Cleaner Air, Better Health

Air pollutant emissions in the Yorkshire and Humber Region

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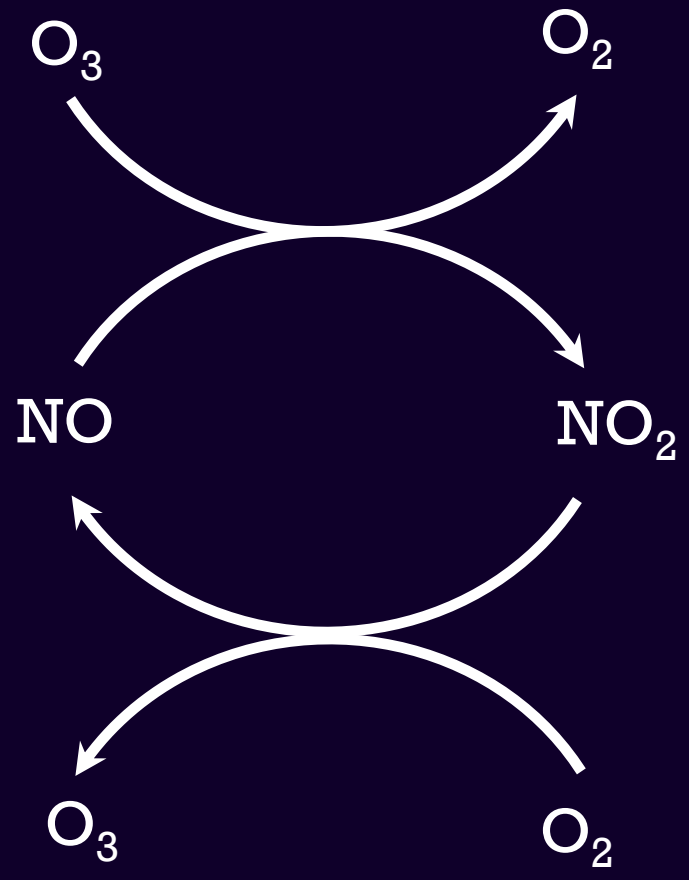
Overview

Nitrogen Oxides – NO_x ($NO + NO_2$)

- Primarily emitted from combustion process as NO
- Inter conversion to nitrogen dioxide (NO_2) through reaction with ozone (O_3) (+other oxidants)
- The effects of acute exposure to NO_2 included with poor pulmonary function, inflammation of airways and increased risk of stroke
- Increased risk to those with pre-existing conditions
- Linked with O_3 and Particulate Matter (PM) formation

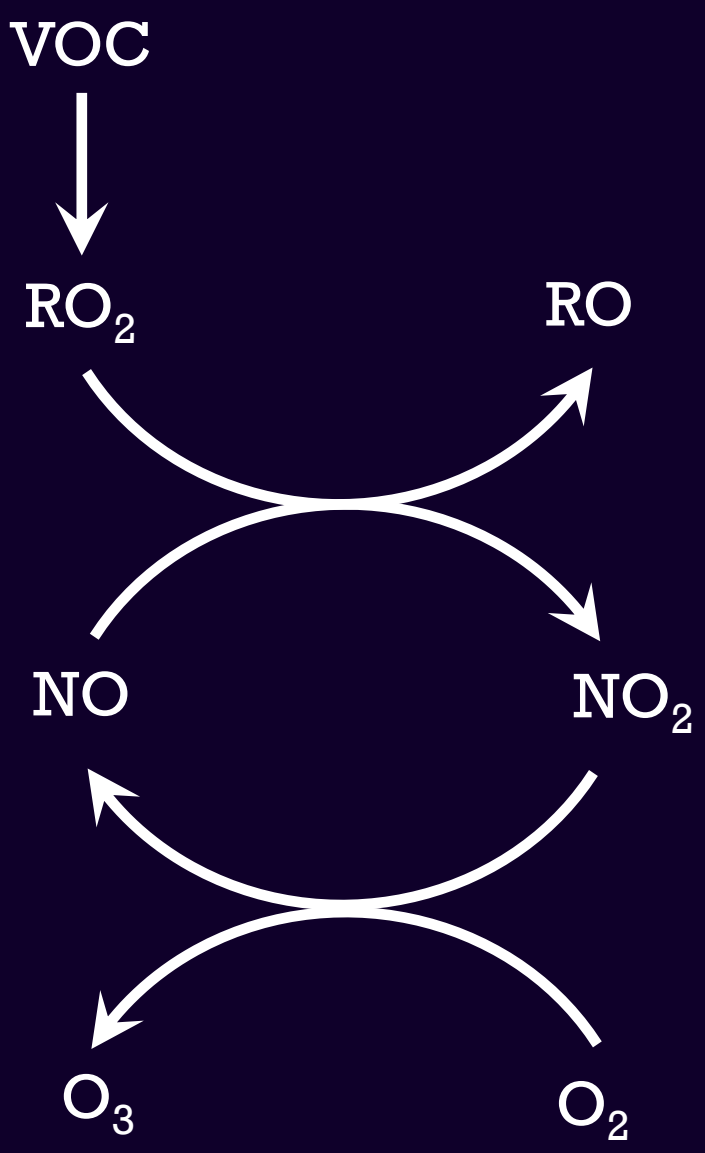
Overview



Ozone – O_3

- Secondary air pollutant, formed from $NO_2 + O_2$
- Has acute and chronic impacts on human health, along with environmental damage to crops
- Repeated exposure can lead to the development of asthma and the exacerbation of other cardio-pulmonary conditions

