

Trends in UK NO_x and NO₂ Concentrations – May 2022 Update

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Since the start of the COVID-19 Pandemic, AQC has periodically updated its analysis of trends in NO_x and NO₂ concentrations across the UK. The approach has been to combine measurements made at more than 100 monitoring sites, spread across the UK, and to remove the predictable effects of weather using statistical models. The methodology is provided in previous reports published by AQC¹. This note updates the analysis to include measurements made up to the end of April 2022.

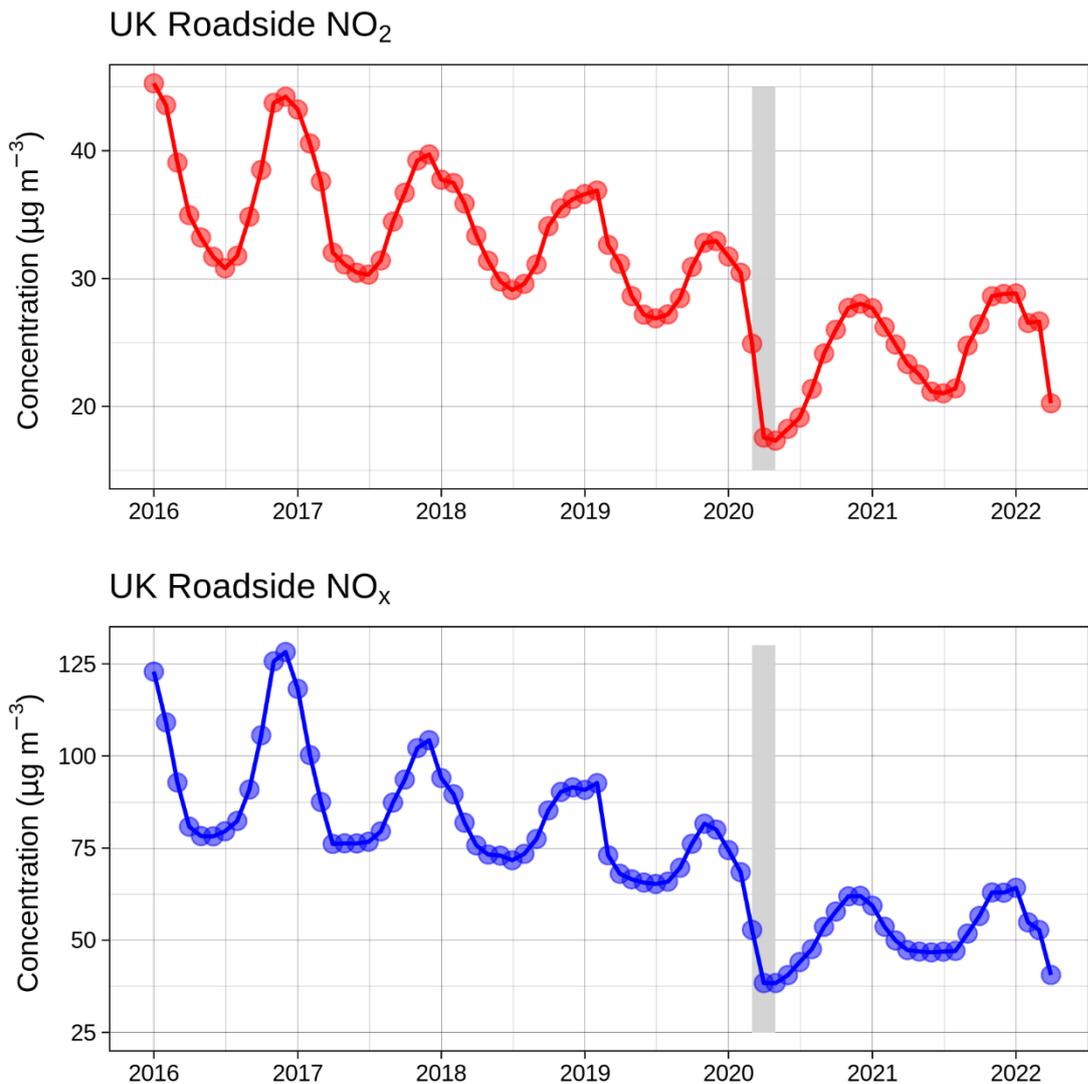


Figure 1: Average monthly deweathered² mean NO₂ and NO_x concentrations from 1st Jan 2016 to 30th April 2022 at 129 UK roadside monitoring sites³

¹ Gellatly, R. and Marner, B. (2020) *Nitrogen Oxides Trends in the UK 2013 to 2019*; Gellatly, R., and Marner, B. (2020b) *The Effect of COVID-19 Social and Travel Restrictions on UK Air Quality*; Gellatly, R., Marner, B., Liska, T. and Laxen, D. (2020) *The Effect of COVID-19 Social and Travel Restrictions on UK Air Quality – 06 April Update*; Liska, T., Gellatly, G., Laxen, D., and Marner, B. (2020) *The Effect of COVID-19 Social and Travel Restrictions on UK Air Quality – November Update*; Pearce, H., Marner, B., and Moorcroft S. *Trends in UK NO_x and NO₂ Concentrations through the COVID-19 Pandemic: January 2022*. All reports available at: <https://www.aqconsultants.co.uk/resources>.

