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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characterization of aerosol chemical composition by aerosol mass spectrometry in Central Europe: an overview" *by* V. A. Lanz et al.

Anonymous Referee #2

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This manuscript reports the analysis results of 13 aerosol mass spectrometer datasets acquired in several locations in Germany, Switzerland, Australia and France. It compares aerosol inorganic and organic species among different locations and gives a nice overview on the chemical composition of submicron aerosol particles in Central Europe. The integration of the analysis results of multiple AMS datasets as done in this work is important. This paper is overall well written. Following are some comments that I expect the authors to respond to.

One important piece of information that is missing from this paper is the mass spectra of the components determined for each study. The mass spectra gave valuable infor-

mation about the chemical characteristics of the components. It is important that the authors show them and make relevant discussions. It is curious to know what they look like and how they compare among the sites of this study as well as vs. OA components published in other studies as deemed appropriate.

In "2.4 Aerosol neutralization", only Takegawa et al. 2006 was cited for the using of ion balance data derived from AMS measurements to determine aerosol neutralization or acidity. I'd like to point out that this approach was first reported in a paper published in JGR in 2005 (Zhang et al., 2005) and was discussed and qualified in detail in a later paper by the same group of authors in EST in 2007 (Zhang et al., 2007). Original works deserve to be cited too.

Fig. 4, figure caption, how were the uncertainties determined? The error bars may be used to show the variability (e.g. 1 stdev) of the values too. Also, it may be useful to color the data points based on the categories classified in Fig. 2.

For the discussions on CE values, it is important that the authors cite more papers and expand the discussions on the use of variable CE throughout a given study or among different studies. The authors mention that Takegawa et al. 2009 applied CE up to 1. But it is important to note that Takegawa used CE = 1 for a study conducted near Beijing during summer, when RH tends to be high, aerosol was composed of high fraction of NH4NO3, and particles were likely to be hydrated. This is consistent with another study conducted in Beijing during July 2006 (Sun et al., 2010), in which a variable CE was applied based on comparison between AMS vs. SMPS. Also, the dependence of CE on particle acidity was observed by Kleinman et al. (2006) and CE =1 was found appropriate for strongly acidic particles. In addition, note that there are a large number of other studies justified the use of CE = 0.5. The review paper by Canagaratna et al. (2007) should be cited to help interested readers find more information about this subject.

In table 2, it is useful to add notes next to the CE values indicating their sources, such

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as citations to articles on individual studies.

Also in table 2, I don't understand why the STP-conversion column show fixed value for each study? Didn't ambient air change temperature during any study?

Page 24995, line 16, the discussion is quite interesting. What's the fractional concentration of sulfate in PM1 in regional and aged background air of Roveredo? Was the wind speed low during this study period?

In discussing the chemical compositions of PM1 (3.1), how about giving a table that lists all the numbers? The PAH results are interesting but only the values of a few sites are cited in the texts. It will be useful that the data from other sites can be found somewhere.

"LV-OOA" and "SV-OOA" were first introduced by Jimenez et al. in a recent Science paper. It should be cited accordingly.

Line 8, p 25000, missing "to" after due.

P 25001, if a portion of OOA is fresh wood combustion OA, how likely BBOA signatures, such as m/z 60 and 73 according to Alfarra et al. (2007), are seen enhanced on the OOA spectrum?

References:

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