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Fossil and non-fossil source contributions to atmospheric carbonaceous aerosols during extreme spring grassland fires in Eastern Europe

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General comments:
Authors present an investigation of impact of biomass burning on the composition of atmospheric carbonaceous aerosol in Lithuania. The ACSM measurement was coupled with PMF model for source apportionment. Satellite observations proved the obtained results. Radiocarbon measurement of OC and EC combined with the ACSM-PMF, the aethalometer measurement of BC and the measurement of organic markers as well as OC/EC were used to deduce the relative contribution of fossil and non-fossil primary and secondary OC and EC to total OC and EC.
The measurements are interesting and of high quality. The paper will provide more insights into the pollution sources due to biomass burning in Lithuania. However, there are a few issues that need to be addressed before acceptance the paper for publication in journal Atmospheric Chemistry and Physics. Major revisions of the paper taking into consideration the comments reported below are requested.

Major comments:
p. 5, lines 9 – 18: The ASCM collection efficiency (CE) depends on a few variables that change from day to day. Therefore, the calculation of average CE and its use for the measurement over the whole campaign does not seem to be correct. It is necessary to state estimation of the uncertainty in the measurement of concentration by ACSM associated with use of average CE value.

p. 9, lines 3-11: Description of POC_{nf} estimation is very strict, addition of more details is necessary.

p. 13, lines 13-14: Text concerning the composition of NR-PM_1 is not sufficiently supported by data to be able to compare the composition of aerosols before and during the grass burning event.

p. 13, line 30 - p. 14, line 1: Mannosan and galactosan have mostly the identical emission sources, therefore, relatively big difference in the correlation of levoglucosan with mannosan and levoglucosan with galactosan needs detailed interpretation.

p. 14, line 8: Average value of ratio L/OC was 0.08. In such case, the average value over the whole study cannot comply with the value of 0.08 valid for grass burning (see Sullivan et al, 2008). What is the range of this ratio during the studied period? Add values of this ratio for period during grass burning and periods before and after the grass burning event.

p. 15, line 4: Compare value 0.67 of EC_{bb} to total EC ratio for biomass burning event with those during days before and after the BB event. Discuss the value of the ratio with the value for grass burning reported in literature.

p. 16, lines 2-4: The value of ratio levoglucosan/BBOC during the whole campaign is not clear. The value of levoglucosan/BBOC ratio of 0.15 was constant during the rest of campaign as well as during the grass burning event?

p. 34, legend of Figure 5: Picene and hopanes are mentioned as tracer species, however, the concentration of these compounds was not previously discussed in the text of paper.

Minor comment:
p. 4, line 11: Add type and producer of used HV sampler.;