² Adjusted using Boosted Regression Trees as detailed in previous reports¹.

³ Grey shading indicates the period March – May 2020 when the first UK-wide COVID-19 lockdown was enforced.

Most of the patterns shown in Figure 1 to Figure 4 have been documented and discussed previously, particularly in the January 2022 report. The new information contained here relates to the period from winter 2021 to spring 2022⁴. For all site types, this shows a continuation of the seasonal trend observed before the pandemic. Concentrations during 2021 tended to be slightly higher than those during 2020, but lower than those in previous years. As explained in the January 2022 report, activity changes caused by the pandemic probably explain some of these changes, but most of the reduction over the timeseries relates to well-understood processes which have reduced NO_x emissions from road traffic and other sectors.

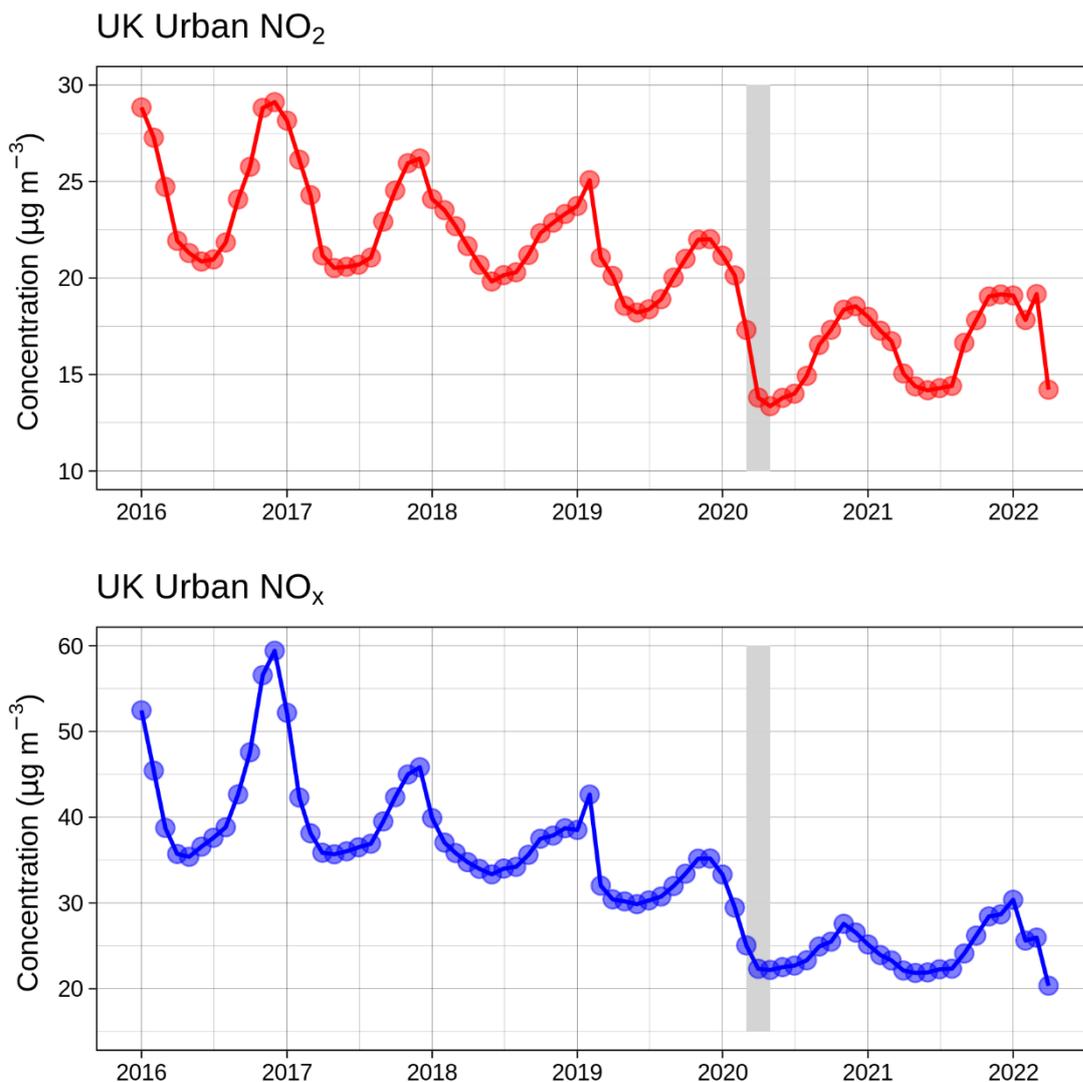


Figure 2: Average monthly deweathered² mean NO₂ and NO_x concentrations from 1st Jan 2016 to 30th April 2022 at 54 urban UK monitoring sites³

