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Air in and around London
- the past year

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Contents

- AQ objectives in 2017
  - Trends going to be covered by Gary

- NO_2 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

Nitrogen Dioxide Annual Means

Nitrogen Dioxide Annual Mean (μgm^{-3})

40 μgm^{-3} annual mean AQS Objective

Industrial   Kerbside   Roadside   Urban background   Suburban   Rural

Nitrogen Dioxide Hours >200µgm^{-3}

Current AQS objective no more than 18 hours greater than 200 µgm^{-3}

y-axis: Nitrogen Dioxide Hours > 200µgm^{-3}

x-axis categories: Industrial Kerbside Roadside Urban background Suburban Rural
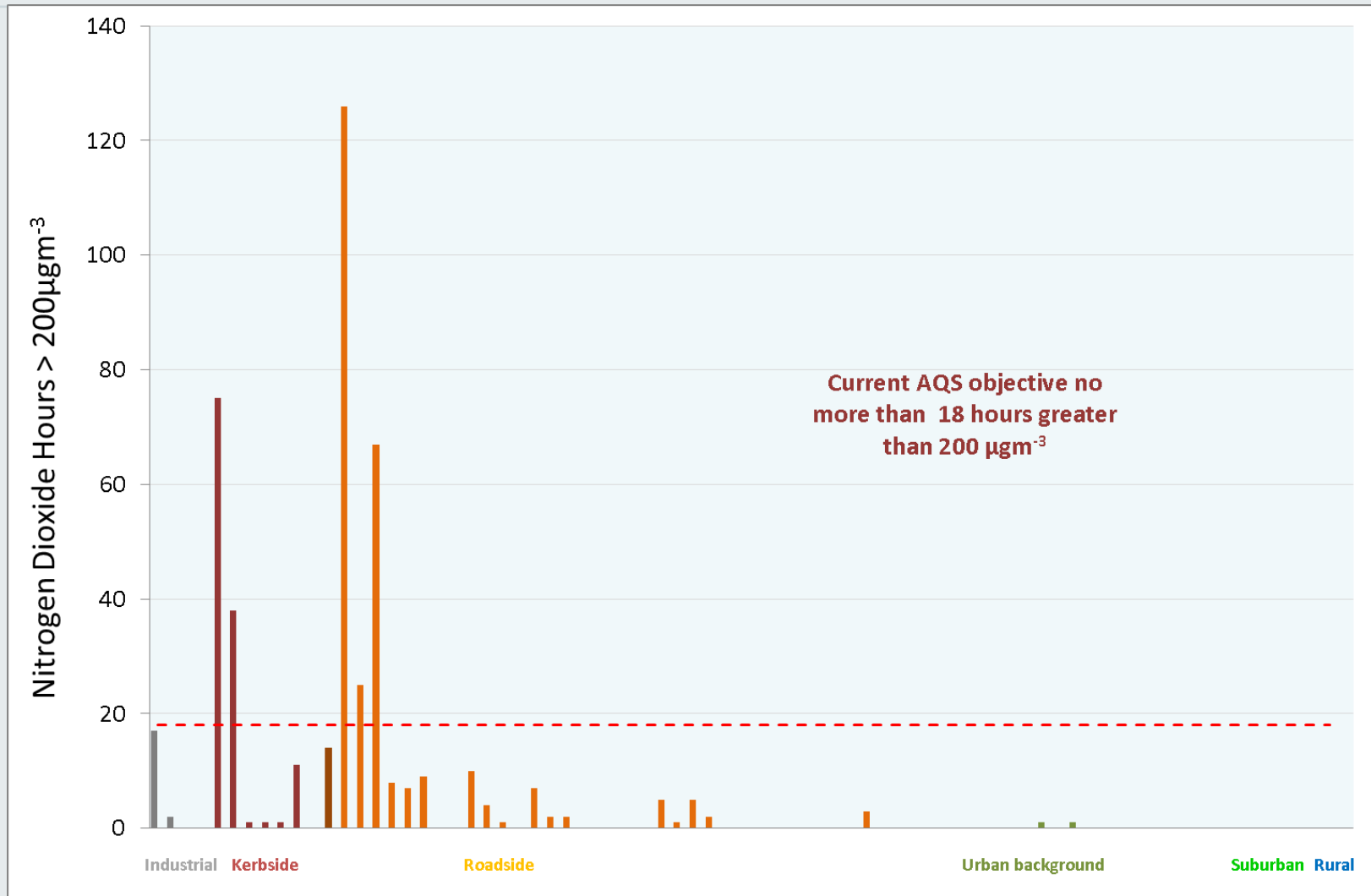
Kept in same order as previous annual mean side.

LondonAir Data visualisations

Our visualisation pages allow you to look at

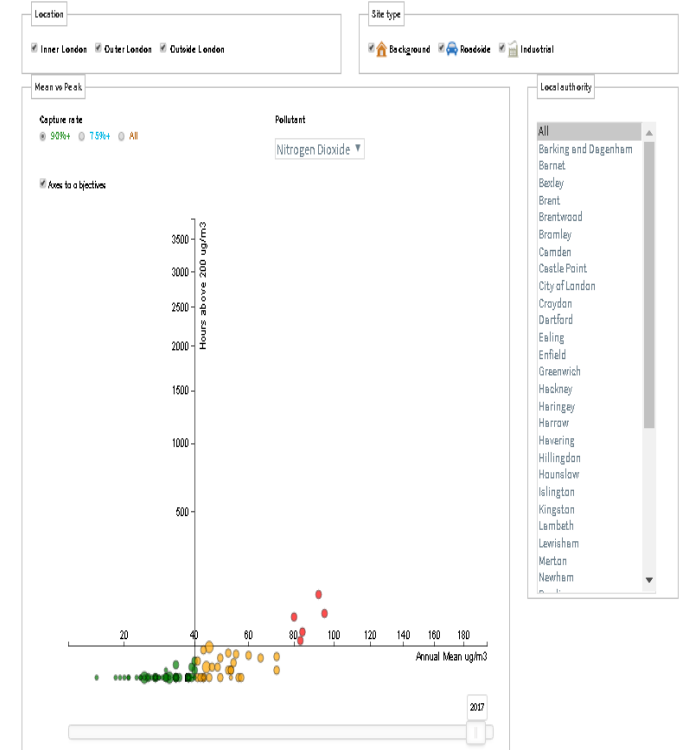- both annual mean and peak exceedances simultaneously. http://www.londonair.org.uk/LondonAir/Data-Visualisations/meanVSpeak.aspx

- Or either over time http://www.londonair.org.uk/LondonAir/Data-Visualisations/objectiveVStime.aspx

