

## ***Interactive comment on “Attributing land transport emissions to ozone and ozone precursors in Europe and Germany” by Mariano Mertens et al.***

**Anonymous Referee #1**

Received and published: 8 November 2019

This publication presents an analysis of the role of transport emissions on different pollutants by using a tagging source apportionment approach. The uncertainties related to the use of different emission inventories are also assessed. The paper is well structured although the English should be reviewed. In this respect, I listed some possible improvements (see the minor comment section) but the whole text would need to be revised. Although I find this work of interest, I listed below some major concerns I have regarding the methodology proposed by the Authors and would appreciate some additional information in the text regarding these points before I could recommend publication.

Major comments:

1. As noted by the Authors in their introduction, sensitivity analysis and tagging ap-

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proach are two approaches that are used to answer different questions. Sensitivity deliver impacts whereas tagging delivers contributions. While it is rather clear that impacts can be used to inform on the potential effects of emission reductions on air quality levels, it is rather unclear how the contributions estimated for the Authors can be used in practice. In one of their earlier work, the Authors mentioned the possibility of using contributions in complement to the impacts to inform on the potential of emission reductions that go beyond the threshold covered by the perturbation or sensitivity method. But this possibility is not mentioned in this work. On the contrary, confusion is introduced in some sections in which the Author seem to indicate that contributions can be used to support air quality strategies, e.g. in Section 4.2 (first three lines).

2. Along the same lines, the Authors mention that these findings based on tagging are in line with other studies using perturbation methods (see l27 in the discussion section). How can these conclusions be reached when it is clearly mentioned in the introduction that perturbation methods and tagging are expected deliver different results. These two statements contradict each other, unless O<sub>3</sub> may be considered as a linear species, in which case both methods would indeed converge to the same conclusions

3. In some sections, many numbers are given to characterize the various contributions, e.g. Section 5. A few additional lines to detail the implication these results may have would be useful.

Minor comments:

Most of these comments address spelling errors or unclear grammatical sentences. But I would strongly suggest the Authors to review the whole text regarding the English writing.

1. In many sentences “as” is used in place of “than” (e.g. p19 l27; p22 l6; p26 l25. . .)
2. P1 l28: teh → the 3. P3 l20: quantifies → quantified 4. P4 l29: Th → the 5. P5 l34: an → a 6. P5 l35: to → too 7. P8 l9: not → note 8. P8 l8: party → part 9. P19 l16: kept → be kept 10. P19 l 25: the text within parentheses is unclear 11. P19 l29:

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increase → increases 12. P19 l34: all most → almost 13. P22 l14 & 15: sentence is unclear 14. P23 l3: second → second most 15. P23 l11: is displayed → are displayed 16. Discussion section: could the Authors add a few words to explain how all these contribution numbers can be validated? Can we use contributions to know which inventory might be closer to the truth? 17. P25 l3: corresponds → correspond 18. P25 l7: depend → depends 19. P25 l8: contributor → contributors 20. P25 l17: increase → increases 21. P25 l19: regions of → regions with 22. P25 l25: not largest → not the largest 23. P27 l11: by different → between different 24. P27: l28 to 30: please check the use of the word “uncertainty” which is used many times in a couple of sentences 25. P28 l2: studies → studied 26. P28 l9: o→ ? 27. P28 l9 region → regions 28. P28 l11 increase → increases 29. P28 l19-20: can the Author develop a little bit more on how they plan to use observation data to validate the contributions? I believe this is a key point and one of the major benefits of the tagging approach.

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