

Comment on acp-2021-979

Anonymous Referee #3

Referee comment on "Linking Switzerland's PM₁₀ and PM_{2.5} oxidative potential (OP) with emission sources" by Stuart K. Grange et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2021-979-RC3>, 2022

general comments:

Grange et al. presented three OP measurements at five different sites in Switzerland. Spatial and seasonal variations are discussed. A MLR model was then used to link OP to PM sources resolved with PMF and the results suggest that road traffic and wood combustion are the major sources. Lastly, the authors used a machine learning algorithm to identify the most important PM constituents to explain OP-DTT and OP-AA to be non-exhaust metals and wood burning organic tracers. Overall, the work is interesting while more details and explanations are needed. I recommend acceptance with some minor revisions.

specific comments

- line 129, the consumption of AA could also be due to direct reactions between PM components with AA for example metals.
- section 2.5, it is still not clear how OP are linked to PM sources identified from PMF using MLR. More details are needed. What are the results for slope coefficients? Are the model interpretation based on the assumption that the sources contribute linearly to OP? How was OP_m calculated? OP was not included in the PMF models. Won't it be more reasonable to just include OP in the PMF model? It would also be helpful to see if including OP in the model result in a better representation of OP-DCFH.
- Rubidium seems to rank top 4 in all cases. This has never been found in any other previous studies, to my best knowledge. Is Rubidium DTT- and AA-active or is it linked to OP sources? What are the sources of Rubidium in Switzerland? Please provide references that indicate rubidium as a tracer for wood burning.
- Figure 5, the color points are quite scattered, however, no discussion on uncertainties at all.
- line 218, PM-coarse contained much of OP signal, it would be helpful to provide numbers, ie. % of PM-coarse in total PM
- line 223, "lower levels of structure" is confusing. do you mean low levels of spatial and

seasonal variation?

technical corrections

- line 120, typo in 25 ug L-1? Should be ug mL-1 instead?
- line 273, typo in DFCH