

Geosci. Model Dev. Discuss., referee comment RC2  
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## Comment on gmd-2020-410

Anonymous Referee #2

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Referee comment on "Comparison of source apportionment approaches and analysis of non-linearity in a real case model application" by Claudio A. Belis et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2020-410-RC2>, 2021

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In this manuscript, the authors identify and quantify the factors leading to a non-linear response of PM concentrations to source emission reductions in a real-world situation. The paper is very well structured, it includes an extensive and comprehensive analysis of results, well presented and discussed, despite the complexity of the subject. This type of study and the results presented here are of high scientific interest. It is of great importance for the research modelling community. Please find below some minor comments and suggestions to improve this manuscript

In the introduction, the authors state that knowledge of the role of different sources of emissions in determining environmental concentrations is a key element in the design of effective air quality control strategies. However, throughout the manuscript, it is not explained how. It would be interesting to address this relationship in the conclusions section, demonstrating that this work is not only a purely scientific/academic investigation, but that it is of great interest to the general society.

Why did the authors choose to include a Final Remarks section and a Conclusion section? Both contents are suitable as final remarks or as conclusions. I would suggest to merge the two sections, or include the final remarks as a last part of the discussion.

Line 306: Authors mention BC, although BC acronym is not defined in the text. It stand for Black Carbon right? Please clarify and add it to the text.

Figures S1, S4, S11, S12 (Supplementary Material): The colour scales used in the figures are too small and difficult to read. Additionally, in figures S11 and S12 it would be interesting to maintain the same colour scale in the different maps for each figure so that the differences were more evident and easier to identify