⁴ Changes to overall data capture mean that the selection of monitoring sites used here is not identical to that used in January 2022, but these changes are small and have minimal effect on the overall patterns. One notable difference is that average concentrations in December 2021 are reported as much lower here than was previously the case. The January 2022 report explained that this was entirely expected, since that analysis did not have access to a complete set of December 2021 data. The same issue does not affect this current analysis, which has access to a full set of data for all months (including December 2021 and April 2022).

Tracking recent observations cannot, in and of itself, provide evidence on future patterns. However, these timeseries present a compelling indication that NO₂ and NO_x concentrations at the majority of roadside and urban locations in the UK are unlikely exceed those seen during 2019 at any point in the foreseeable future. This welcome observation will be helpful when developing strategies for future air quality management.

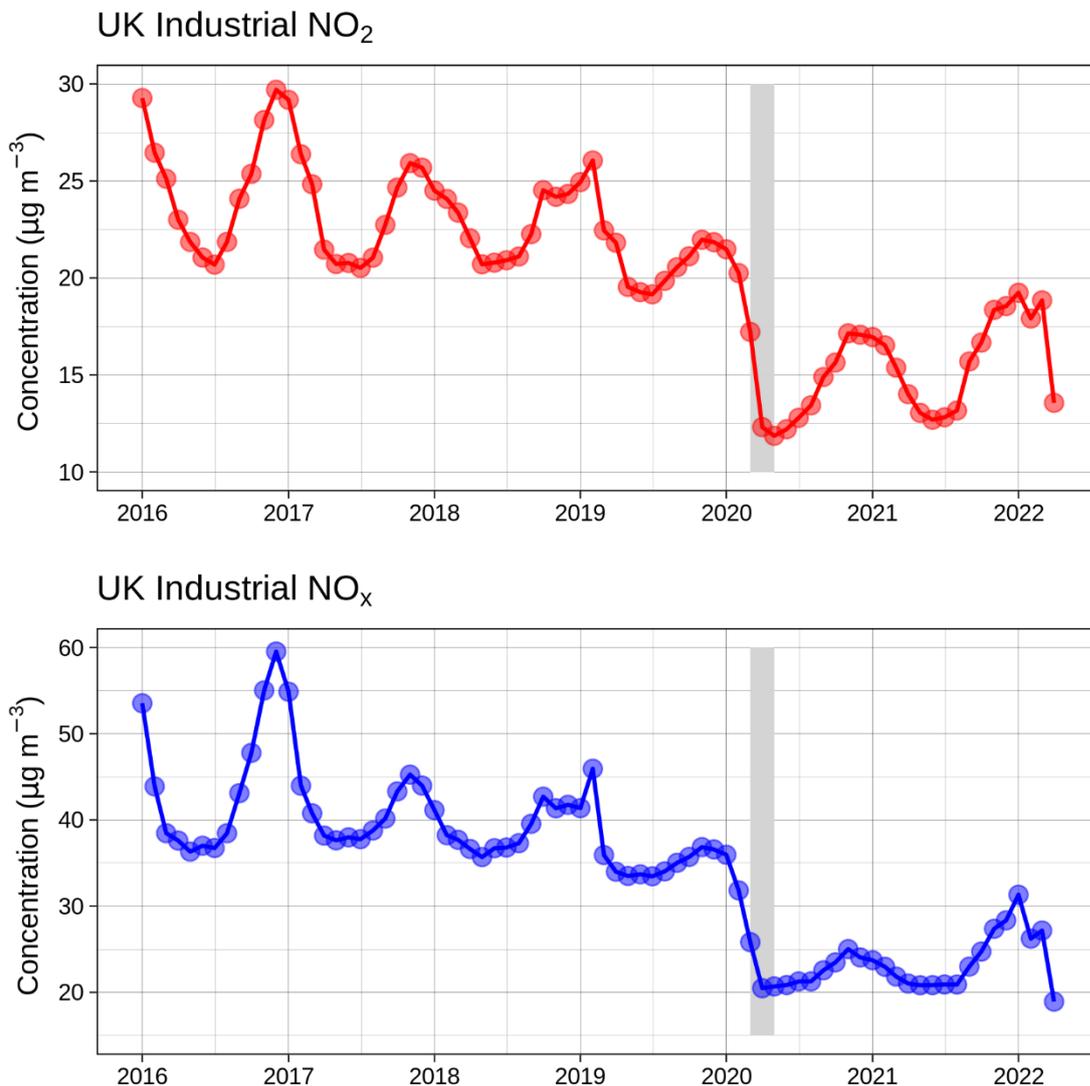


Figure 3: Average monthly deweathered² mean NO₂ and NO_x concentrations from 1st Jan 2016 to 30th April 2022 at 13 industrial UK monitoring sites³

