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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Qualitative and quantitative determination of water in airborne particulate matter" *by* S. Canepari et al.

Anonymous Referee #1

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Mass closure of atmospheric aerosol samples is of high scientific priority, as when it can be achieved it is a strong indication that the total composition of the aerosol is well understood. It is also of very high relevance to policy, as a reliable knowledge of the total make-up of the aerosol is an important starting point for developing cost-effective abatement measures. To date, one of the biggest uncertainties in mass closure has been determination of water associated with airborne particles. This is especially a problem in Europe where the CEN protocols require sample conditioning at a relative humidity at which significant amounts of water are retained in the particles. Accurate assessment of the concentrations of water is critical to a full mass closure on such particles.

This paper describes a method based upon the long established Karl-Fisher method

for evaluating the water content of atmospheric aerosol samples. The method has been tested for its accuracy, repeatability and freedom from interferences and appears to perform rather well.

The manuscript is well written and pleasantly free from errors. The science quality is high and no errors of any significance were identified. There is possibly one omission, although this is a matter that the authors may be planning to address in subsequent publications. Earlier work has either assigned unaccounted mass to bound water without evidence or has used simple algorithms based upon hygroscopic compound concentrations to estimate bound water content. With the availability of this method, the authors should be able to achieve mass closure on particulate matter and possibly enhance some of the empirical factors such as the OC to OM conversion necessary in the reconstruction of particle mass. Some examples of such calculations would be a great asset, although arguably beyond the realm of the current paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 27367, 2012.