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LONDON



Air in and around London - the past year

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Contents

- AQ objectives in 2017
 - Trends going to be covered by Gary
- NO₂ Hourly LV exceedance this year, 2018
- Three episodes since June 2017
 - Looking particularly at the influence of weather
- Some new web page functionality and apps

AQ objectives in 2017

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

New map based interface on LondonAir

New this year on LondonAir a map based interface to AQ objectives annual statistics . Search by borough and see also site type.

<https://www.londonair.org.uk/LondonAir/LATools/AnnualAirQuality.aspx>

London Air

FORCAST TODAY MODERATE TOMORROW MODERATE

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Air Pollution - Information - Monitoring - Tools - Quick Links (Public)

You are on this page: Home >> Data >> Annual Air Quality Objectives

Air Quality Objectives

The Air Quality Objectives tool accesses compliance with the Government's AQ Objectives over any twelve month period as defined by the start date.

Find annual objectives:


Select borough: All

Select site: Greenwich - Westthorne Avenue - Roadside

Select a start date: 01-01-2017

View

Monitoring sites:

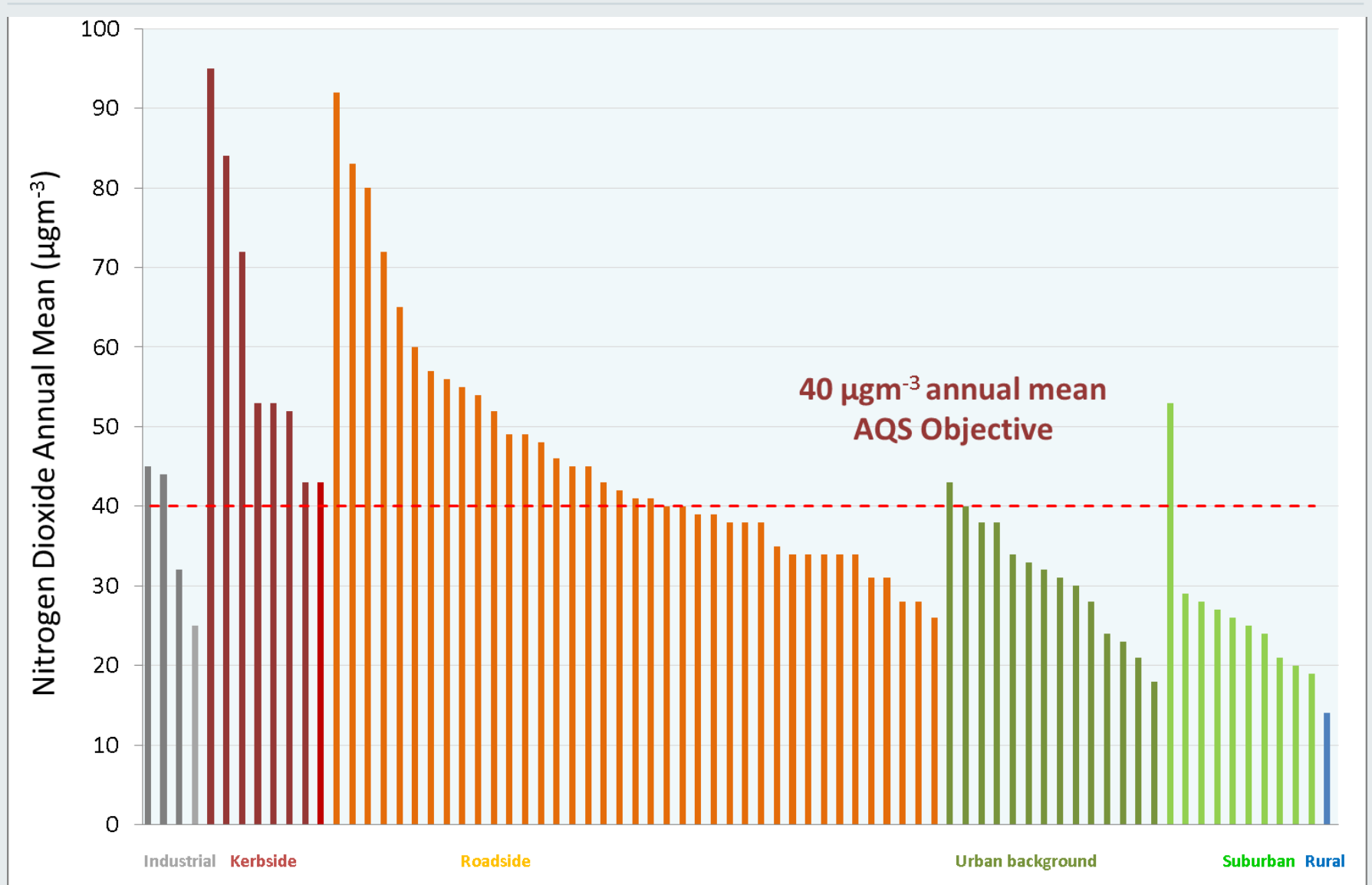


Download as CSV

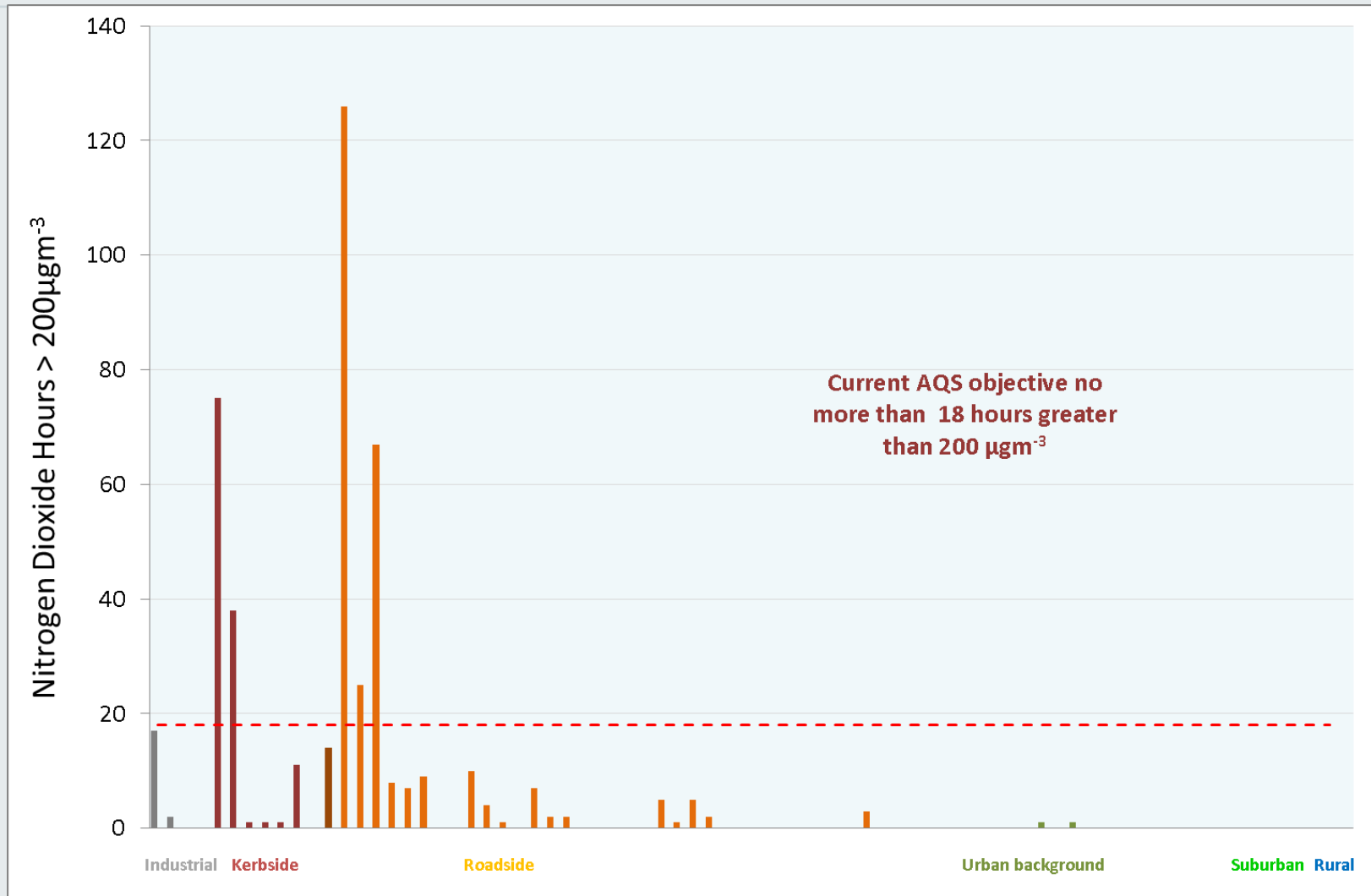
Annual Objectives - (Date range one year from 1-1-2017)

