fri Jun 21 13:02:41 UTC 2019
Source 1   lat.: 51.500000   lon.: 0.000000   height: 200 m AGL

Trajectory Direction: Backward   Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 8 May 2018 - GDAS1
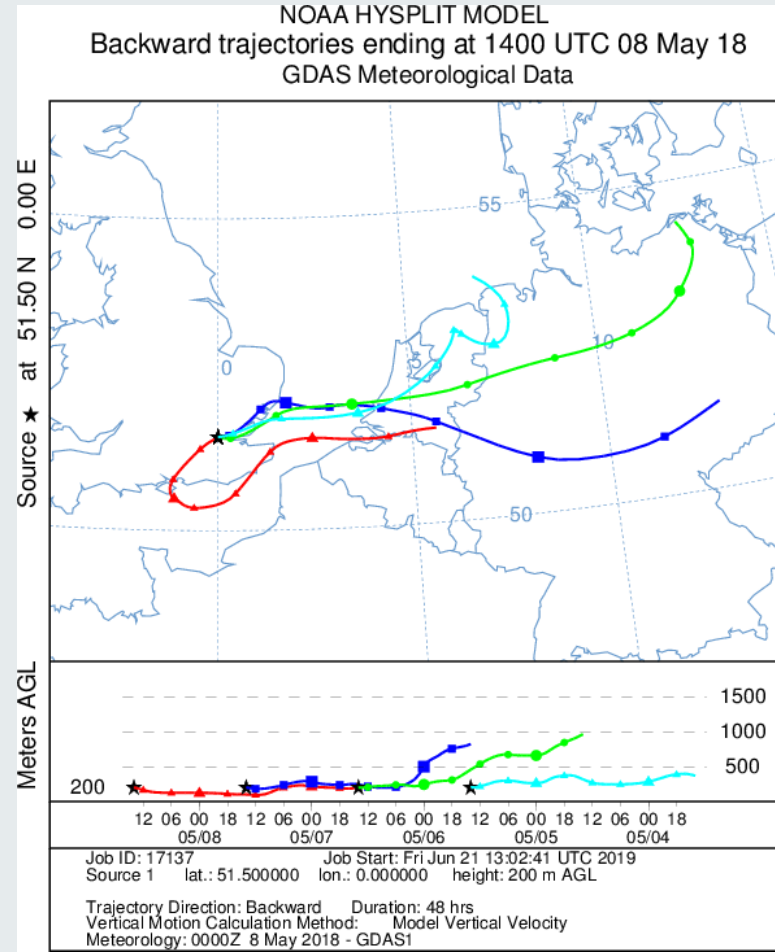
5-8th May (PM & O₃)

