

## ***Interactive comment on “Morphological, chemical and optical absorbing characterization of aerosols in the urban atmosphere of Valladolid” by S. Mogo et al.***

**S. Mogo et al.**

Received and published: 5 August 2005

The authors wish to thank Darrel Baumgardner for the helpful comments pertaining the revision of this manuscript. Bellow is a point by point response which shows how we had addressed each item of the review.

General comments:

It is true that we have only 17 days of measurement starting on Dec 03 and ending on Jun 03. In spite of this larger measurement period one must point out that 12 of the measurements are concentrated between Jan 19 and Apr 20 which makes about one

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

measurement a week on those three months. We are aware that this is a small data set. Nevertheless, it give us a qualitative-semiquantitative idea about the aerosols of the city of Valladolid. This town is representative of the middle center of Spain where there are not any studies about aerosol properties. In the revised manuscript we made a more detailed analysis of the data.

Technical comments:

1 - The authors agree that this is not the ideal situation for collecting samples but we explained that there is  $\approx 20\%$  of days without wind and that in the days with wind, south is not a predominant direction. In the other hand, we believe that the local PM concentration levels are more influenced by the synoptic conditions than by the local winds. So we presently are classifying our data with air masses trajectories using the NOAA's HYSPLIT model but this classification is included in another paper since this work is included in a largest campaign whose objective is the detailed characterization of the aerosol in Valladolid). Respect to the building, it is a 35 years old building with the walls covered in artificial stone, which aren't as susceptible as other materials of releasing particles so the contamination of samples should be minimum.

2,3 - We added a sentence explaining that the sampling took place during night, usually starting at 8 pm (local time) and that we avoided the fog events.

4,5,6 - The following paragraph was added in section 2.3: "The filters were weighed before and after collection for determination of the amount of particulate matter in each impactor stage. The transmission measurements of the clean filter and the loaded filter were separated by 36-46 hours to allow stabilization and acclimatization in the weighing room. Special care was taken in order to remove electrical charges from the filters. Transmission measurements were made through blank filters for testing filters variability. For a 46 h period between the measurements of the blank and the loaded filter no differences were observed."

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)

7 - The method is very reproducible, within 1-2% margin, but the calibration of the instrument has an uncertainty of  $\approx 20\%$ . This was clarified in the manuscript.

8 - We used the OPAC package and defined a new mixture with the proportions and the number density of our main components to obtain the optical characteristics of the aerosol. Then we compared the  $\sigma_a$  from the OPAC calculations with the measured  $\sigma_a$  (section 3.2, last paragraph). The problem in here is that there are too many unknown parameters, which have to be estimated in order to achieve this kind of calculations. We don't have exact information about all the components of the aerosol, proportions of the mixture and density had to be estimated.

9 - Correction made.

10 - We added a sentence explaining each shape, section 3.1: "The classification of chain agglomerates (c) refers to the typical appearance of submicrometer carbonaceous spheres forming chain-like clusters, the spherical (s) shape refers to round or spherule-like particles, prolonged (p) refers to particles having an oblong or somewhat elongated form and particles with other shapes were classified as irregulars (i)."

11 - Sections 3.1.1-3.1.4 were combined and included in section 3.1.

12,13,14 - We performed a detailed analysis of 240 particles, corresponding to 3 different days of measurements, which makes 12 filters and, in each filter, 20 particles were analyzed. This is explained in the revised manuscript. Actually there are much more particles analyzed corresponding to different days but in this manuscript we only included the ones collected during the days of the campaign, the days for which  $\sigma_a$  was measured too. The % of particles of each type is now detailed in the text, too (section 3.1).

15 - It is not possible to obtain absolute particle concentration from the SEM data because the particles are not homogeneously distributed through the filter.

16 - See point 2.

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)

17 - See General comments.

18 - Correction done.

19,20 - The 4 tables were combined into a single one and more discussion about shapes and composition had been added. We also added a sentence explaining that the elements shown in parentheses as in (Al,Fe) present only a small signal in the EDX spectrum.

21,22 - A discussion about shape/composition had been added to the revised manuscript at the end of section 3.1, paragraph 10.

23 - We added to the manuscript a paragraph explaining the relation between aerodynamic sizes ( $\phi_a = \phi_g \kappa \sqrt{\frac{\rho}{\rho_0}}$ ) and explaining the effect of the particle density on the aerodynamic diameter.

24 - See point 1.

25 - Correction done.

26 - 60 particles were analyzed in each range of sizes. This information was added to the caption of the figure.

27 - Optical properties (as  $\sigma_a$ ) depend on the shape of the particles which is closely dependent of the chemical structure and composition. Comparison with other European towns was added to section 3.2.

28 - See 8.

29,30 - The wavelength dependence of the absorption coefficient is more deeply discussed through the introduction of the  $\alpha_a$  parameter, section 3.2.

31 - Error sources have been detailed in the revised manuscript.

32 - The possible contribution of dust for absorption is now mentioned in the conclusions.

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)

---

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 3921, 2005.

**ACPD**

5, S1952–S1956, 2005

---

Interactive  
Comment

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

S1956

EGU