PM$_{10}$ Days >50 μgm^{-3}

PM₁₀ Annual Means
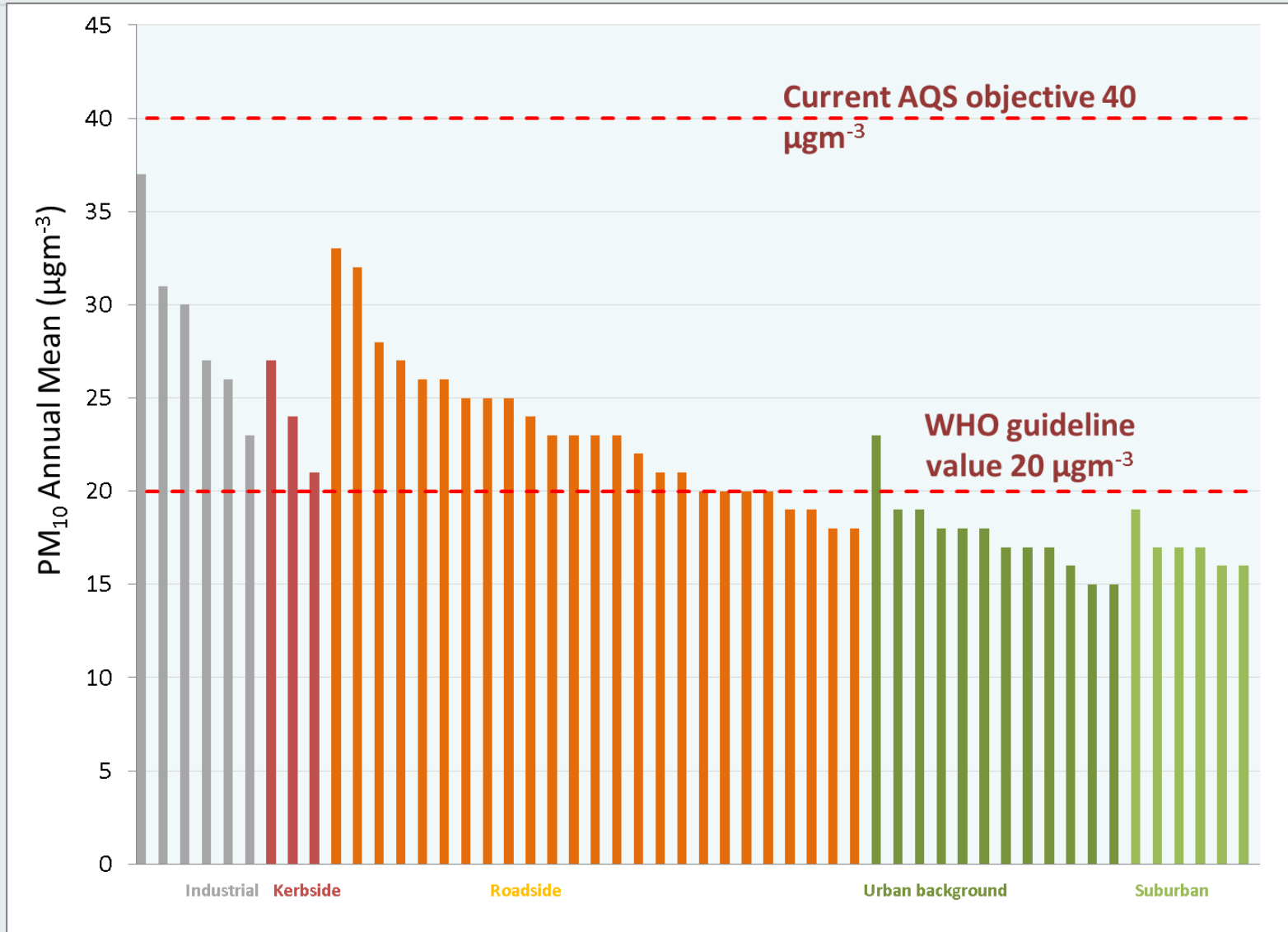
PM$_{2.5}$ Annual Means