Monday 7th – Bank Holiday

- Hottest for 40 years

Poor Spring led to late application of fertiliser to agricultural land

Higher than normal temperatures evaporated this into airborne pollutants (a lot nitrate)
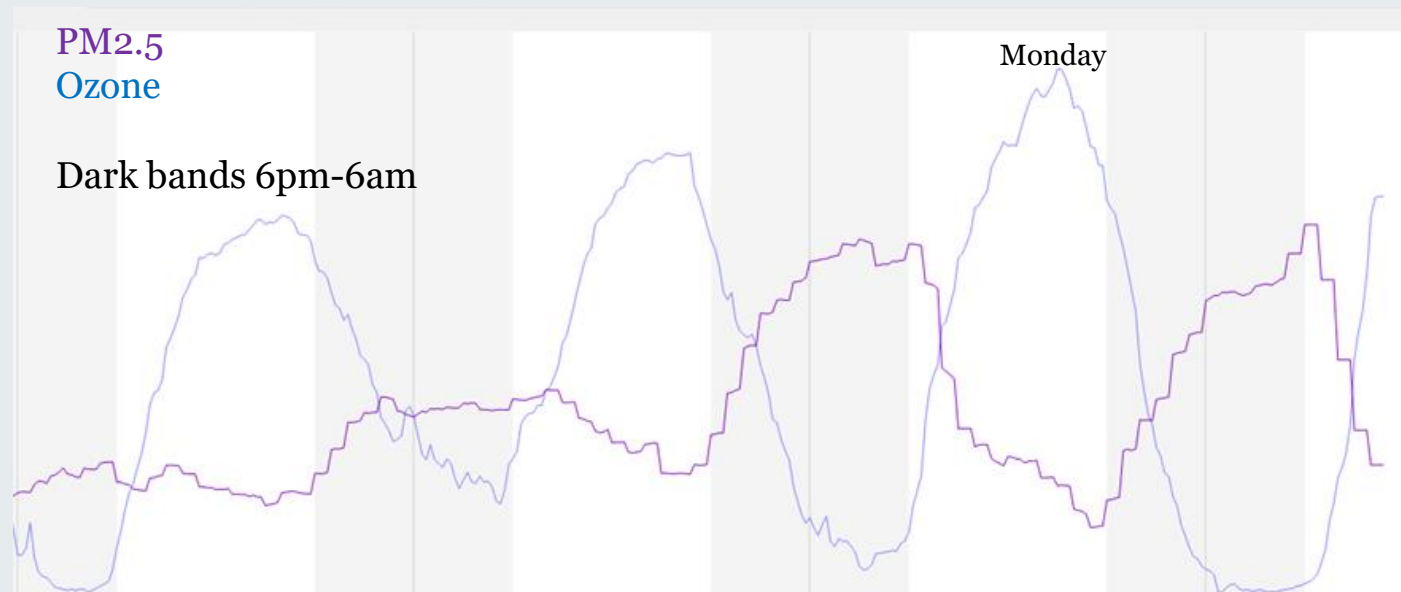
And then drove some of the particle into the gas phase during the day, reducing particles and increasing ozone

PM2.5
Ozone

Dark bands 6pm-6am

Monday

New "supersite" at King's sports ground -Honor Oak Park

June/July 2018 Ozone episode

The episode started on 23rd June and ran until July 27th

Only four days 'low' air pollution during the 35 day period in London and south east England.

The episode included 17 consecutive days of 'moderate' ozone, the greatest number of consecutive days for 10 years.

