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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characterization of high-resolution aerosol mass spectra of primary organic aerosol emissions from Chinese cooking and biomass burning" *by* L.-Y. He et al.

Anonymous Referee #2

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The manuscript submitted by He et al. describes an interesting data set of Chinese cooking and biomass burning organic aerosol emissions, analyzed by aerosol mass spectrometry. Given the fact that the analysis and characterization of ambient (organic) aerosol relies heavily on source emission studies, that there are still many (organic) aerosol emission sources which have not been characterized yet, that many studies are focused on Northern America and Western Europe, the present study is an important complement to the already existing datasets. The manuscript has a clear structure, the analysis is well-thought out. There are a few aspects with regard to contents which should be addressed, and a revision of language is needed before publication.

Specific comments

1. Signal at m/z: Throughout the whole manuscript, there is confusion about the expressions "ions at m/zX" or "masses at m/zX". It should be made clear by the authors that what is measured at a particular m/z is the signal (of that mass fragment", that different ions can contribute to a signal at a mass integer, and that the mass fragments described in section 3.4 are used as markers for different OA compounds rather than the individual ions, which nevertheless help to interpret better the characteristics of the respective compounds. See e.g. conclusions, where "ion fragments" is used instead of "ions".

2. Introduction: The authors only give rather limited information on Chinese cooking and its emissions, and a few more paragraphs on that topic could be included. Are there studies estimating the contribution of cooking emissions to ambient PM1 levels? Why were exactly those four dishes chosen?

3. Experimental setup: Further details should be given for the setup of the experiments. Was the inlet heated? What are the particle losses expected in the inlet line? About the dilution factors: With a dilution factor of 10 – 100, did the authors get atmospherically relevant concentrations? After the residence chamber, the sample is further diluted, but there is no information on the dilution factor. What was the exact temperature of the residence chamber? The authors mention that the smoke resides in the residence chamber for 30 s, where it cools down and becomes aged. What kind of aging do the authors refer to? "Aging" in atmospheric chemistry usually denotes oxidation processes, which under the setup described here is rather unlikely to be meant.

For both the cooking and the biomass burning experiments, further details should be given on the conditions of the fire (stable burning? Flaming? See e.g. Weimer et al., 2008, Geophys. Res. Atmos.) and the cooking when acquiring spectra. Was the cooking process representative for people's way of cooking? The time trends given in the supplementary section should be given in μg m-3, and the measurement periods

should be labeled. Would it be possible to derive (preliminary) emission factors from these experiments?

4. N/C ratios: The N/C ratios reported for the BB and CC emissions are very low. Are they significant, especially considering the rather high fitting error for the nitrogen-containing species when doing high-resolution analysis?

Technical comments

1. References: References should be given for the statements made in the first and second sentence of the introduction. In the references for Factor Analysis of AMS measurements, Lanz et al., 2007, ACP, should be included.

2. Plural versus singular:

-AMS measurements. Plural instead of singular should be used throughout the whole paper for "AMS measurements" (see lines 8, 10 and 21 in abstract, line 25 in introduction, lines19 and 23 in section 3.1, line 7 in section 3.3, etc.). In abstract, line 1, "Aerosol Mass Spectrometry" should be used, since it is more the description of a technique than an instrument in this context.

-Composition: Use singular (abstract, line 10; introduction, last section; section 3.3, line 1; section 3.4, line 14;)

3. Vocabulary: "Systematically" instead of "systemically" (abstract, line 13); "while" shouldn't be used as in abstract, line 19, or section 3.3, line 6, or conclusions; "moreover" as in abstract, line 22, should be replaced by e.g. "in addition"; "reference for" instead of "reference in" (abstract, line 26); "identifying" instead of "suggesting" (introduction, line 27); "adsorption" instead of "absorption" (section 2.1); "lichen" instead of "wattle" (section 2.2); "heating" instead of "warming" (section 2.2); delete "on the other hand" (section 2.2); throughout the whole manuscript: "great", in a normative sense, is used instead "high" or "many", (see e.g. introduction or section 3.1, line 18); rephrase title of section 3.2; "included" instead of "involved", section 3.3, line 28; rephrase "ben-

efiting" in section 3.4;

4. Commas: Set commas in the following and similar sentences (abstract, lines 15 and 16; conclusions): "The MS of the CC emissions show high similarity, with m/z41 and m/z55 being the highest signals. . ."; introduction, lines 5-6;

5. Grammar: "Compare" as in abstract, line 23, should be used in passive form; use "Chinese" instead of "China" (section 2.2); "0.5 – 1.5 kg biomass were used" instead of "was used" (section 2.2); rephrase "The calibration of IE used. . ." (section 2.3); use "to discuss" in passive form (section 2.3, line 22); use "contributed to" (section 3.1); "it can be seen" instead of "it is seen" (section 3.1); "As a general evaluation" (section 3.2, first line); generally check English grammar for section 3.2; rephrase "as in this study" (section 3.4);

6. Verbalism: Introduction, line 14: Say "submicron aerosol chemical composition" instead of "submicron aerosols" only, because the latter doesn't refer to a measurable quantity; introduction, line 27: append "emissions" to motor vehicles, meat cooking, and trash burning; section 3.1: do not use expression "our group" (manuscript should be impersonal); section 3.3: use "O/C ratio" consistently; "AMS community" should be avoided since it might not be understood by people outside that community (introduction)

7. Symbols: Use "-" instead of "$\sim$" (throughout the whole manuscript)

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 21237, 2010.