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
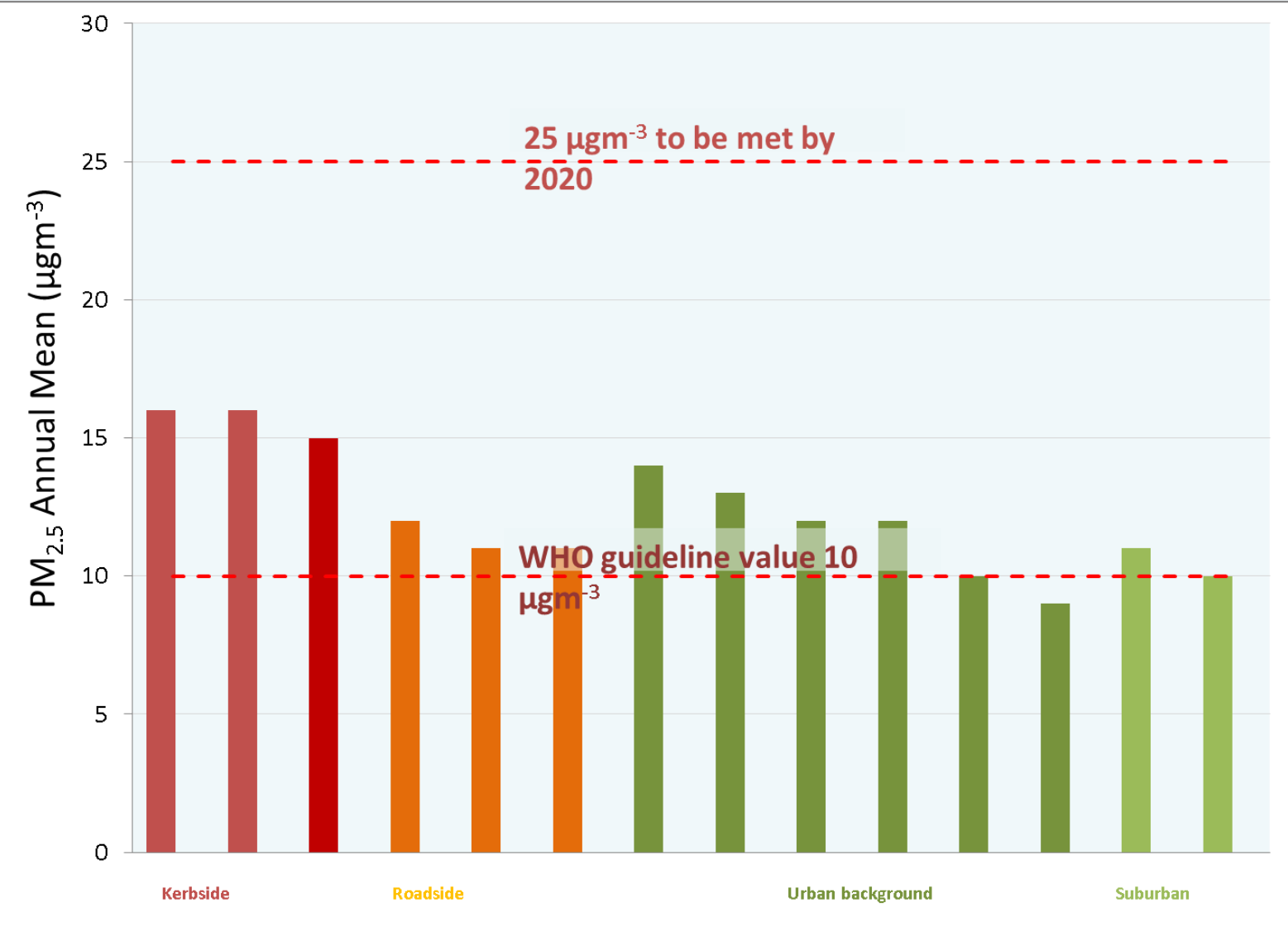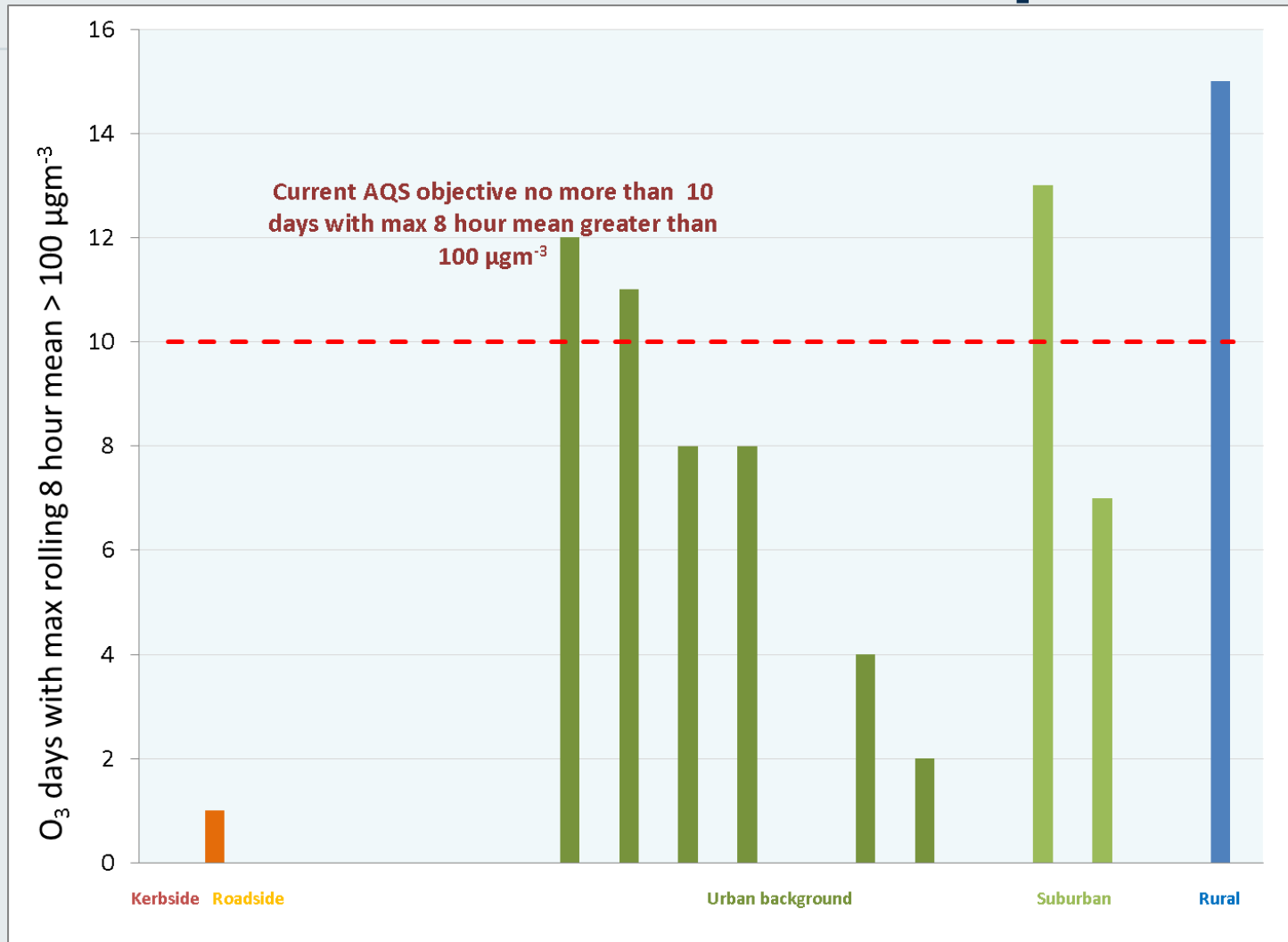
Look at how weather;

- Controls where pollution goes (if at all)