Overview



Volatile Organic Compounds - VOCs

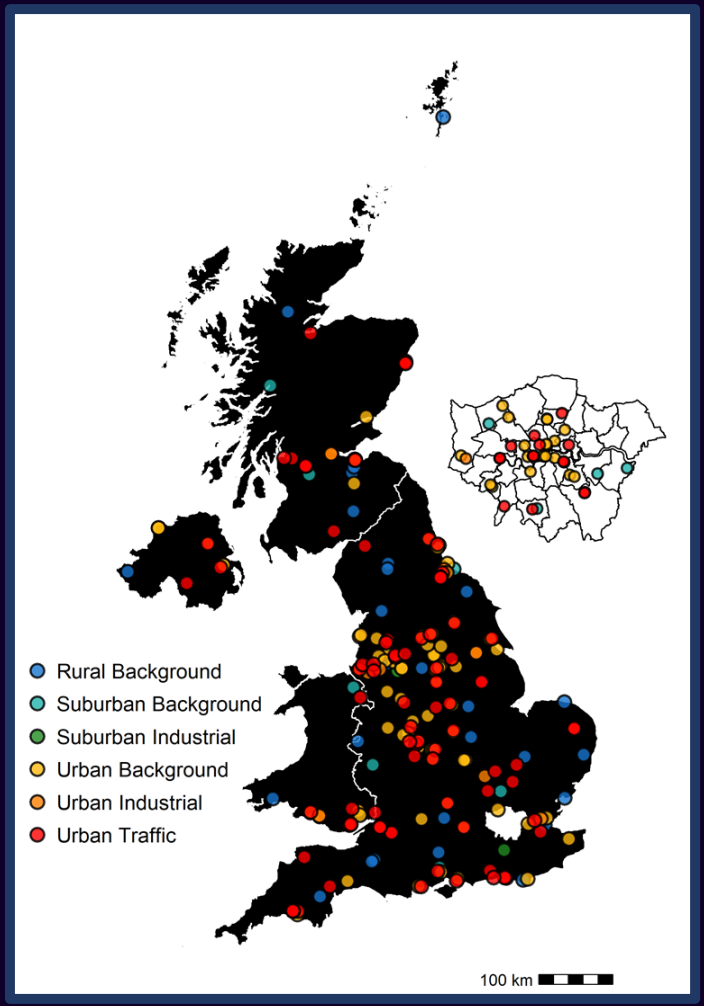
- Includes a wide range of organic molecules from a variety of sources
- Examples include
  - 1,3-butatdiene – released from vehicle exhausts
  - Limonene – a common ingredient of household cleaning products
  - Isoprene – released from trees
- Important for net production of O_3

Overview

Particulate Matter – PM

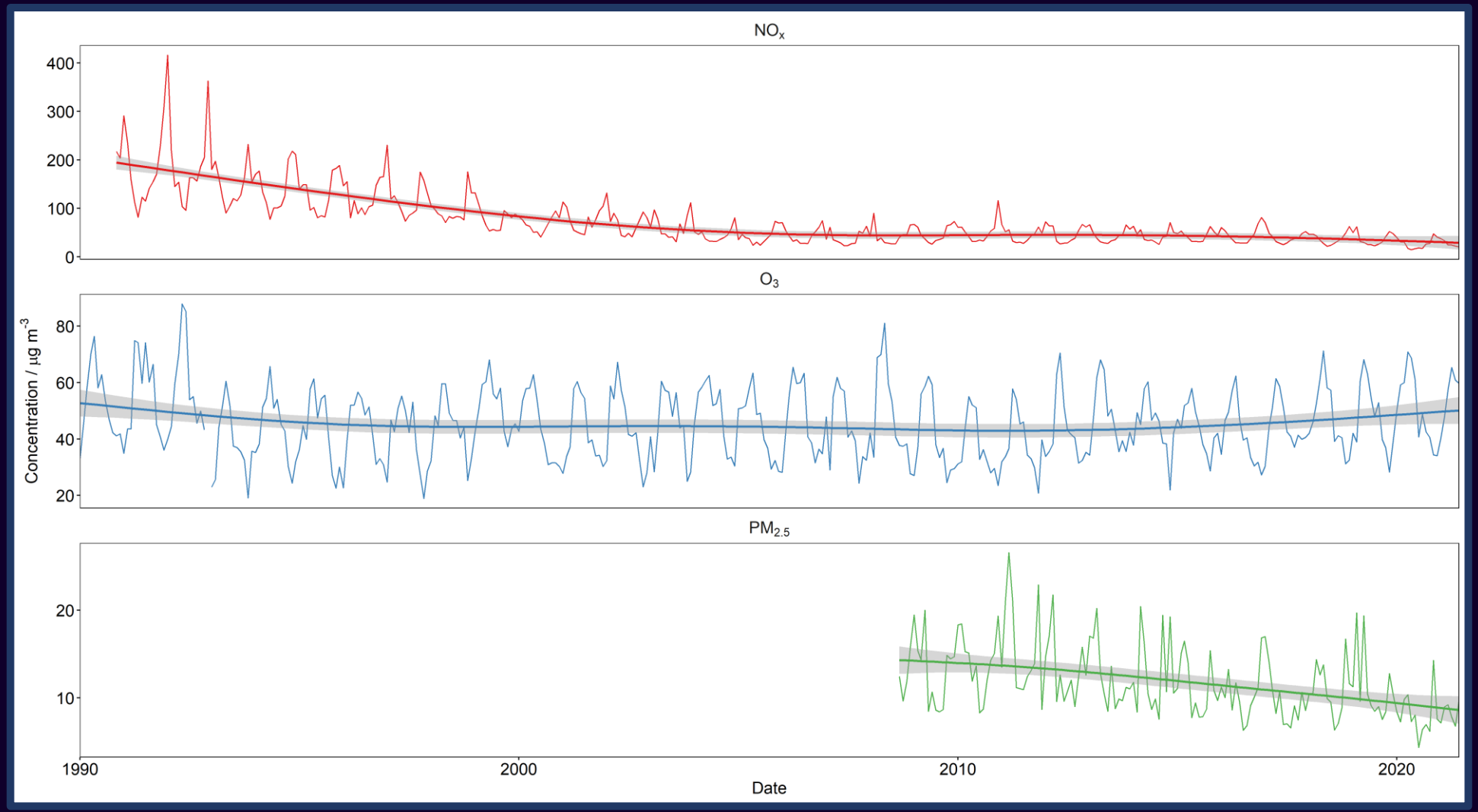
- Emitted from various combustion sources
- Also produced secondarily from NO_x and VOCs
- Generally longer lived, leading to increased contribution from long range transport
- Classified by particle diameter: PM_{10}, diameter less than 10 μm, $PM_{2.5}$ < 2.5 μm etc
- Fine modes are more respirable, being drawn deep into the lungs

