

## ***Interactive comment on “Analysis of Sulfate Aerosols over Austria: A Case Study” by Camelia Talianu and Petra Seibert***

**Anonymous Referee #1**

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General Comments: (overall quality)

The paper is interesting, as it integrates various types of measurements across Europe to demonstrate the impact of possible emission sources on different aerosol concentrations at various ground-level and remote sensing (especially Lidar) monitoring points. Although the 6-day observation period is relatively short, the deliberations certainly demonstrate the potential of FLEXTRA and FLEXPART for short- and possibly also long-range source apportionment studies.

Specific Comments:

Section 2 (Methodology) is rather lengthy and very detailed. Some parts could perhaps be moved into an Appendix Section.

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The authors should avoid to mention Trade Names or direct references to companies and commercial instruments, unless absolutely necessary for the understanding of the methods deployed.

Since the trajectories in Fig.5 indicate sources from almost all over Europe (understandable, especially in the lower & mid levels), but also very distant sources (mostly in elevated layers), the authors should show the relevant meteorological maps for the study period (850, 700, 500, 300 & 200 or 250 hPa circulation) to provide physical evidence for “conflicting” circulations in some of the layers, and especially for the “outlying regions”. Of course, FLEXTRA ingests the upper air data from ECMWF, but a cross-verification with “real meteorological data” will make the cases more convincing.

P10 / L27 & 28 - “No contributions from Europe are seen for these layers.” This may be true for the period in April, as there may not have been any deep convection. However, it would be interesting to also study a summer period with strong convective activity over Central Europe (obviously, in a separate paper !). I am still a bit skeptical about the long-range transport of pollutants - there would be a significant dilution factor . . .! Unless there are major sources emitting ? An indication of such sources would make your findings more convincing.

Technical corrections:

Figs. 4 & 13 - Key for variables needs to be enlarged P8 / L20 - Height of layers “amsl” or “AGL” (also in tables)

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-1155>, 2018.

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