Site	Type	Pollutant	Objective	Result	Capture Rate(%)	Achieved Objective
Greenwich - Westthorne Avenue	Roadside	NR nitrogen Dioxide	200 ug/m3 as a 1 hour mean, not to be exceeded more than 18 times a year	2	97%	YES
Greenwich - Westthorne Avenue	Roadside	NR nitrogen Dioxide	40 ug/m3 as a annual mean	39	97%	YES
Greenwich - Westthorne Avenue	Roadside	Ozone	100 ug/m3 as a 8 hour mean, not to be exceeded more than 30 times a year	0	97%	YES
Greenwich - Westthorne Avenue	Roadside	PM10 Particulate	40 ug/m3 as a annual mean	21	97%	YES
Greenwich - Westthorne Avenue	Roadside	PM10 Particulate	50 ug/m3 as a 24 hour mean, not to be exceeded more than 35 times a year	35	97%	YES
Greenwich - Westthorne Avenue	Roadside	PM2.5 Particulate	25 ug/m3 as a annual mean	11	99%	YES

Nitrogen Dioxide Annual Means



Nitrogen Dioxide Hours > 200 $\mu\text{g}\text{m}^{-3}$



Kept in same order as previous annual mean side.

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>

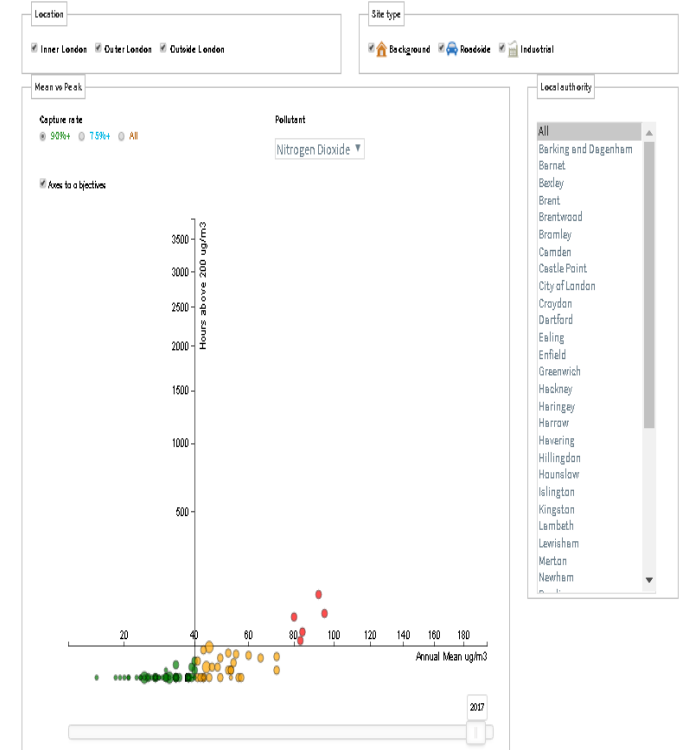
- Or either over time

<http://www.londonair.org.uk/LondonAir/Data-Visualisations/objectiveVStime.aspx>

Monitoring Sites Visualisation: Mean Vs Peak

This is a prototype visualisation of the annual objectives for monitoring sites, enables you to explore the relationship between the pollution around us across the year and the short peak we sometimes get. It is only useful to examining the relationship between short term exceedances and annual mean exceedances of NO_2 and PM_{10} . This visualisation starts by showing information for all sites in the LAQH but it is likely you'll want to filter down to a smaller set. You can find more information on how to use this visualisation under Controls, below the graph. Any data recorded since the start of the previous year may be provisional and subject to change. The information is calculated twice daily, so may not reflect the latest data. There is also a rather nice visualisation showing Objective Vs Time Graph. Many thanks to Mehdi Khoury, who created this visualisation.

