Interactive comment on “Water content of aged aerosol” by G. J. Engelhart et al.

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Received and published: 15 September 2010

This is an interesting paper which presents new results about the potential to use the AMS to measure particulate water. At face value, the results would suggest that no particle-phase water is lost in the AMS lens, which conflicts with the experimental results of Matthews et al. (AS&T 2008) and Zelenyuk et al. (Anal. Chem., 2006).

This apparent conflict may be resolved by using a relative ionization efficiency (RIE) for water in the AMS which is larger than the value of 1.0 assumed in this study. To my knowledge a value of RIE_H2O has not been published, but several groups have independently concluded that RIE_H2O has a value between 2 and 4, as discussed at several AMS Users Meetings, including the recent 2010 meeting in Hyytiala. Using those RIE_H2O values, the results of this paper can be interpreted as a loss of 50-75% of the original particle-phase H2O, but with the amount of water remaining in the
particles being proportional to the amount of water originally present in them.

The reasons for the relatively high RIE_H2O may be related to its low m/z, analogously to the similarly high values of RIE_NH4 (really ionized as NH3(g)) which are typically in the range 3-4, as routinely measured as part of the AMS calibration with NH4NO3. Clearly additional research on both RIE_H2O and on the proportionality between particle-phase H2O before and after the AMS inlet is needed. If the latter is found to hold in additional studies and a wide range of environments, it would be a very useful (if unexpected, at least by me) addition to the measurement capabilities of the AMS.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 21653, 2010.