Monitoring


Rural Background
Suburban Background
Suburban Industrial
Urban Background
Urban Industrial
Urban Traffic
100 km

Trends

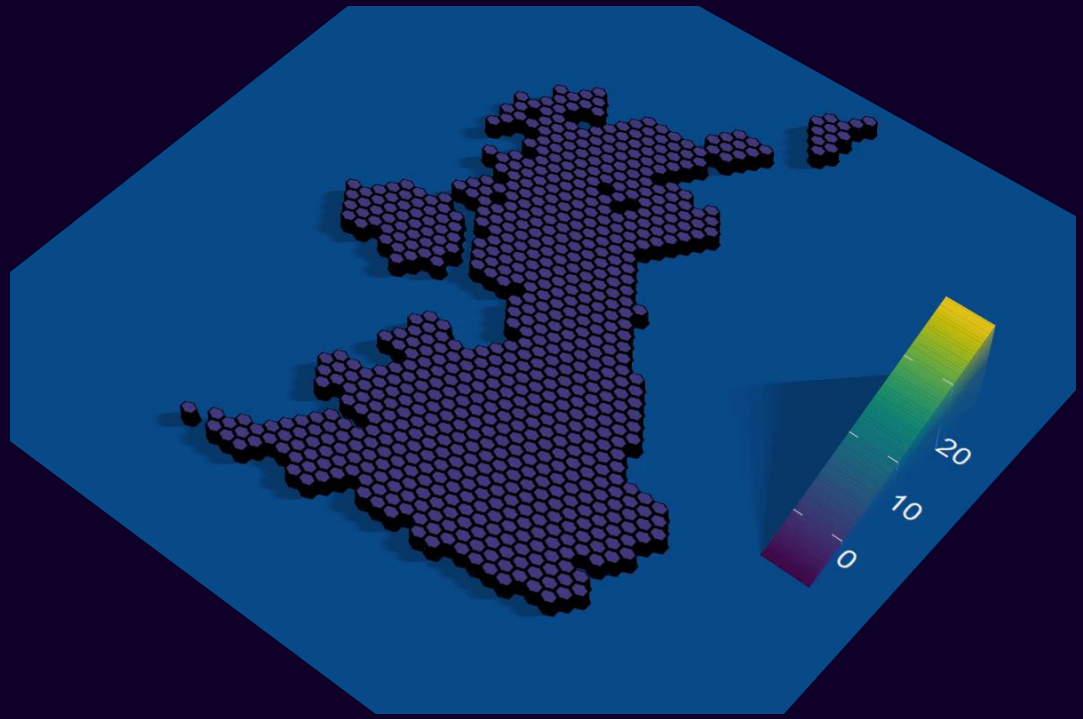
Concentrations



Trends

Emissions

- UK Emissions are estimated in the National Atmospheric Emissions Inventory (NAEI)
- It is produced for a wide variety of air pollutants and green house gases
- Based on activity data and emissions factors from a wide variety of sources