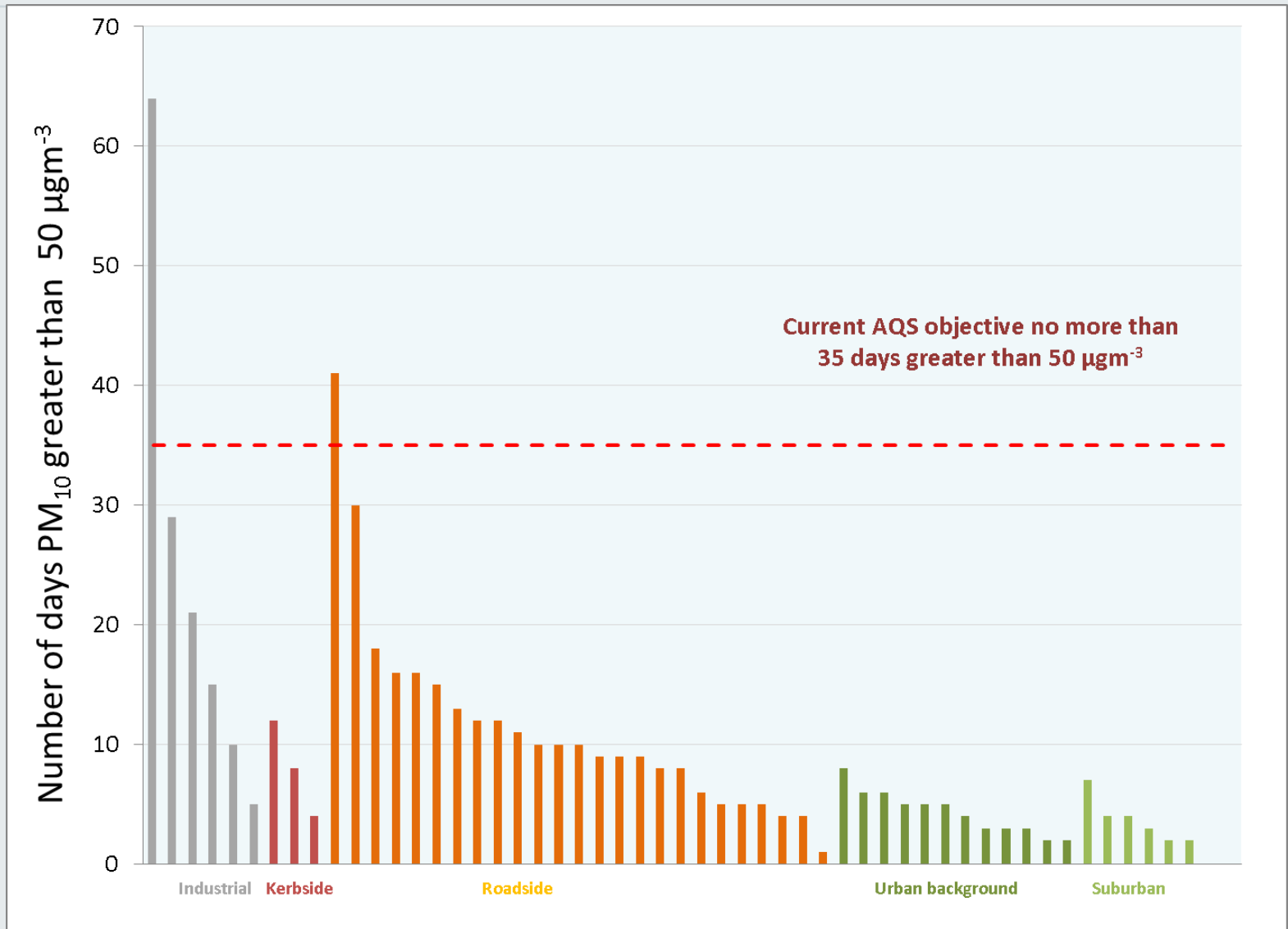
Data visualisation



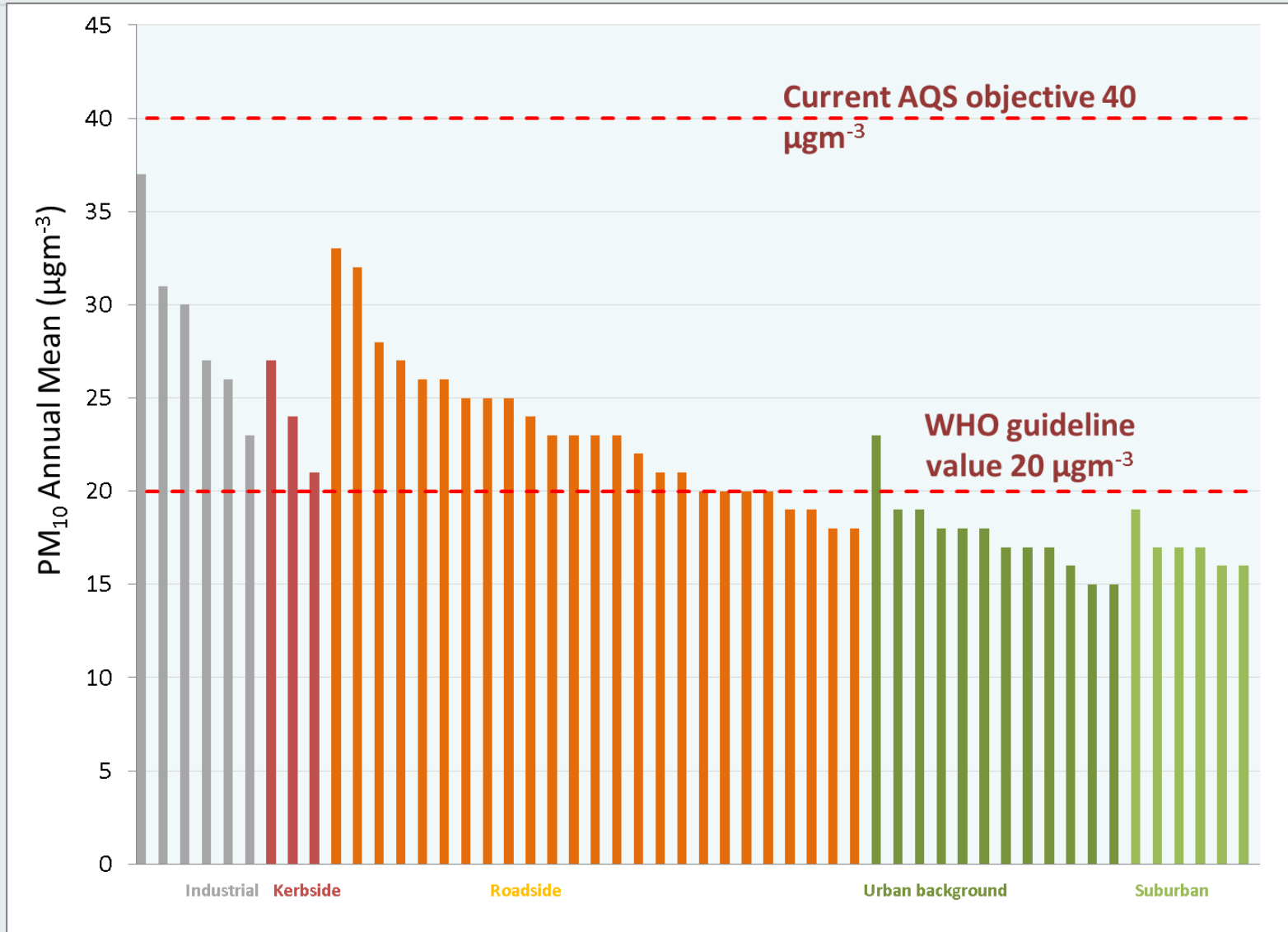
Controls

- Slider Bar
- Graph
- Local Authority
- Location

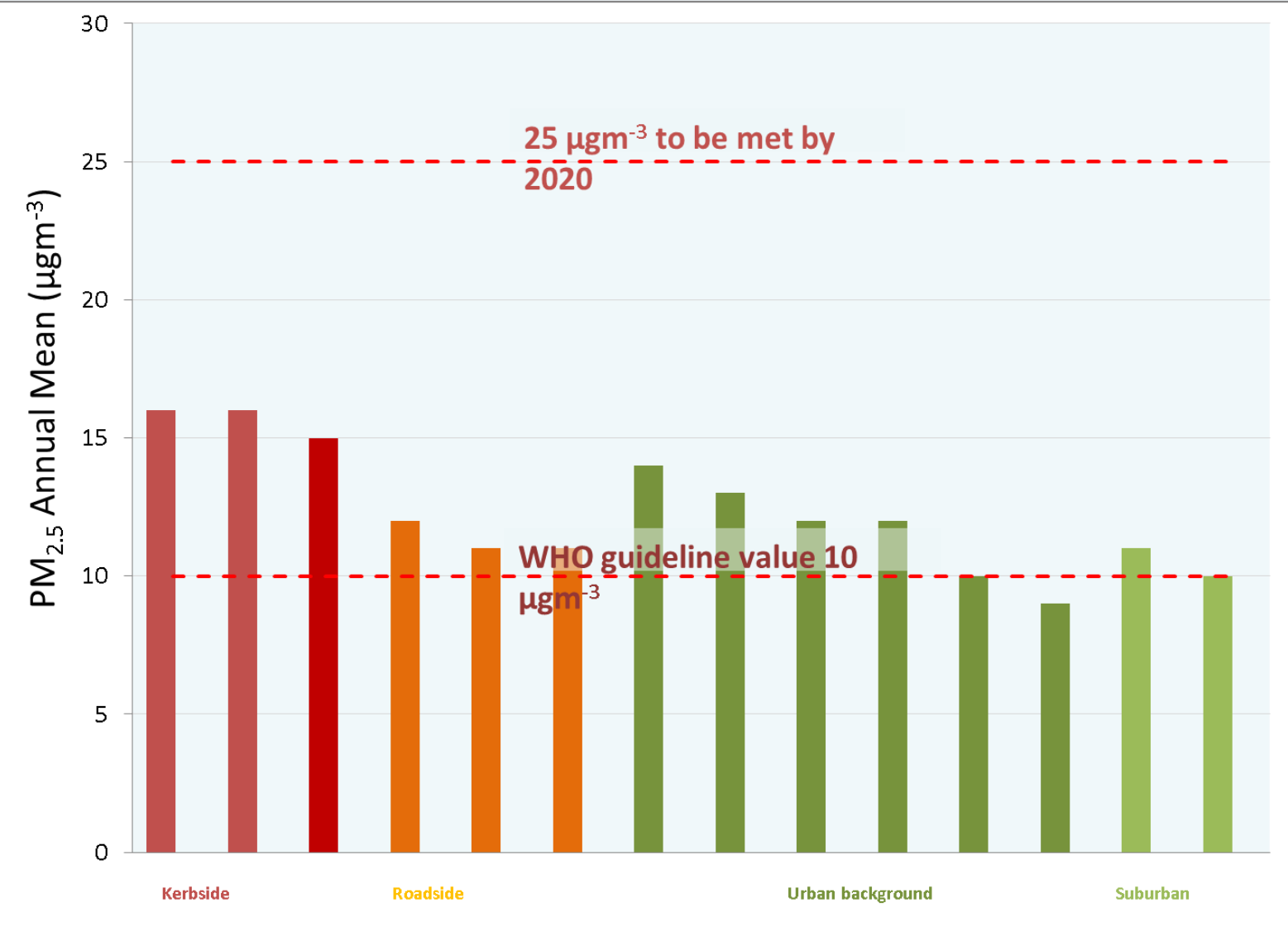
PM₁₀ Days >50 μgm⁻³



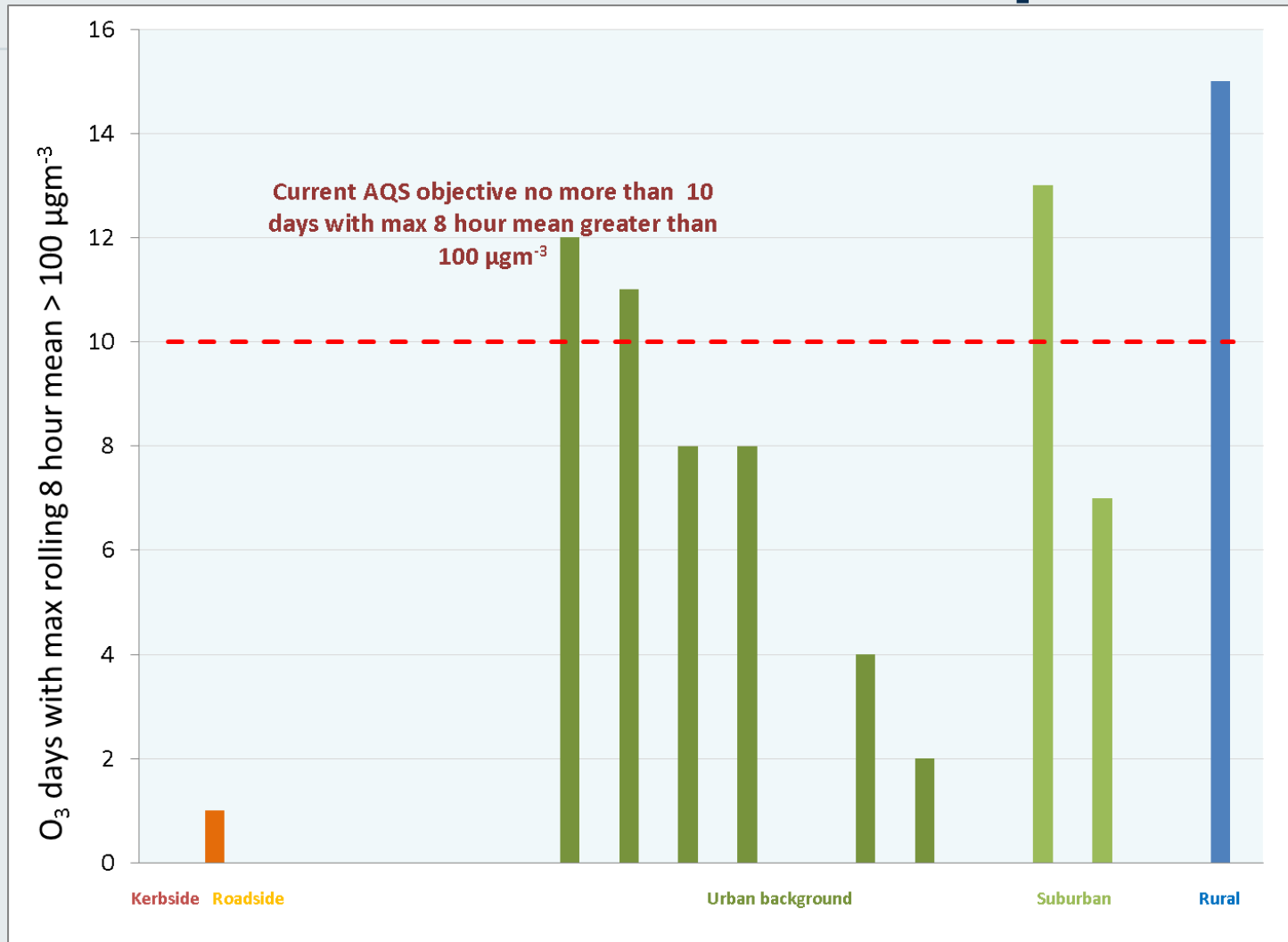
PM₁₀ Annual Means



PM_{2.5} Annual Means



Ozone days Max 8 hour mean >100µgm



Several sites which would usually be in high ranking positions fell below 90% data capture this year so not shown.

Influence of Weather

Influence of weather

Both local weather and regional weather impact measurements

Look at how weather;

- **Controls where pollution goes (if at all)**
- **Can influence what emissions are released and when**
- **Can influence what reactions occur in the atmosphere**