- Can influence what emissions are released and when

- Can influence what reactions occur in the atmosphere

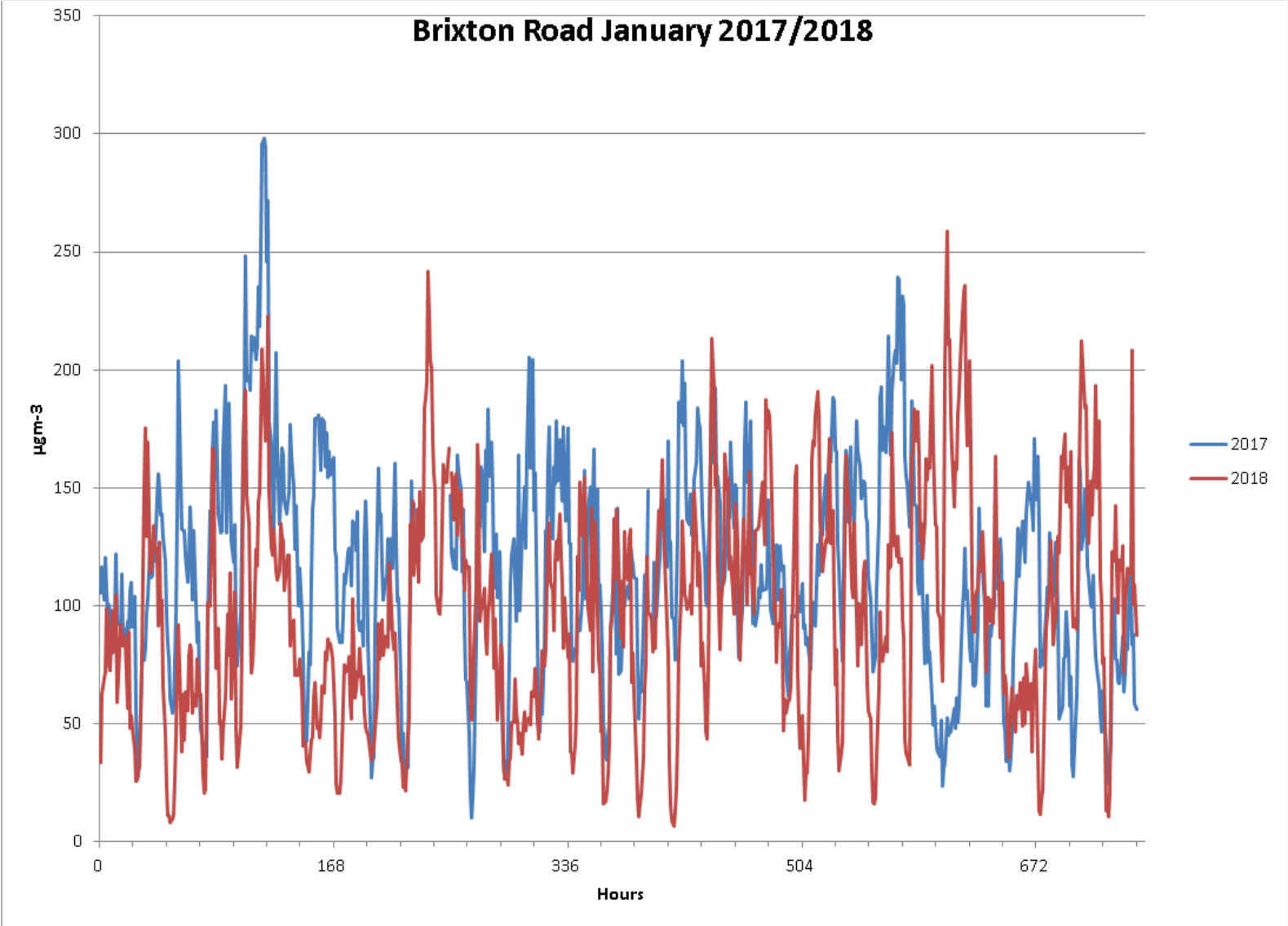# Where the wind blows

Roadside

Or maybe not

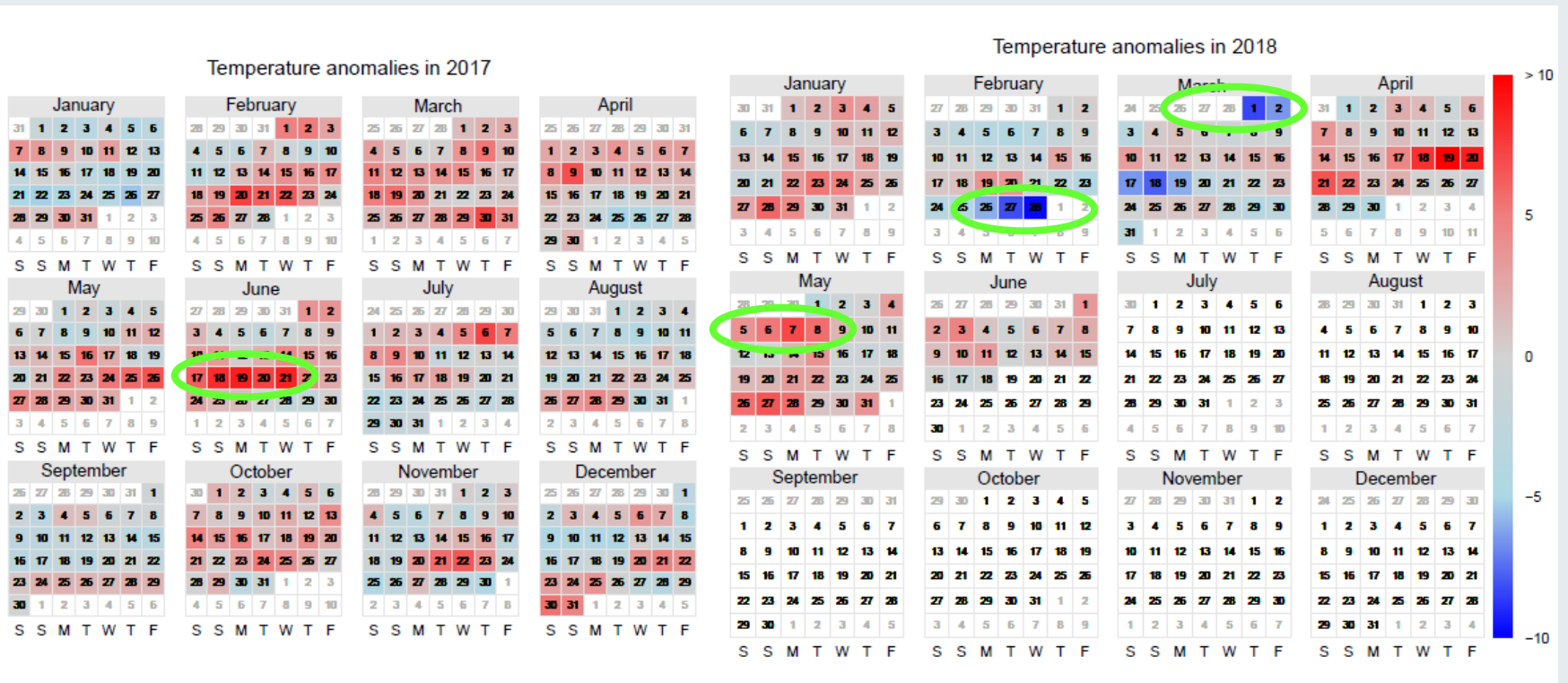Google Maps

NO$_2$ 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

NO$_2$ LV breach 2017 – 2018 (Brixton Road)