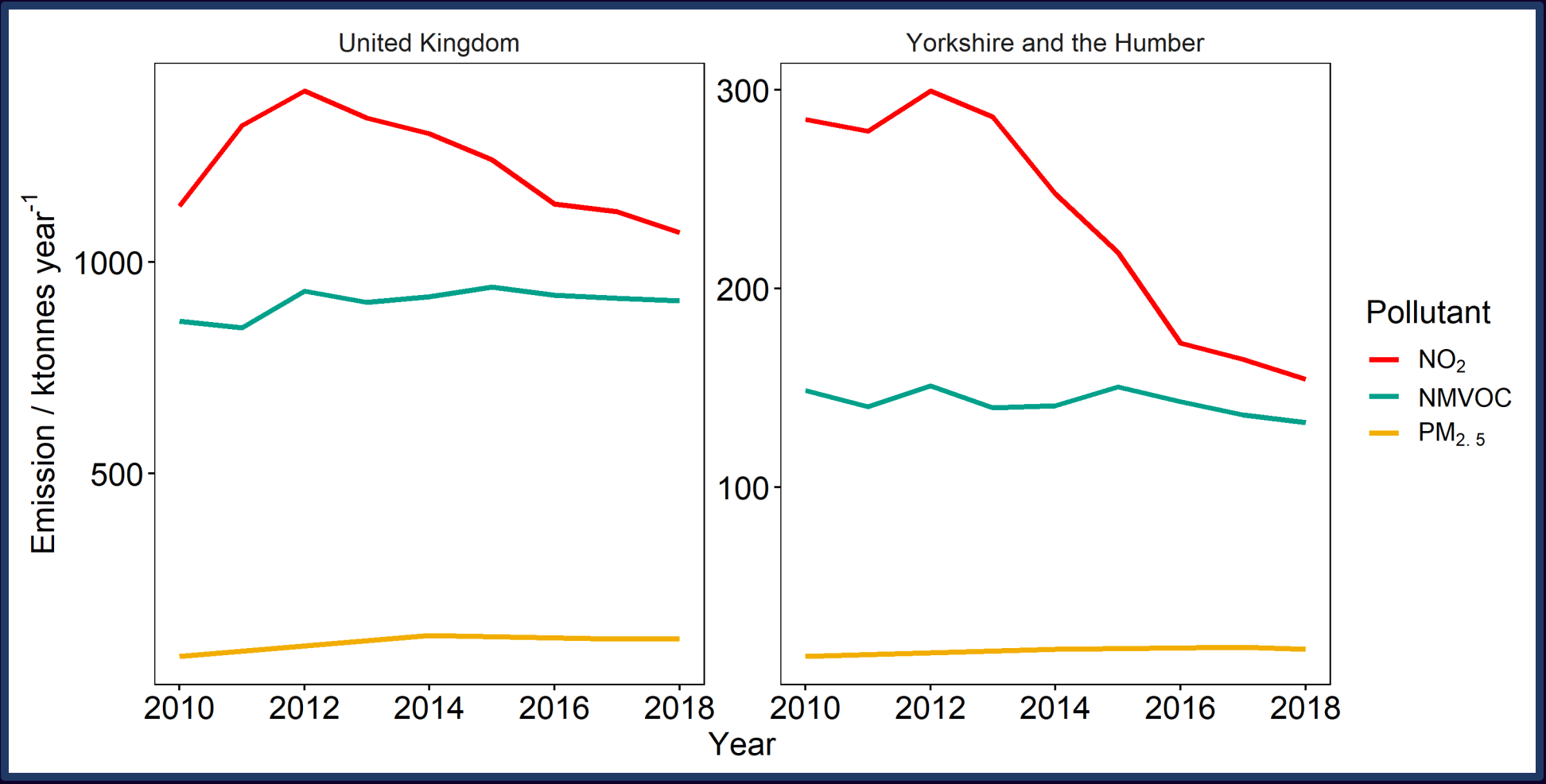


NAEI for Road Transport

The NAEI is commissioned by DEFRA and is currently produced by Ricardo Energy and Environment. naei.beis.gov.uk