Where the wind blows

Roadside



Or maybe not

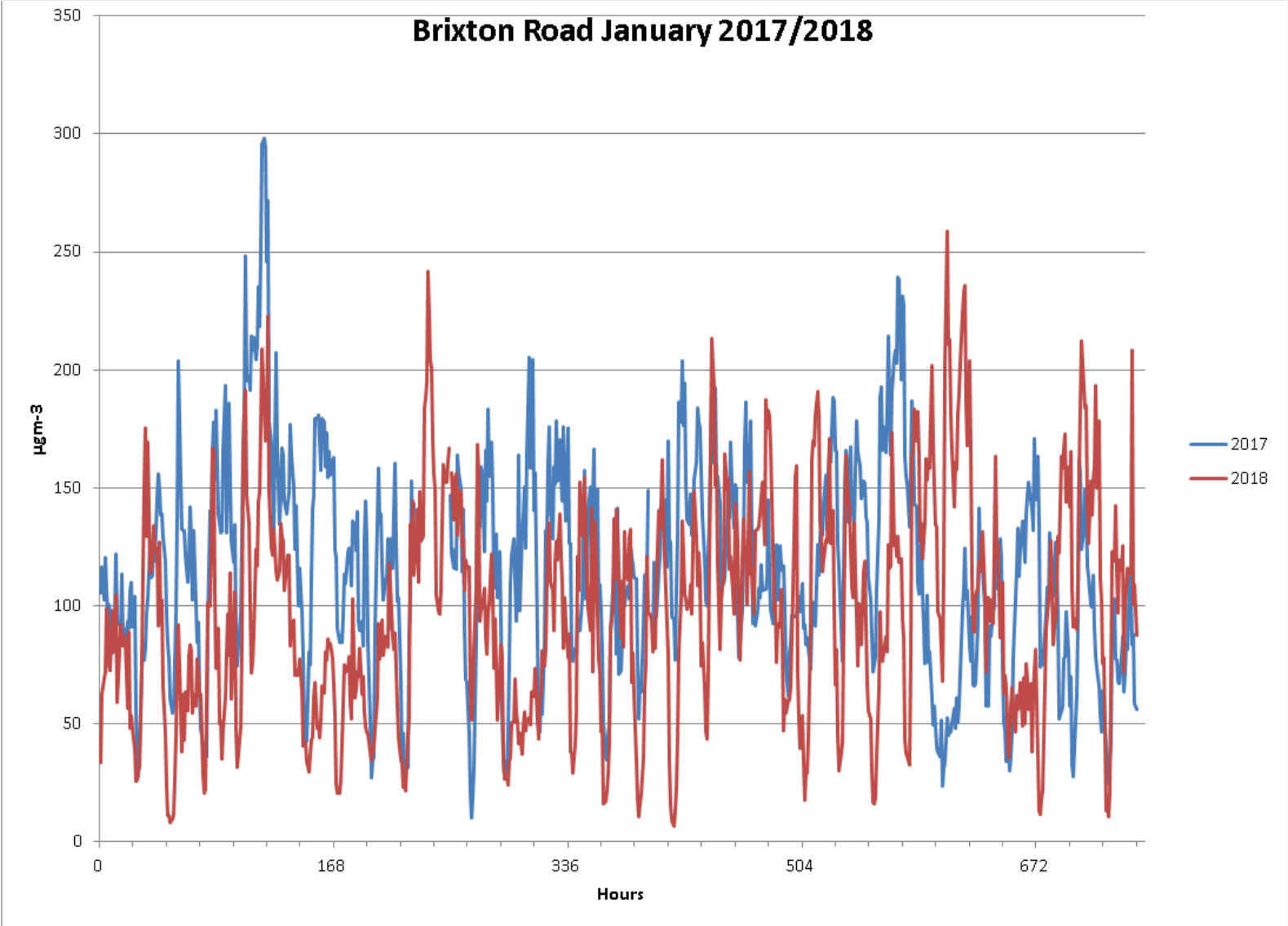


Google Maps

NO₂ Hourly Exceedances last 10 years

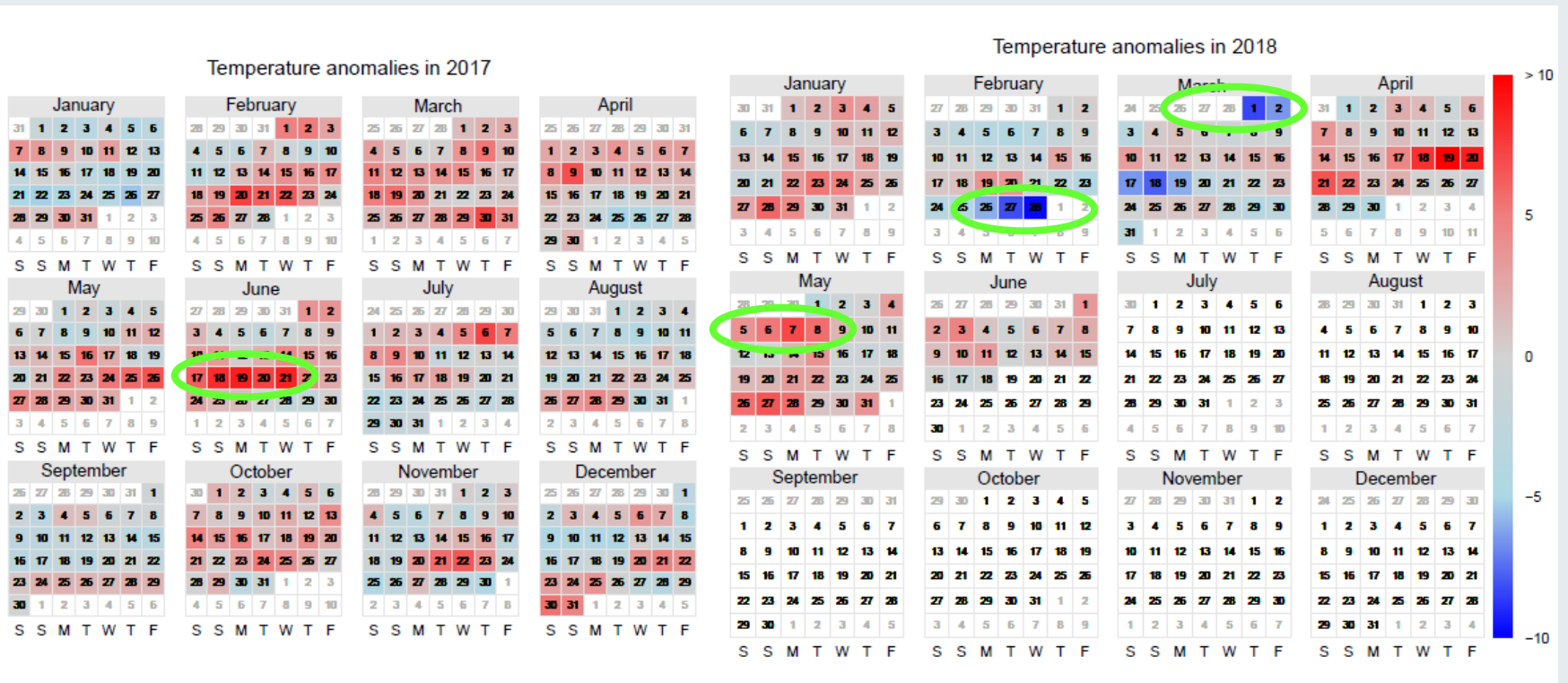
SiteName	Time of 19th Hour >200µg/m³
Lambeth - Brixton Road	06/01/2008 13:00
Lambeth - Brixton Road	03/01/2009 13:00
Lambeth - Brixton Road	03/01/2010 20:00
Lambeth - Brixton Road	03/01/2011 14:00
Wandsworth - Putney High Street	03/01/2012 17:00
Wandsworth - Putney High Street	03/01/2013 11:00
Westminster - Oxford Street	03/01/2014 20:00
Westminster - Oxford Street	02/01/2015 21:00
Kensington and Chelsea - Knightsbridge	06/01/2016 18:00
Wandsworth - Putney High Street	06/01/2017 17:00
Lambeth - Brixton Road	31/01/2018 20:00

NO₂ LV breach 2017 – 2018 (Brixton Road)



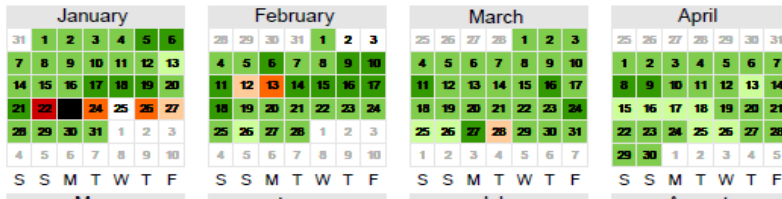
Temperature anomalies 2017-2018

(Last 40 years London Heathrow Met. data)



"Beast from the East" – Feb-Mar 2018 (Marylebone Road)

