

Interactive comment on “Seasonal characteristics of organic aerosol chemical composition and volatility in Stuttgart, Germany” by Wei Huang et al.

Anonymous Referee #1

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This manuscript presents seasonal differences in organic aerosol loading, chemical composition and volatility in Stuttgart, Germany using AMS and FIGAERO-CIMS measurements. They found that organic aerosols in the winter show lower volatilities and higher O:C compared to organic aerosols in the summer. Their dataset also provides information on sources of organic aerosols in the two seasons using identified species. Before this work is published in ACP, the authors need to provide careful clarification and further discussion of several important aspects in this manuscript. Please find the comments below.

General comments:

C1

1. Were the filters that were collected in different seasons analyzed at different times of the year? If so, Tmax calibration using compounds with known vapor pressures may be required to constrain the instrument variability. It is possible that Tmax shifted for the same compounds due to differences in FIGAERO configuration and setup.

2. If I understand correctly, the filters were set up in the temperature-controlled room as well. Is it possible that in the winter campaign, when particles were sampled from the cold ambient air onto the filters held in the 298 K room, compounds with higher vapor pressures (probably SVOCs) already evaporated? If so, this will lead to underestimation of the SVOC contribution in the winter.

Specific comments:

1. I suggest using O:C without the word “ratio” because the “:” means “ratio”. The authors can just say “the oxygen to carbon ratio (O:C)” and subsequently just use O:C.

2. How similar are mass loadings for different filters? I suggest providing the mean and the standard deviation.

3. In line 187-191. How statistically different are the values in the Summer vs those in the Winter? It looks like they all fall within the uncertainty range.

4. In line 203, I suggest showing the time series plot of the OA concentration measured by the AMS versus the CHO_x measured by the FIGAERO CIMS.

5. In line 258, although filters were deposited during daytime, the CHON compounds can come from NO₃ oxidation from previous nights.

6. In line 273, I suggest presenting the volatility calculation here instead of just citing the reference.

7. In Figure 3, is there a reason why compounds with $\log C^* > -1.5$ are all labeled as SVOC? I suggest changing to the commonly-used volatility classes (SVOC: $-0.5 < \log_{10} C^* < 2.5$; IVOC: $-2.5 < \log_{10} C^* < 6.5$).

C2

8. The paragraph starting in Line 141 is too long. I suggest breaking it into two or three shorter paragraphs.

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