Brixton Road January 2017/2018

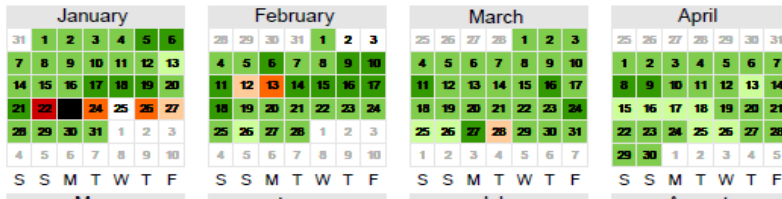# Temperature anomalies 2017-2018
(Last 40 years London Heathrow Met. data)
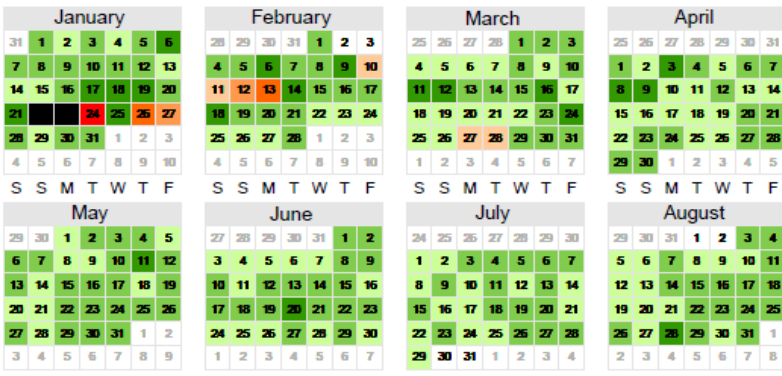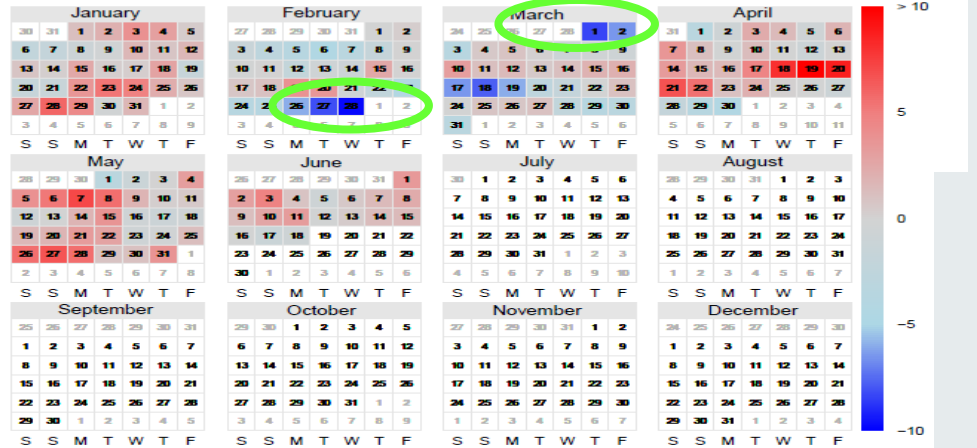
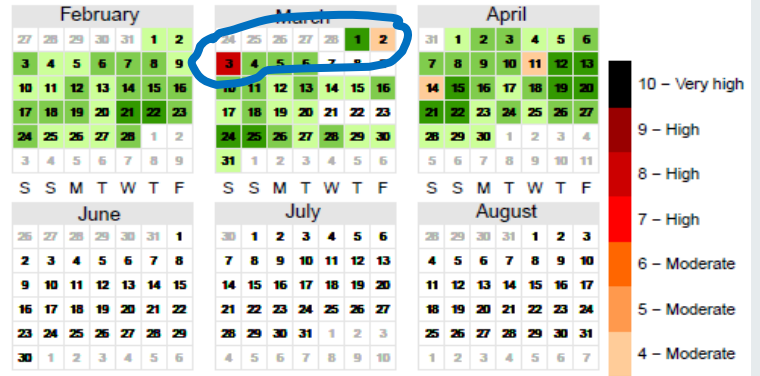# "Beast from the East" – Feb-Mar 2018 (Marylebone Road)

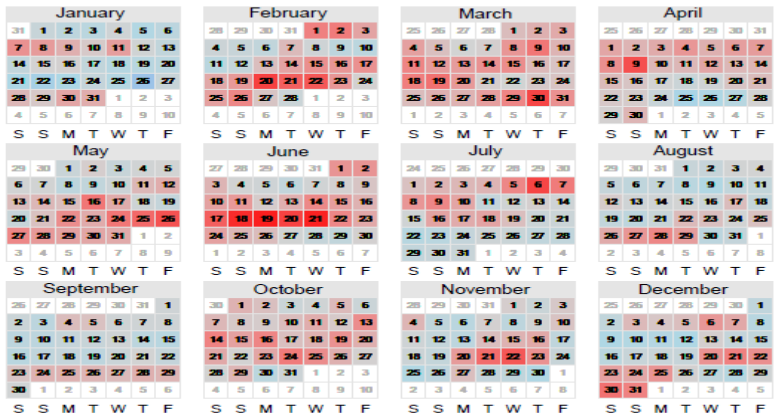# "Beast from the East" – Feb-Mar 2018

Marylebone Road
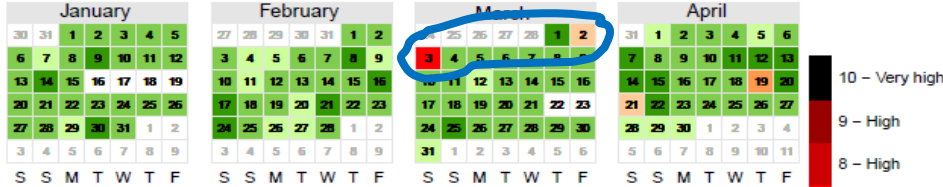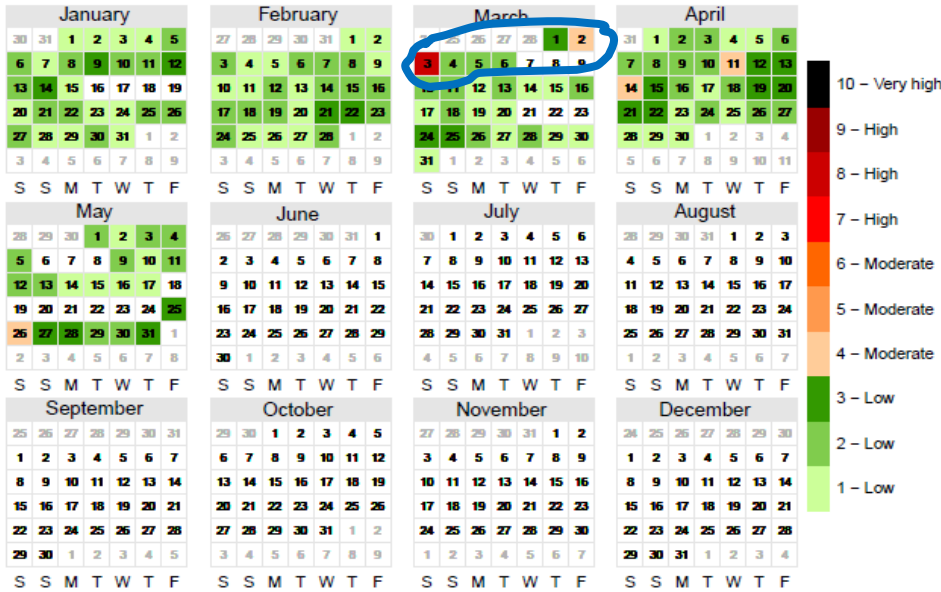
Greenwich Eltham
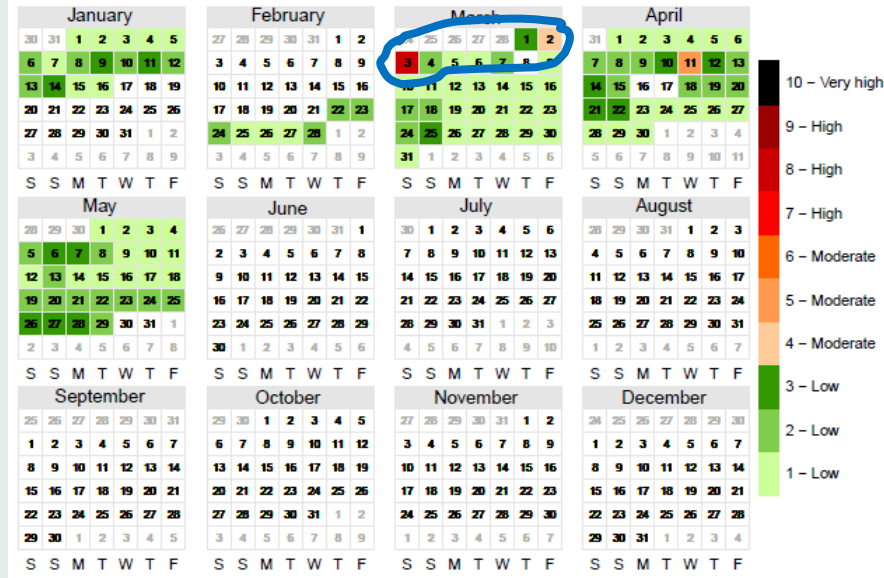
"Beast from the East"

