

Reply to Dr. Ye Kuang

Dear Dr. Kuang,

Thank you so much for your comments. Based on your suggestions, we add more discussion into the text with all references are cited, as

“A combination of dry and wet nephelometers has been used to estimate (1) aerosol liquid water content (ALW) (Guo et al., 2015; Kuang et al., 2018) and hygroscopicity (Kuang et al., 2017), relying on the measured aerosol light scattering enhancement factor (f_{RH}) (Fierz-Schmidhauser, et al., 2010; Titos, et al., 2016). When combined with aerosol chemical composition data, this approach also allows for the determination of κ_{OA} (Kuang et al., 2020; Kuang et al., 2021). These advancements have significantly promoted the application of nephelometers in aerosol hygroscopicity studies, and they also open up possibilities for using currently very popular, inexpensive optical scatter particle monitors for same purpose (e.g., Thermo pDR-1500, priced around \$5,000; even more affordable options like Purple Air, costing a few hundred dollars, and Plantower PMS series, available for tens of dollars). These inexpensive devices, based on single-wavelength nephelometric technology, could potentially be used to infer aerosol hygroscopicity and associated ALW. However, unlike the commonly dry/wet nephelometers that measure particle scattering coefficients to calculate f_{RH} , these inexpensive particle monitors directly report particle mass concentration as a bulk measurement, essentially functioning as “black boxes”. Unfortunately, there are very few studies that explore the potential of these optical particle monitors for such applications. ” **(Line 50-61 in the revised version)**

And,

“Meanwhile, it also emphasized the possibility of using this system for using direct ambient measurements, very similar to the innovative outdoor dry/wet nephelometer system described by Qiao et al. (2024), without drying aerosols first before analysis as the HDMA (Tang et al., 2019) and without worrying about altering their actual phase state in ambient air (Qiao et al., 2024).” **(Line 200-203 in the revised version)**