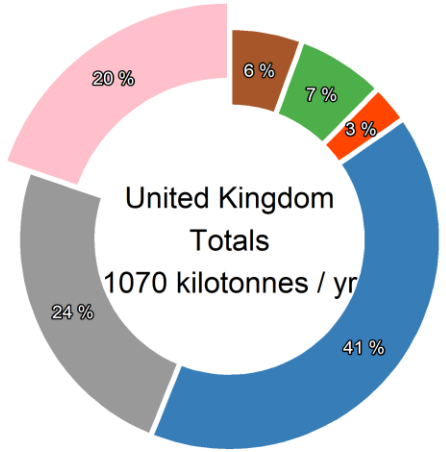
Trends

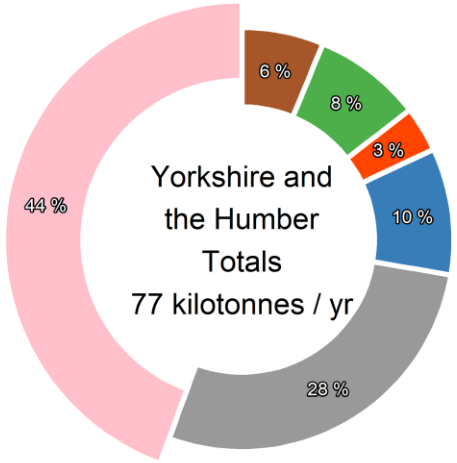
Emissions

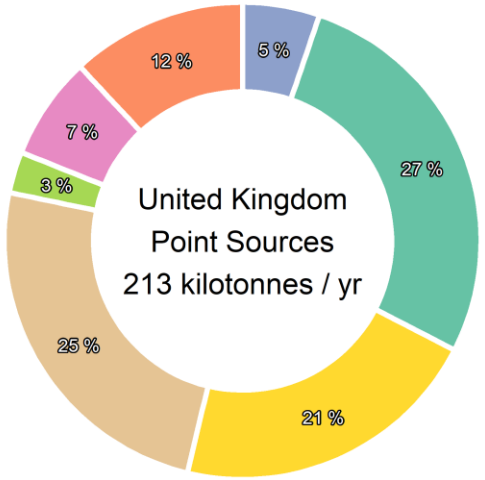


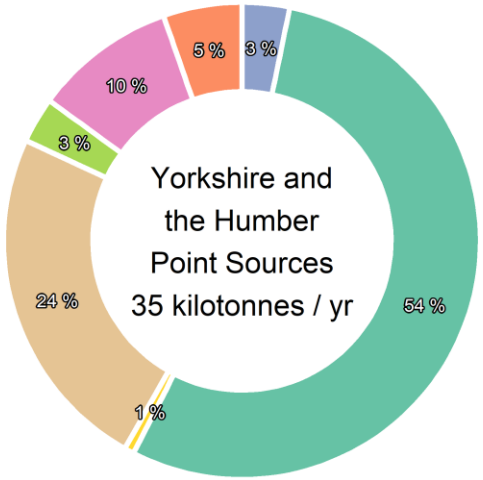
Trends

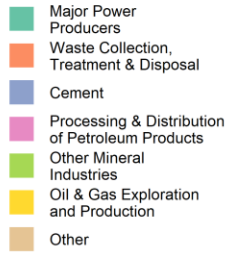
Emissions





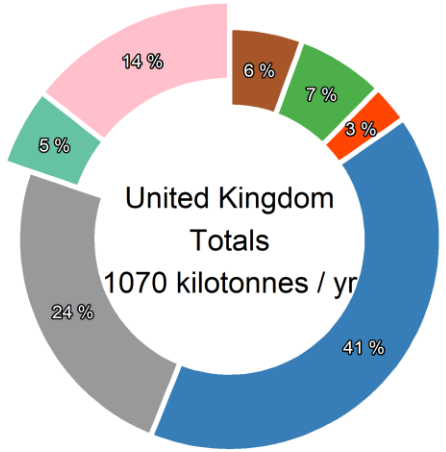


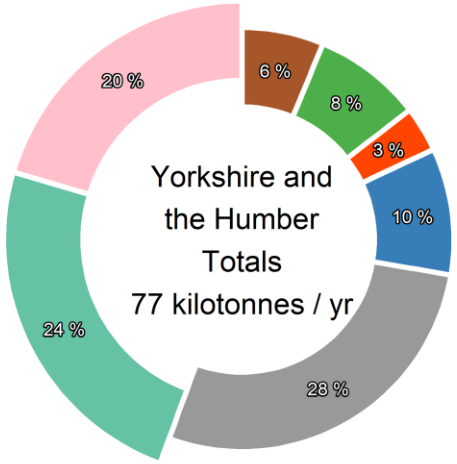


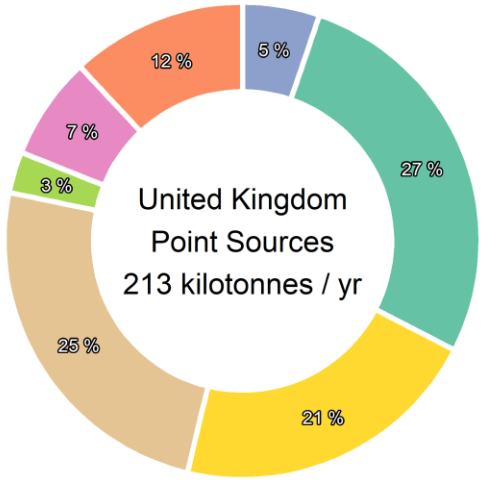


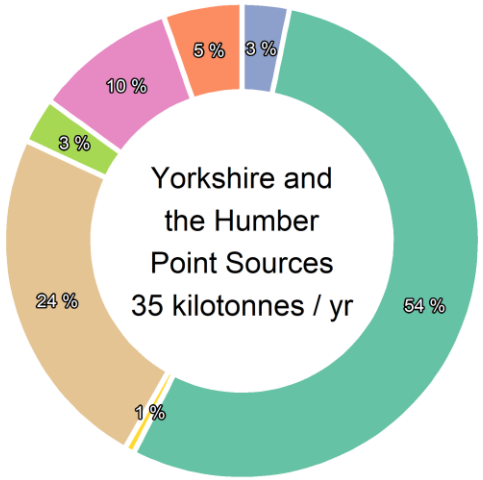