Chemical composition of PM London Background 05 Mar 2018

Real−time chemical composition of PM
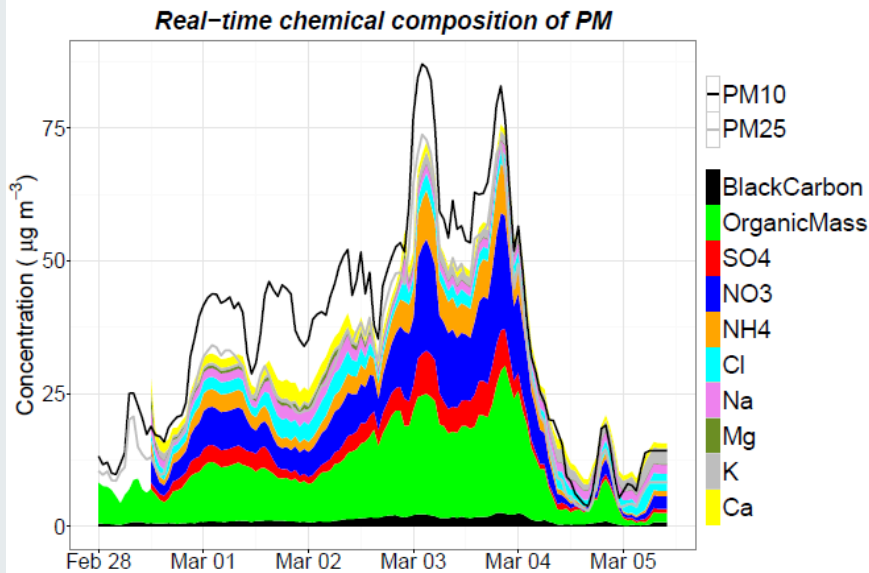
*Black Carbon – diesel vehicles and wood burning;
*Organic Mass – both local (traffic, wood burning and cooking) and distant sources;
*SO4 – industry;
*NO3 – both distant and local sources (traffic, and domestic heating);
*NH4 – agriculture;
*Cl, Na and Mg – sea salt produced from breaking waves;
*K – wood burning and wind−blown soil;
*Ca – resuspended soil and construction;
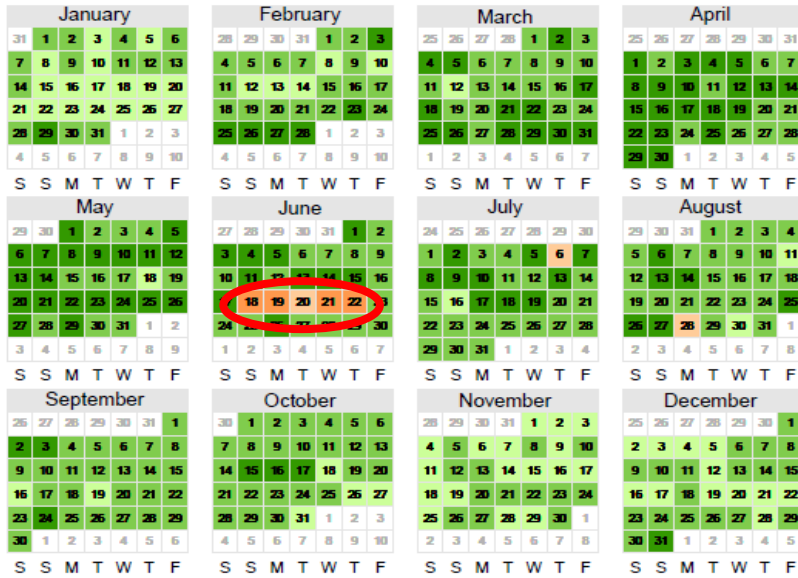
What happened ? – not forecast by anyone

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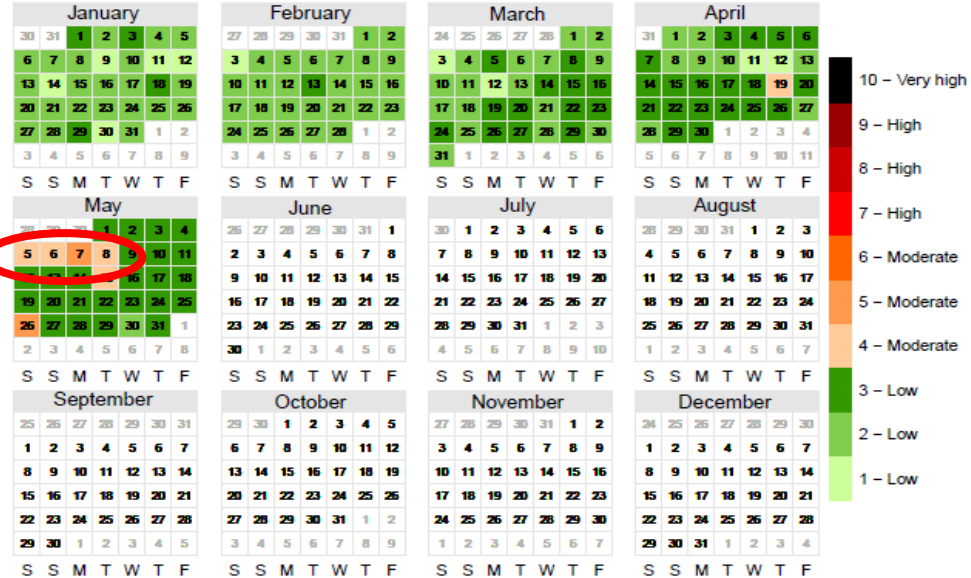- by 3rd recirculation over SE England and N France

