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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Physical and optical properties of aerosols over an urban location in Spain: seasonal and diurnal variability" *by* H. Lyamani et al.

Anonymous Referee #1

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This comment refers to the observations of extremely low single-scattering albedos in Granada at all times of the year. I am not questioning the possibility that these are real. The basin topography, meteorology, and carbon sources in the city all should contribute to these. The assumption, however, that they are real because the absorption component was measured using a MAAP instrument is weak. In the Introduction (pg. 18162, lines 19-28), the authors state that the MAAP is the most reliable filter-based absorption measurement available, and they cite two early references by the inventor of the instrument as evidence of this. The total measurement uncertainty of the MAAP measurement is given on pg. 18166, line 13 as "around 12 percent", again based on the early papers of the inventor.

Recent studies (e.g., Subramanian et al., AS&T Vol. 41, #6, 2007; Lack et al., Vol. 42, #12, 2008; Cappa et al., Vol. 42, #12, 2008) have shown that filter-based light absorption instruments can have problems with liquid and/or organic particles and that these instruments can in fact significantly overestimate the light absorption coefficient. These papers should at the very least be cited. The question is whether or not the MAAP instrument has had any recent laboratory studies conducted with these types of liquid/organic aerosols and whether the 12% total measurement uncertainty value is valid. The MAAP measurement technique is very similar to that employed in the papers above which showed a significant positive artifact. The major difference between methods (MAAP vs. PSAP) is that the MAAP measures reflected light from the filter surface to better estimate the aerosol scattering effect in and on the filter. If the liquid/organic particles migrate into the filter matrix, however, the correction scheme employed may not be valid. How does the MAAP radiative transfer model handle light absorption that can occur at any depth in the filter matrix (i.e., NOT a simple two-layer system of particle-laden layer plus particle-free layer)? Has this ever been tested?

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 18159, 2009.