

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2022-189

Anonymous Referee #2

Referee comment on "Attribution of surface ozone to NO_x and volatile organic compound sources during two different high ozone events" by Aurelia Lupaşcu et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-189-RC2>, 2022

Attribution of surface ozone to NO_x and VOC sources during two different high ozone events

by Lupascu et al.

The manuscript is written in a clear language and well structured. The relevant literature is presented in the introduction. The limitations of the approach are described and discussed. The results are presented and discussed with reference to previous studies. However, the figures reporting the results should be improved because are difficult to visualize. A discussion about possible steps to deal with the model underestimation compared to observations would enhance the impact of the study.

Specific comments

Line 70: OH radical

Line 75: There are two Butler et al. citations in the reference list. The authors should distinguish them with a letter.

Line 178: Please clarify the abbreviations of the VOC regions used in Figures 7 and 8

Line 210: Please, explain what temporal resolution is used for the comparison (hourly,

daily, other?)

Line 228: Please, comment if there are significant differences in the performance indicators between urban and rural sites.

Line 306: More work is needed to understand the causes of the underestimation

Line 319: the influence of stomatal resistance on the model performance should be further explored

Section 4.3.1: The authors should discuss more the stratospheric ozone intrusion observed in Northern Germany in this section.

Line 359: What do you mean by small? Please, quantify

Line 368: What to mean by polluted air? polluted with O₃ or with other pollutants?

Line 381: Please, report the share here

Line 427: In the figures can be observed diurnal cycles but not easy for the reader to compare the exact timing between O₃ from NO_x and VOC

Line 472: In Figure 9 total O₃ and the one deriving from GER and ROE are plotted, not clear to which one you refer when you speak of O₃ from biogenic sources. Please, be more specific

Results: it would be useful to add a figure summarizing the overall results where both absolute and relative source contributions are reported.

Figures 5 to 8: it is a good idea to combine the graphs of all the German regions in one single figure. However the details are hardly visible and the text/ scales are too small. It is necessary to find a way to summarize the info. My suggestion is to show only the average values for each region in the combo figure and to connect the plots with a line to the relevant region to ease the visualization (reading codes is awkward).

Conclusions: include a statement on what actions should be taken to deal with the overall model underestimation of observations.