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Interactive comment on “Radiocarbon analysis of elemental and organic carbon in Switzerland during winter-smog episodes from 2008 to 2012 – Part 1: Source apportionment and spatial variability” by P. Zotter et al.

Anonymous Referee #2

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This is a very interesting manuscript, with the aim of identifying the sources of carbonaceous aerosol during wintertime smog episodes in Switzerland. The main result is that wood burning consistently makes a major contribution to wintertime smog in Switzerland, over a large region and long time period, even in major urban centers. There was previous evidence for this, but only for campaigns of limited regional and temporal scope, where it was difficult to prove that this is indeed a large-scale problem.

The study is very thoroughly conducted, with careful corrections of artifacts and a good

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[Discussion Paper](#)



error analysis. The results are clearly presented in the figures and generally support the conclusions very well. Only the descriptions of the results is sometimes a bit cumbersome, and it is easy to lose track what the many numbers in the text are referring to. I therefore recommend acceptance with a few minor revisions, listed below.

1) Page 15608, line 9 -20: All the individual p values make this very tedious to read. It is sufficient to state at the beginning or the end of the paragraph that all the differences discussed here are significant at the 95% confidence level.

2) Page 15608, line 16 – 23: This sentence is too long.

3) Page 15610, line 10ff: Four stations were measured only for one winter, consequently only 5 data points are used for the whisker plot, including 10th and 90th percentile. This is statistically not very meaningful. I suggest to simply use a mean and standard deviation for these 4 stations in Figures 2 and 3. This also has the advantage that the stations with only few data points are immediately recognizable in the figures.

4) Page 15613, line 19-21 and line 23-24: This is an example of the writing style that made reading of the results section unnecessarily difficult. Four numbers are given in succession and only at the end of the sentence it is clear which ones refer to OC and EC. It would have been much more clean to write "... 58-71% and 1.5 – 5.2 ugCm-3 for OCNF and ... for ECNF". This is just a small difference in sentence construction but makes a big difference for the reader, e.g. I had to reread the original sentence at least once to get the numbers straight in my head. Please throughout the manuscript, use the construction with "respectively" as sparingly as possible. (Only if it makes the sentence significantly shorter, or if there are not too many numbers in the text.) This will make the results section much more easy to read.

5) Page 15613, line 25ff: You are packing three separate conclusions (sources, SOC formation, and regional air pollution) in one sentence. Better to use one sentence per conclusion. In my opinion the point about SOC formation is not self evident, since SOC formation and possible influence on OCNF was not discussed before. Please elaborate

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this point a bit more.

6) Page 15614, line 9: “contributions of OC, or “concentrations of OC”?”

7) Page 15618, line 21ff: see comment 4, this is really not clear

8) Page 15619 line 10ff: If OC_{bb}/EC_{NF} ratios are similar North and South of the Alps is this not somewhat contradictory to the conclusion that more efficient burners are used in the North? Is there evidence that more efficient burners have a similar OC/EC ratio as less efficient burners?

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 15591, 2014.

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