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Atmospheric Measurement Techniques Discussions

Interactive comment on "A semi-continuous study on the toxicity of atmospheric particles using a versatile aerosol concentration enrichment system (VACES): development and field characterization" *by* Xiaona Shang et al.

Anonymous Referee #1

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General comments : This work investigated a semi-continous system intending to on-line monitor the toxicity of atmospheric particles. An existing device, the VACES (versatile aerosol concentration enrichement system) was extended and enhanced for this purpose. This study provided a comparison between the measurement of the "toxicity" through using concentrated aerosols in the VACES system and non-concentrated from ambient air.

The manuscript is generally well-written and is straightforward (maybe too much). Within the framework of analyses presented in this work, the results appear to be

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sound. However, there are a number of major issues, and among them, the scientific choice of the toxicicological assay. These should be considered and addressed before the manuscript can be considered for publication.

Specific concerns :

A major issue is that throughout the manuscript, the authors emphazied that PM health effects, may be measured by photobacteria assay and to my knowledge, this bioassay has not been shown in any study to be associated with adverse PM health effects (if this is incorrect, please provide relevant citations). The study relies on the assay developed by Jing et al, 2019 which is in fact an ecotoxicological assay, not a toxicological assay. This ecotoxicological assay is based on the light inhibition of photobacteria which is sensitive to most of environmental toxics. This assay is not specific and responds to many toxics when it's known that PM health effects rely mainly on oxidative stress. And finally this ecotoxicological assay (called biotoxic assay by their authors Jing et al ;, 2019) has not been compared to any toxicological assay. It does not quite make sense that the undertone of the manuscript hinges on the ability of VACES to permit monitoring aerosol toxicity when there is currently no link between photobacteria inhibition and adverse health effects from PM (if not relevant, please provide citatioon or comparison between photobacteria answer and toxicological results towards atmospheric particles) Another point is the comparison of the "ecotoxicity" between non-concentrated and concentrated aerosols in ambient air. During both experiments are done for a temperature of 45°±2 °C in the saturator and then results are compared for ambient samples and samples through VACES. I guess that this temperature is not physiologically relevant when aiming at monitoring human health. The system shouldn't overpass 37.5°C since at 45°C, many semi-volatile components may disappear and influence the answer of the system. Finally , the data presented are good, but the manuscript should be modified/re-written to emphasize on the measurements and data and not over-extrapolate the impacts and implications of the results to human health. All the more, analysis and VACES performances should be deeper.

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