Trends

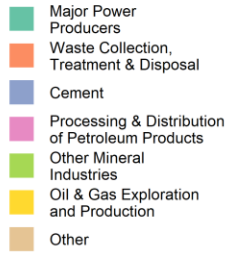
Emissions











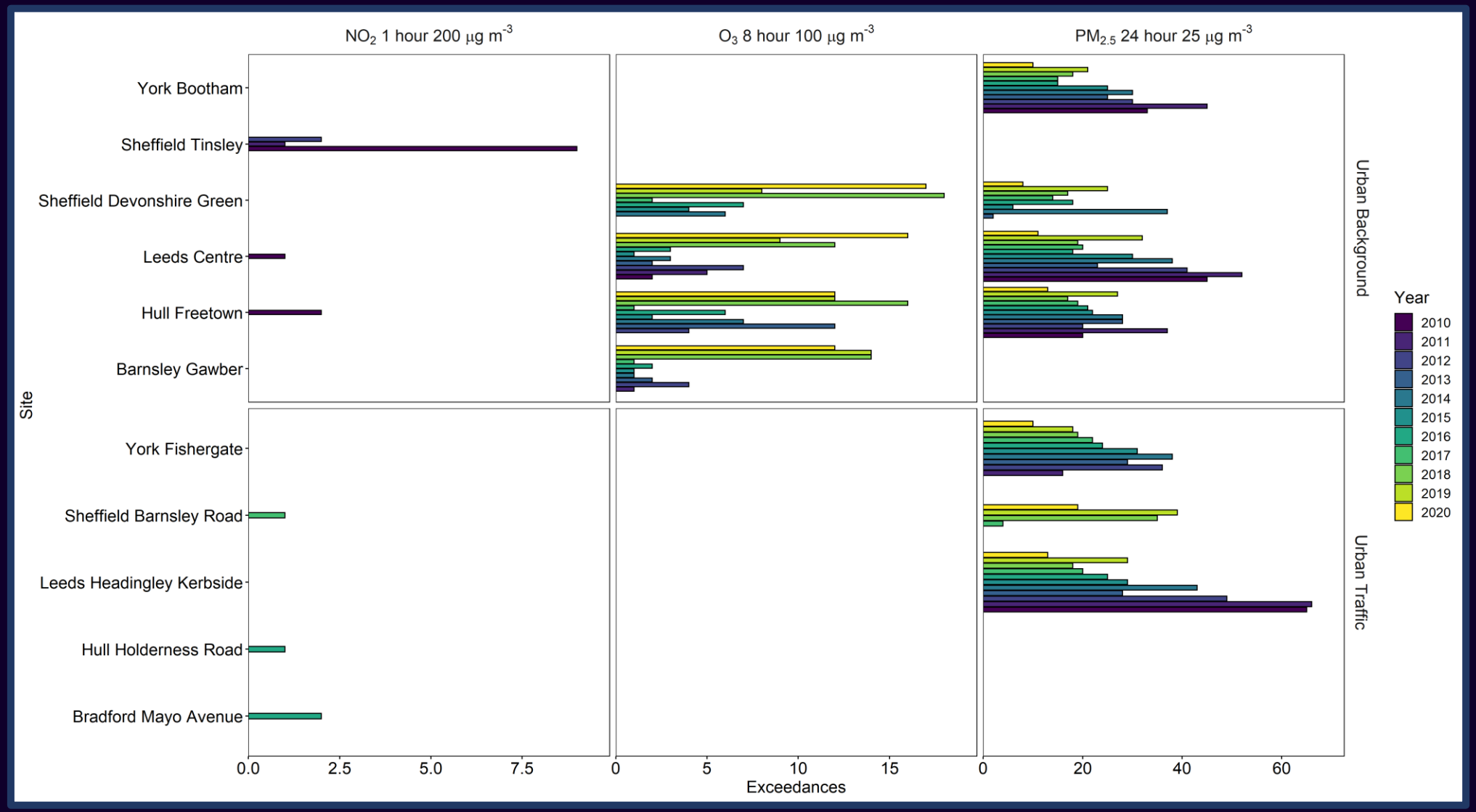
Exceedances

UK Air Quality Objectives

Pollutant	Objective / μgm^{-3}	# of allowed exceedances / yr^{-1}	Averaging Period
NO_x	200	8	Hourly
$PM_{2.5}$	25	-	Annual
O_3	100	10	8 hourly

The World Health Organisation also suggests a 24 hour objective of 25 μgm^{-3} for $PM_{2.5}$