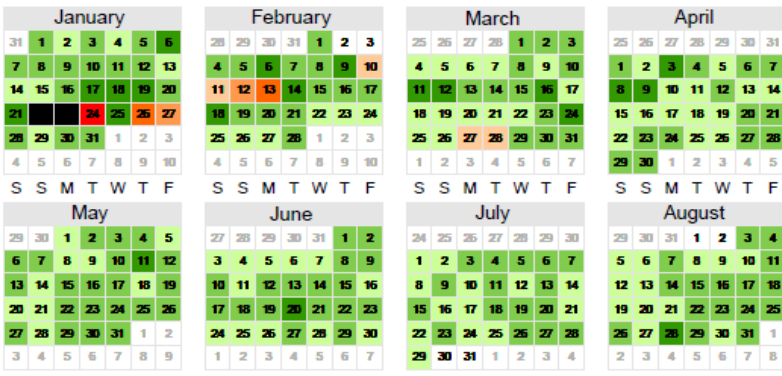
PM₁₀ in 2017



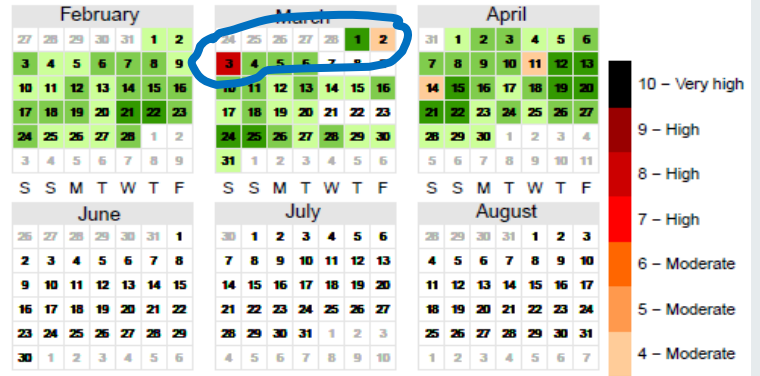
PM₁₀ in 2018



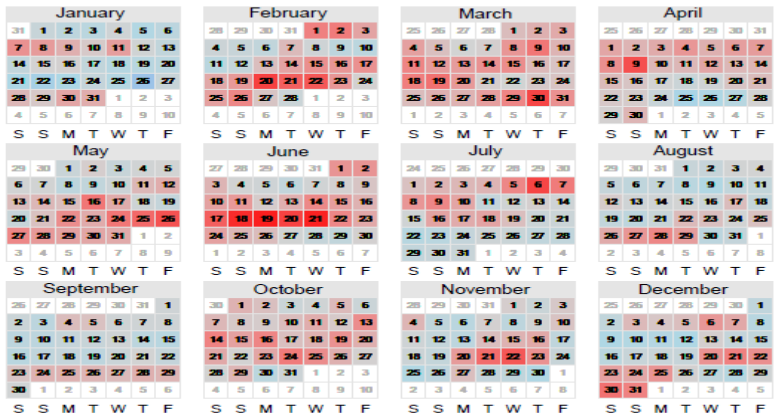
PM_{2.5} in 2017



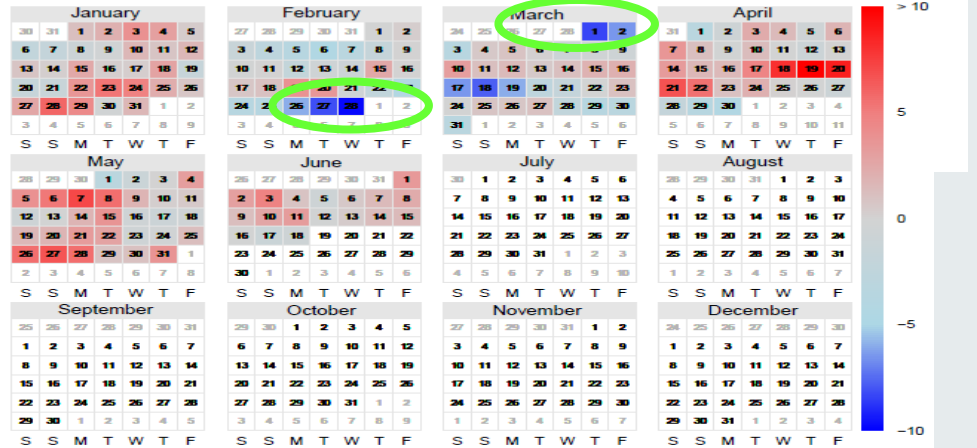
PM_{2.5} in 2018



Temperature anomalies in 2017



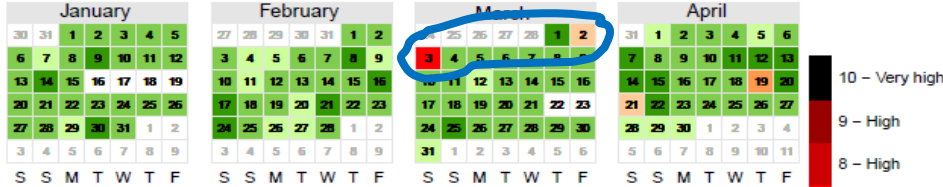
Temperature anomalies in 2018



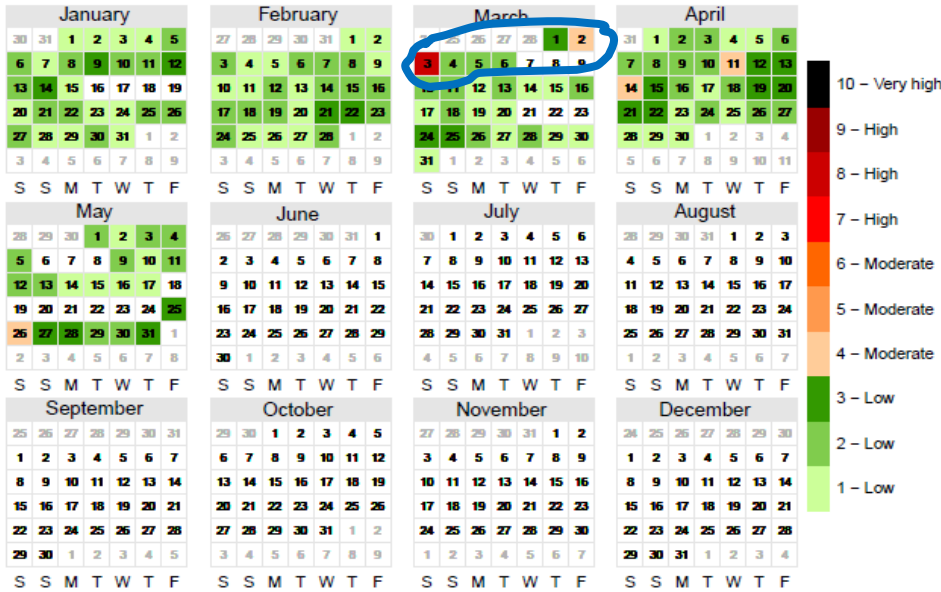
"Beast from the East" – Feb-Mar 2018

Marylebone Road

PM₁₀ in 2018



PM_{2.5} in 2018

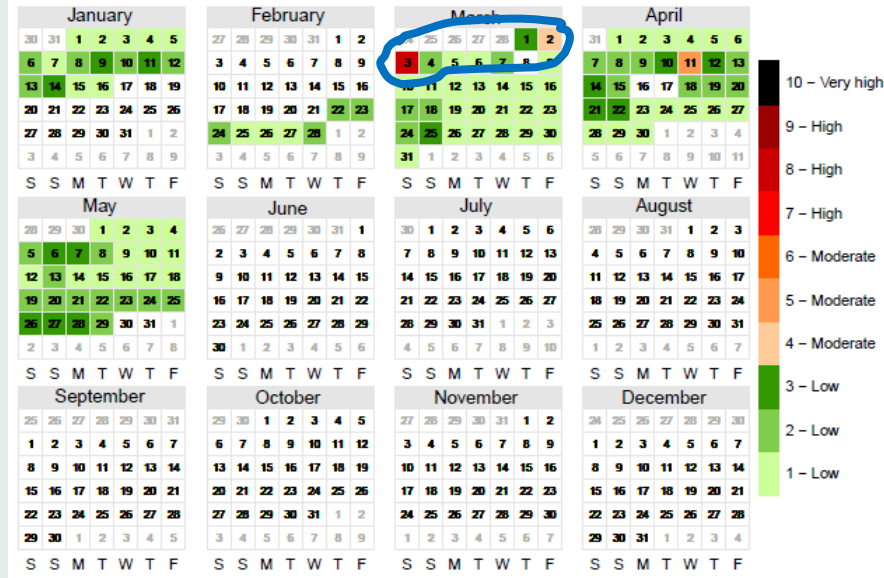


Greenwich Eltham

PM₁₀ in 2018

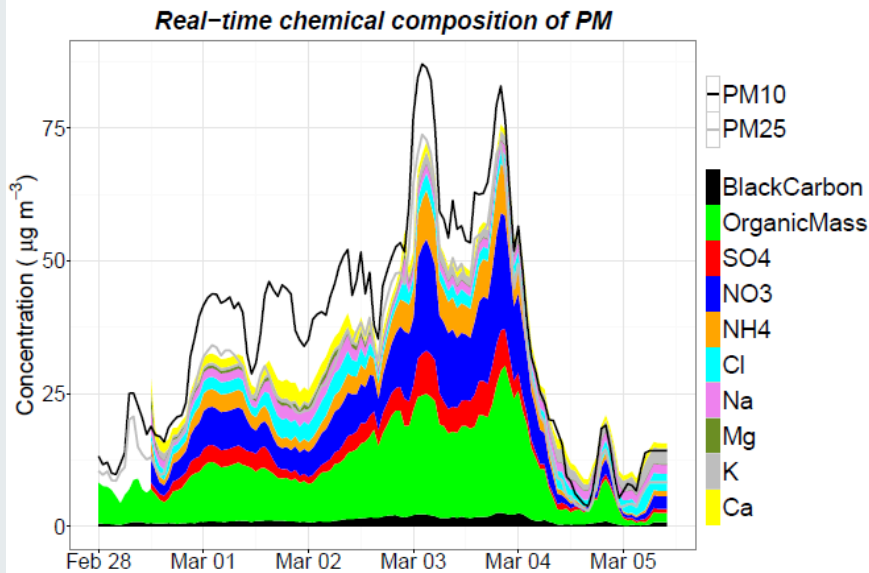


PM_{2.5} in 2018



“Beast from the East”

Chemical composition of PM London Background 05 Mar 2018



- *Black Carbon – diesel vehicles and wood burning;
- *Organic Mass – both local (traffic, wood burning and cooking) and distant sources;
- *SO₄ – industry;
- *NO₃ – both distant and local sources (traffic, and domestic heating);
- *NH₄ – agriculture;
- *Cl, Na and Mg – sea salt produced from breaking waves;
- *K – wood burning and wind-blown soil;
- *Ca – resuspended soil and construction;

What happened ? – not forecast by anyone

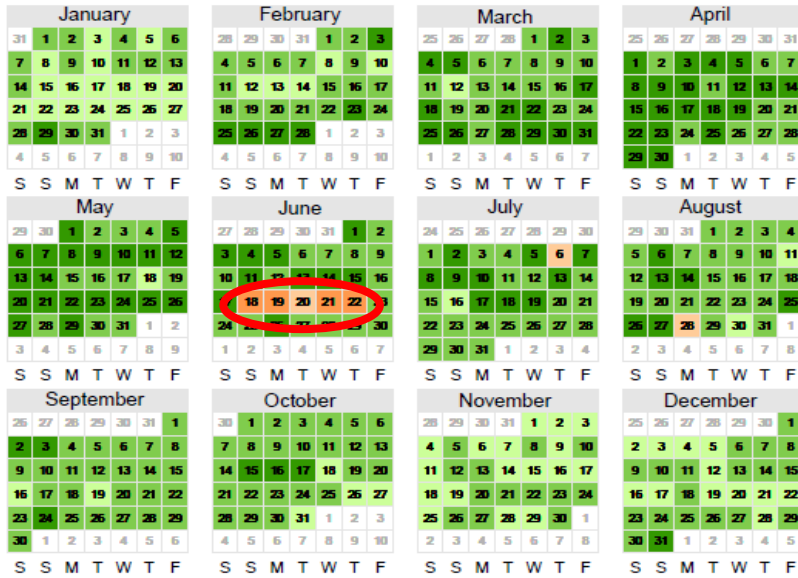
- Snow and very cold
- Europe suffering the same
- Started with Easterly wind importing pollution from continent
- by 3rd recirculation over SE England and N France