High (>160µg/m^3 as 8 hour running average) recorded on 5 days

EU information limit (180µg /m^3 hourly) exceeded on 4 days

Last 5 years Mean Ozone (running 8 hour mean)
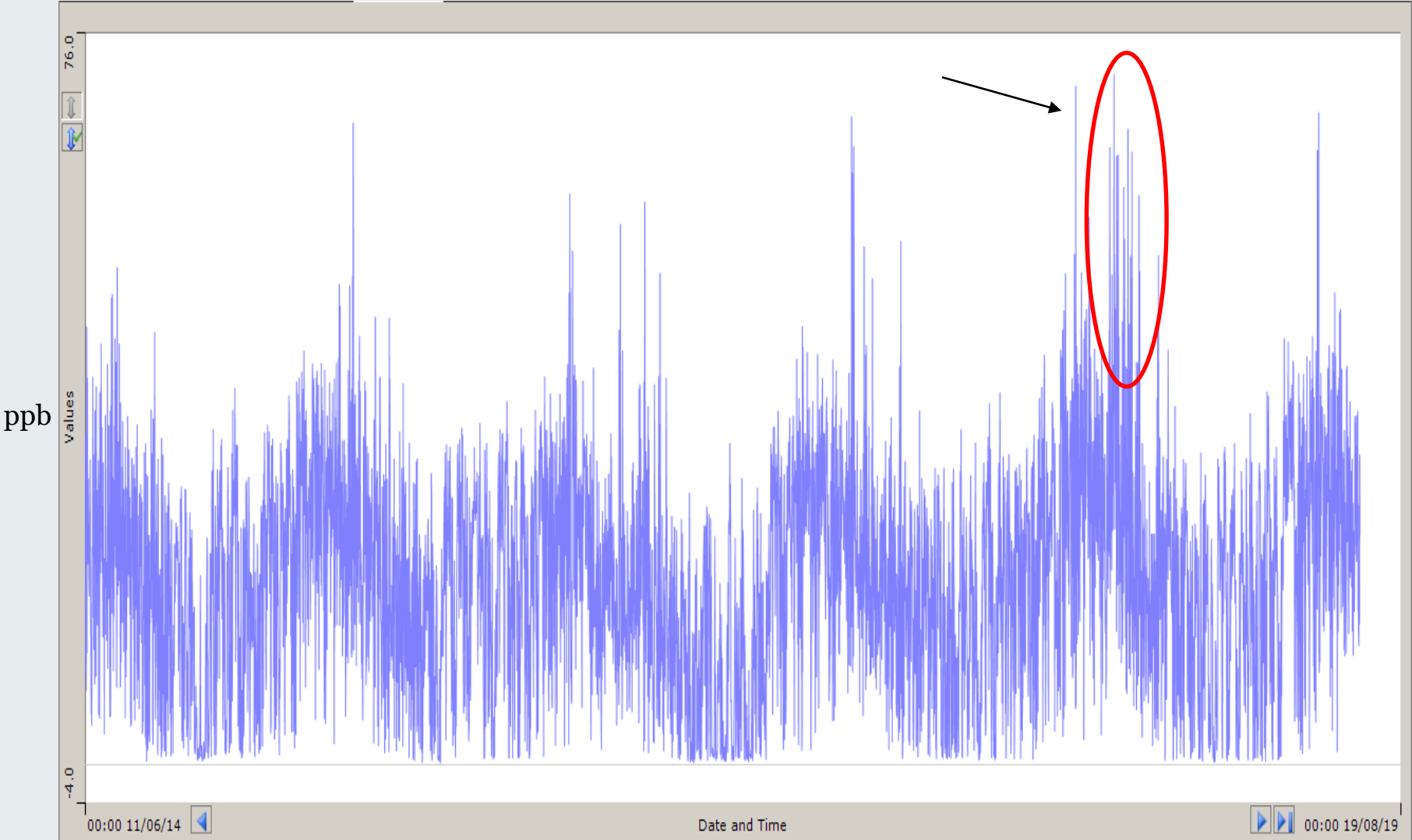
Website developments – poster maker
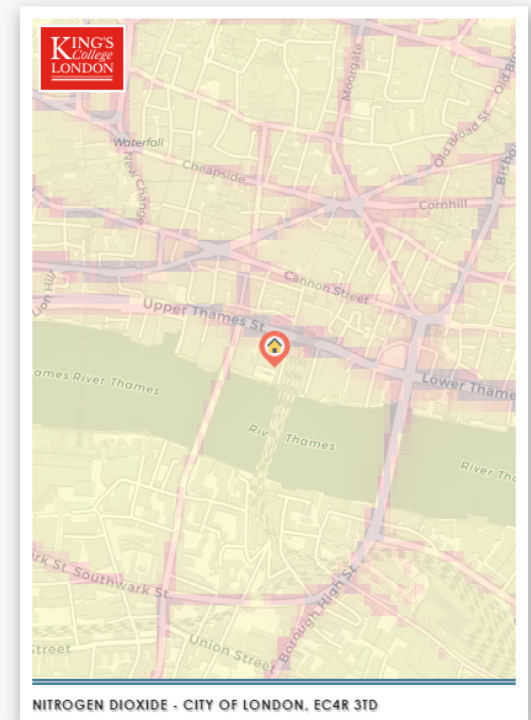
Conclusion

- Many of the "worst places" are getting better for NO2 and PM
- The improvement is not uniform across all locations
  - More work needs to be done to identify the reasons

- Ozone is increasing and will be more of a problem in coming years
  - Impacts the whole population

- New super site will enable us to bring even more understanding to air pollution in and around London.

Thanks to

All the members who support the London Air Quality Network.
        The network and the information it provides only exists through your support.

The team behind me ensuring the quality of the data on a daily basis - for more than 25 years.

And special thanks to Louise Mittal who produced all my graphs !