Exceedances

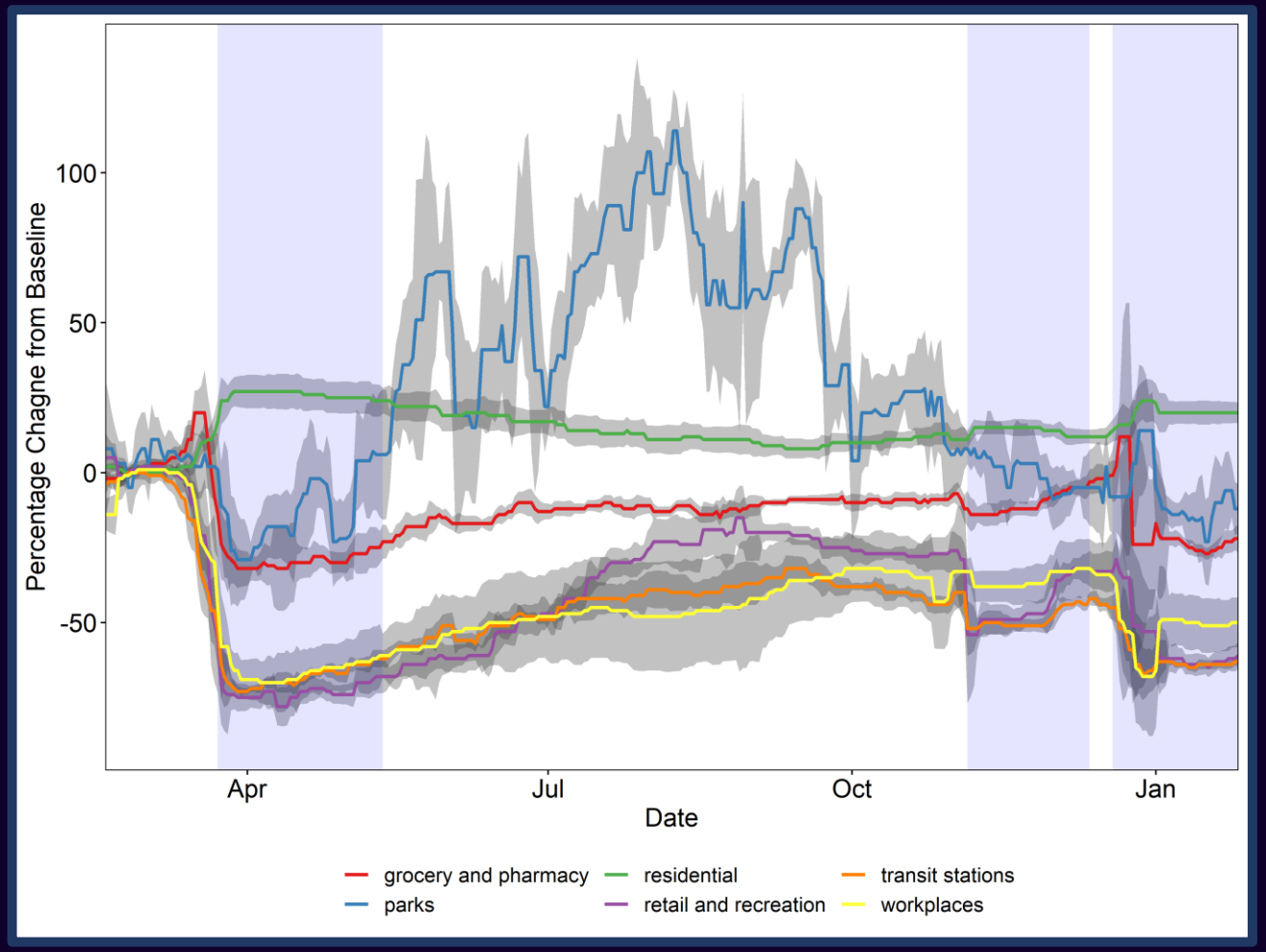


Twenty-Twenty

THE PRESS

York in lockdown is an eerie sight

18th April 2020
By Megi Rychlikova
Photos - Michelle Sorrell



Twenty-Twenty

Urban Background

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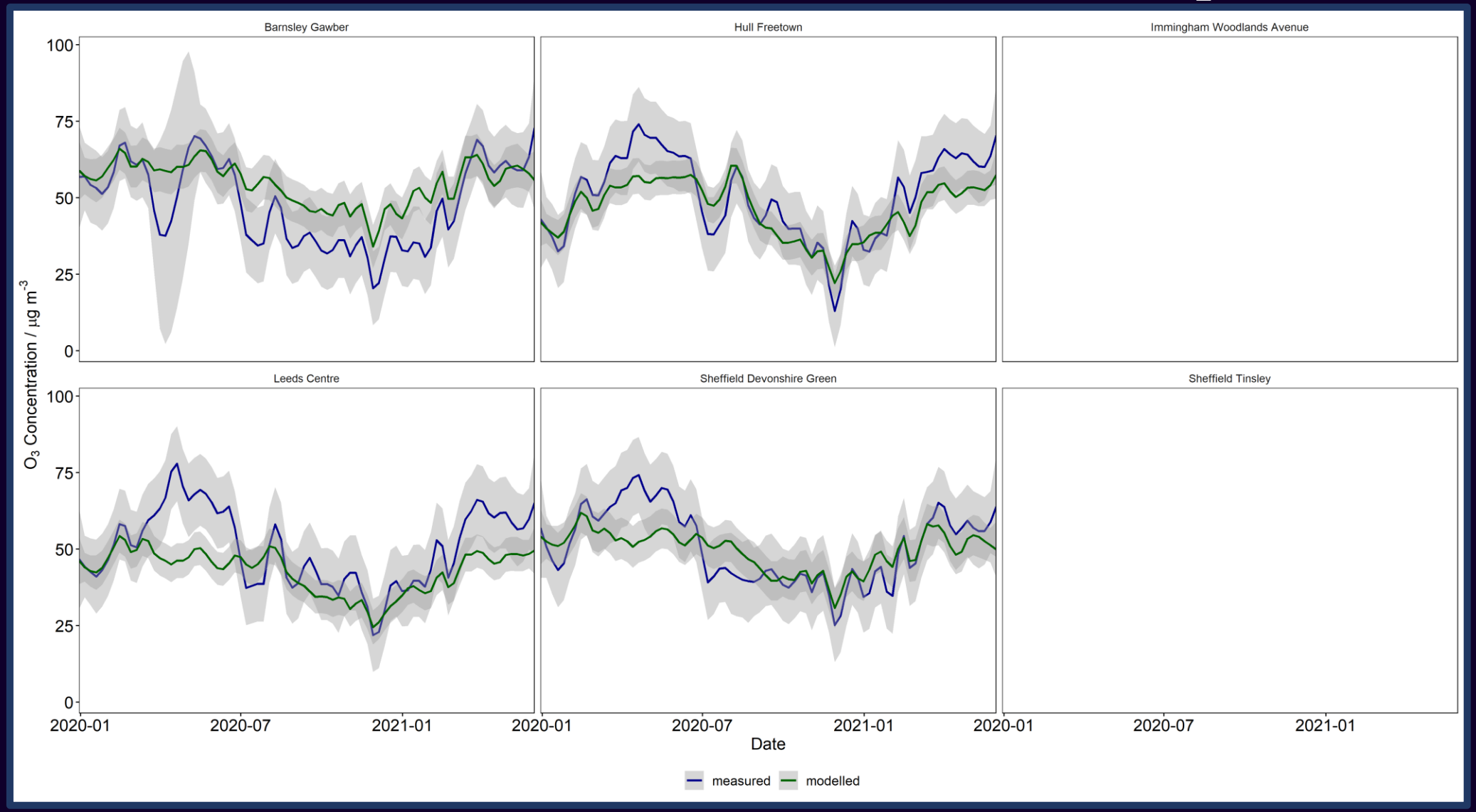