Some people stayed at home

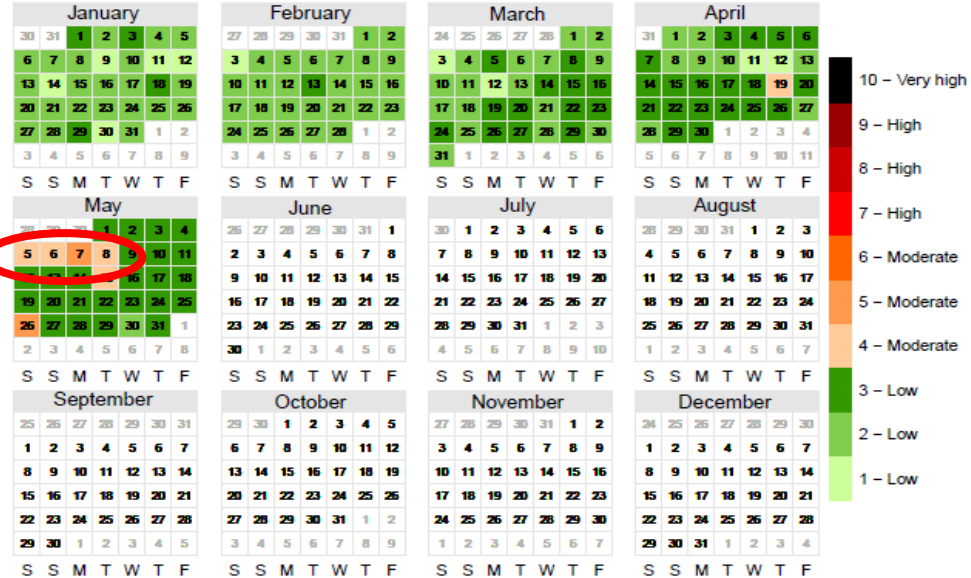
- Heating on at work and at home, and both higher (look at **Blue**, with peaks in evening).
- Friday/Saturday (2/3rd) increase in wood burning both locally and imported (look at **Green Organic Mass**)

Ozone episodes 2017-2018 (Greenwich Eltham)

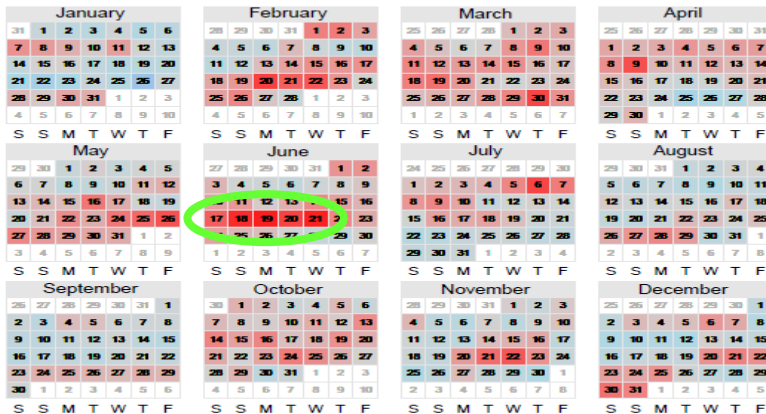
O₃ in 2017



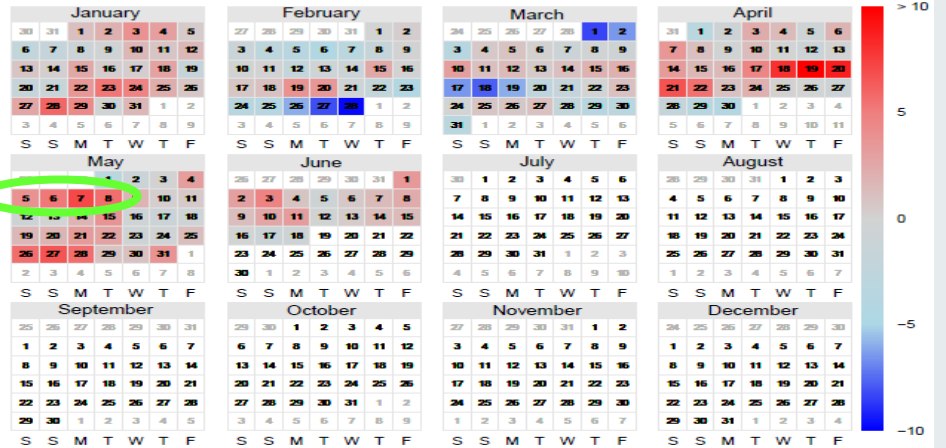
O₃ in 2018



Temperature anomalies in 2017



Temperature anomalies in 2018



Ozone episode June 2017

Ground-level ozone production requires ;

1. ozone precursor chemicals

- oxides of nitrogen
- Volatile Organic Compounds (VOCs)
- carbon monoxide

2. time in strong sunshine to power conversion of these chemicals into ozone.

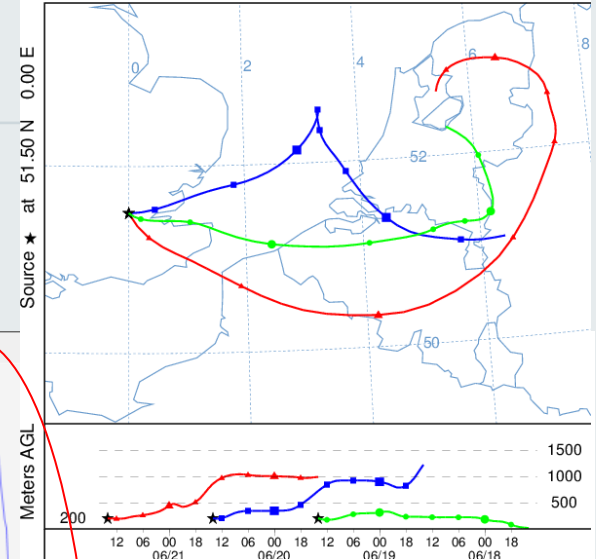
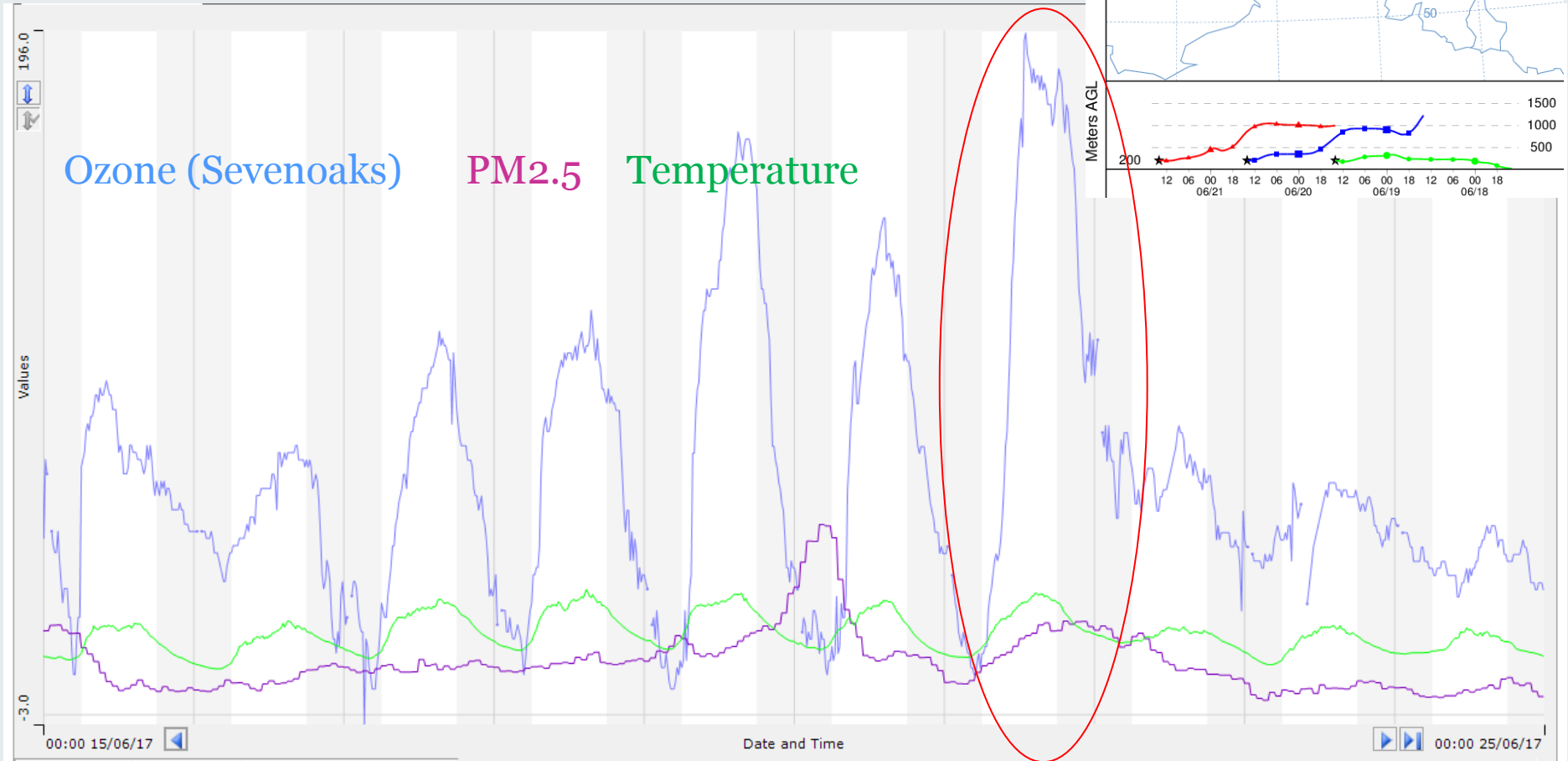
On 21st June polluted air drifted over the southern UK from the near continent.

