Interactive comment on “Composition and origin of PM$_{2.5}$ aerosol particles in the upper Rhine valley in summer” by Xiaoli Shen et al.

Anonymous Referee #2

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This paper describes a six-week ground-based study of aerosol chemistry in the Rhine Valley, near Karlsruhe. Both LAAPTOF and AMS were deployed and the field data is interpreted in conjunction with COSMO-ART model. This paper is well written, and it is a valuable contribution to ACP. While the paper is somewhat closely related to the author’s previous paper, I think that there is enough new material to merit publication. I have some concerns about how AMS data is used, so I recommend some major revisions before publication.

Major comments:

There are some outstanding questions about source apportionment (for example, the biomass burning class identified by LAAPTOF). I think running PMF analysis on AMS data would help answer those questions and make the analysis more complete. There
is certainly enough data to do so and it is an odd choice not to include such analysis.

To add on to the above, a unique feature of this study is that SPMS and AMS are deployed together. It would be nice to see a bit more synergy in data analysis as well. Currently, it seems like the details focus on SPMS. For example, for marine-influenced air masses, did high resolution AMS spectra show typical AMS marine markers, such as MSA?

Minor comments:

Page 4, line 118: “...deployment of a laser ablation aerosol particles time-of-flight mass spectrometer (LAAPTOF; AeroMegt GmbH)” Pretty sure this should be “particle” instead of “particles”

Page 5, line 138: Acronym TSP shows up for the first time and has not been defined.

Page 6, line 180: “behaved anti-correlated” is an odd turn of the phrase. Would revise to “were anti-correlated”

Page 6, line 182: should this read “…for particles larger than 2.5 µm measured in this study…” instead of 2.5 nm?

For Figure 2 and associated discussion, are these averages over the entire campaign?

Page 8, line 246: averaged -> average

Page 8, line 248: organics -> organic

Figure 4 caption: extend -> extent

In Figure S9, it is hard to tell visually that LAAPTOF m/z 129 and AMS organonitrate are correlated. There are quite a few instances where they are not. Can you plot these against each other and give the R2?


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