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)
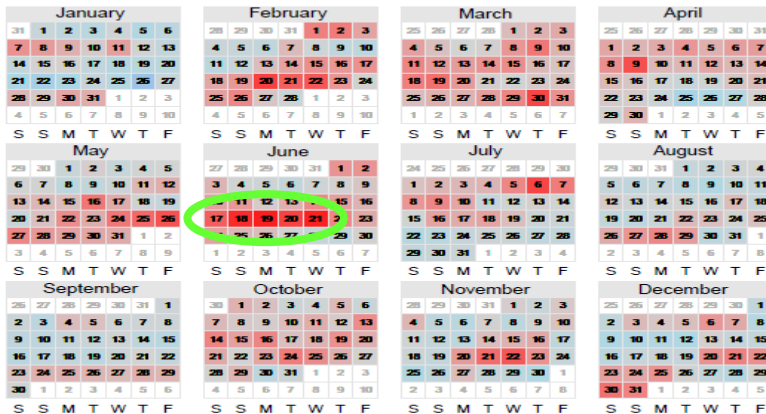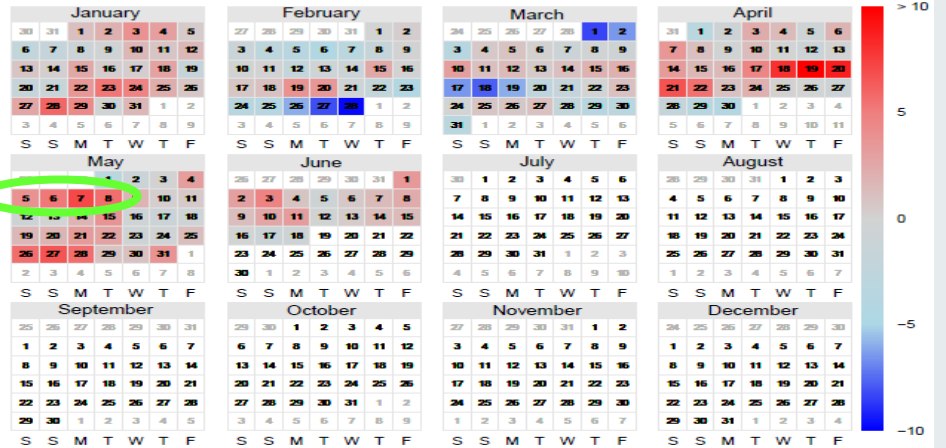
Ozone episodes 2017-2018 (Greenwich Eltham)

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.

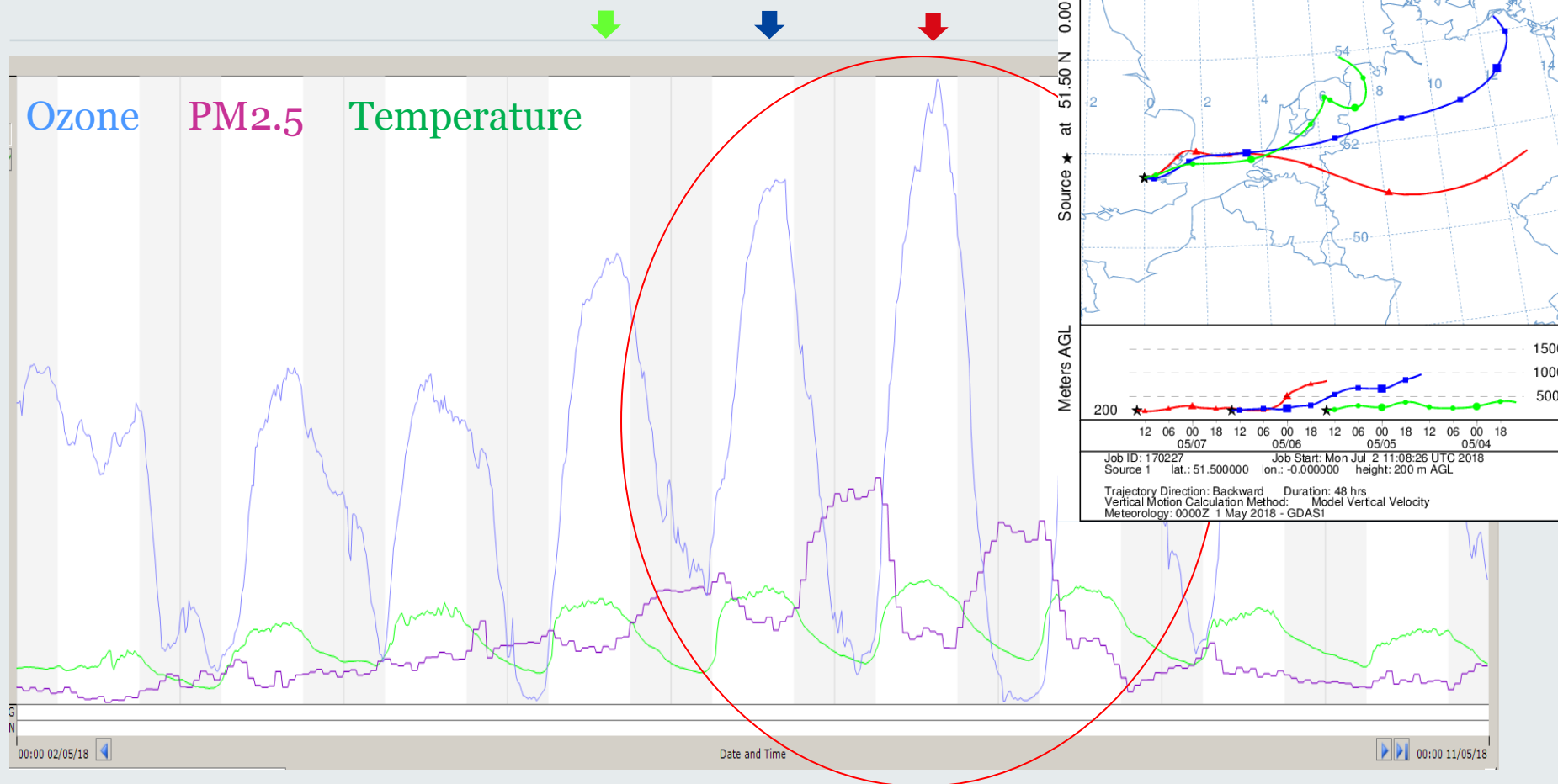Very strong sunshine gave us the hottest June day since 1976 and drove ozone into High.

