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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 #2

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This MS describes a large set of aerosol data collected in an urban area in Spain. Main pollution sources are traffic, space heating, and, in the dry season, soil dust. The co-location of measurements of optical and physical aerosol properties with sun photometer measurements is interesting, as too few such studies are available in the literature.

One of my comments would have been on the MAAP, too, but the authors answered this concern satisfactorily already in their reply to the other reviewer.

My main concern is the lack of data for the size range below 0.5 μm. This cannot be remedied at this time, but I strongly suggest a change of wording in the MS to avoid

misunderstandings by cursory readers. The MS always refers to "fine" and "coarse" particles, but particles in the size range above 0.5 μm are already fairly coarse, and much larger than fresh traffic emissions or freshly formed secondary aerosols (d < 100 nm). The term "fine" should be substituted by a different descriptor (maybe N_0.5-1μm or a similar symbol?).

The high absorption coefficient and low single scattering albedo measured during part of the study seem reasonable if the sampling site is considered (heavy traffic).

The large day-to-day variations in wintertime could also be linked to meteorological mixing conditions and not only to rain events as suggested. Is there a correlation between scattering and / or absorption coefficients and wind speed? Data on inversion heights and/or the height of the mixing layer from radiosonde ascents should also provide support of the interpretation. The discussion of the different contribution of dry soils to the aerosol loading (p18171) should be substantiated by looking at the trends of the ratio N_0.5-1/N_1-20 and not only the trend of the two number concentrations. The suggestion that the low mixing heights could play a role in the differences of this ratio between summer an winter months (p18173, first par.), however, should be dropped. Low mixing heights as such will not change the size distribution of the aerosol.

The comparison of single scattering albedo obtained in this study to values elsewhere should be restricted to similar sampling sites (near kerbside), as "urban" stations can vary widely in the relative impact of heavy traffic. The data obtained in this study will not necessarily be representative of the regional aerosol or even the urban aerosol in Granada (see also comment below).

In section 4.2.1., arguments are presented to interpret the daily cycles of absorption and scattering coefficients. The link to local emissions and mixing conditions is substantiated by the data. A clear indication for the secondary particle formation (p 18178, lower part) and traffic related particle re-suspension, however, is not seen from the data presented here, so the attribution should be given as a suggestion rather than

as a statement of fact. The same comment applies to the discussion on the diurnal variation of the albedo (p18179 and 18180). The time needed for the formation of secondary aerosol as well as its continuous formation might also mean that this aerosol is advected rather than formed in the city itself and is part of the regional aerosol burden.

In the conclusion section, the term “urban aerosols in Granada” is too general, and might raise doubts about the accuracy of the high absorption coefficient and low single scattering albedo. Data were measured at a single station heavily impacted by traffic, and this station need not be representative of the urban area of Granada.

A tiny point: the term “Diesel” suggests Diesel engines. “Fuel oil” is chemically the same, but does not carry this connotation.

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