This manuscript provides a comprehensive data set for the characterization of primary OAs using the CV-ACSM compared to the SV-AMS. Similar spectral characteristics were found between the SV-AMS and CV-ACSM, and the latter showed additional thermal decomposition in the spectra. There is another paper on AMTD that addresses the similar topic (https://www.atmos-meas-tech-discuss.net/amt-2019-449/). This study should make comparisons to that one. Overall the paper is well written. I recommend acceptance for publication on AMT after minor revisions.

Specific comments:

Page 3, Line 27: What kind of stove was used?

Figure 1 is difficult to read especially for the standard deviations. I suggest to split Figure 1 to 2 graphs (one for OA and the other for WSOA) and enlarge the mass spectra.

Page 5, Line 16-17: Please indicate what numbers were shown in the parentheses? I think you mean f60 and f73. Has other COA studies also showed pronounced f60 and f73? Please compare. Also, what fuel was used for cooking? Is it possible that the signals of levoglucosan come from the burning of the fuel?

Page 5, Line 20-24: If the CV-ACSM sampled PM2.5 and the SV-AMS sampled PM1, there might be a composition difference. When comparing the two (not only for COA but also for other OAs), please justify the conclusions with that in mind.

Also, the authors mentioned about less enhancement of f44 compared to Hu et al. 2018a. Can this be partially explained by the loading difference? I mean the loadings herein were 2 orders of magnitude greater than ambient OA concentrations. More volatile species may partition to the particle phase compared to Hu et al. 2018a as well as the other study that I mentioned earlier. Please indicate the difference of conditions when making the comparisons.

Page 10, Line 6-7: The water-soluble fraction of POA also depends on the atmospheric dilution of the primary sources. This study should discuss about the sampling OA loading levels and the possible change of solubility after atmospheric dilution. Would that change the order of solubility?

The loading-dependent OA composition also limits the application of the source profile directly in ME-2 (Page 10, Line 18-25). For example, if the source profile is obtained at 1000 ug m-3, the actual source in the atmosphere is indeed tens of ug m-3 after quick dilution. Many studies have shown the OA composition varied a lot at various loadings especially for combustion sources like BBOA and CCOA and hence may change the mass spectra. The authors should be clarify this complication and do not mislead users to use the source profiles without cautions.

Technical Remarks:

“/” in “m/z” should not be italized.