

The authors would like to thank the reviewer for their detailed comments and suggestions to improve the manuscript. Please find below our responses and details of corrections made to the manuscript.

Introduction, page 1, line 29:

References:

.....Villena et al., 2011 change to Villena et al., 2012, (please see Reference, page 22, line 13)

There are two different publications by Villena et al. cited in our manuscript. The paper from 2011 is about HO_x production from HONO photolysis and the 2012 paper is about interferences in NO₂ chemiluminescence instruments. We therefore believe that these are both cited correctly.

Introduction, page 3, line 11, 20.....: General a range of numbers should be specified as "a to b" and not "a - b". And add for all given physical quantities one space between number and unit (please see guidelines for authors, mathematical notation and terminology). E.g. please change.....ranging from 0.16-1.00%.... toranging from 0.16 to 1.00 %....

We thank the reviewer for noting these errors. The manuscript has now been revised to change these instances.

Introduction, page 3, line 34: Data taken at site in North Kensington, London during 2012 as part of Clean Air for London (ClenarLo)....., please add the reference Bohnenstengel et al., 2015

Reference has been added.

Introduction, page 4, line 11: Supplementary table S1: Why are for the motorcycles and in particular buses in comparison with cars and light and heavy goods only the total number of licensed vehicles are listed? Buses and coaches have often a diesel engine and the contribution of diesel fuelled vehicles to the total number of vehicles will be higher than 44%.

The reviewer is correct in that if buses and coaches are included the contribution of total diesel vehicles if would be higher than 44%. The statistics from Driving and Vehicle Licensing Agency (DVLA) and Department for Transport (DfT), however, only provide numbers of vehicles by body type for buses and coaches (see: <https://www.gov.uk/government/statistical-data-sets/veh06-licensed-buses-and-coaches>) and not fuel type, therefore we are unable to provide an accurate number for the total licensed diesel buses and coaches. The total number of buses and coaches will include some minibuses which may be petrol fuelled and ultra-low emission buses.

Experimental, page 4, line 27: Please use SI units, e.g. please change 52 kph to 52 km h⁻¹ and please check also all other units in text and in figures!

(please see guidelines for authors, mathematical notation and terminology) Experimental, page 5, line 22: Please change ...0.9 L/min to 0.9 L min⁻¹ (please see guidelines for authors, mathematical notation and terminology).

We thank the reviewer for bringing these errors to our attention. Units have now been changed to the appropriate format in the revised manuscript. We have also added vehicle speed values in kilometres per hour (km h⁻¹) in addition to miles per hour (commonly used in the UK) in parentheses on page 4 line 27. The following text has also been added to the caption for Figure S2 in the supplementary material to provide further information on vehicle speeds in the tunnel:

“The speed limit in the tunnel is 30 miles per hour (48 km h⁻¹), therefore, most vehicles drive slightly above the speed limit, except when the tunnel is congested.”

Experimental, page 6, line 6: Statistical errors are given in \pm range, please add for all statistical errors \pm , e.g. changewere 0.8 ppbv.....to were \pm 0.8 ppbv.....(see also line 8, 9, 12...) (please see guidelines for authors, mathematical notation and terminology).

Changes have been made to the final manuscript to include \pm for all statistical errors.

We also have adjusted the text on page 6, lines 14 & 15, to emphasise the origin of the systematic errors in the BBCEAS measurements of HONO and NO₂: “...were dominated by the systematic uncertainties in the cross sections and the mirror reflectivity.” And we have added the bracketed text “(from combining the statistical and systematic errors)” on page 6, line 16, to make it clear that the total measurement uncertainty includes both these two types of error.

Result and discussion, page 7, line 2 In figure 2 also the diurnal cycle of NO is shown, but not mention or discuss in the paper. In contrast to the shown diurnal cycle of NO the NO_x diurnal cycle is discuss but not shown in figure 2, why?

When NO_x is discussed in this section the authors were referring to the NO and NO₂ cycles together. As the reviewer has rightly demonstrated however this is not clear, therefore the text in this section has been changed to the following:

“Figure 4 presents 15 minute averaged time series for gases measured in the tunnel. NO, NO₂, HONO and CO₂ follow the same diurnal cycle as each other indicating that they have a similar source. There is a clear difference in weekday and weekend diurnal cycles with peaks associated with rush hour traffic observed in NO, NO₂, HONO and CO₂ during the weekdays, which are not present at the weekend. The measured concentrations are also lower at the weekend, on average.”

Result and discussion, page 10, line 13 How was the uncertainty of the wind speed measurements (see also table 1) ? Better than \pm 0.3 % ?, if not please change the given wind speed from3.89 m s⁻¹ to 3.9 m s⁻¹.

The reviewer is correct; we quoted too many decimal places, and the last decimal is not significant. The wind speed has now been changed from 3.89 m s⁻¹ to 3.9 m s⁻¹. This change brings the text into

alignment with the manufacturer's specification for the Kestrel anemometer that we used to record wind speed: "accuracy = $\pm 3\%$ or the last digit of the reading", which in our case means $\pm 0.1 \text{ m s}^{-1}$.

Result and discussion, page 14, line 25 Please change... Liang et al. estimated.... to Liang et al. (2017) estimated....

Change has been completed.

Result and discussion, page 15, line 4, 5, 9... References Carslaw et al., 2016 Matthaios et al., 2108 and Grange et al., 2017 are mention in the text but not listed in the references list, please add these references to the list and check all others!!!

We thank the reviewer for spotting this error. The references have been checked and updated to ensure they are all correct.

References The reference list contains some typos, some reference are unlisted and should be carefully checked by the authors. For example: References, page 20, line 41 Rappengluck, B. change to Rappenglück, B.....

As above, all references have been checked and corrected where needed.

Figures and Figure captions: Some displayed measurement data have no error bars e.g. figure 6, S1 and S7, why? Are the errors of the measured data are taken into account by the calculation of the regression parameters (e.g. slope and intercept) Please check the mathematical notation and terminology. e.g. figure 3a, y-axis, please change number of vehicles/hour....to.... number of vehicles h-1

Mathematical notation and terminology have been changed in the figures for the revised manuscript.

Error bars representing $1\text{-}\sigma$ standard deviation of the mean have now been added to Figures 7b and 7c in the main paper and Figure S7 in the supplementary material. In the original manuscript the diesel and petrol fractions in Figure 7 and Figure S7 were determined for each 1-hour bin from the sum of the number of vehicles over the four days of ANPR measurements. In the revised version the mean and $1\text{-}\sigma$ standard deviation for each 1-hour bin has been calculated to 2 decimal places. Additionally, the $\Delta\text{HONO}/\Delta\text{NO}_x$ data plotted in Figure S7 has also been rounded to 2 decimal places. These revisions have resulted in a small change in the slope and intercept from the previous version. The revised data also changed the calculated values of ER_{DV} and ER_{NDV} in section 3.2.3, however the final conclusions remain the same.

Additional text given below has also been added to the main paper on page 12, lines 31 & 32, to provide a calculated value of the emission ratio for diesel vehicles, and associated error.

"Extrapolating the best fit line in Figure S7 to $x = 1$ gives a plausible emission ratio for diesel vehicles of $ER_{DV} = 1.35 \pm 0.50\%$."

Error bars have not been included on the regression plots for Figure 6 and Figure S1 because this makes the figures look crowded and the regression lines are less clear. The regression was not weighted by the errors in the measurements. We have instead used a non-weighted reduced-major-axis method when calculating the regression parameters and quoted the 95% confidence interval on the slope to provide information on the uncertainty in the calculation of $\Delta\text{HONO}/\Delta\text{NO}_x$.