

Response to Editor: We are grateful to the editor for their diligent review of this article once again.

Our Reply follows (*the editor's comments are in italics and blue*)

General Comments

Thank you for doing good work in reviewing the manuscript. There are a few minor corrections I still ask you to do.

Minor comments

One of the reviewers was asking about the soil NO_x emissions and asked to add discussion on this. I understand this is difficult to take into account but you should add this as one of the discussion points as a source of uncertainty as asked by the reviewer. At the same tie time you could mention on seasonality of urban/rural factor as you find none

Reply: Thanks for the comments. We will add discussion on these two points in the **Section 2.3**. Remarks are now added in page 7, line 29-33 and page 8, line 1-3 by saying: *“The seasonality of Urban/Rural factors for NO₂ is also explored in Supplement Figure S3. It reveals that the Urban/Rural factor tends to be larger in spring and summer compared to autumn and winter, which contradicts the expected NO₂ lifetime. However, the difference is not significant and varies with changes in the research area. This could be attributed to the combined effects of factors like meteorological conditions, regional hotspots, human activities, biological sources, and topography. In addition, soil NO_x emissions during summer can have a significant impact, particularly as they are a primary source for rural areas (Lu et al., 2021). However, it is challenging to provide concrete evidence based on the available data because we cannot distinguish the sources of NO_x. Therefore, further refinement of the research area and consideration of multiple factors are necessary rather than concluding solely from ground observations.”*

The Urban/Rural factor of ground NO₂

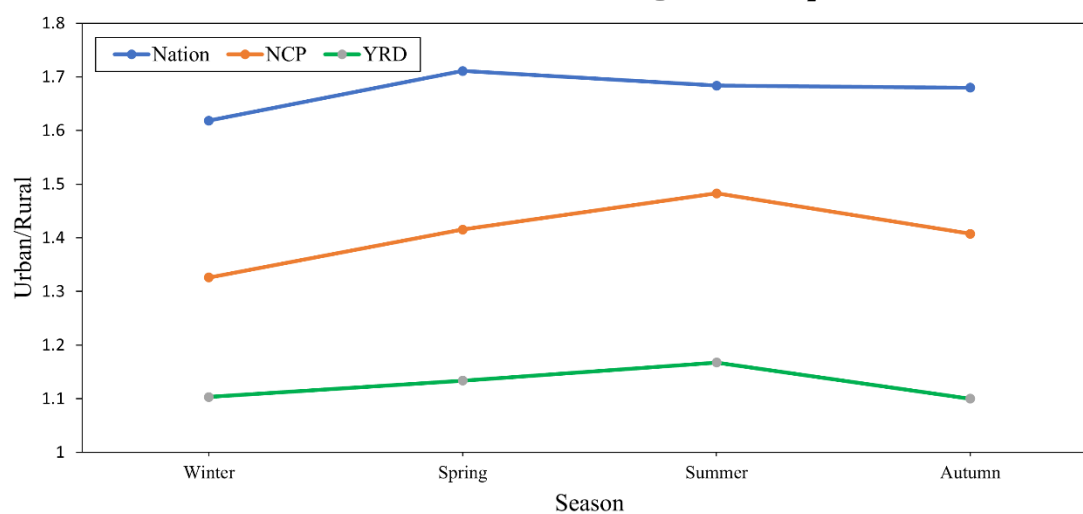


Figure S3. The seasonal Urban/rural factors of ground NO₂. Each season is calculated from the average of 2015-2017 data. The blue dots correspond to the national scale, while the orange and green dots represent the NCP and YRD regions, respectively.

Another reviewer asked for language check and I do not see from the track changes that such correction would have been made. If you forgot to add those as track changes, please provide track changes version with those included.

Reply: We thoroughly reviewed the language but did not highlight the minor changes. Now, we have provided a version with all track changes highlighted.

Similarly updates on the reference links are not visible so it remains unclear which of those you have corrected and which ones not. Please include fully track-changed version of the manuscript.

Reply: Sorry, we forgot to highlight the previous changes. The new version will include fully track changes.

Minor additional comments

Equation 1 should have dot at the end

Reply: Corrected.

Equation 2 should have comma in the end

Reply: Corrected.