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

Ozone June 2017

Ozone (Sevenoaks)   PM2.5   Temperature
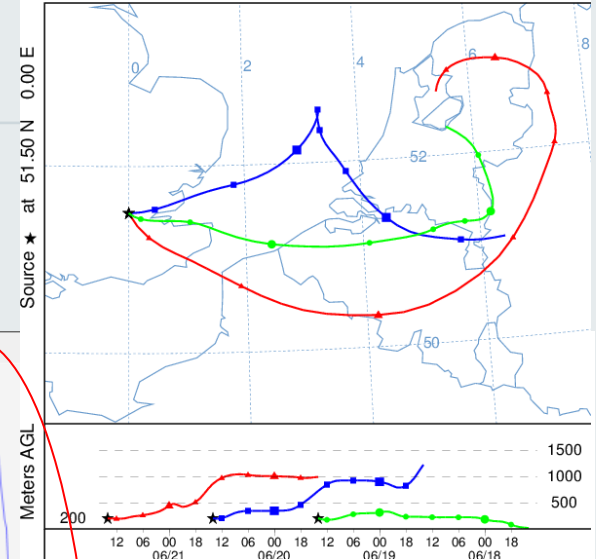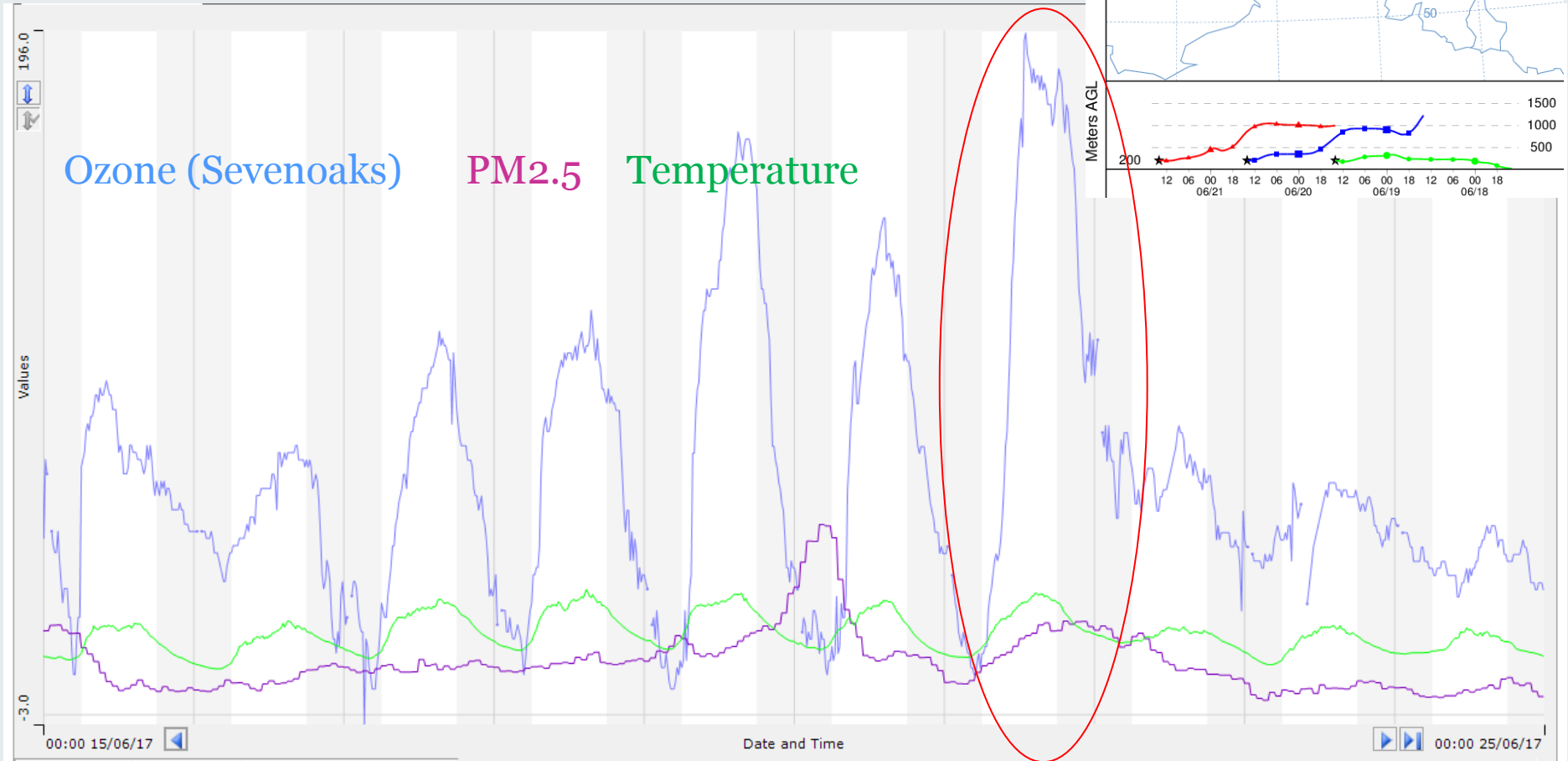
Ozone/PM episode May 2018


Ozone   PM2.5   Temperature

- 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
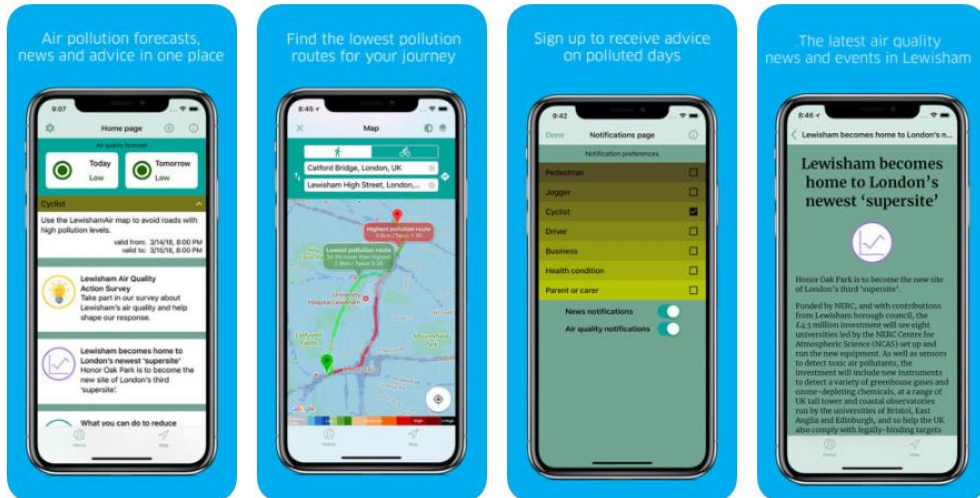
- Subscriber user groups e.g driver, cyclist, health conditions etc

- LA gets analytics data

- 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

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