Very strong sunshine gave us the hottest June day since 1976 and drove ozone into High.

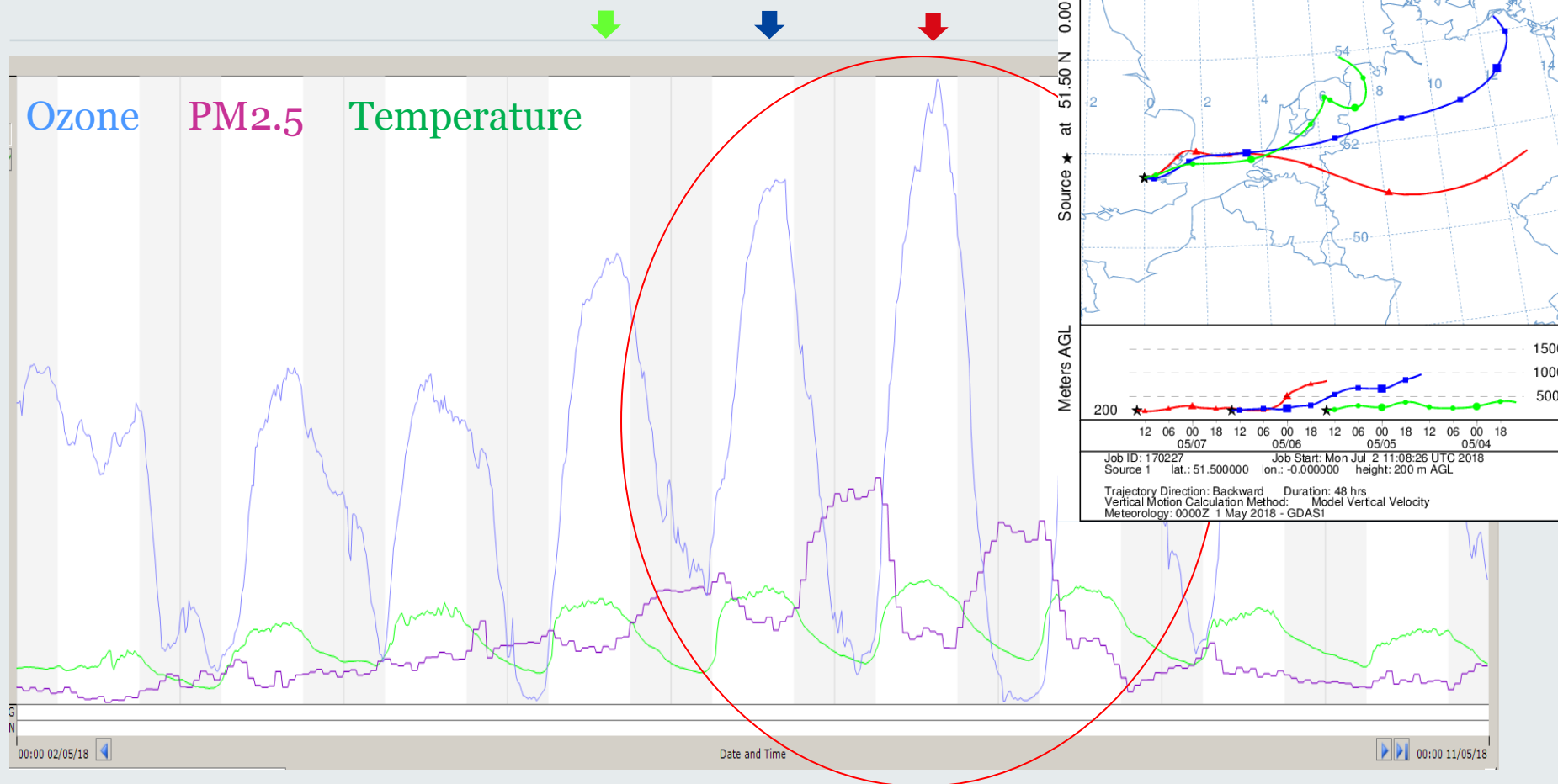
First time we recorded index level 8 ozone since introduction of the Daily Air Quality Index

Ozone June 2017

NOAA HYSPLIT MODEL
Backward trajectories ending at 1400 UTC 21 Jun 17
GDAS Meteorological Data



Ozone/PM episode May 2018



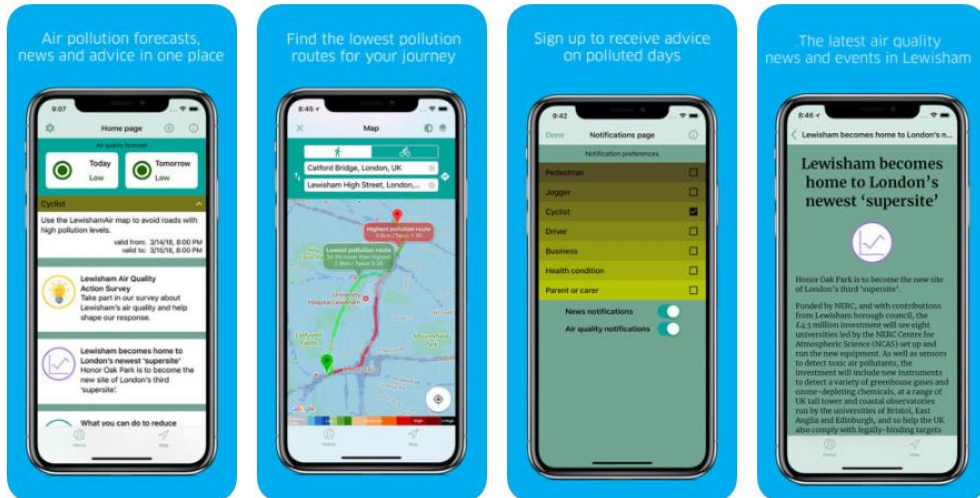
- Cold wet spring led to later than normal application of fertiliser across agricultural land, both here and on the continent.
- This appeared as nitrate and organics in the particles make up, similar to common spring time episodes
- The higher than normal temperatures saw some of this particulate move into the gas phase and drove the rise in ozone and fall in particulate.

New local authority specific apps



Lewisham Air 4+
Clean air routes, news + more
King's College London
Free

Screenshots [iPhone](#) [iPad](#)



- Subscriber user groups e.g driver, cyclist, health conditions etc
- LA gets analytics data

Download the
Lewisham
Air app



- Find low-pollution travel routes
- Sign up for air pollution forecast alerts
- See live air quality data
- Hear about air quality news and events
- Find out what Lewisham Council is doing to improve air quality

www.lewisham.gov.uk/airquality

- See Carleen Campbell (Lewisham) & Andrew Grieve (King's)

Conclusion

- Many of the “worst places” are getting better
- The improvement is not uniform – Gary will talk more about this
- Weather can influence both emissions and the levels recorded
- Weather conditions induce the most severe episodes not just emissions
- Small changes in weather can give dramatic changes in pollution levels, both up and down.
- New apps give the ability to inform residents and influence their behaviour to help reduce pollution

Thanks to all those who support the London Air Quality Network and work we do through contracts. The network only exists through your support.

Thanks to all the team who make this possible by ensuring the quality of the data on a daily basis for 25 years.

And especially thanks to Dr Gary Fuller & Dr Anna Font who produced many of my graphics whilst I was on holiday !