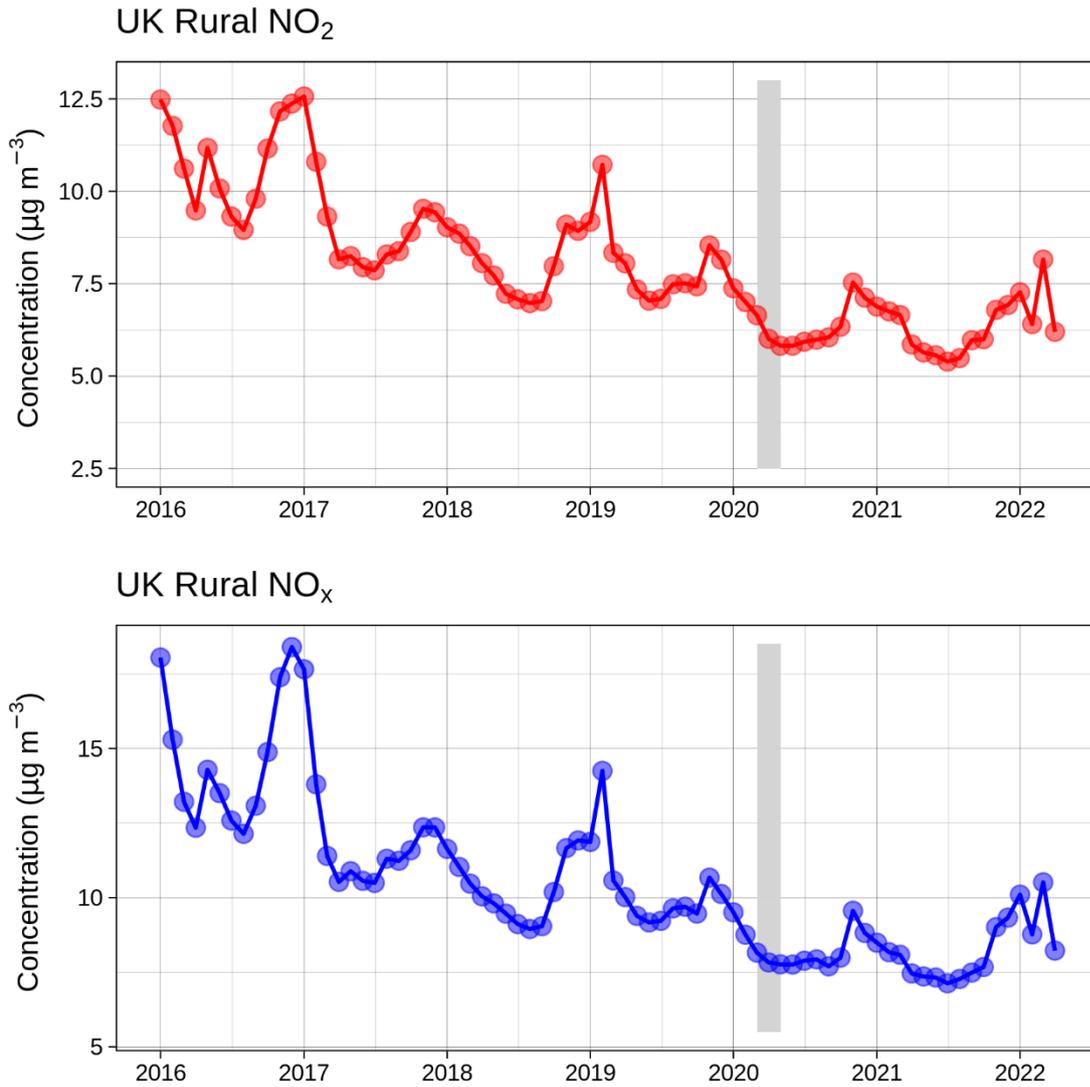


Figure 4: Average monthly deweathered² mean NO₂ and NO_x concentrations from 1st Jan 2016 to 30th April 2022 at 13 rural UK monitoring sites³