

Reviewers comments in black

Replies to comments in blue

Changes to document in green

Editor Comment

Page 4, line 111-112: The authors stated that "Measurements of water mass, however, remain absent from filter-based PM_{2.5} measurements". This is not true, as the paragraph starting at line 125 provided an overview of previous studies which measured water mass of filter samples.

Thank you for identifying that source of confusion. We added to the last sentence at the end of the first paragraph to clarify the meaning of "filter samples." This clarification repairs the apparent contradiction

Main document (lines 112 to 115): "..Measurements of water mass, however, remain absent from filter-based PM_{2.5} measurements made by air quality networks such as Interagency Monitoring of Protected Visual Environments (IMPROVE) or the Surface PARTiculate mAtter Network (SPARTAN)."

Page 4-5, line 125-145: there are a few more studies which measured water mass of filter samples. Please refer to Section 3.2 in a previous review article (Tang et al., 2019) for more information.

We now add a paragraph reviewing other possible offline water mass measurements. We add this paragraph to the supplement given our focus on studies reporting water mass measurements from atmospherically generated aerosols.

Main document (lines 130 through 131): "Most measurements of water mass in atmospheric PM_{2.5} filter samples have either applied destructive techniques prohibiting further composition measurements,..."

Main document (lines 151 to 153): "Additional methods to measure water mass associated with deposited ambient aerosols, as well as a method to estimate water mass thermodynamically, are summarized in Supplemental Text S1."

Supplement (lines 74 to 90): “There are a few other potential methods for measuring water content of aerosol deposited on filters. In principle, these methods should be able to measure water mass, in an offline manner, on a filter or film given enough deposited ambient aerosol mass (Tang et al., 2019). Physisorption analyzers determine the change in aerosol absorbed water by monitoring the change in water partial pressure after exposure of the deposition to RH (Ma et al., 2010; Hung et al., 2015). Knudsen cells introduce gaseous water to the sample at very low pressures. Water mass associated with the sample is determined by measuring the gas phase water concentration before and after sample exposure (Seisel et al., 2004). Thermogravimetric analyzers alter the temperature and RH of the atmosphere around both a sample pan and an empty pan. Changes in sample mass relative to the empty pan are monitored with changes in RH (Gu et al., 2017). Quartz crystal microbalances attach a film, with deposited aerosol, to an oscillating resonator. Then, upon change in RH, the change in oscillating frequency is related to change in deposition mass (Arenas et al., 2012; Zuberi et al., 2005). Tapered-element oscillating microbalance (TEOM) might also be used off-line by introducing changes in RH (without introducing aerosol) through the sample line to measurement chamber (Rogers et al., 1998).”

References: Tang, M. J., Chan, C. K., Li, Y. J., Su, H., Ma, Q. X., Wu, Z. J., Zhang, G. H., Wang, Z., Ge, M. F., Hu, M., He, H., and Wang, X. M.: A review of experimental techniques for aerosol hygroscopicity studies, *Atmos. Chem. Phys.*, 19, 12631-12686, 2019. [24]