

Interactive comment on “LOAC: a small aerosol optical counter/sizer for ground-based and balloon measurements of the size distribution and nature of atmospheric particles – Part 2: First results from balloon and unmanned aerial vehicle flights” by J.-B. Renard et al.

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We want to thank the referee for his comments that will help us to improve our paper. Nevertheless, we are disappointing by some of his comments. Below are our answers on these points, before submitting the revised version of the paper.

Referee General Comments

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It is no true that we have copied/pasted parts of the paper 1. A careful reading of the two texts show that no more than few tens of lines are partly in common, and they concern only the description of the instrument and some conditions of measurements. Also, it is not true that they are repetitions that occupy about 1/3 of the paper. All the photographs are necessary to show the LOAC gondolas. We agree that we can provide the dimensions. Also, it is not true that part 3 present copied-pasted results from paper 1. On paper 1, we have presented mass concentrations derived from LOAC measurements at “Observatoire Atmospherique Generali” and comparison with normative “Airparif” measurements. On paper 2, we present a vertical profile of concentrations and the associated typology. This is totally different. The cross-comparison of LOAC in different geophysical conditions were already presented in paper 1; we prefer to speak of “cross-comparison” than of “validation” since there are no absolute reference instrument for counting. We agree that information concerning the inlet are not provided here, although the information are available in paper 1.

3.1 General comments

Rejecting aerosol outside the gondola could create a local pollution. Since the inlet is outside the gondola, rejecting the aerosols inside the gondola will prevent contamination. Also, the gondola in is motion during flight under meteorological or tethered balloons.

3.3 Tethered balloons

Unfortunately, no information of the size distribution were available from the Vienna air quality network. Also, no measurements at different altitudes were also available. The aim of the paper was not to present all the results obtained during the OAG campaign (it will be done in an up-coming paper). The validation for ground-based measurement at OAG was done in the paper 1 for mass concentrations. On the other hand, there is no possibility to conduct cross-comparison for measurements under balloons since, as for Vienna observations, no measurements were available with altitude No particles

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greater than 20 micrometers were detected during the flight presented here, since large particles in urban pollution are not so frequent. But LOAC can detect large particles, as shown later in the paper from unmanned aerial vehicle (Figure 3) tropospheric pressurized balloons (Figure 13) measurements LOAC works well in the 0.2-0.8 micrometers size range, as explained in our answer to paper 1 referee comments.

3.5 Upper tropospheric and stratospheric flights

Figure 15: They are some lack of measurements between 5.5 and 8 km due telemetry lost. There figure is almost redundant with the Figure 17. We propose to remove the figures 15 and 16. In fact, we have plotted raw concentrations measurements. Since the concentrations are “low” in the stratosphere, taking into account the LOAC detection statistic discussed in paper 1, the vertical profiles must be smoothed and/or the vertical sampling must be reduced. We propose to replace the figure 17 by new figures (here Fig. 1) with a larger vertical integration and the profiles slightly smoothed (given below). This Figure 17 presents indeed background conditions.

Page 10069 lines 10-14: There is a contradiction in the referee comment. We agree that the cited paper reports on various campaign at different dates and locations and we must be careful concerning our conclusions. Then, the referee makes a comparison between LOAC and Deshler counting size distribution measurements that were conducted at different dates and locations. The geophysical conditions above Laramie (US) for the Deshler counter can strongly differ from those over the Mediterranean basin, even in the stratosphere.

Page 10069 lines 21-24: We agree that the “stratified” layer effect on the figures can be confused.

Page 10072 line 12: The concentrations increase (in the stratosphere) will not produce extinction ratio of several orders of magnitude. Calculations are shown that they can no more than a factor 30.

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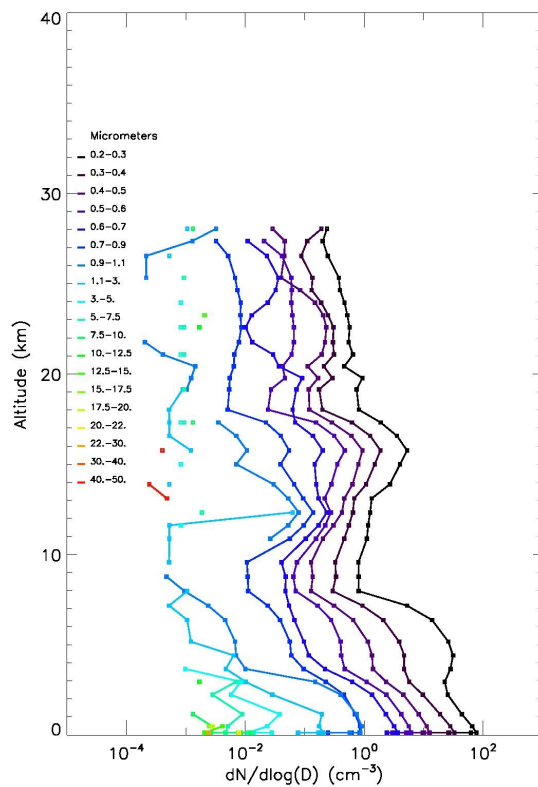
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Fig. 1.

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