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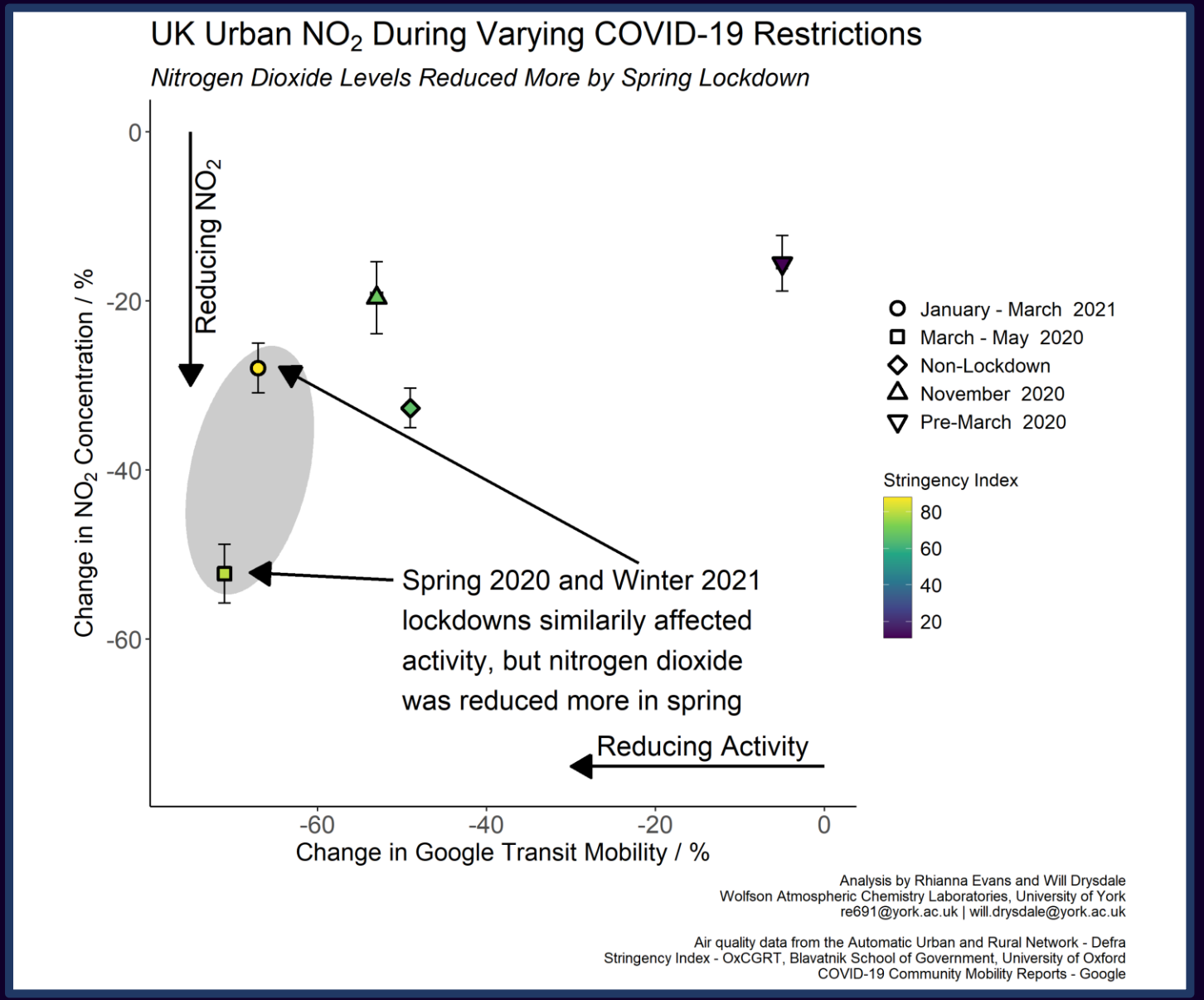

Thanks For Listening

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