Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2021-748

morgane perron (Referee)

Referee comment on "Iron from coal combustion particles dissolves much faster than mineral dust under simulated atmospheric acidic conditions" by Clarissa Baldo et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-748-RC2, 2021

Main comment:

Anthropogenic emissions were recently shown to represent a significant source of bioaccessible Fe to the atmosphere. The manuscript by Baldo et al., 'Iron from coal combustion particles dissolves much faster than mineral dust under simulated atmospheric acid conditions' investigates in detail the dissolution kinetics of Fe from coal fly ash samples in solutions which simulate atmospheric acidic processing. The resulting data is used to fine-tune aerosol dissolved Fe predictions in the IMPACT model.

The manuscript is well-written and numerous figures assist a good understanding of the study. Additional tables may help an easier read as suggested in the commented version of the manuscript attached to this review. Also, the last 2 Figures (10 and 11) were only briefly discussed in the manuscript and may therefore be moved to the SI if necessary.

Throughout the manuscript some words employed tend to exaggerate the impact of the result obtain (considerable improvement made to the model prediction) or infer a result without strong proof (the "other" phase from figure 5 was asserted to be 'aluminosilicates' in the abstract). Comments were made on the manuscript to highlight these words which I suggest should be down-scaled. Finally, some confusion arose in the early part of the manuscript where the word "dust" is sometimes used instead of "aerosol". This confusion should be avoided.

The result presented in this study will greatly enhance the general understanding on the nature of aerosols (CFA here) and the link between mineralogy and dissolution kinetics under different atmospheric-like conditions. Therefore, I fully support the publication of this manuscript in Atmospheric Chemistry and Physics after minor revision.

Other minor comments are displayed on the manuscript

Please also note the supplement to this comment:
https://acp.copernicus.org/preprints/acp-2021-748/acp-2021-748-RC2-supplement.pdf